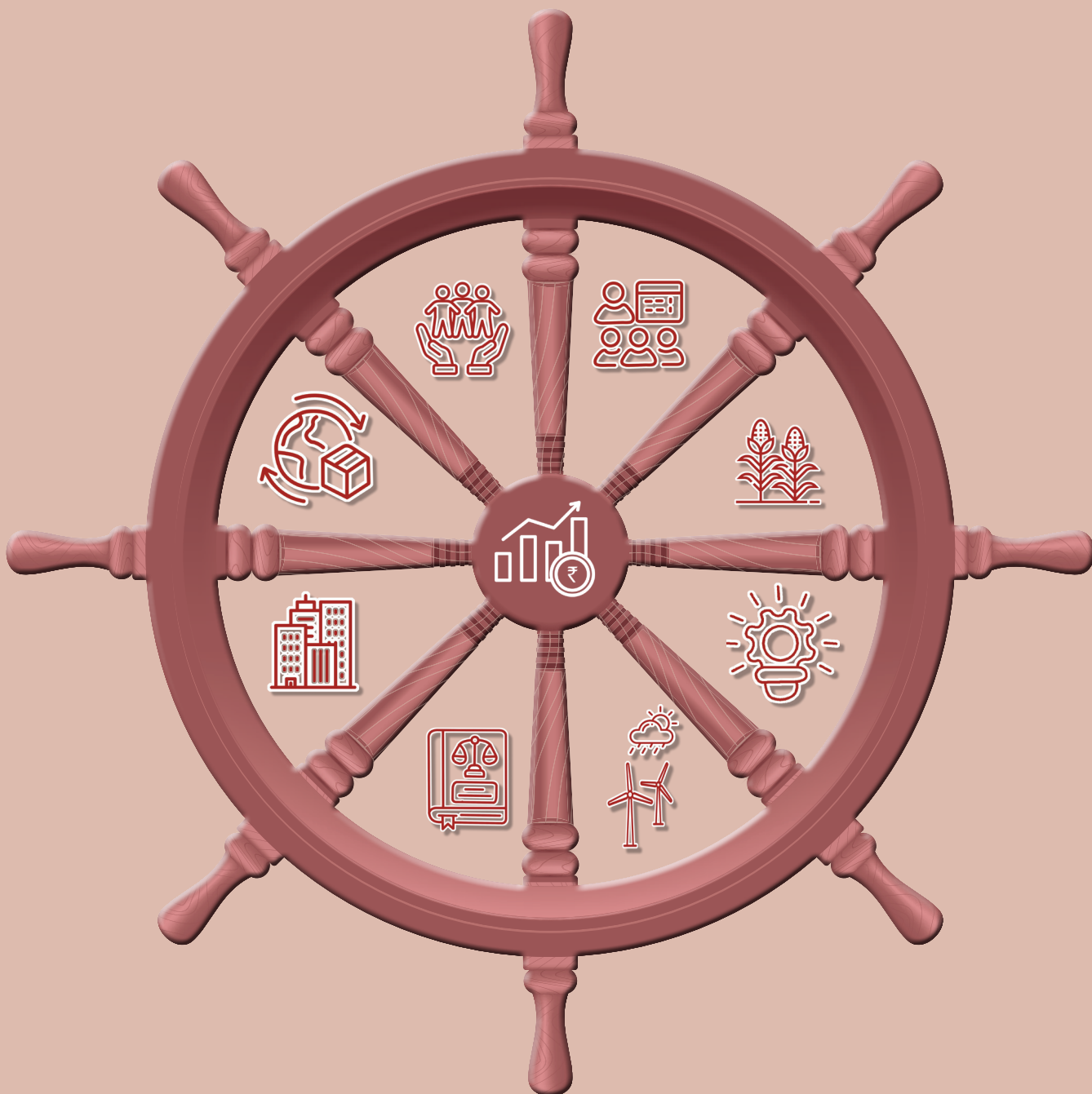


ECONOMIC SURVEY

2024-25



सत्यमेव जयते
Government of India





Economic Survey 2024-25

Government of India
Ministry of Finance
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Economic Division
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Preface : Driving domestic growth and resilience through deregulation

Lowering the cost of business through deregulation will make a significant contribution to accelerating economic growth and employment amidst unprecedented global challenges

It will be over six months since the last Economic Survey when you lay your hands and cast your eyes on this document and this preface. In theory, there should not be much to write in this preface, given the short time lapse since the last Survey. In reality, there is. The world is perhaps evolving more rapidly than we realise. In the longer span of history, this is par for the course. But, we will leave that contemplation for another occasion.

2024 was a year of elections. Three big democracies went in for elections: India, America and Indonesia. India returned the incumbent to office for a third term. The ruling party continued in Indonesia with a different leader at the helm. In America, there was a change in the presidency. The new President has been in office for less than two weeks now. The world has had an early inkling of policy changes that will affect the global movement of goods and labour.

Europe faces both political and economic uncertainties. Europe's biggest economic engine, Germany, experienced economic contraction for two successive years. Political uncertainty, too, is a factor since elections are due to be held in February this year. France has had political uncertainty due to developments in the wake of the snap elections called there. The United Kingdom had a change of government. After a long gap, the Labour Party came into office amidst fiscal pressures and a slowing economy. In general, Europe is facing competitiveness pressures amidst much higher energy costs caused, in part, by the transition towards renewable energy. To a large extent, these developments have affected the global economy. The Index of Global Economic Activity of the Federal Reserve Bank of Dallas has been volatile since the pandemic began slowing at the end of 2023.¹

The reopening of the Chinese economy after the Covid shutdown has not led to a spurt in economic growth rate as overcapacity and financial strains in the real estate sector have come to the fore. Due to weak aggregate demand, the economy is in deflationary mode. The absence of a significant policy stimulus to boost domestic consumption means excess capacity spills over into external markets. Chinese exports are thriving. China's trade surplus in 2024 was nearly one trillion US dollars.

Recent strength in the US dollar and rethinking in the Federal Reserve about the path of policy rates in America have caused emerging market currencies to weaken. Fiscal strains and low real rates relative to history have led to rapid erosion of value in some currencies compared to others. Borrowing costs for sovereigns are also rising as financial markets re-evaluate the outlook for inflation, policy rates and fiscal prudence.

Several stock markets worldwide are at elevated levels and do not appear unduly concerned about economic growth and earnings uncertainties. Nor have financial stability risks fazed investors even though serious concerns are re-emerging about securitisation, leveraged loans²

1 See <https://fred.stlouisfed.org/series/IGREA>

2 'Wall Street's complex debt bonanza hits fastest pace since 2007', Financial Times, 10th December 2024 (<https://www.ft.com/content/5219f962-3499-4928-8c73-5610b7a0109e>)

and private credit.³ Based on several metrics, current valuation and sentiment levels in the US stock market may be the most extreme or among the top three.

In his report, *The Future of European Competitiveness*⁴, Mario Draghi wrote:

“The EU also benefitted from a favourable global environment. World trade burgeoned under multilateral rules. The safety of the US security umbrella freed up defence budgets to spend on other priorities. In a world of stable geopolitics, we had no reason to be concerned about rising dependencies on countries we expected to remain our friends. But the foundations on which we built are now being shaken. The previous global paradigm is fading. The era of rapid world trade growth looks to have passed, with EU companies facing both greater competition from abroad and lower access to overseas markets.”

This is the global backdrop for India as it seeks to steady and sustain the growth momentum that the economy has experienced post-Covid. The passing of the era of rapid world trade growth clouds the outlook for India’s export growth because, historically, India’s export growth has been a high beta play on global export growth. This means domestic growth levers will be relatively more important than external ones in the coming years.

The report on European competitiveness could easily have been written for India. Most of the challenges cited therein apply to India, except that India is an aspiring nation, and the European continent has the cushion of a higher per capita income. Europe is, by and large, ageing, but India has a more youthful demographic profile. That is an advantage, but it comes with a huge responsibility.

One of the refrains in the Draghi report is the ‘China Challenge’ to European competitiveness. It is no less for India. Several commentators have recently written about the manufacturing colossus that China has become in the last six years.⁵

India faces limitations in producing critical goods at the scale and quality required to serve the infrastructure and investment needs of an aspiring economy. For instance, India has low production capacity in the solar energy sector for key components like polysilicon, ingots, and wafers. The production capacity of monocrystalline silicon ingot is expected to quintuple by 2025 from 2 GW in 2023, but it won’t be enough to meet the demand in the country. Several solar equipment manufacturers in the country significantly depend on Chinese supply chains and related services. The single-source concentration risk in several product areas exposes India to potential supply chain disruptions, price fluctuations and currency risks. India’s task is cut out.

It means going all out to attract, promote and facilitate further domestic and foreign investments that India needs to become a competitive and innovative economy. It will not be easy because competition for investment is not only with other emerging economies but advanced economies, too, who are determined to keep their businesses at home. Equally, investing in and strengthening domestic supply-chain capability and resilience will be the hallmarks of strategic and long-term thinking on the part of the private sector. Alternative sources of supply, where possible, have to be located and nurtured, going beyond short-term cost considerations.

3 ‘Defaults on leveraged loans soar to highest rate in 4 years’, Financial Times, 24th December 2024 (<https://www.ft.com/content/e6ba508c-4612-4b4a-9a6b-ecde6fc91c12>)

4 https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead_en

5 ‘What Scared Ford’s CEO in China’, Wall Street Journal, 14th September 2024 (<https://www.wsj.com/business/autos/ford-china-ev-competition-farley-ceo-50ded46>)

Another priority related to the above that calls for a calibrated and careful approach is climate change and energy transition. Public policy will have to recognise the role of Energy Security and Energy Affordability in enhancing and maintaining competitiveness. It means forging India's own path to energy transition and diversification away from fossil fuels. In this regard, electric mobility makes economic sense in a country which imports most of its oil and has abundant renewable energy and coal. However, it raises important challenges that need addressing. The import intensity of E-Vehicle production – especially from countries with whom India has persistent and large trade deficits- is very high. The extent to which electric mobility is incentivised in the short run needs to keep this factor in mind. Indigenising the technology and raw materials for electric mobility is an urgent task. Finally and importantly, given India's vast size and limited land availability, public transportation is a more efficient alternative for viable energy transition. Therefore, national-level policies and local nudges must promote and facilitate its use, going beyond the focus on tail-pipe emissions of private transportation choices.

It will also require appropriate skilling and education for India's youth to take advantage of technological advances such as Artificial Intelligence, enabling its population to stay one step ahead of technological developments. That would minimise or even eliminate the potential adverse impact on employment and, if possible, turn it into a force for augmenting employment. It would require a departure from 'business as usual' for collaboration between academic institutions and businesses. Innovation should be facilitated through resource flows, setting up centres of excellence in different technologies and expanding autonomy for academic and research institutions to attract top talent from the rest of the world to India. Policy action on this front is already underway, with recent budgets reflecting a clear focus on a technology-driven economy. This includes establishing Artificial Intelligence Centres of Excellence (CoE) at top educational institutions across India and the announcement of a ₹1 lakh crore financing corpus to catalyse private sector innovation and R&D in sunrise sectors.

Achieving competitiveness will be an incomplete project without raising productivity in the primary sector. As we wrote in the Economic Survey 2023-24, the agriculture sector needs to be freed, empowered and emboldened to diversify away from water-dependent crops. Simultaneously, irrigation cover has to rise. Agricultural research will need a leg up. Much more can be done. Farmer support policies can benefit from a perusal of a report⁶ that the OECD put out in November.

Above all, underpinning specific policy efforts will have to be the philosophical approach to governance. "Getting out of the way" and allowing businesses to focus on their core mission is a significant contribution that governments around the country can make to foster innovation and enhance competitiveness. The most effective policies governments - Union and States - in the country can embrace is to give entrepreneurs and households back their time and mental bandwidth. That means rolling back regulation significantly. That means vowing and acting to stop micromanaging economic activity and embracing risk-based regulations. That means changing the operating principle of regulations from 'guilty until proven innocent' to 'innocent until proven guilty'. Adding layers of operational conditions to policies to prevent abuse makes them incomprehensible and regulations needlessly complicated, taking them further from their original purposes and intents.

6 Agricultural Policy Monitoring and Evaluation 2024: Innovation for Sustainable Productivity Growth' 6th November 2024 (<https://tinyurl.com/zph8e5es>)

“Getting out of the way” is not easy for societies that are still structured around communities, groups, and kinship. These societies are largely hierarchical in nature. Various institutional forces propelled people in Western societies to go out and build relations with strangers. This process started as early as the first millennium.⁷ As a result, dealing with strangers and building networks and communities with them became necessary. Scale became inevitable and easier. One has to trust to deal with and form relationships with strangers. Written contracts formed the basis of such trust, and other institutional developments followed. However, in close-knit and kinship-based communities such as India, the trust quotient is still high within but low without. That inhibits scale. The low-trust quotient also gives rise to elaborate verification, compliance and reporting requirements. Further, by and large, hierarchical societies are not made for disruption, change and innovation but for maintaining the status quo. Even in such societies, in places and industries where this pattern is broken, innovation, competitiveness and scale emerge. The information technology sector and the startup ecosystem that emerged in Bengaluru in the nineties are examples.

But, ‘get out of the way’ and trust people, we must, for we have no other choice. ‘Business as usual’ carries a high risk of economic growth stagnation, if not economic stagnation. Yes, trust is a two-way street and the non-government actors in the economy have to vindicate the trust reposed. In fact, quite a significant chunk of the complicated compliance requirements stem from the efforts of businesses wanting to keep out domestic and foreign competition to the detriment of other industries and the economy. Nonetheless, wiping out the trust deficit in the country is imperative and government agencies have to set the agenda in this regard. Then, it is a good bet that the Indian public will overcome the challenges and turn them into opportunities on the way to Viksit Bharat by 2047.

One crucial aspect of the low-trust ‘without’ is that practices and policies that evolved in Western societies may be inapplicable and unlikely to succeed in India. India has to choose its own path suited to its context and history. While every chapter of the Economic Survey makes a case for simplification and deregulation wherever possible and necessary, it also acknowledges areas where more and/or appropriate regulatory intervention may be necessary.

For example, it is reasonable to expect that financial regulators hold themselves to the same standards that they expect of regulated entities. At the same time, in the chapter on ‘Monetary and Financial Sector Developments’, we also caution against the risk of financialisation and asset price bubbles that are now endemic to the West. That is why some measures India’s regulators took to rein in excessive and financially ruinous speculation for investors were necessary, not just for systemic stability. They were welfare measures in effect.

Similarly, if India were to realise the vast potential of its youthful population, their mental, emotional and physical health need to be nurtured. Scientific evidence abounds that the consumption of ultra-processed foods (High in Fat, Salt and Sugar or HFSS) is a big factor in undermining both physical and mental health. In this regard, globally, self-regulation has been ineffective. Stringent front-of-the-pack labelling rules are needed and to be enforced. It is not an exaggeration to suggest that the country’s future growth potential rides a lot on this measure. According to a WHO report published in 2023, India’s consumption of ultra-processed foods shot up from about USD 900 million in 2006 to over USD 37.9 billion in 2019.⁸ That is an

7 Henrich, Joseph: ‘The Weirdest People in the World: How the West Became Psychologically Peculiar and Particularly Prosperous’. Penguin Books Ltd. Kindle Edition

8 ‘In a pickle: Why it’s time for Fssai to wake up and crack the whip’, Mint, 19th May 2024 (<https://www.livemint.com>).

annual compounded growth rate of over 33%. It is unclear if India has clear front-of-the-pack labelling stipulations for HFSS food.

In the Economic Survey 2023-24, in the chapter on the Social Sectors, we focused on the impact of screen time and ultra-processed foods on children. This time, the chapter examines the impact of work culture, lifestyle and eating habits on mental health. These are some of the areas where the state has to step in. At the same time, when it comes to higher education, the chapter posits that the implementation of the National Education Policy is held back by regulations that are supposedly voluntary but effectively mandatory.

Further, the chapter delves into the policy priorities for women, farmers, youth and the poor. Facilitating their productive and enhanced participation in economic activity is the litmus test of inclusive development policies. Investment in education, skill, and physical and mental health will be the focus for the youth of both genders. The poor will be provided targeted support to improve their livelihoods and opportunities to move from the periphery to the centre of economic activity. It is about finding pathways for advancing their income and living standards through empowerment. For women, governments around the country will have to eliminate legal and regulatory hurdles that hold back their participation in the labour force besides undertaking facilitative measures. In other words, governments must get out of the way of women joining the workforce.

The chapters on the Industrial Sector and Employment and Skill Development bat for deregulation to boost capital formation and accelerate employment and output growth. In particular, the chapter on Industries notes the positive correlation between states that score on the 'Ease of Doing Business' parameters and the level of industrial activity. States that aspire to raise their industrialisation quotient know what they need to do. At the same time, the chapter celebrates the success story of the Production-Linked Incentive Scheme in air-conditioners, which is a story of successful indigenisation through government intervention.

The chapter on external sector developments wades into the challenges that India will face in the near future, such as the threat of restrictive trade policies that the European Union has initiated in the name of avoiding carbon leakage and saving the forests of the world. These have the potential to restrict India's exports and widen the current account deficit at a time when the net foreign direct investment into India is declining because of successful exits by foreign investors, incentives given by many governments for investments to stay onshore and higher interest rates in hard currencies. Therefore, the chapter raises the question of whether India's sustainable current account deficit is lower than previously estimated. That has implications for capital formation and investment efficiency or lowering the incremental capital-output ratio. In that sense, this chapter provides a neat segue for the domestic issues covered in later chapters.

The special essay on Artificial Intelligence (AI) and its implications for employment generation in India is a brave attempt on our part to put forward some hypotheses on whether the technology would be hugely and adversely disruptive to employment. It suggests with all humility tentatively that some of the fears might be misplaced. The chapter does not answer the question of whether the problems that the world faces need a technological solution, such

as artificial intelligence. Technologists would scoff at such a question. They would counter that technology evolves due to the creative ingenuity of humans and that applications follow. Further, given the rapid ageing in some societies, this was perhaps a welcome development for them. It may not be so for all countries. Particularly so for a labour-rich country like India. Therefore, policymakers in those countries have to question whether AI is necessary. If the answer is unclear, it warrants closer scrutiny of its costs and benefits with necessary follow-up action. Even in countries where AI may fill the shrinking labour force, AI's enormous demand for water and electricity is slowly coming into view, much to the bewilderment of policymakers. Therefore, whether the world is better or worse off with AI is not easily answered now.

The topic of climate change and energy transition, as well as their international implications and linkages, has figured prominently in the last couple of editions of the Economic Survey. It is no different this time. The topic will be with us at least for another decade or two. This is another area where the government is front and centre, and the private sector will be somewhat peripheral since public goods are not the private sector's priority. Globally, strong evidence is emerging that high and rising dependence on intermittent sources of power, and high energy costs are strongly correlated. Indeed, causality is likely running from the former to the latter and is one of the causes of the rapid and deep slide in industrial production in Germany, as industries, citing higher energy costs, relocate to other places. Research notes⁹ that firm low-carbon resources—including nuclear power, bioenergy, and natural gas plants that capture CO₂—help reduce the costs of lowering the carbon emission of electricity generation as, without these resources, costs rise rapidly as CO₂ limits approach zero. While global warming warrants energy transition, as Prof. Mike Hulme pithily titled his book, 'Climate change isn't everything'.

As we noted earlier in this preface - and it is time to conclude it - energy transition plans must be mindful of geopolitical vulnerabilities and avoid deepening India's dependence on external sources for critical imports. Strategic thinking is warranted. The two obsessions of the West - the water and power-guzzling AI and energy transition - do not sit well with each other. One has to give. It appears to be the latter because the more the West (Europe, in particular) goes for wind and solar in its energy mix, the greater the coal consumption in China. The link between the two runs as follows: the requirement for critical minerals and rare earths rises with the share of renewable energy in the overall energy consumption. China dominates the production or processing of these materials. Processing requires cheap power. Otherwise, these inputs would be costlier, making energy transition even more expensive for Europe than it already is. Cheap power is possible only with coal-fired thermal plants. So, both are two sides of the same coin, wrote Ed Conway.¹⁰ This complex interplay makes one thing clear for India. It has to focus a lot more than it has so far on adaptation than on emission mitigation. That is the focus of the chapter on Climate and Environment.

The first and fifth chapters deal with near-term and medium-term outlooks for the Indian economy. The first chapter delves more than it normally does on global developments and the risk factors. That is as it should be, given the state of the world. The medium-term outlook is an elaborate examination of several of the issues this preface touches upon and, therefore, the

9 Sepulveda et al.,(2018): The Role of Firm Low-Carbon Electricity Resources in Deep Decarbonisation of Power Generation, *Joule* 2, 2403–2420, November 21, 2018 ^a 2018 Elsevier Inc (<https://doi.org/10.1016/j.joule.2018.08.006>)

10 Ed Conway: 'The most hopeful chart in the world', 19th December 2024 (<https://edconway.substack.com/p/the-most-hopeful-chart-in-the-world>)

need to get the domestic economic engine purring by pulling all the levers of deregulation. As is the tradition with all Economic Surveys, the first chapter gives our outlook for the real economy growth rate for the financial year 2025-26. I am not going to reveal it here and stop you from flipping the pages further. You can see the number at the end of the first chapter. The philosophy behind the growth projection is consistent with the philosophy that the government and the Ministry of Finance have adopted in the last five years with respect to fiscal goals: be realistic and strive harder to do better than that. The stellar progress in bringing public finances on track in this period is a vindication of this approach.

This edition of the Economic Survey does not deal with state capacity issues. The previous edition published in July 2024 did so. The demand for state capability and capacity to respond to these developments and make progress on social and economic indicators amidst rising geopolitical conflicts will be unlike anything we have experienced since independence. Meeting that demand is a priority above all else.

The Indian economy is on a steady growth path. The macroeconomic health checklist looks good. As the country aims to accelerate its economic growth rate in the coming years, it has the tailwind of strong balance sheets in the domestic corporate and financial sectors. But, globalisation is on the retreat. Hence, raising the growth average in the next two decades will require reaping the demographic dividend through a deregulation stimulus. As the Spartans apparently believed, “the more you sweat in peace, the less you bleed in war”. This Economic Survey is all about that, or so we would like to believe.

I hope this preface has given you a flavour of this Economic Survey and whetted your appetite to know more about what it packs between the pages. I am responsible for the views expressed and the errors, if any, committed in this document. Please let us know what you think of the former and point out the latter. We promise to get better at each outing.

As always, putting it and pulling it all together is a labour of love and a *Yagna*. Making the changes happen in reality is a *Sadhana*.

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Abbreviations

AA	Adjudicating Authority
AAM	Ayushman Arogya Mandirs
AAY	Antyodaya Anna Yojana
AB PM-JAY	Ayushman Bharat- Pradhan Mantri Jan Arogya Yojana
ABC	Academic Bank of Credit
ABDM	Ayushman Bharat Digital Mission
ABHA	Ayushman Bharat Health Accounts
ABS	Automatic Block Signalling
ADUW	National Database of Unorganised Workers
AEs	Advanced Economies
AGI	Artificial General Intelligence
AI	Artificial Intelligence
AIF	Agriculture Infrastructure Fund
AIM	Atal Innovation Mission
AMFI	Association of Mutual Fund Industry
AMI	Agriculture Marketing Infrastructure
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
ANBC	Adjusted Net Bank Credit
APIs	Active Pharmaceutical Ingredients
APMC	Agricultural Produce Market Committee
APY	Atal Pension Yojana
ARC	Autonomous Reasoning Capability
ASI	Annual Survey of Industries
ASUSE	Annual Survey of Unincorporated Sector Enterprises
ATMA	Agricultural Technology Management Agency
AUC	Assets Under Custody
AuM	Assets under Management
AUSC	Advanced Ultra-Super-Critical
BCD	Basic Customs Duty
BCG	Bacille Calmette Guerin
BFSI	Banking Financial Services Insurance
BFT	Bare Foot Technicians
BHEL	Bharat Heavy Electricals Limited
BIS	Bank for International Settlements
BoP	Balance of Payments
BPL	Below Poverty Line

BPNI	Breastfeeding Promotion Network Of India
BPO	Business Process Outsourcing
BRAP	Business Reform Action Plan
BRR	Business Responsibility Report
BRSR	Business Responsibility and Sustainability Report
BTSSs	Base Transceiver Stations
CAB	Current Account Balance
CAD	Current Account Deficit
CAG	Comptroller & Auditor General
CAGR	Compound Annual Growth Rate
CAGR	Compound Annual Growth Rate
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CAPE ratio	Cyclically Adjusted Price-Earnings Ratio
CASEL	Collaborative For Academic, Social, And Emotional Learning
CBAM	Carbon Border Adjustment Mechanism
CBIS	Cross-Border Interbank System
CCRP	C-DOT Collaborative Research Program
CCS	Consumer Confidence Survey
CCU	Cardiac Care Units
C-DoT	Centre for Development of Telematics
CDs	Corporate Debtors
CE	Capital Expenditure
CEOBE	Off-Balance Sheet Exposure
CERT-In	Indian Computer Emergency Response Team
CET-1	Common Equity Tier-1
CFPI	Consumer Food Price Index
CGA	Controller General of Accounts
CGFSSD	Credit Guarantee Fund Scheme for Skill Development
CGHS	Central Government Health Scheme
CGS	Credit Guarantee Scheme
CGS-NPF	Policy brief e-NWR-based Pledge Financing
CGSS	Credit Guarantee Scheme for Startups
CGTMSSE	Credit Guarantee Fund Trust for Micro and Small Enterprises
CHAMPIONS	Creation and Harmonious Application of Modern Processes for Increasing the Output and National Strength
CHC	Community Health Centres
CHCs	Custom Hiring Centres
CHE	Current Health Expenditure

CIRP	Corporate Insolvency Resolution Process
CLF	Cluster Level Federations
CLU	Change of Land Use
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
CoP	Conference of the Parties
CFCs	Common Facility Centres
CPI	Consumer Price Index
CPSEs	Central Public Sector Enterprises
CPSU	Central Public Sector Undertaking
CRAR	Capital-to-risk-weighted assets ratio
CRISIL	Credit Rating Information Services of India Limited
CROPIC	Collection of Real Time Observations and Photographs of Crops
CRP	Community Resource Persons
CRR	Cash Reserve Ratio
CRZ	Coastal Regulation Zone
CSCAF	Climate Smart Cities Assessment Framework
CSCs	Common Service Centers
CSDCI	Construction Skill Development Council Of India
CSE	Centre for Science and Environment
CSIRTs	Sectoral Computer Incident Response Teams
CSO	Central Statistical Office
CSR	Corporate Social Responsibility
CVD	Cardiovascular Diseases
CWPPs	Community Water Purification Plants
CWS	current weekly status
CwSN	Children With Special Needs
DA JGUA	Dharti Aaba Janjatiya Gram Utkarsh Abhiyan
DAHD	Department Of Animal Husbandry And Dairying
DAY- NRLM	Deendayal Antyodaya Yojana - National Rural Livelihood Mission
DBN	Digital Bharat Nidhi
DBT	Direct Benefit Transfers
DDoS	Distributed Denial of Service
DDUGJY	Deen Dayal Upadhyaya Gram Jyoti Yojana
DFCs	Dedicated Freight Corridors
DFI	Doubling Farmers' Income
DFIs	Development Financial Institutions
DGCA	Directorate General of Civil Aviation
DGFSALI	Directorate General Factory Advice Service & Labour Institute

DGFT	Directorate General of Foreign Trade
DIET	District Institutes Of Education And Training
DIKSHA	Digital Infrastructure For Knowledge Sharing
DIs	Drug Intermediates
DMP	Disaster Management Plan
DoGE	Department of Government Efficiency
DPI	Digital Public Infrastructure
DPIIT	Department for Promotion of Industry and Internal Trade
DRE	Decentralised Renewable Energy
DTE	Down To Earth
e-BRC	electronic Bank Realisation Certificate
ECCE	Early Childhood Care And Education
ECEH	E-Commerce Export Hub
ECHS	Ex-Servicemen Contributory Health Scheme
EDPMS	Export Data Processing and Monitoring System
EEIs	Regional Extension Education Institutes
e-KYC	electronic Know Your Customer
EMC	Electronics Manufacturing Clusters
EMDEs	Emerging market and developing economies
EMEs	Emerging Market Economies
e-NAM	electronic National Agriculture Market
e-NWR	electronic Negotiable Warehouse Receipts
EPFO	Employees' Provident Fund Organisation
EPR	Extended Producer Responsibility
EPU	Economic Policy Uncertainty
ESIC	Employees' State Insurance Corporation
ETS	Emissions Trading System
EUDR	European Union Deforestation Regulation
EV	Electric Vehicle
FADA	Federation of Automobile Dealers Associations
FAR	Fully Accessible Route
FCA	Foreign Currency Assets
FCNR	Foreign Currency Non-Resident
FD	Fiscal Deficit
FDI	Foreign Direct Investment
FFR	Federal Funds rate
FIDF	Fisheries and Aquaculture Infrastructure Development Fund
FLFPR	Female Labour Force Participation Rate

FLN	Foundational Literacy And Numeracy
FMCG	Fast Moving Consumer Goods
FMG	Foreign Medical Graduates
FMIIs	Financial Market Infrastructures
FNHW	Food, Nutrition, Health, And WASH
FOMC	Federal Open Market Committee
FOPL	Front-Of-Pack Labels
FPCs	Farmer Producer Companies
FPI	Foreign Portfolio Investment
FPO	Farmer Producer Organisation
FPS	Fair Price Shop
FREE-AI	Framework for Responsible and Ethical Enablement of Artificial Intelligence
FREPS	Financial, real estate and professional services
FSDC	Financial Stability and Development Council
FSR	Financial Stability Report
FSSAI	Food Safety And Standards Authority Of India
FTAs	Free Trade Agreements
FTL	Frontier Technology Labs
FTP	Foreign Trade Policy
FY	Financial Year
GAME	Global Alliance for Mass Entrepreneurship
GCA	gross cropped area
GCC	Global Capability Centres
GCC	Gulf Cooperation Council
GCF	Green Climate Fund
GCI	Global Cybersecurity Index
GCP	Green Credit Programme
GCT	Gati Shakti Multi-Modal Cargo Terminal
GDP	Gross Domestic Product
GDP	Gross Domestic Product
GEAPP	Global Energy Alliance for People and Planet
GEC	Green Energy Corridor
GEF	Geo-Economics Fragmentation
GeM	Government e-Marketplace
GEPU	Global Economic Policy Uncertainty
GER	Gross Enrolment Ratio
GFC	Global Financial Crisis
GFCF	Gross Fixed Capital Formation

GFCI	Global Financial Centres Index
GHE	Government Health Expenditures
GHG	Green House Gas
GIFT-IFSC	Gujarat International Finance Tec-City- International Financial Services Centre
GII	Global Innovation Index
GLC	ground level credit
GMP	Good Manufacturing Practices
GNPAs	Gross Non-Performing Assets
GP	Gram Panchayat
GPP	Gender Point Persons
GPR	Geopolitical Risk
GRC	Gender Resource Centres
GST	Goods and Services Tax
GSVA	Gross State Value Added
GTR	Gross Tax Revenue
GVA	Gross Value Added
HCES	Household Consumption Expenditure Survey
HDI	Human Development Index
HEI	Higher Education Institutions
HFIIs	High-Frequency Indicators
HSCs	High-Speed Corridors
HSN	Harmonised System Nomenclature
HWC	Health Wellness Centre
IAS	Index of Agricultural Sustainability
IAY	Indira Awaas Yojana
IBC	Insolvency and Bankruptcy Code
IBUs	IFSC Banking Units
ICCC	Integrated Command and Control Centres
iCET	US-India initiative on Critical and Emerging Technology
ICICI	Industrial Credit and Investment Corporation of India
ICMR	Indian Council Of Medical Research
ICRIER	Indian Council for Research on International Economic Relations
ICT	Information And Communication Technology
IDBI	Industrial Development Bank of India
IDFC	Infrastructure Development Finance Company
IEA	International Energy Agency
IEC	Importer Exporter Code
IEO	Independent Evaluation Office

IFCI	Industrial Finance Corporation of India
IFSCA	International Financial Services Centres Authority
IFSCs	International Financial Services Centres
IGB	Indian Government Bonds
IIE	Indian Institute of Entrepreneurship
IIFCL	India Infrastructure Finance Company Limited
ILO	International Labour Organisation
IMF	International Monetary Fund
INR	Indian Rupee
InvITs	Infrastructure Investment Trusts
IoMT	Internet Of Medical Things
IoT	Internet of Things
IP	Intellectual Property
IP	Interest Payments
IPDS	Integrated Power Development Scheme
IPOs	Initial Public Offerings
IR	Indian Railways
IRBs	Independent Regulatory Bodies
IRENA	International Renewable Energy Agency
IS	Interest Subvention
IT	Information Technology
ITA	International Tourist Arrivals
ITeS	Information Technology enabled Services
ITI	Industrial Training Institutes
JJM	Jal Jeevan Mission
JSS	Jan Sikshan Sansthan
KCC	Kisan Call Center
KCC	Kisan Credit Card
KILA	Kerala Institute For Local Administration
KLEMS	Capital (K), Labour (L), Energy (E), Materials (M), and Services (S)
KM	Kilometres
KPIs	Key Performance Indicators
KSI	Key starting materials
KYC	Know Your Customer
LBSAP	Local Biodiversity Strategy and Action Plans
LFPR	Labour Force Participation Rate
LiFE	Lifestyle for Environment
LLMs	Large Language Models

LMA	Labour Mobility Agreements
LMT	Lakh Metric Tonnes
LSA	Legal Services Authorities
MAHAFPC	Maha Farmers Producer Company Limited
MAITRIs	Multipurpose AI Technicians in Rural India
MAS	Monetary Authority of Singapore
MeitY	Ministry of Electronics and Information Technology
MFN	Most Favoured Nation
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MHQ	Mental Health Quotient
MISHTI	Mangrove Initiative for Shoreline Habitats & Tangible Incomes
MISS	Modified Interest Subvention Scheme
ML	Machine Learning
MLD	Million litres per day
MM	Money Multiplier
MMF	Man-made Fibre
MMLP	Multi-Modal Logistics Parks
MMPA	Migration and Mobility Partnership Agreements
MNRE	Ministry of New and Renewable Energy
MoE	Ministry Of Education
MoEFCC	Ministry of Environment, Forest and Climate Change
MoES	Ministry of Earth Sciences
MoHUA	Ministry of Housing and Urban Affairs
MoLE	Ministry of Labour and Employment
MoRTH	Ministry Of Road Transport And Highways
MoSPI	Ministry of Statistics and Programme Implementation
MoTA	Ministry of Tribal Affairs
MoU	Memorandum of Understanding
MOVCDNER	Mission Organic Value Chain Development for North Eastern Region
MPC	Monetary Policy Committee
MPC	Multi-Purpose Centres
MPCE	Monthly Per Capita Expenditure
MR	Measles Rubella
MRO	Maintenance Repair and Overhaul
MSDE	Ministry of Skill Development and Entrepreneurship
MSE-CDP	Micro and Small Enterprises-Cluster Development Programme
MSEFC	Micro and Small Enterprises Facilitation Council

MSMES	Micro, Small, and Medium Enterprises
MSP	Minimum Support Price
MSU	Mobile Storage Unit
MTPA	Million Tonnes Per Annum
MVA	Mega Volt-Amperes
NABARD	National Bank for Agriculture and Rural Development
NABCONS	NABARD Constancy Services
NaBFID	National Bank for Financing and Infrastructure Development
NABL	National Accreditation Board For Testing And Calibration Laboratories
NACH	National Automated Clearing House
NALSA	National Legal Services Authority
NAP	National Adaptation Plan
NAPCC	National Action Plan on Climate Change
NAPi	Nutrition Advocacy In Public Interest
NAPS	National Apprenticeship Promotion Scheme
NAQUIM	National Aquifer Mapping Project
NASSCOM	National Association of Software and Service Companies
NBFCs	Non-Banking Financial Companies
NCAP	National Clean Air Programme
NCD	Non-Communicable Disease
NCF-FS	National Curriculum Framework For Foundational Stage
NCLT	National Company Law Tribunal
NCQG	New Collective Quantified Goal
NCrF	National Credit Framework
NDCs	Nationally Determined Contributions
NDF	Non-Deliverable Forwards
NDMP	National Disaster Management Plan
NDR	Non-debt receipts
NDTL	Net Demand and Time Liabilities
NEER	Nominal Effective Exchange Rate
NEET-UG	National Eligibility Cum Entrance Test – Under Graduate
NEP	National Education Policy
NFDP	National Fisheries Digital Platform
NFSA	National Food Security Act
NGRBC	National Guidelines for Responsible Business Conduct
NH	National Highway
NIDHI	National Initiative for Developing and Harnessing Innovations
NIESBUD	National Institute for Entrepreneurship and Small Business Development

NIIF	National Investment and Infrastructure Fund
NIM	Net Interest Margin
NIP	National Infrastructure Pipeline
NIPUN	National Initiative For Proficiency In Reading With Understanding And Numeracy
NITI	National Institution for Transforming India
NIUA	National Institute of Urban Affairs
NMC	National Medical Commission
NMP	National Monetisation Pipeline
NMSA	National Mission for Sustainable Agriculture
NMSH	National Mission on Sustainable Habitat
NPAs	Non-Performing Assets
NPCDCS	National Programme For Prevention And Control Of Cancer, Diabetes, Cardiovascular Diseases, And Stroke
NPS	National Pension System
NRI	Non-Resident Indian
NRR	Revenue Receipts (net to Centre)
NSAP	National Social Assistance Programme
NSDC	National Skill Development Corporation
NSE	National Stock Exchange
NSIL	New Space India Limited
NSO	National Statistical Organisation
NSQF	National Skills Qualification Framework
NSTI	National Skill Training Institutes
NTC	Tax Revenue (net to Centre)
NTMs	Non-Tariff Measures
NTPC	National Thermal Power Corporation
NTTM	National Technical Textiles Mission
OBICUS	Order Books, Inventory, and Capacity Utilisation Survey
OEN	Open Credit Enablement Network
ODF	Open Defecation Free
ODL	Open Distance Learning
OECD	Organisation for Economic Cooperation and Development
OFC	Optical Fibre Cable
OMO	Open Market Operations
ONDC	Open Network for Digital Commerce
ONORC	One Nation, One Ration Card
OOPE	Out-Of-Pocket Expenditure
OPV	Oral Polio Vaccine

ORR	Own Revenue Receipts
OSH	Occupational Safety and Health
OTR	Own Tax Revenue
PACS	Primary Agricultural Credit Societies
PADOS	Public, administration, defence & other services
PAHO	Pan American Health Organisation
PARAKH	Performance Assessment, Review, And Analysis Of Knowledge For Holistic Development
PAT	Profit after tax
PAYGO	Pay-As-You-Go
PBMC	Performance Based Maintenance Contracts
PBS	Population Based Screening
PD	Primary Deficit
PDMC	Per Drop More Crop
PDOT	Pre-Departure Orientation Training
PDS	Public Distribution System
PFCE	Private Final Consumption Expenditure
PFRDA	Pension Fund Regulatory and Development Authority of India
PHC	Primary Health Centres
PHH	Priority Household
PIB	Press Information Bureau
PKVY	Paramparagat Krishi Vikas Yojana
PLFS	Periodic Labour Force Survey
PLI	Production-Linked Incentive
PLISFPI	Production Linked Incentive Scheme for Food Processing
PM JANMAN	Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan
PM POSHAN	Pradhan Mantri Poshan Shakti Nirman
PM SHRI	Prime Minister's Schools For Rising India (PM SHRI).
PMAY-G	Pradhan Mantri Awaas Yojana-Gramin
PMAY-U	Pradhan Mantri Awas Yojana – Urban
PMBJKs	Pradhan Mantri Bhartiya Janaushadhi Kendras
PMFBY	Pradhan Mantri Fasal Bima Yojana
PMFME	Pradhan Mantri Formalisation of Micro Food Processing Enterprises
PMGDISHA	Pradhan Mantri Gramin Digital Saksharta Abhiyan
PMGKAY	Pradhan Mantri Garib Kalyan Anna Yojana
PMGSY	Pradhan Mantri Gram Sadak Yojana
PMI	Purchasing Manager's Index
PMJJBY	Pradhan Mantri Jeevan Jyoti Bima Yojana

PM-KISAN	Pradhan Mantri Kisan Samman Nidhi
PMKSK	Pradhan Mantri Kisan Samridhhi Kendras
PMKSY	Pradhan Mantri Kisan Sampada Yojana
PMKSY	Pradhan Mantri Krishi Sinchayee Yojana
PM-KUSUM	Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan
PMKVY	PM Kaushal Vikas Yojana
PM-MITRA	Pradhan Mantri Mega Integrated Textile Region and Apparel
PM-MKSSY	Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana
PMMSY	Pradhan Mantri Matsya Sampada Yojana
PMSBY	Pradhan Mantri Suraksha Bima Yojana
PPP	Public-Private Partnership
PPPs	Public Private Partnerships
PRASHAD	Pilgrimage Rejuvenation and Spiritual Augmentation Drive
PRI	Prompt Repayment Incentive
PSL	Priority Sector Lending
PV	Photovoltaic Cell
PVTG	Particularly Vulnerable Tribal Groups
QIPs	Qualified Institutional Players
R&D	Research And Development
R&D	Research and Development
RAD	Rainfed Area Development
RAS	Recirculating Aquaculture Systems
RBI	Reserve Bank of India
RCA	River Cities Alliance
RCBs	Rural Cooperative Banks
RD	Revenue Deficit
RE	Revenue Expenditure
REC	Renewable Energy Certificates
REER	Real Effective Exchange Rate
REIT	Real Estate Investment Trusts
RERA	Real Estate Regulation Act
REs	Regulated Entities
RES	Renewable Energy Source
RFIs	Rural Financial Institutions
RIA	Regulatory Impact Assessment
RKVY	Rashtriya Krishi Vikas Yojana
RoA	Return on Assets
RoE	Return on Equity

ROSCTL	Rebate of State and Central Taxes and Levies
RRBs	Regional Rural Banks
RSA	Restructured Standard Advances
RSBY	Rashtriya Swasthya Bima Yojana
RTAs	Regional Trade Agreements
RTP	Reserve Tranch Position
RVSFs	Registered Vehicle Scrapping Facilities
SAGY	Saansad Adarsh Gram Yojana
SAMARTH	Smart Manufacturing and Industry
SARTHAQ	Students' And Teachers' Holistic Advancement Through Quality Education
SBM	Swachh Bharat Mission
SBM-G	Swachh Bharat Mission - Grameen
SBM-U	Swachh Bharat Mission - Urban
SC	Super-Critical
SCBs	Scheduled Commercial Banks
SCERT	State Council Of Educational Research And Training
SD 2.0	Swadesh Darshan
SDG	Sustainable Development Goal
SDGCAC	SDG Coordination And Acceleration Centres
SDGCC	Sdg Coordination Centres
SDR	Special Drawing Rights
SEL	Social And Emotional Learning
SFI	Self-Reliant India
SGrBs	Sovereign Green Bonds
SHC	Sub-Health Centres
SHG	Self-Help Group
SHGs	Self-Help Groups
SIA	SBI Intelligent Assistant
SII	Safe in India Foundations
SIIC	Skill India International Centres
SIP	Systematic Investment Plan
SISFS	Start-up India Seed Fund Scheme
SLCR	Smart Laboratory on Clean Rivers
SLR	Statutory Liquidity Ratio
SMAM	Sub-Mission on Agricultural Mechanization
SPS	Sanitary and Phytosanitary Measures
SRI	Systematic Rice Intensification
SRLM	State Rural Livelihoods Missions

SSC	Sector Skill Councils
SSE	Social Sector Expenditure
STARS	Strengthening Teaching-Learning And Results For States
STEM	Science Technology Engineering Mathematics
STMC	Short Term Maintenance Contracts
STRY	Skill Training of Rural Youth
SUL	Solar Urja Lamps
SWAYAM	Study Webs Of Active Learning For Young Aspiring Minds
TBT	Technical Barriers to Trade
TD	Tax devolution
TE	Total Expenditure
TEUs	Twenty-foot Equivalent Units
THE	Total Health Expenditure
TOP	Tomato, Onion and Potato
TPDS	Targeted Public Distribution System
TPU	Trade Policy Uncertainty
TReDs	Trade Receivables electronic Discounting System
TTHCS	Trade, transport, hotel, communication and broadcasting services
TTT	Tim Tim Tare
TVET	Technical and Vocational Education and Training
UAN	Universal Account Number
UAP	Udyam Assist Platform
UDAN	Ude Desh ka Aam Naagrik
UGC	University Grants Commission
UIP	Universal Immunisation Programme
ULBs	Urban Local Bodies
ULI	Unified Lending Interface
ULLAS	Understanding Of Lifelong Learning For All In Society
UNCTAD	United Nations Conference on Trade and Development
UNCTAD	UNCTAD Trade Analysis and Information System
TRAINS	
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
UPF	Ultra-Processed Food
UPI	Unified Payment Interface

UR	Unemployment Rate
URMP	Urban River Management Plan
US	Usual Status
USC	Ultra-Super-Critical
USD	United States Dollar
UT	Union Territory
UTs	Union Territories
VGf	Viability Gap Funding
VO	Village Organisations
WASH	Water, Sanitation and Hygiene
WEE	Women Economic Empowerment
WEFEP	Women Entrepreneur Financial Empowerment Programme
WEO	World Economic Outlook
WFP	World Food Programme
WHO	World Health Organization
WINDS	Weather Information and Network Data Systems
WIPO	World Intellectual Property Organisation
WPR	Worker Population Ratio
WTO	World Trade Organisation
WTUI	World Trade Uncertainty Index
YES-Tech	Yield Estimation System based on Technology
YoY	Year on Year

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STATE OF THE ECONOMY: GETTING BACK INTO THE FAST LANE

The global economy exhibited steady yet uneven growth across regions in 2024. A notable trend was the slowdown in global manufacturing, especially in Europe and parts of Asia, due to supply chain disruptions and weak external demand. In contrast, the services sector performed better, supporting growth in many economies. Inflationary pressures eased in most economies. However, services inflation has remained persistent. Although commodity prices have stabilised, the risk of synchronised price increases persists. With growth varying across economies and last-mile disinflation proving sticky, central banks may chart varying paths of monetary easing. This will lead to uncertainty over future policy rates and inflation trajectories. This apart, geopolitical tensions, ongoing conflicts, and trade policy risks continue to pose significant challenges to global economic stability.

In this global context, India displayed steady economic growth. As per the first advance estimates of national accounts, India's real GDP is estimated to grow by 6.4 per cent in FY25. Growth in the first half of FY25 was supported by agriculture and services, with rural demand improving on the back of record Kharif production and favourable agricultural conditions. The manufacturing sector faced pressures due to weak global demand and domestic seasonal conditions. Private consumption remained stable, reflecting steady domestic demand. Fiscal discipline and strong external balance supported by a services trade surplus and healthy remittance growth contributed to macroeconomic stability. Together, these factors provided a solid foundation for sustained growth amid external uncertainties.

Looking ahead, India's economic prospects for FY26 are balanced. Headwinds to growth include elevated geopolitical and trade uncertainties and possible commodity price shocks. Domestically, the translation of order books of private capital goods sector into sustained investment pick-up, improvements in consumer confidence, and corporate wage pick-up will be key to promoting growth. Rural demand backed by a rebound in agricultural production, an anticipated easing of food inflation and a stable macro-economic environment provide an upside to near-term growth. Overall, India will need to improve its global competitiveness through grassroots-level structural reforms and deregulation to reinforce its medium-term growth potential.

INTRODUCTION

1.1 Global economic conditions are shaped by changing growth dynamics, fluctuating commodity prices, and evolving monetary policies, which influence domestic inflation, trade balances, and capital flows. At present, this interconnectedness is complicated by unusual levels of geopolitical tensions, supply chain disruptions, and climate-related shocks. Against this background, this chapter is organised broadly into four sections. The first section outlines the global economic scenario comprehensively, highlighting growth and inflation trends, policy stances, and key emerging risks and uncertainties. The second section focuses on the domestic macroeconomic situation, examining developments from the demand and supply sides. The third section delves into the emerging trends in public finances, inflation, external sector, financial markets and employment. The concluding section presents the prospects and outlook for growth in the presence of global headwinds while capitalising on domestic growth drivers.

GLOBAL ECONOMIC SCENARIO

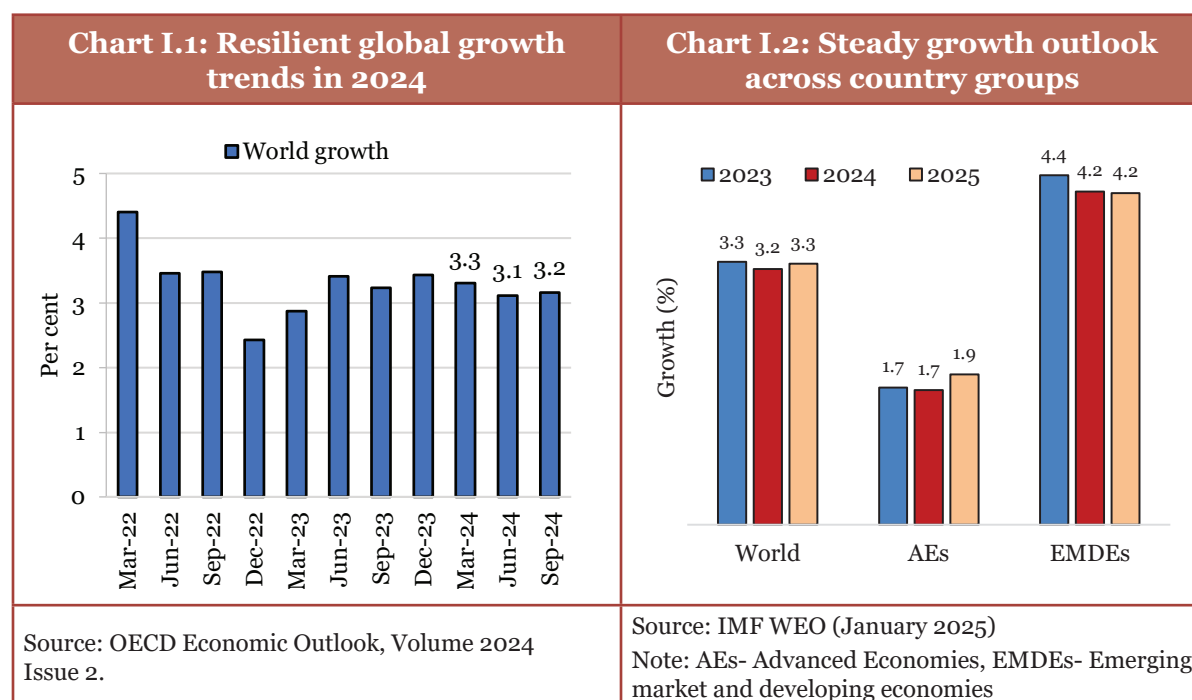
Steady global growth and varied regional dynamics

1.2 Globally, 2024 has been an eventful year. The year witnessed unprecedented electoral activity on the political front, with more than half of the global population voting in major elections across countries. Meanwhile, adverse developments like the Russia-Ukraine conflict and the Israel-Hamas conflict increased regional instability. These events impacted energy and food security, leading to higher prices and rising inflation. Cyberattacks also became more frequent and severe, with growing human and financial consequences due to the increasing digitisation of critical infrastructure.¹ Geopolitical tensions, have reshaped global trade. Geopolitical risks and policy uncertainty, especially around trade policies, have also contributed to increased volatility in global financial markets.²

1.3 Nonetheless, global economic growth has remained fairly moderate. The global economy grew by 3.3 per cent in 2023. The International Monetary Fund (IMF) has projected growth of 3.2 per cent and 3.3 per cent for 2024 and 2025, respectively. Over the next five years, global growth is expected to average around 3.2 per cent, which is modest by historical standards. While the overall global outlook remains steady, growth varies across different regions.

1 S&P Global. (n.d.). Geopolitical risk. S&P Global. <https://tinyurl.com/2yrnmmsp>.

2 Reserve Bank of India. (2024). Press release: Minutes of the Monetary Policy Committee Meeting, December 4 to 6, 2024. https://www.rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=59347.



1.4 Despite higher interest rates, advanced economies (AEs) witnessed stable growth in the first half of 2024. This was on account of moderating inflation and sustained employment and consumption.³ However, the growth outlook differs between the United States (US) and the Euro Area. Growth in the US is expected to remain strong at 2.8 per cent in 2024 and may decline slightly in 2025, reflecting a moderation in consumption and exports.⁴

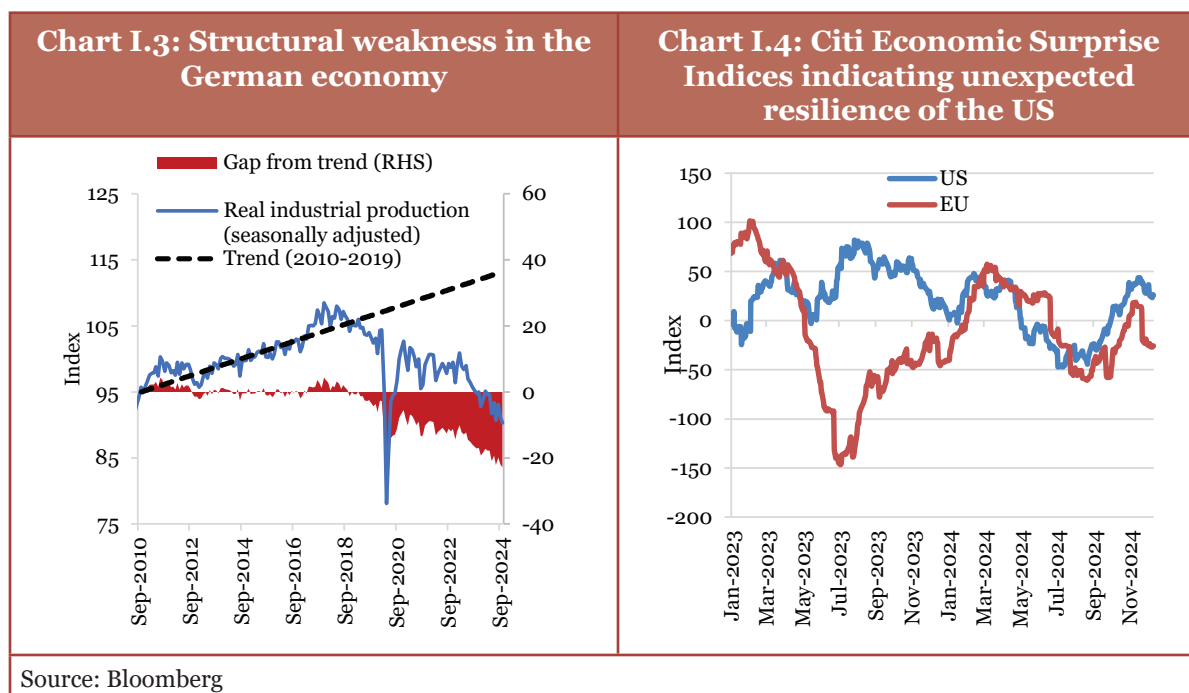
1.5 In the Euro area, growth is expected to improve from 0.4 per cent in 2023 to 0.8 per cent in 2024 and further to 1.0 per cent in 2025 on the back of improving services activity. However, growth outcomes in Europe have been varied. Some countries like Spain, France, Poland, and the United Kingdom have benefitted from the strength of their services sector. Meanwhile, manufacturing-intensive countries like Germany and Austria are being weighed down by weak demand.⁵ Germany's structural weaknesses, particularly in manufacturing (Chart I.3), have been noticeable, contributing to the slackness in Europe's manufacturing. Political developments in France and Germany are also adding to policy uncertainty in Europe's major economies.

1.6 The divergence of the growth trajectories of Europe and the US can also be seen in Citi Economic Surprises indices for these countries (Chart I.4). These indices compare actual data releases with analyst expectations. A value above zero indicates the data

3 Euromonitor International. (2024). Global economic outlook: Q3 2024. Euromonitor International. <https://www.euromonitor.com/article/global-economic-outlook-q3-2024>.

4 International Monetary Fund. (2024). Regional economic outlook: Western Hemisphere, October 2024. <https://tinyurl.com/2ep72n66>.

5 International Monetary Fund. (2024). Regional economic outlook: Europe, October 2024. <https://tinyurl.com/2s377x4z>.



was stronger than analyst expectations, while a negative value indicates weaker actual data compared to expectations. Between January 2023 and November 2024, data for the US economy continued to present more ‘positive’ surprises than the EU, compared to the analyst estimates.

1.7 Within Asia, Japan's growth was hindered by domestic supply disruptions in the early part of the year, while China's growth weakened after the first quarter, affected by sluggish private consumption and investment, alongside challenges in the real estate sector.⁶

Services sector growth steady; manufacturing faces challenges

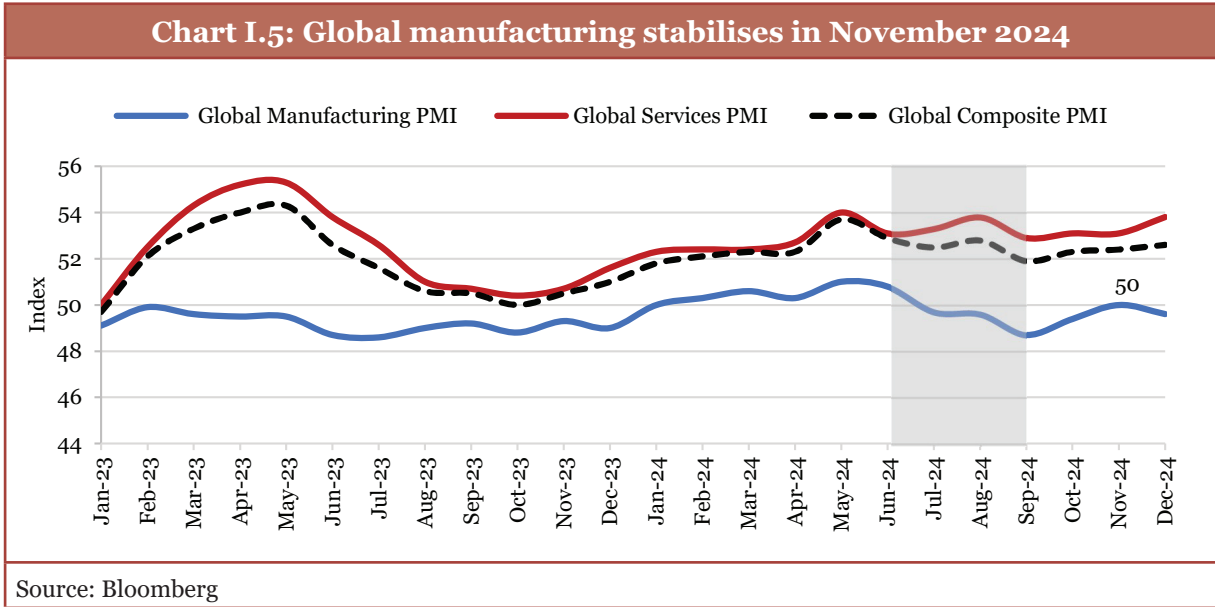
1.8 The global composite Purchasing Managers' Index (PMI) has stayed in the expansion zone for the fourteenth month in a row (as of December 2024). The services sector continues to show strength while manufacturing PMI indicated contraction.⁷

1.9 In 2024, the global manufacturing PMI started strong, moving into expansion for the first time since mid-2023 and remained so through the first half of the year. By July 2024, weaker conditions pushed the PMI back into contraction. Following four months of gradual declines, the global manufacturing sector stabilised in November with an index value of 50.0, indicating no overall change in operating conditions.⁸ Output growth in consumer and intermediate goods offset a downturn in investment goods. Increased production was attributed to stabilising new order intakes and the clearance of backlogs of work.

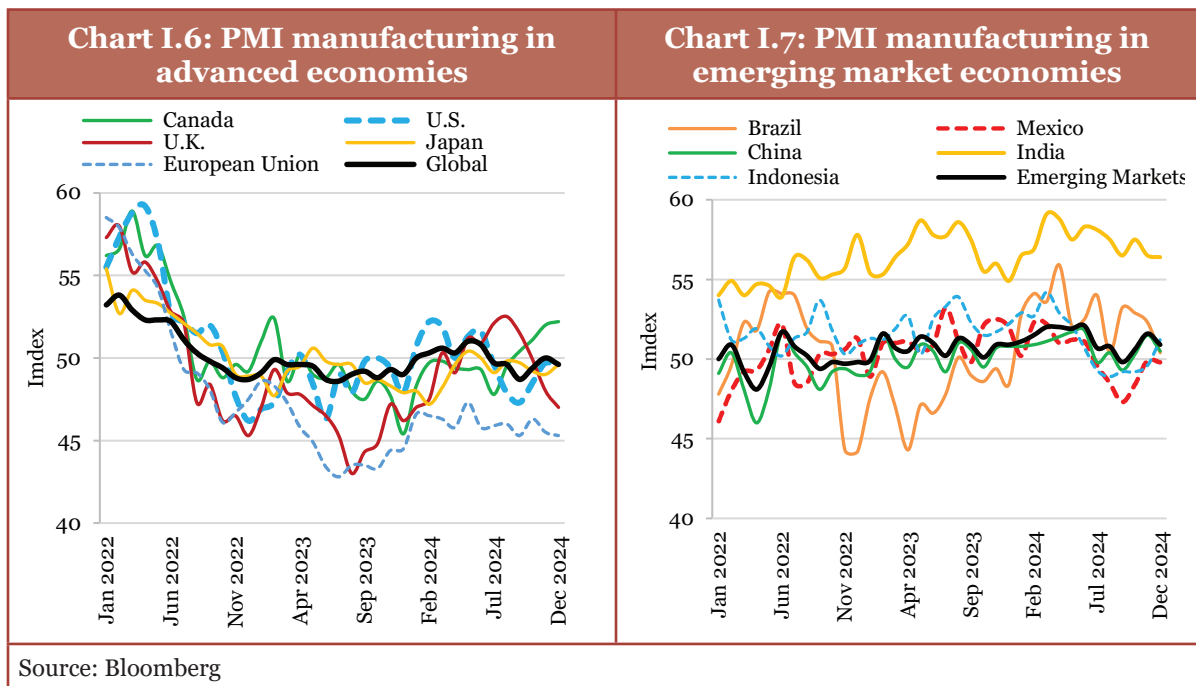
6 International Monetary Fund. (2024, October 31). Regional economic outlook for Asia and the Pacific. October 2024. <https://tinyurl.com/ycka65ub>.

7 S&P Global. (2025, January 6). Global growth accelerates as solid service sector expansion offsets manufacturing weakness. <https://tinyurl.com/mr3pkjmh>.

8 S & P Global. Global manufacturing PMI highlights. <https://tinyurl.com/bddkyr27>.



1.10 Production trends varied widely across regions in December (Chart I.6 and I.7). Production rose in 13 of the 30 nations for which December PMI data were available. The Eurozone saw the steepest contractions, led by France, Germany, and Austria. North America showed mixed results, with Canada’s growth offset by declines in the US and Mexico. India reported the strongest expansion of output. The outlook for global manufacturing also remained subdued in December, with business sentiment dipping to a three-month low.⁹

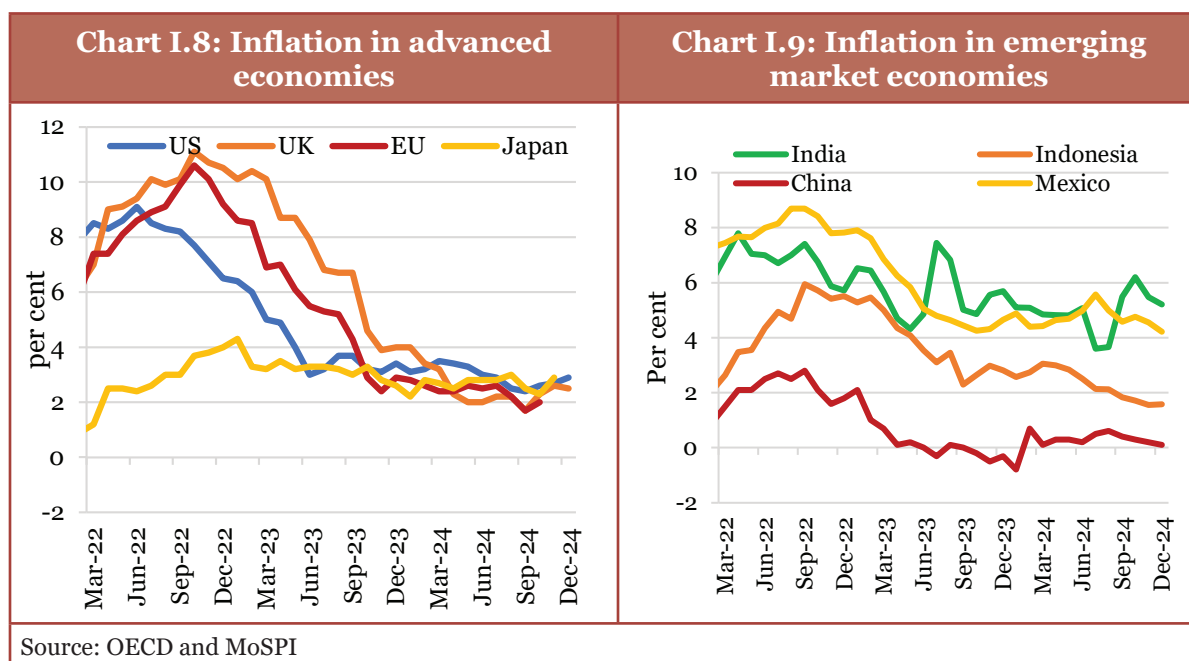


⁹ S&P Global. (2025, January 2). J.P.Morgan Global Manufacturing PMI: Global manufacturing contracts at end of 2024. <https://tinyurl.com/yn3a2fnm>.

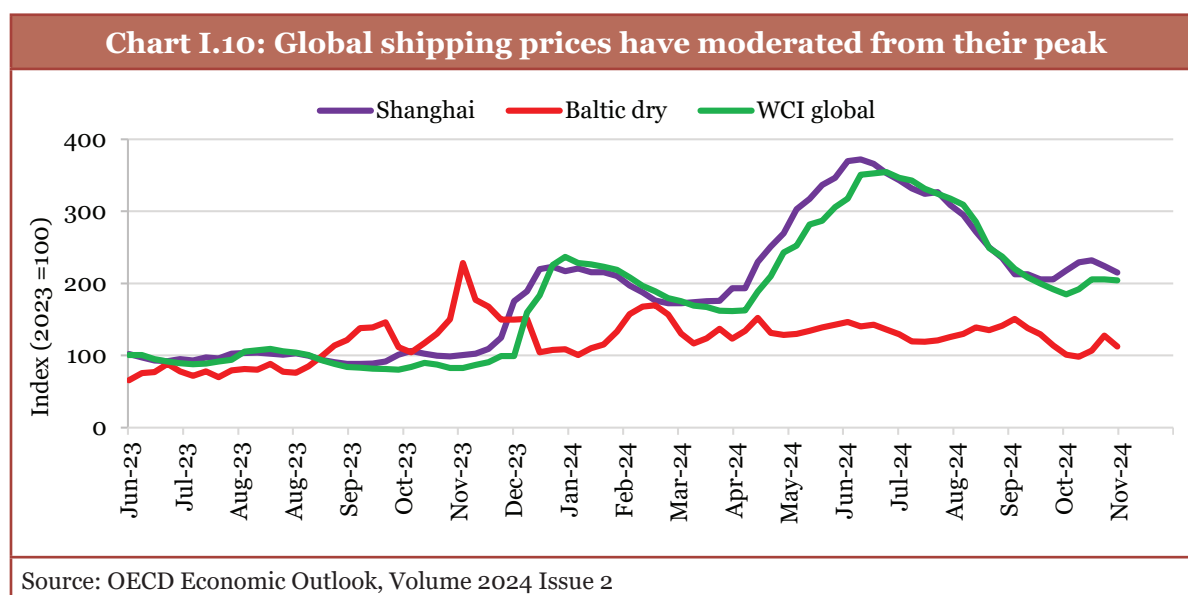
1.11 On the global services front, the global Services PMI Business Activity Index rose to a four-month high of 53.8 in December. This signals expansion for the twenty-third consecutive month. Expansion was recorded across business, consumer, and financial services. Financial services experienced the fastest pace of expansion.

Inflationary pressures ease, but risks of synchronised price pressures persist

1.12 Inflation rates across economies have trended downward steadily, approaching central bank target levels. This has been the result of tighter monetary policy regimes across the globe and supply chains adapting to higher levels of economic uncertainty. As a consequence, price pressures eased in 2023 due to a reduction in fuel prices. In 2024, it was attributed to a broad-based reduction in goods inflation.



1.13 However, disinflation seems to have slowed due to the persistence of services inflation, while core goods inflation has fallen to negligible levels. The IMF World Economic Outlook (WEO) October 2024 reasons that this is on account of higher nominal wage growth as compared to pre-pandemic trends. The report notes that there are early signs that these pressures are abating, thereby aiding the disinflation process.



1.14 However, recent disruptions in global shipping have pushed goods prices up. These events have also pressurised the global supply chains. This is reflected in higher levels of the Global Supply Chain Pressure Index (GSCPI) in the quarter ending September 2024. Chart I.10 shows that while container freight rates normalised in 2023, they experienced a significant surge in 2024. This was due to stronger demand, shipping route disruptions in the Red Sea, and delays at the Panama Canal, all of which have partially sustained inflationary pressures.¹⁰

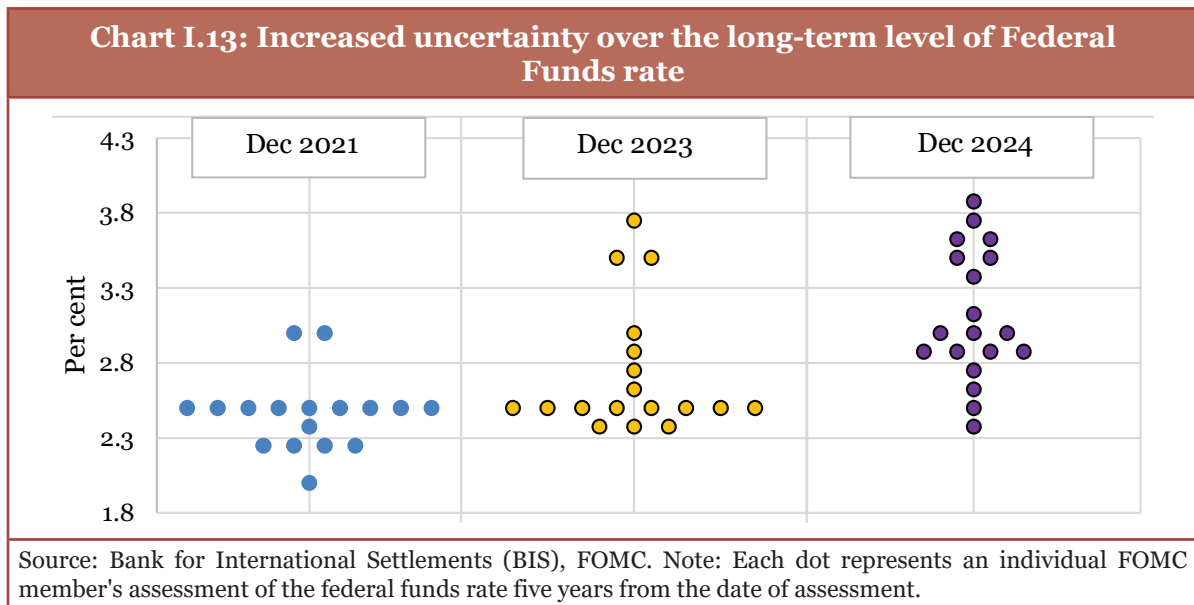
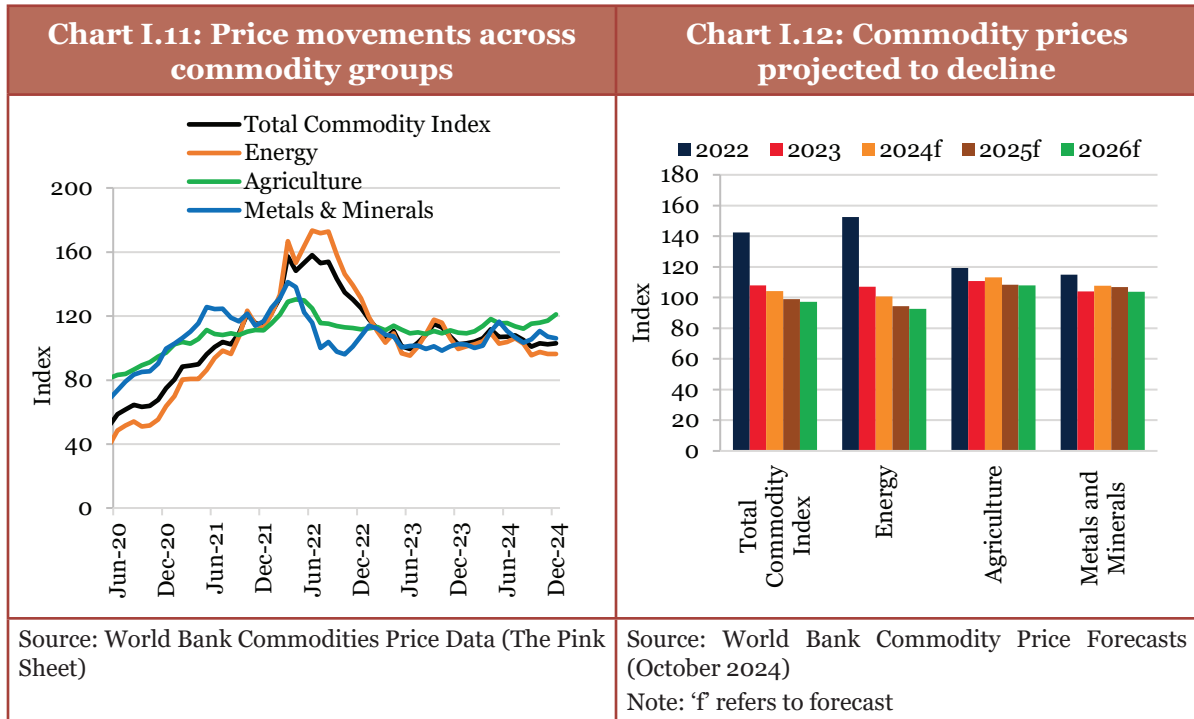
1.15 The risk to inflation from increases in commodity prices seems limited in 2025-2026. After softening in 2024, commodity prices are expected to decline moderately (Chart I.12). While this easing is a positive sign, the risk of synchronised price increases remains, especially during periods of global economic stress. Although recent shocks like geopolitical conflicts and extreme weather have caused price fluctuations, their impact has largely subsided, leading to more varied commodity prices. However, escalating tensions continue to pose a risk of synchronised price increases, undermining the effectiveness of inflation mitigation.¹¹

Easing monetary policy stances amidst divergent expectations

1.16 Taking advantage of the steep decline in inflation, major central banks have implemented a policy pivot to lower policy rates. Given the differentials in the trajectories of economic activity across countries, the pace of policy rate reduction is bound to differ. There is also uncertainty regarding the levels of the year-ahead and terminal policy rates across economies at the end of the current monetary easing cycle.

¹⁰ United Nations Conference on Trade and Development (UNCTAD). (2024). Trade and Development Report 2024. (Page 51) <https://tinyurl.com/2c7tjrxu>.

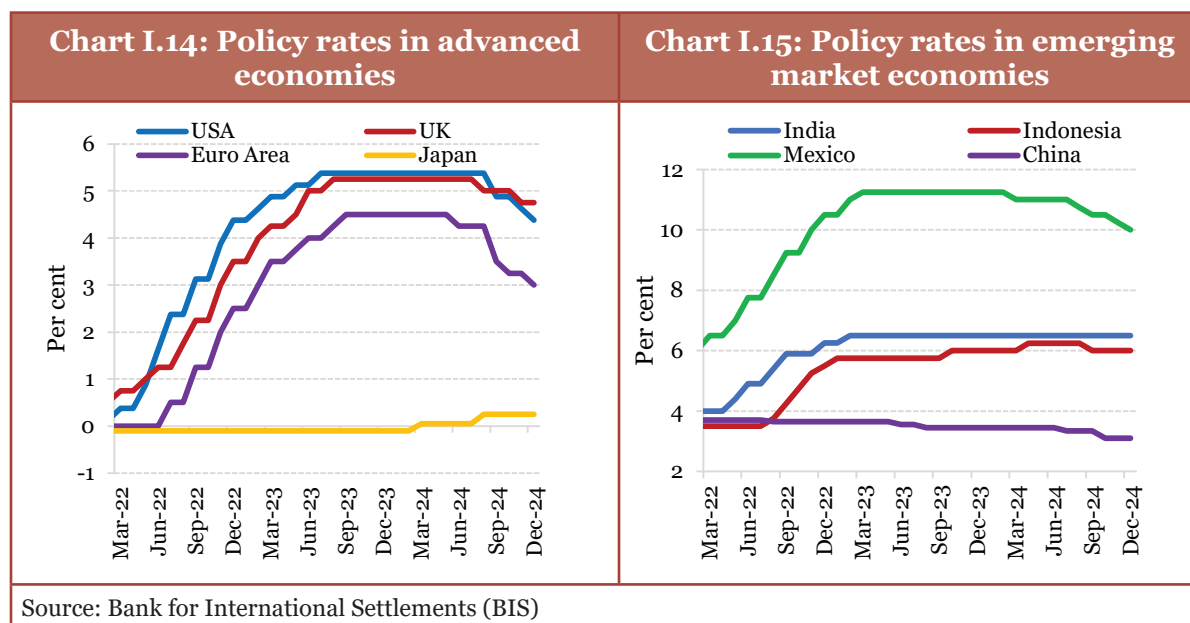
¹¹ World Bank. (2024). 'Commodity Price Synchronization: A New Era?' <https://tinyurl.com/nk59hcpx>.



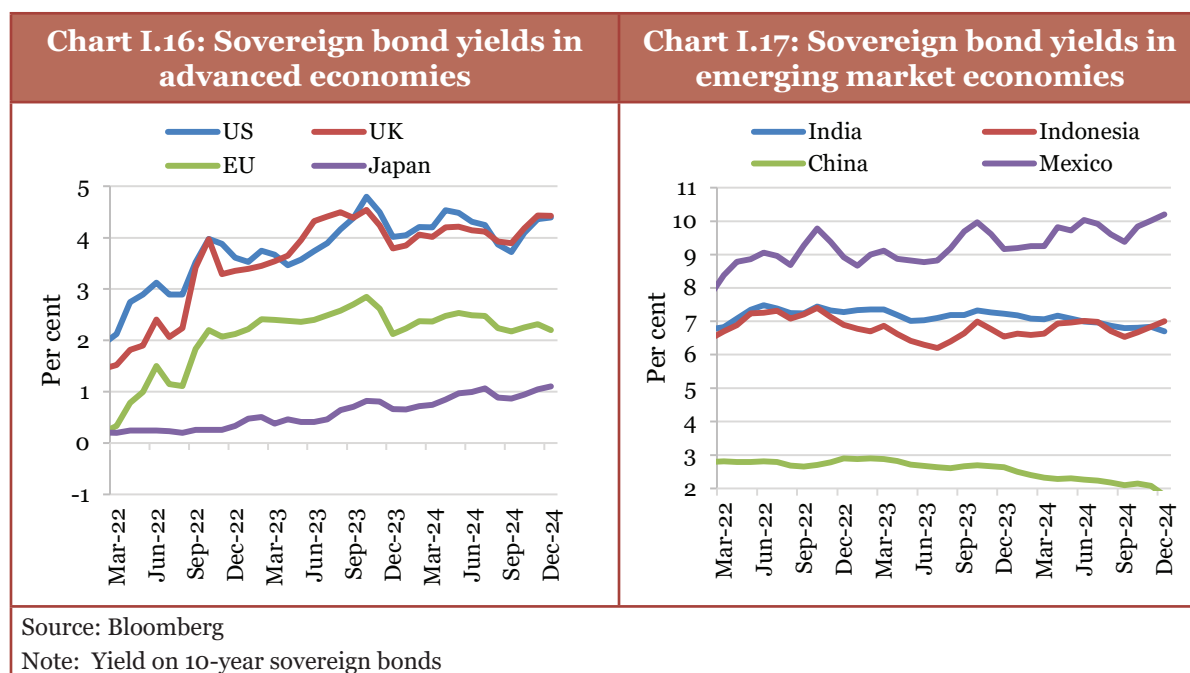
1.17 In the short term, the US market expectations of the Federal Funds Rate (FFR) were much lower than the actual FFR level for both 2023 and 2024. Similar uncertainty may persist over the course of 2025.¹² One way to visualise the uncertainty regarding the FFR over the long term is through the expectations of policymakers about the ‘long-run’ policy rate. The Federal Open Market Committee (FOMC) presents a dot-plot of its members’ assessment of the direction of the policy rate over different time horizons. Chart I.13 presents the dot-plots that represented the FOMC members’ assessments in December 2021, December 2023, and December 2024. The dot-plots show that while

¹² Ashworth, M., & Gilbert, M. (2025, January 2). Politics, economics and markets create a 2025 three-body problem. Bloomberg. <https://tinyurl.com/mppdkbdr>.

the long-run policy rate is likely to be higher, the variance in members' expectations is also larger, indicating increased uncertainty over the terminal policy rate.



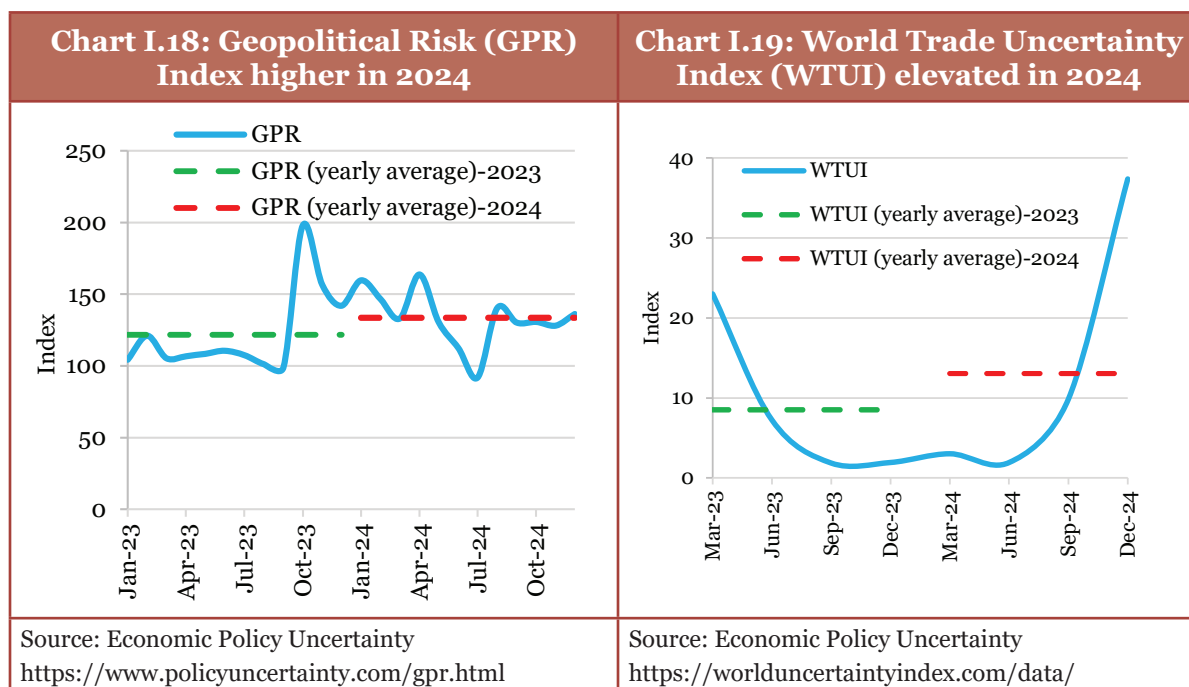
1.18 The success in inflation control, the consequent easing of monetary policies, and expectations of lower borrowing costs began to reflect in the downward trajectory of sovereign bond yields of advanced economies between April and September 2024. However, renewed global uncertainty over inflationary pressures and the direction of monetary policies have pushed bond yields up in October - December 2024. Lower growth prospects and deflationary pressures have pushed Chinese sovereign bond yields lower, thereby widening the sovereign yield spread between the world's two largest economies.



Geopolitical uncertainties continue to pose risks to the global economic outlook

1.19 Geopolitical risks remain elevated (Chart I.18) due to ongoing conflicts, which pose significant risks to the global economic outlook. These risks can influence growth, inflation, financial markets, and supply chains. An intensification of the evolving conflicts in the Middle East, or the Russia-Ukraine conflict, could lead to market repricing of sovereign risk in the affected regions and disrupt global energy markets. The oil market is well-supplied for now. However, any damage to energy infrastructure could tighten supply, adding uncertainty to the global economic outlook.¹³

1.20 Tensions in the Middle East have disrupted trade through one of the critical shipping routes – the Suez Canal. About 15 per cent of global maritime trade volume normally passes through the Suez Canal. In response, several shipping companies have diverted their ships around the Cape of Good Hope, which has increased delivery times by 10 days or more, on average. These disruptions have led to higher freight rates along major shipping routes, which in turn impact global trade activity.



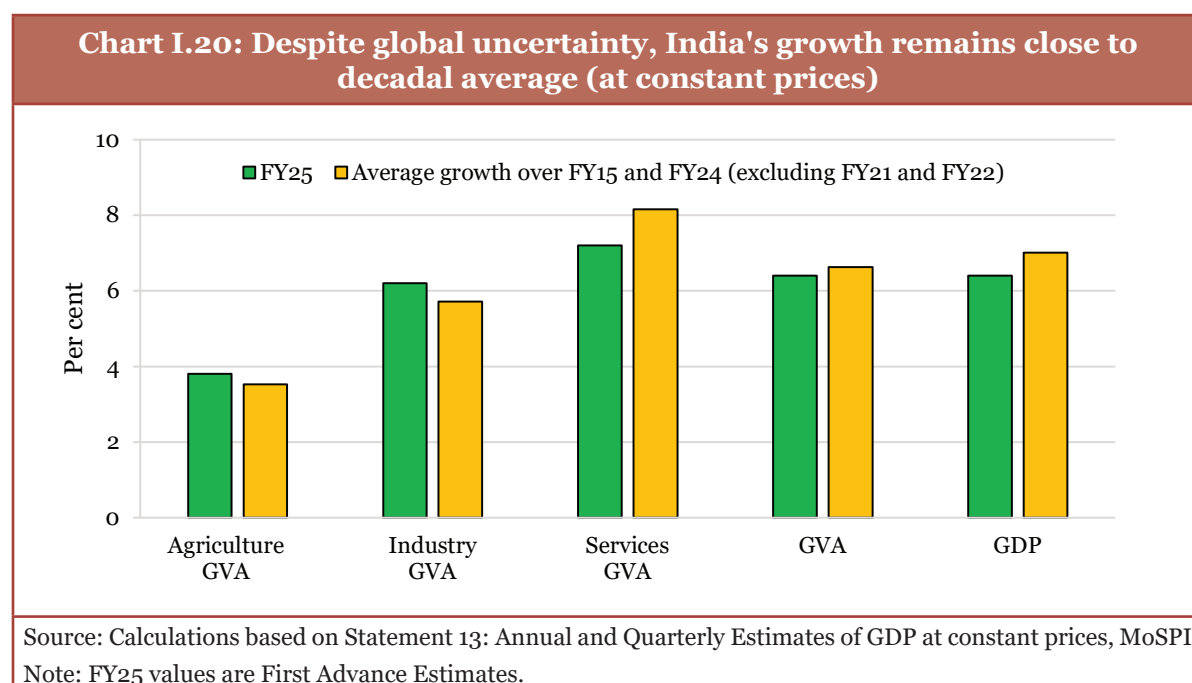
1.21 Heightened risks are also evidenced by other indices, such as the Geopolitical Economic Policy Uncertainty index, which remains elevated due to global concerns about economic policies. Similarly, the World Trade Uncertainty Index has risen, driven by trade tensions and policy shifts in major economies. Trade policy uncertainty has increased sharply in recent months, though it has not yet reached the levels seen in 2018-19. The stock of import-restrictive measures within G20 economies continues to

¹³ OECD. (2024, December). OECD Economic Outlook, Volume 2024 Issue 2. <https://tinyurl.com/m6yn9wz2>.

grow, now affecting 12.7 per cent of G20 imports—more than three times the coverage of such measures in 2015. If uncertainty persists and trade-restrictive measures continue to rise, they could increase costs and prices, deter investment, hinder innovation, and ultimately reduce global economic growth. In light of these developments, Chapter 5 of the Survey on the Medium-Term Outlook elaborates on the global factors and the importance of strengthening the levers of domestic growth.

DOMESTIC ECONOMY REMAINS STEADY AMIDST GLOBAL UNCERTAINTIES

1.22 As per the first advance estimates released by the National Statistical Office, Ministry of Statistics & Programme Implementation (MoSPI), the real gross domestic product (GDP) growth for FY25 is estimated to be 6.4 per cent. From the angle of aggregate demand in the economy, private final consumption expenditure at constant prices is estimated to grow by 7.3 per cent, driven by a rebound in rural demand. PFCE as a share of GDP (at current prices) is estimated to increase from 60.3 per cent in FY24 to 61.8 per cent in FY25. This share is the highest since FY03. Gross fixed capital formation (GFCF) (at constant prices) is estimated to grow by 6.4 per cent.



1.23 On the supply side, real gross value added (GVA) is also estimated to grow by 6.4 per cent. The agriculture sector is expected to rebound to a growth of 3.8 per cent in FY25. The industrial sector is estimated to grow by 6.2 per cent in FY25. Strong growth rates in construction activities and electricity, gas, water supply and other utility

services are expected to support industrial expansion. Growth in the services sector is expected to remain robust at 7.2 per cent, driven by healthy activity in financial, real estate, professional services, public administration, defence, and other services. The analysis of growth trends in this chapter, hereinafter, is mostly based on the trends in the first half (H1) of FY25, on which the information base is more comprehensive.

Resilient recovery

1.24 The COVID-19 pandemic caused widespread disruptions to economies worldwide. Economic Survey 2023-24¹⁴ compared the post-pandemic trends until Q4 FY24 with the pre-pandemic trajectory and concluded that the economy grew briskly enough to avert any permanent loss of output. This section extends the analysis to Q2 FY25 (ending September 2024) with a sectoral view of the economy.

1.25 The overall picture is encouraging. Aggregate GVA surpassed its pre-pandemic trend in Q1 FY25, and it now hovers above the trend in the H1 FY25¹⁵. The agriculture sector remains strong, consistently operating well above trend levels. The industrial sector has also found its footing above the pre-pandemic trajectory. The robust rate of growth in the recent years has taken the services sector close to its trend levels (Chart I.21 to Chart I.24).

1.26 A closer look at industrial sub-sectors reveals a spectrum of performances (Chart I.25). Construction has been a standout, gaining momentum since mid-FY21 and soaring approximately 15 per cent above its pre-pandemic trend—an impressive feat driven by robust infrastructure development and housing demand. The utilities sector, including electricity, gas, water supply, and other services, reached its pre-pandemic trend by the end of FY23 and has consistently stayed above these levels. Manufacturing, while steadily recovering, remains slightly below its pre-pandemic trajectory. Meanwhile, mining continues to operate below its pre-pandemic trend.

1.27 The recovery within the services sector has been uneven (Chart I.26). Financial, real estate and professional services have taken the lead, surpassing pre-pandemic trend levels by the end of FY23. Public administration, defence, and other services followed suit, exceeding the trend for the first time in Q1 of FY25 since the onset of the pandemic. However, trade, hotels, transport, and communication services are gradually catching up with the pre-pandemic trend. These contact-intensive sectors faced challenges due to lockdown, restricted demand for travel, and reduced demand for hospitality, entertainment, and personal services.

14 Economic survey 2023-24, Chapter 1 – State of the Economy, Box I.1: Growth in GDP, GVA, and their components ensure no permanent losses in demand and output. <https://tinyurl.com/r8ykwj6>.

15 H1 refers to the first half of the corresponding Financial Year that is April to September.

Chart I.21: Aggregate GVA recovery continues

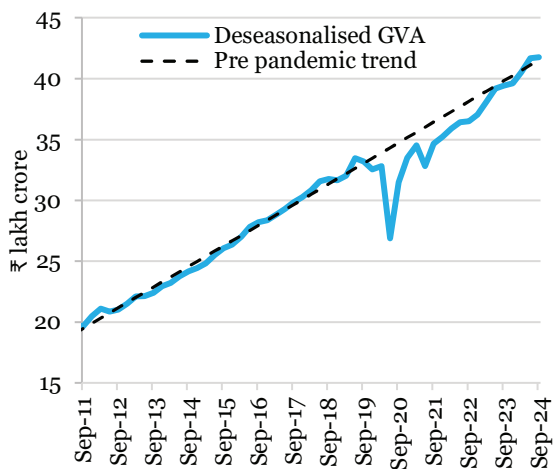


Chart I.22: Agriculture GVA sustained at higher levels

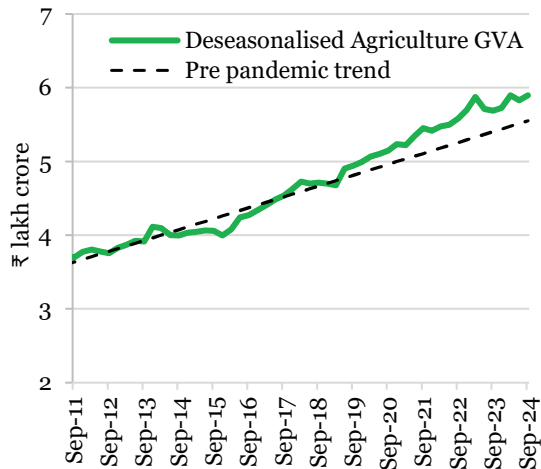


Chart I.23: Industrial GVA operating above the trend level

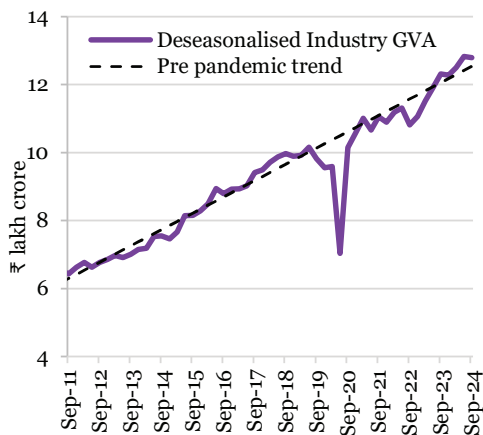


Chart I.24: Services GVA is close to its trend

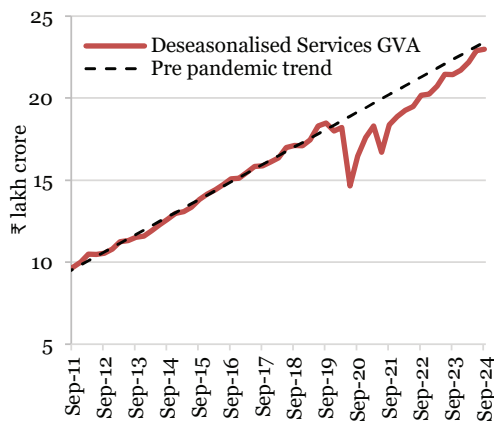
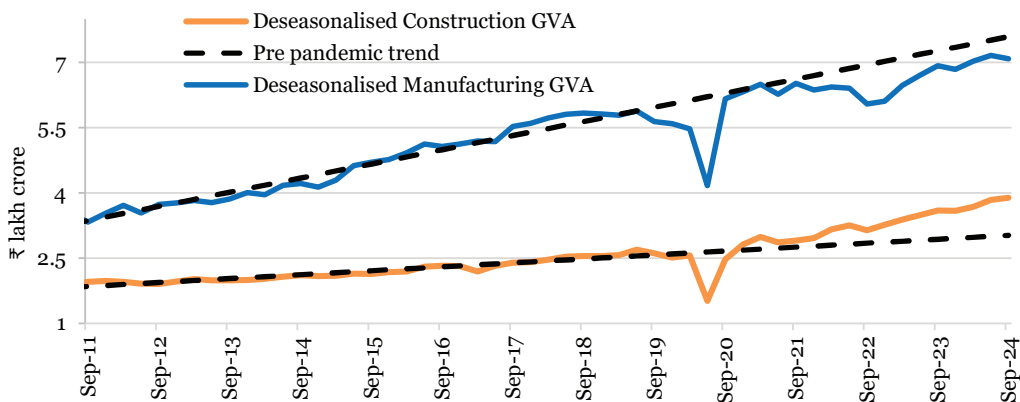
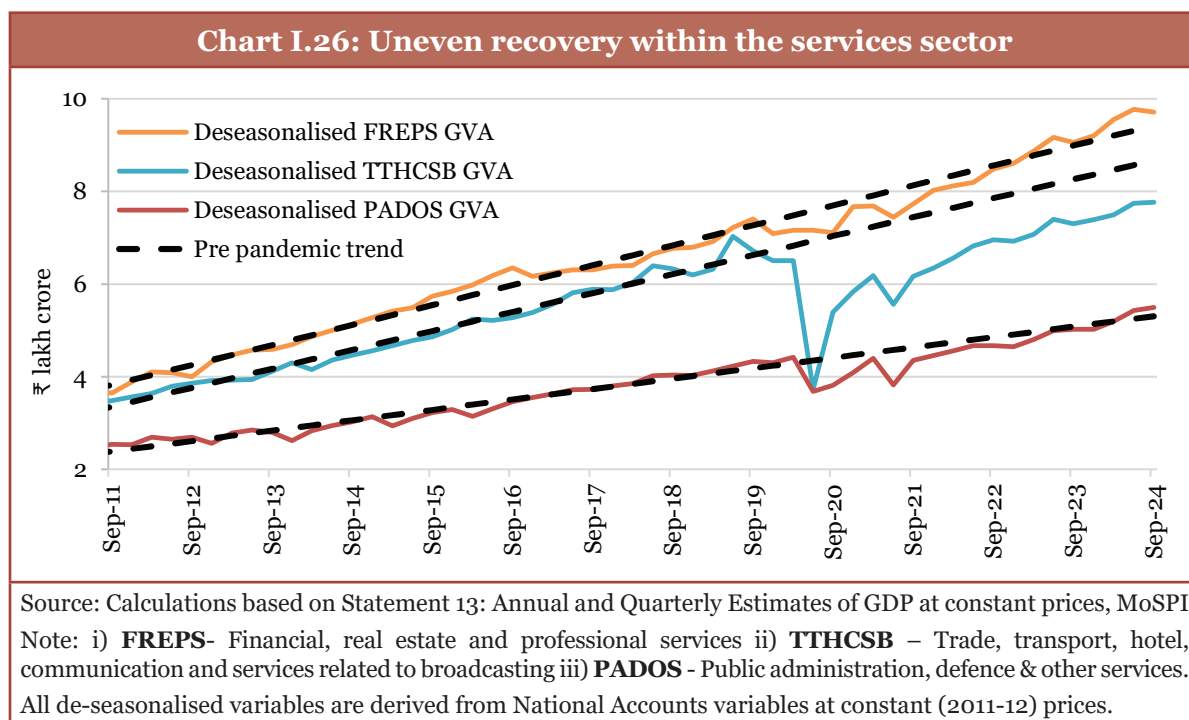


Chart I.25: Construction GVA operating well above trend levels, and manufacturing GVA gradually recovering





Growth in H1 FY25 driven by agriculture and services sector

1.28 The real GVA grew by 6.2 per cent in H1 FY25. A strong growth momentum in Q1 FY25 was followed by a subdued performance in Q2 FY25. The agriculture and services sectors emerged as key growth drivers during this period. However, the overall growth was tempered by moderation in industrial growth, particularly in manufacturing, which faced challenges from slowing global demand and supply chain disruptions.

Improved agricultural prospects in FY25

1.29 Agriculture growth remained steady in H1 FY25, with Q2 recording a growth rate of 3.5 per cent, marking an improvement over the previous four quarters. Healthy Kharif production, above-normal monsoons, and an adequate reservoir level supported agricultural growth. As per the first advanced estimates of agricultural production for 2024-25, total Kharif food grain production is estimated at a record 1647.05 lakh metric tonnes (LMT), higher by 5.7 per cent compared to 2023-24 and 8.2 per cent higher than the average food grain production in the past five years. The estimated increase is mainly on account of the rise in rice, maize, coarse grains and oilseeds output. A normal southwest monsoon in 2024 has improved the water levels in reservoirs, ensuring sufficient water for irrigation during the rabi crop production. As of 10 January 2025,

rabi sowing of wheat and gram was 1.4 per cent and 0.8 per cent higher, respectively, compared to the previous year. Improved agricultural prospects also bode well for softening of food inflation pressures over the course of the year.

Manufacturing sector growth moderates but shows positive expectations

1.30 The industrial sector grew by 6 per cent in H1 FY25. Q1 saw a strong growth of 8.3 per cent, but growth moderated in Q2 due to three key factors. First, manufacturing exports slowed significantly due to weak demand from destination countries, and aggressive trade and industrial policies in major trading nations. Second, the above-average monsoon had mixed effects - while it replenished reservoirs and supported agriculture, it also disrupted sectors like mining, construction, and, to some extent, manufacturing. Third, the variation in the timing of festivities between September and October in the previous and current years led to a modest growth slowdown in Q2 FY25.

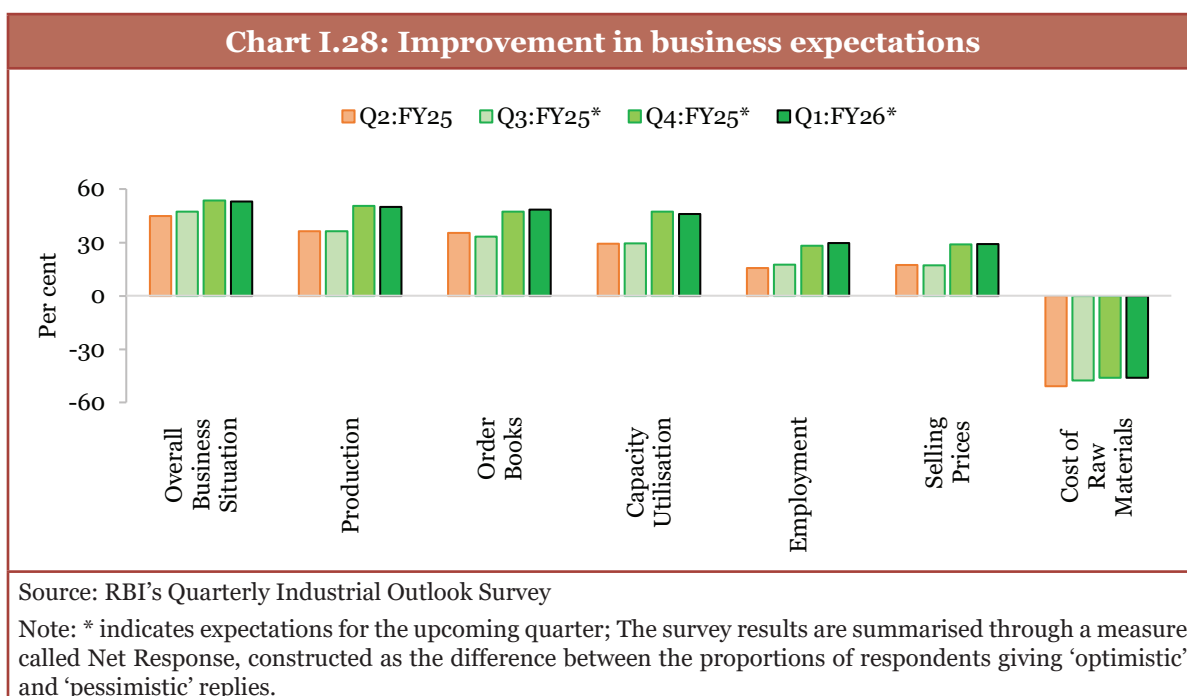
1.31 Disaggregated data reveals that while many manufacturing sub-sectors experienced growth, others faced challenges, likely due to global and seasonal factors. Oil companies suffered due to inventory losses and lower refining margins, while steel companies faced price pressures and lower global prices. The cement sector faced weak demand in Q2 due to heavy rains and lower selling prices. However, with the conclusion of the monsoon season and the expected pick-up in government capital expenditure, sectors such as cement, iron, and steel are expected to see a recovery. Further, mining and electricity are expected to normalise after the monsoon-related disruptions.¹⁶

1.32 Despite various challenges, India continues to register the fastest growth in manufacturing PMI, which is also reflected in Chart I.7 of the previous section. The latest Manufacturing PMI for December 2024 remained well within the expansionary zone. The expansion rate for December 2024 exceeded its long-term average, driven by new business gains, robust demand, and advertising efforts. Meanwhile, international orders grew to a four-month high midway through the third fiscal quarter, signalling recovering external demand, as reported by companies.

¹⁶ RBI Governor's Statement: December 6, 2024 <https://tinyurl.com/4j6xwp2r>.



1.33 According to the RBI's Industrial Outlook Survey, manufacturing firms reported improved demand conditions in Q3 FY25 and expect further improvements in Q4 FY25 and Q1 FY26. The survey also reflected better expectations for production, order books, employment, capacity utilisation, and the overall business environment during Q4 FY25 and Q1 FY26.



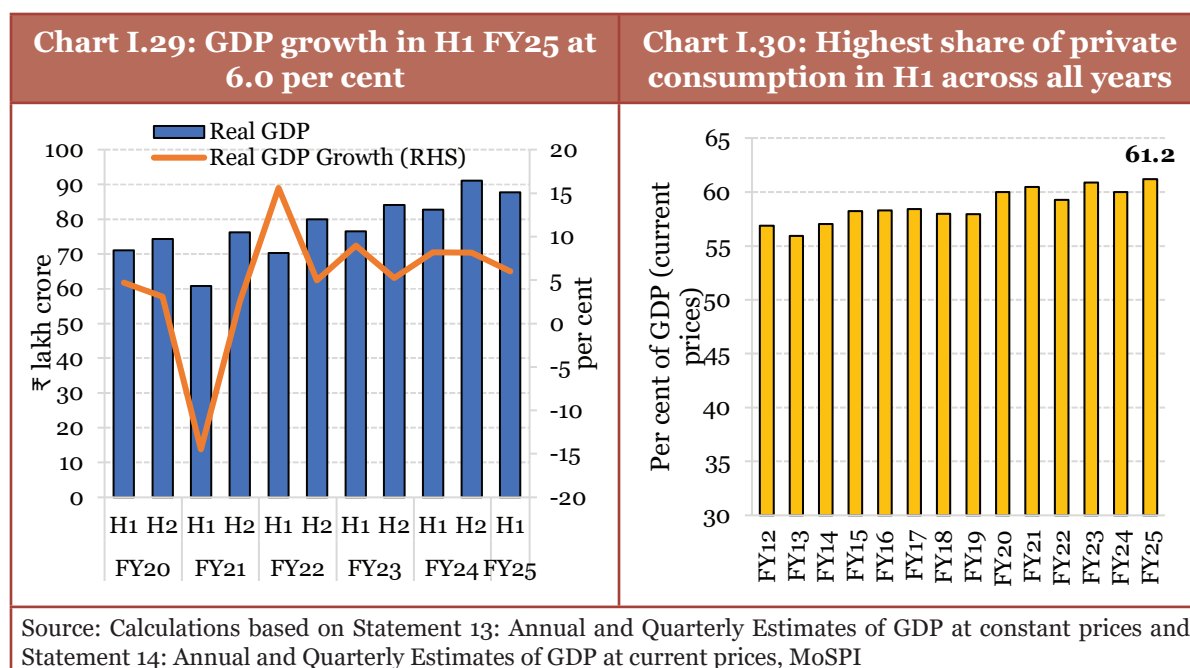
Robust growth in the services sector

1.34 The services sector continues to perform well in FY25. A notable growth in Q1 and Q2 resulted in 7.1 per cent growth in H1 FY25. Across sub-categories, all the sub-sectors have performed well. The robust performance of the services sector is also reflected

in high-frequency indicators (HFIs). PMI services have been in an expansionary zone during H1 FY25, supported by growth in new orders, rise in output, improvement in sales and enhanced employment generation. The hospitality sector performed well, with hotel occupancy rates in H1 FY25 similar to the previous year. Average daily rates and revenue per room increased due to higher corporate and leisure travel. Air cargo activity grew in double digits, while port traffic remained stable. Information Technology (IT) companies also performed better than the previous quarter.¹⁷

Analysis of GDP by expenditure categories

1.35 India's GDP at constant (2011-12) prices grew by 6.7 per cent and 5.4 per cent in Q1 and Q2 FY25, respectively. This implied a real GDP growth of 6.0 per cent in the first half of the current fiscal.



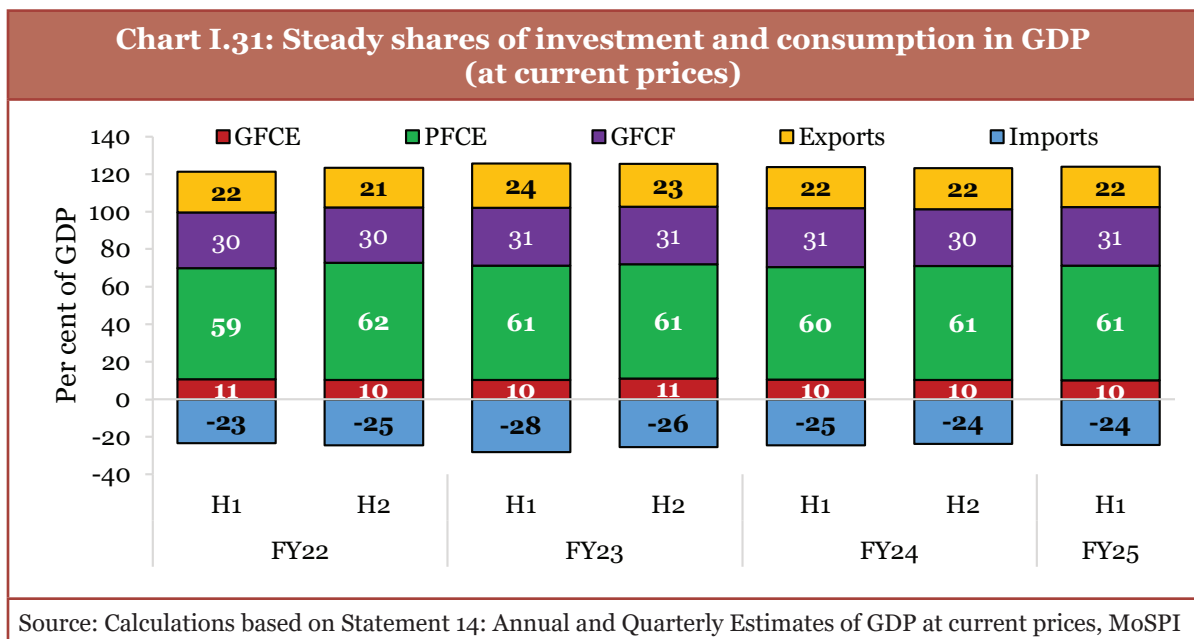
1.36 From a demand perspective, Private Final Consumption Expenditure (PFCE) firmed up in H1 FY25, growing by 6.7 per cent YoY. While National Accounts data is not disaggregated by geography, indicators such as 2-wheeler and 3-wheeler sales and tractor sales signal that rural demand contributed to private consumption growth. This is also reflected in the January 2025 round of National Bank for Agriculture and Rural Development (NABARD's) Rural Economic Conditions and Sentiments Survey, where 78.5 per cent of rural households reported an increase in their consumption expenditure during the last year.¹⁸ The impulse from rural demand is expected to continue in the second half of the fiscal year with the returns from a bumper Kharif crop and higher MSPs for a prospectively good Rabi crop.

17 Reserve Bank of India. (2024, December 24). RBI Bulletin December 2024. <https://tinyurl.com/rur6xe8u>.

18 NABARD, Rural economic conditions & sentiments survey. (January 2025) <https://tinyurl.com/3cu6pfk9>.

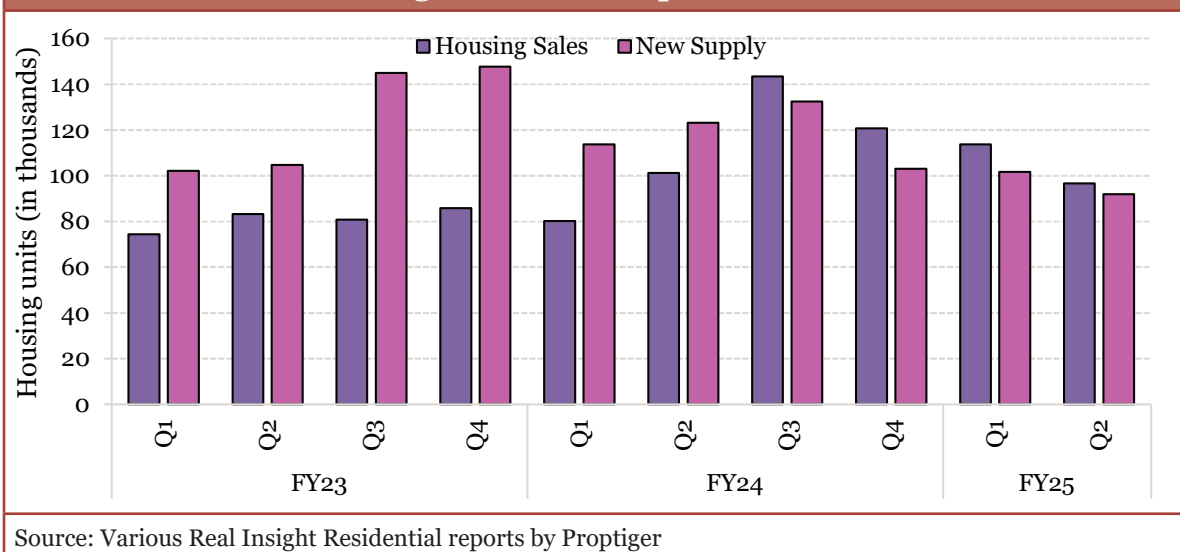
1.37 On the other hand, indicators of urban demand presented mixed trends. According to data from the Federation of Automobile Dealers Associations (FADA)¹⁹, the growth of passenger vehicle sales has slowed to 4.2 per YoY cent in April – November 2024 compared to 9.2 per cent in the corresponding period of the previous year. Fast-moving consumer goods (FMCG) sales in urban areas, as per Nielsen IQ, have recorded a moderate growth in H1FY25. However, there is steady growth of 7.7 per cent YoY in air passenger traffic in April – November 2024. The 7.3 per cent YoY growth indicated by the First Advance Estimates for PFCE at constant prices for FY25 indicates a pick-up in the most recent months.

1.38 The moderation in real GDP growth can be traced to a softening of growth in Gross Fixed Capital Formation (GFCF) from 10.1 per cent in H1 FY24 to 6.4 per cent in H1 FY25. Q1 FY25 witnessed a slowdown in capital expenditure across different levels of government on account of the conduct of the general elections. Private sector investment growth may have remained subdued thus far in FY25 on account of the domestic political timetable, global uncertainties and overcapacities.



1.39 An additional reason for the slowdown in capital formation growth in Q2 FY25 may have emanated from the moderation in residential investment by households in this quarter, which is on the back of a sharp uptick over the last few quarters. Industry reports, however, point out that the correction in demand-supply metrics in this sector is indicative of market normalisation after a period of robust performance. An inventory overhang of 23 months signals healthy demand momentum in the segment.

Chart I.32: Moderating housing sales and launches on the back of a high base in the top 8 cities²⁰



1.40 The slowdown in investment activity is likely temporary. Green shoots in capital formation are visible. Union government capex is up 8.2 per cent in July – November 2024 and is expected to pick up further pace. Early results of the RBI's Order Books, Inventory, and Capacity Utilisation Survey (OBICUS) show that the seasonally adjusted capacity utilisation (CU) in manufacturing firms was 74.7 per cent in Q2 FY25, above the long-term average of 73.8 per cent.²¹ A private sector report's²² analysis of a sample of capital goods companies indicates that the order books of these companies have registered a sharp increase of 23.6 per cent in FY24 as against a compound annual growth rate (CAGR) of 4.5 per cent in the preceding four years. Moreover, in H1 FY25, there has been a growth of 10.3 per cent compared to the end of FY24. The RBI's report on private investments showed that investment intentions increased to ₹2.45 lakh crore for FY25 as compared to ₹1.6 lakh crore for FY24. Along with fresh investment, some of the existing intentions would spill over and be implemented in FY26.

1.41 On the external front, exports of goods and non-factor services at constant prices increased by 5.6 per cent in H1 FY25, while imports increased by 0.7 per cent. In Q2 FY25, imports of goods and services at constant prices contracted by 2.9 per cent, primarily driven by a decline in commodity prices. As a result, net exports contributed positively to real GDP growth in this period.

1.42 As India's economy continues to expand, the growth process has been ably supported by stability on fronts such as inflation, fiscal health, and balance of payments.

²⁰ The top 8 cities refer to Ahmedabad, Bangalore, Chennai, Delhi-NCR, Hyderabad, Kolkata, Mumbai, and Pune.

²¹ Footnote no. 19, RBI Governor's Statement: December 6, 2024 <https://tinyurl.com/4j6xwp2r>.

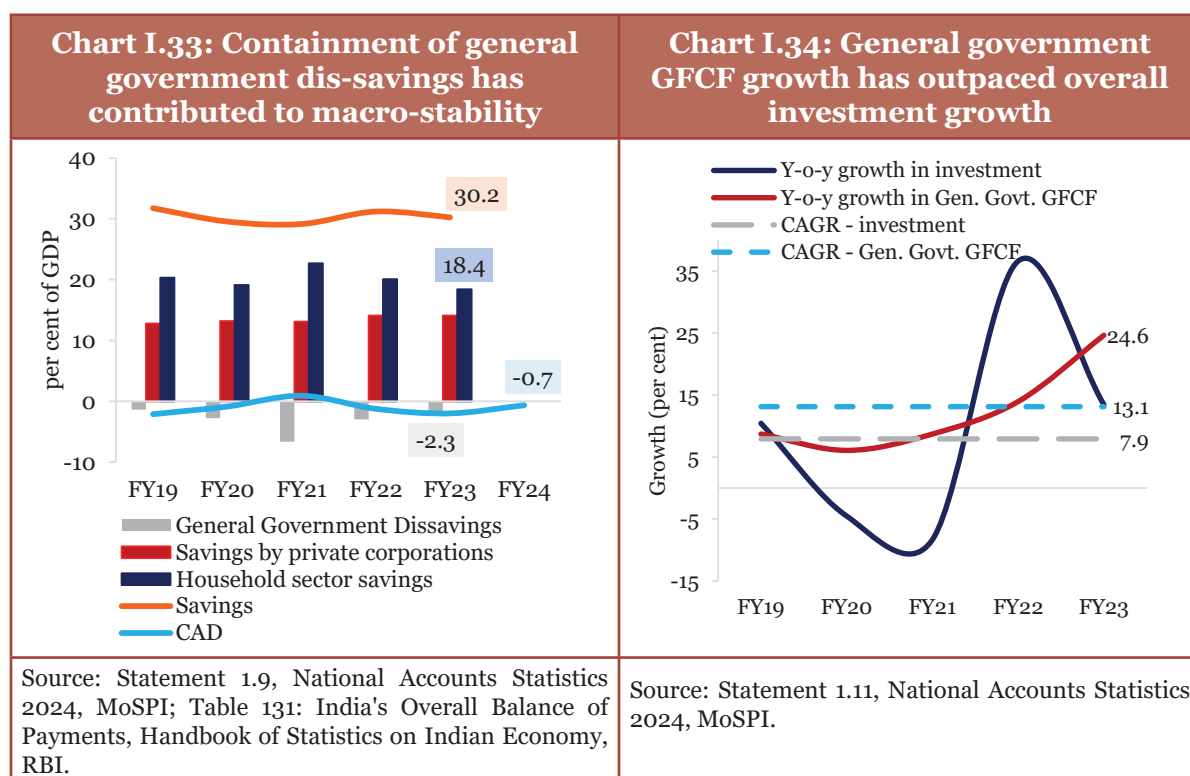
²² CARE Ratings. (2024, November). India's capex story gives a mixed picture. <https://tinyurl.com/54ed858f>.

The following section presents a closer examination of these stability factors and provides valuable insights into the resilience and sustainability of the Indian economy in the face of global and domestic challenges.

ECONOMY CHARACTERISED BY STABILITY AND INCLUSIVITY ON MULTIPLE FRONTS

Improving public finances support macro stability

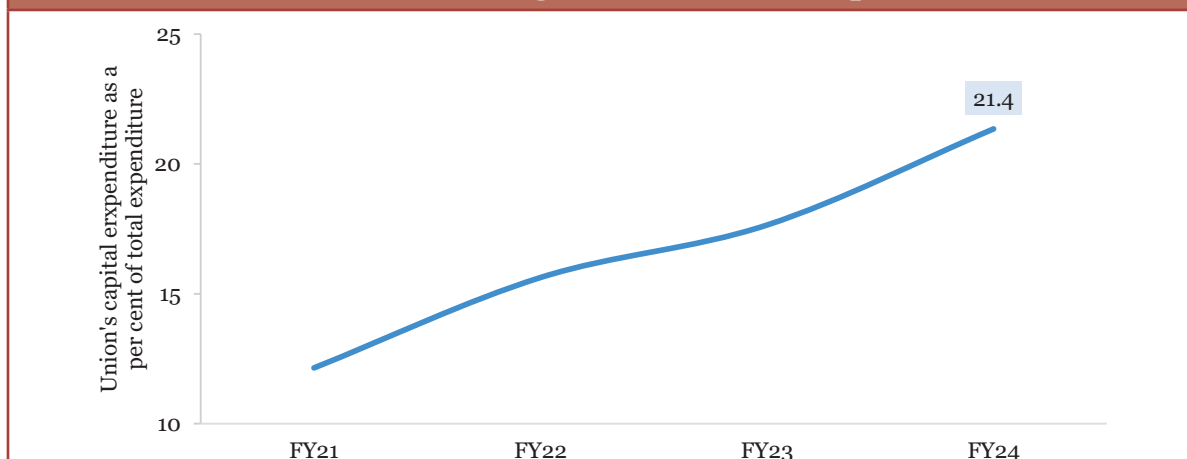
1.43 Since the COVID-19 pandemic, judicious fiscal management has helped to rein in general government dis-savings (Chart I.33). This assumes greater significance in sustaining the overall savings in the economy. With private corporate savings hovering around 14 per cent of GDP, persistent general government dis-savings could have implied a greater reliance on foreign funding. Prudent fiscal management in the last four years kept the overall savings-investment gap from widening and ensured a comfortable financing of the current account deficit, even though the household saving rate moderated. (Chart I.34 below).



Fiscal discipline of the union government

1.44 The Union government's indicators of fiscal discipline have improved progressively. Quality of expenditure approximated by capital expenditure as a per cent of total expenditure of the union, has continuously improved since FY21.

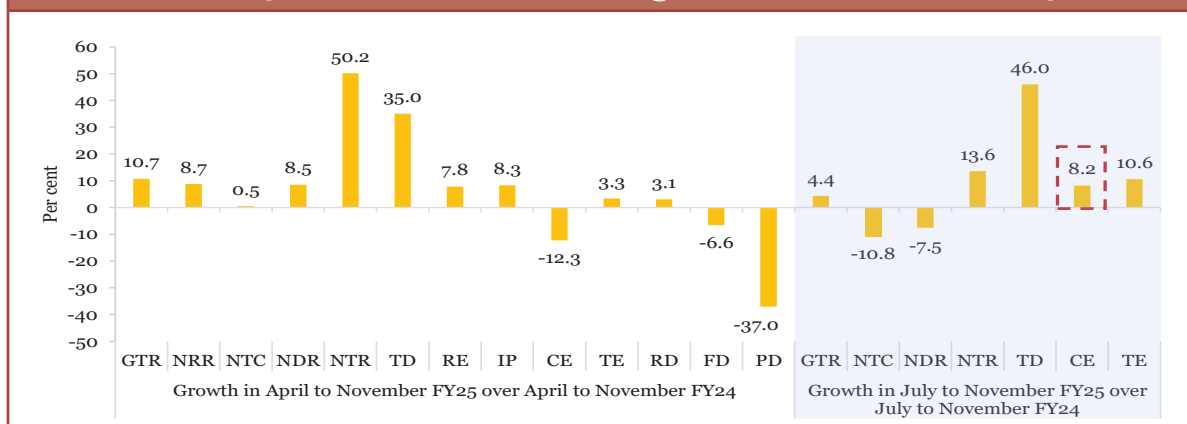
Chart I.35: Strong focus on fiscal discipline



Source: Union Budget documents. Provisional actuals for FY24.

1.45 During April - November 2024 (Chart I.36 below), three major facts stand out in union finances. First, following an unprecedented expansion of capital expenditure in the last four years, it remained subdued during Q1 FY25, owing to general elections. However, it rebounded after July despite a reduction in non-debt receipts owing to an increase in the devolution of taxes to states. Until November 2024, defence, railways and road transport accounted for about 75 per cent of the capital expenditure, whereas significant YoY growth occurred in power and food and public distribution. Second, despite the gross tax revenue (GTR) increasing by 10.7 per cent YoY during April-November 2024, the tax revenue retained by the Union, net of devolution to the states, hardly increased. This was because of increased tax devolution, which helped the states to manage their expenditures smoothly. Thirdly, as of November, the deficit indicators of the union were comfortably placed, leaving ample room for developmental and capital expenditure in the rest of the year.

Chart I.36: Sound and sure footing of union finances in FY25

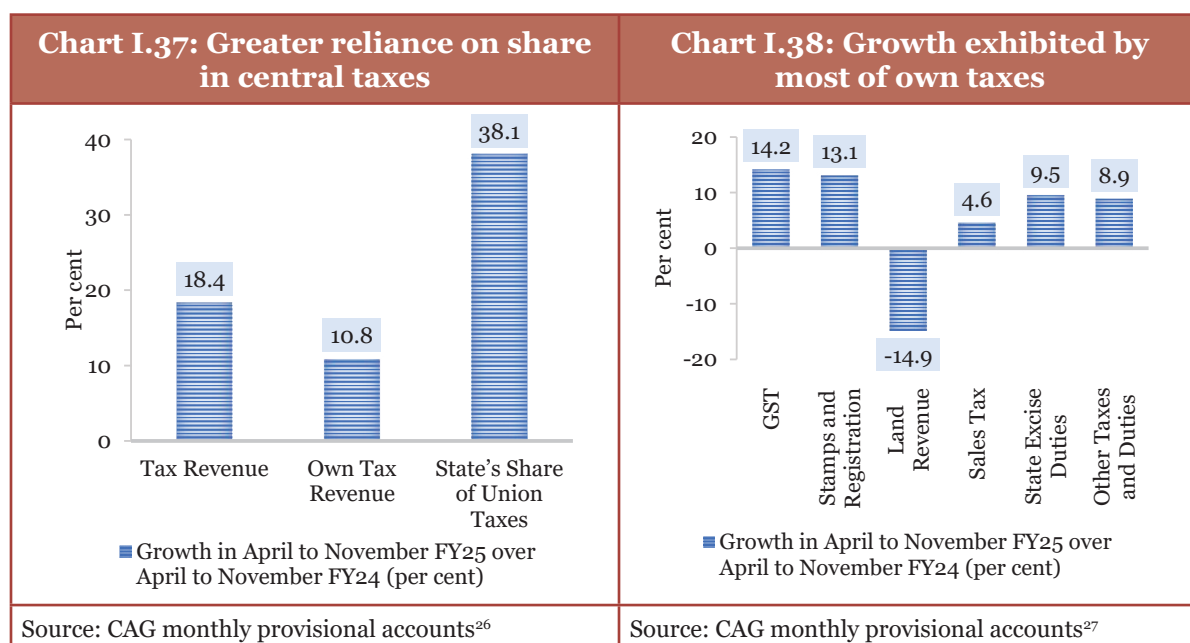


Source: CGA monthly provisional accounts.

Note: GTR- Gross Tax Revenue; NRR-Revenue Receipts (net to Centre); NTC-Tax revenue (net to Centre); NDR-Non-debt receipts; TD-Tax devolution to States; RE-Revenue Expenditure; IP-Interest Payments; CE-Capital Expenditure; TE-Total Expenditure; FD-Fiscal Deficit; RD-Revenue Deficit; PD-Primary Deficit.

Varying patterns in state finances

1.46 A review of preliminary unaudited estimates of 27 states²³ for the period April - November 2024²⁴ corroborates the second point above (Chart I.37). The GTR of the union and own tax revenue (OTR) of the states have increased at comparable pace during this period. However, the overall tax revenue position of the state governments appears better as of November, because of increased tax devolution by the union. Among the state-specific taxes, stamps and registration, sales tax, state excise duties, and other taxes and duties registered positive growth, whereas land revenue²⁵ declined, for states as a collective (Chart I.38).



1.47 For 15 states²⁸, OTR accounted for more than half of their total tax receipts (Chart I.39), the highest being Telangana at 88 per cent, followed by Karnataka and Haryana at 86 per cent each. Further, states with a higher ratio of own revenue receipts (ORR) to total revenue receipts also tended to have relatively lower ratios of revenue deficit to total revenue receipts (Chart I.40).

23 Andhra Pradesh (AP), Arunachal Pradesh (AR), Assam (AS), Bihar (BR), Chhattisgarh (CG), Gujarat (GJ), Haryana (HR), Himachal Pradesh (HP), Jharkhand (JH), Karnataka (KA), Kerala (KL), Madhya Pradesh (MP), Maharashtra (MH), Manipur (MN), Meghalaya (ML), Mizoram (MZ), Nagaland (NL), Odisha (OD), Punjab (PB), Rajasthan (RJ), Sikkim (SK), Tamil Nadu (TN), Telangana (TS), Tripura (TR), Uttar Pradesh (UP), Uttarakhand (UK) and West Bengal (WB).

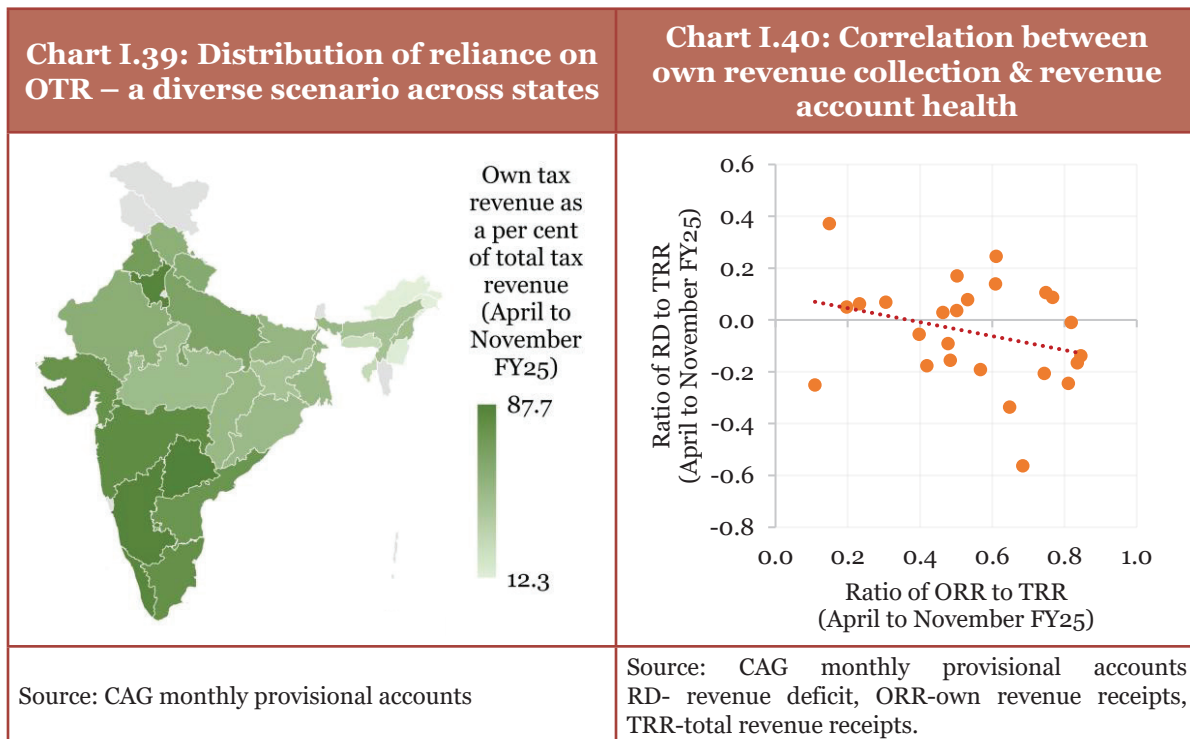
24 April to July reference period for Jharkhand; April to September for Arunachal Pradesh and Manipur.

25 Land revenue for Himachal Pradesh included in 'other taxes and duties'.

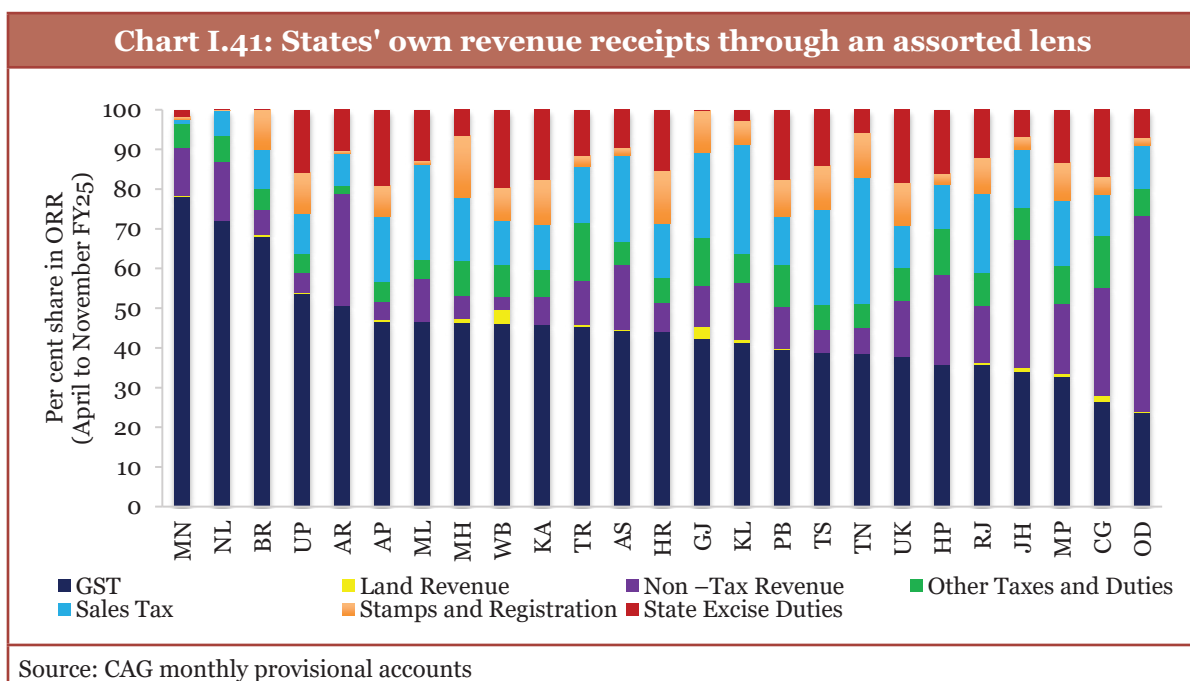
26 Share of central taxes for Mizoram and Sikkim included in 'other taxes and duties'.

27 Ibid.

28 Out of 25 States; Mizoram and Sikkim excluded.



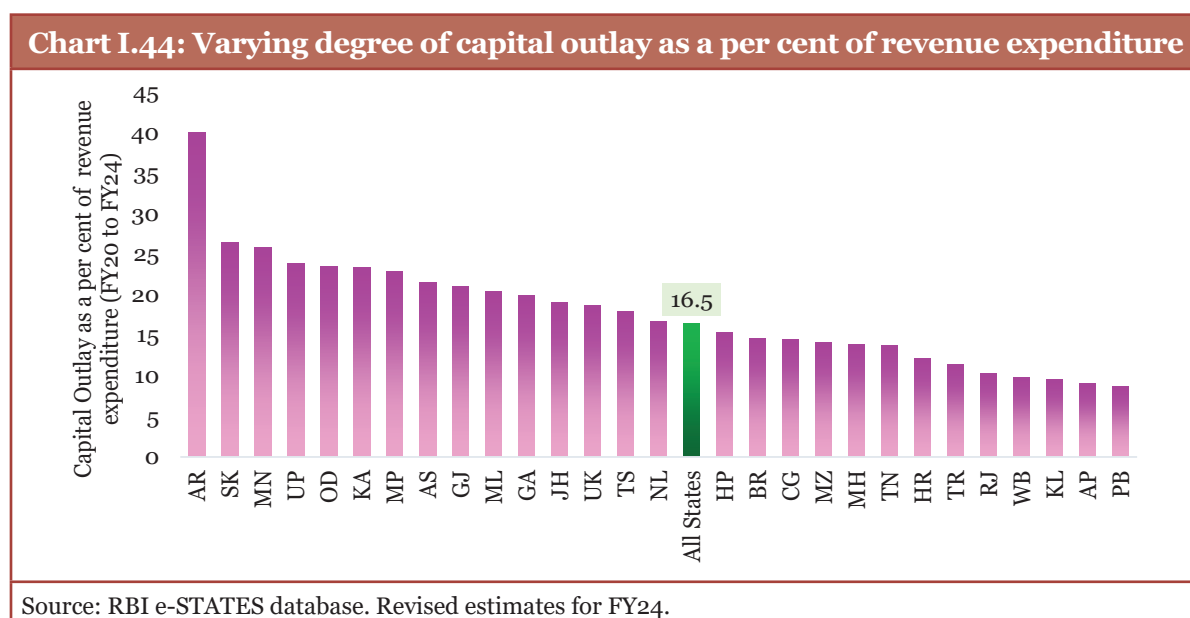
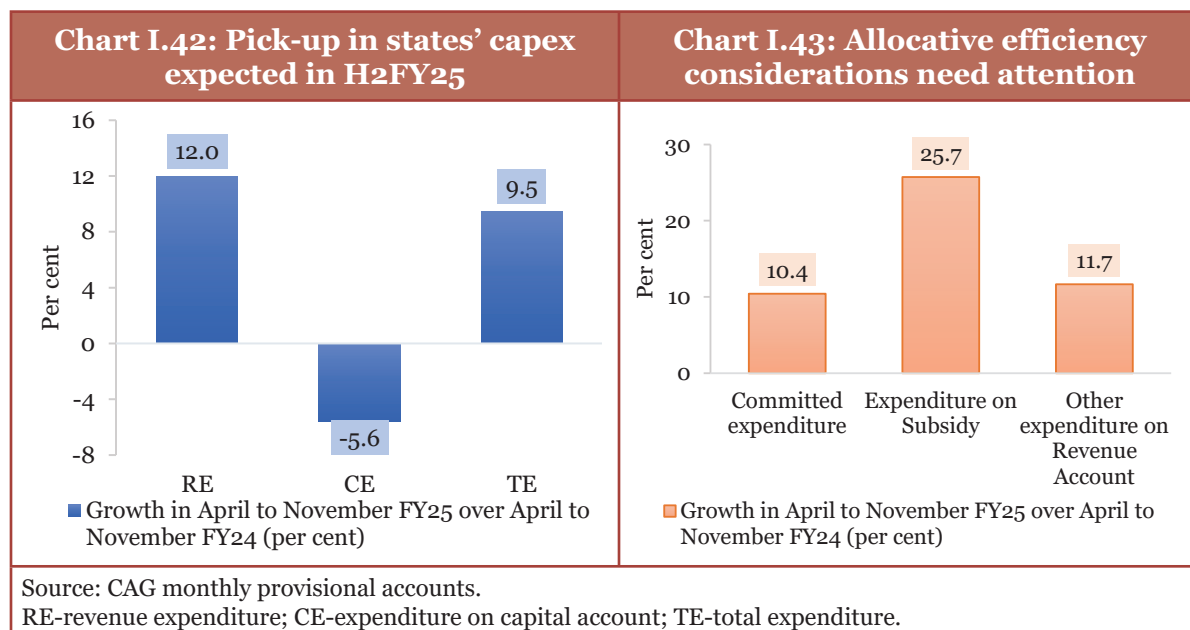
1.48 For 23 States²⁹, GST was the main source of revenue amongst ORR with the greatest reliance thereon by Manipur and Nagaland at 78 per cent and 72 per cent, respectively (Chart I.41). States garnering the highest shares in respective ORRs w.r.t. stamps & registration, sales tax and state excise duties were Maharashtra, Tamil Nadu and West Bengal, respectively. Odisha exhibited the highest share of non-tax revenue in ORR at 49 per cent.



29 Ibid.

1.49 The revenue expenditure of the states grew at 12 per cent (YoY) during April to November 2024 (Chart I.42), with subsidies and committed liabilities³⁰ registering a growth of 25.7 per cent and 10.4 per cent, respectively (Chart I.43). With expenditure on capital account for states declining by 5.6 per cent, total expenditure grew by 9.5 per cent. However, 11 states witnessed an increase in capex.

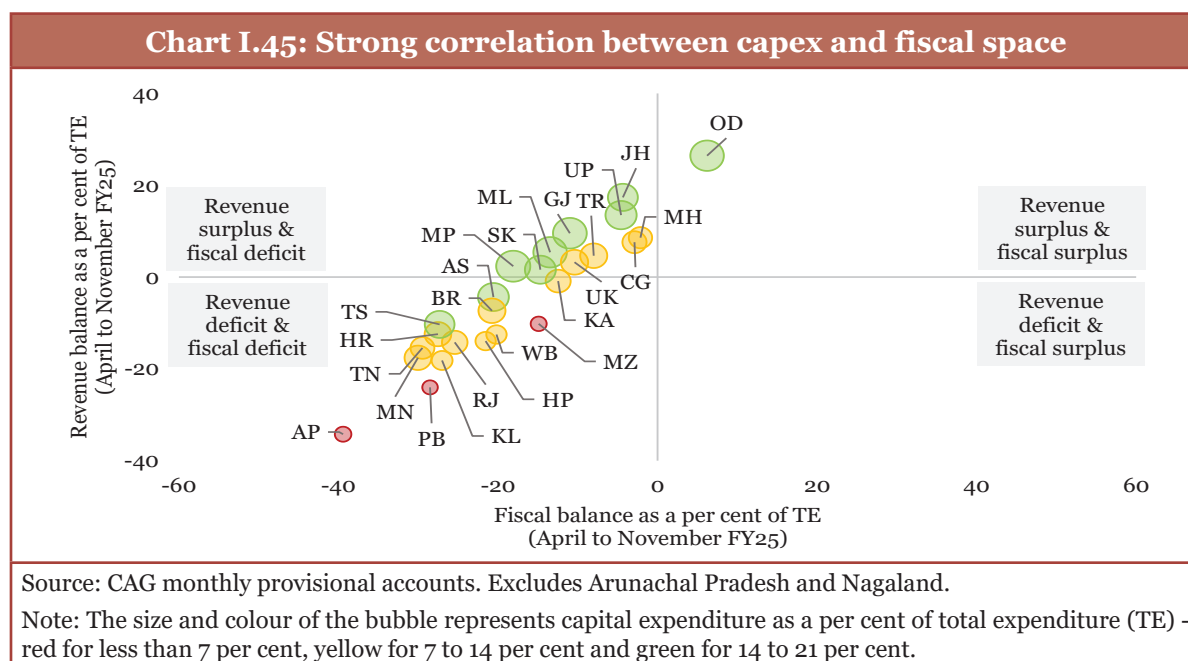
1.50 In the quality of expenditure, measured by capital outlay as a per cent of revenue expenditure over the five years ending FY24, states³¹ exhibited considerable variation (Chart I.44).



³⁰ Interest payments, salary and pension. For Mizoram and Sikkim, expenditure on pension and subsidy; for Karnataka and Tamil Nadu, expenditure on salaries & wages and subsidies; and for Arunachal Pradesh, expenditure on subsidies included in 'other expenditure on revenue account'.

³¹ 28 states.

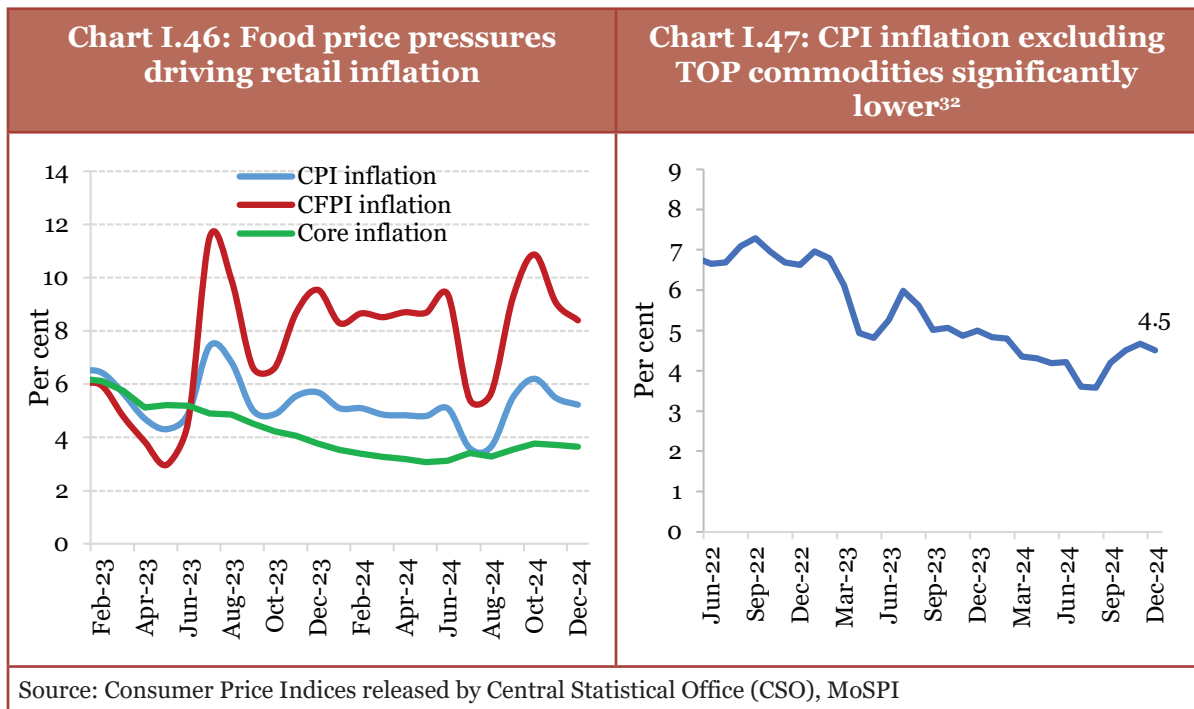
1.51 In April–November 2024, 11 States maintained revenue surplus (Chart I.45). The chart shows that revenue surplus (or lower revenue deficit) is correlated with higher capital expenditure.



Inflation – a combination of low and stable core inflation with volatile food prices

1.52 Retail headline inflation, as measured by the change in the Consumer Price Index (CPI), has softened from 5.4 per cent in FY24 to 4.9 per cent in April – December 2024. The decline is attributed to a 0.9 percentage point reduction in core (non-food, non-fuel) inflation between FY24 and April – December 2024. While the average inflation in FY25 has trended downward, monthly volatility in food prices and a select few commodities have been responsible for CPI inflation printing towards the upper side of the tolerance band of 4 (+/-) 2 per cent.

1.53 Pressures in food prices have been driven by factors such as supply chain disruptions and vagaries in weather conditions. Food inflation, measured by the Consumer Food Price Index (CFPI), has increased from 7.5 per cent in FY24 to 8.4 per cent in FY25 (April–December), primarily driven by a few food items such as vegetables and pulses. Chart I.47 plots headline retail inflation excluding the following commodities – tomato, onion and potato, (TOP). These commodities together constitute 2.2 per cent of the CPI basket.



External sector stability safeguarded by services trade and record remittances

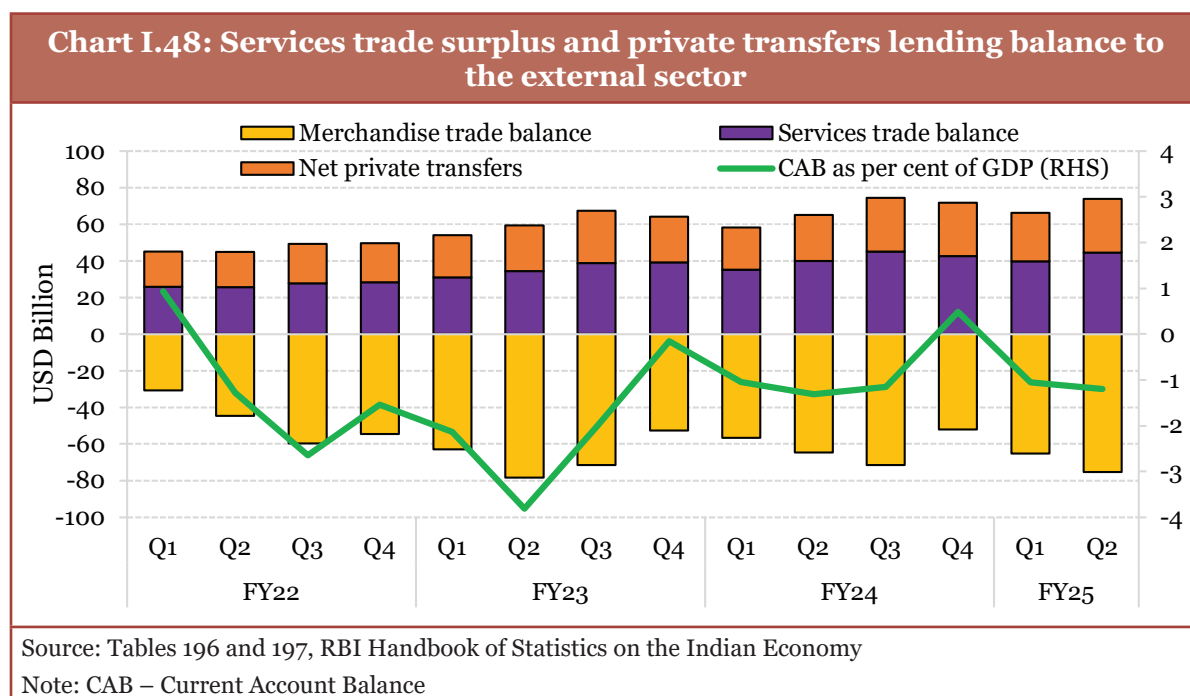
1.54 India’s external sector displayed mixed trends, primarily due to volatile global conditions. A decline in commodity prices affected India’s merchandise exports through the petroleum goods channel. Data on merchandise trade shows that India’s merchandise exports grew by 1.6 per cent YoY in April – December 2024.³³ However, non-petroleum exports (on the same comparison basis) were up by 7.1 per cent. Non-petroleum and non-gems and jewellery exports rose by 9.1 per cent. Merchandise imports rose by 5.2 per cent. This growth was primarily driven by an increase in non-oil, non-gold imports. Gold imports also grew, influenced by higher global prices, early purchases ahead of festive spending, and demand for safe-haven assets.

1.55 While the outpacing of merchandise imports over merchandise exports widened India’s merchandise trade deficit, India’s services trade surplus has lent balance to the overall trade deficit. India’s robust services exports have propelled the country to secure the seventh-largest share in global services exports, underscoring its competitiveness

³² Further, if gold and silver are also excluded, CPI inflation excluding these five commodities (which constitute 3.4 per cent of the CPI basket) is even lower.

³³ https://www.commerce.gov.in/wp-content/uploads/2025/01/PIB-Release_15012025-final.pdf.

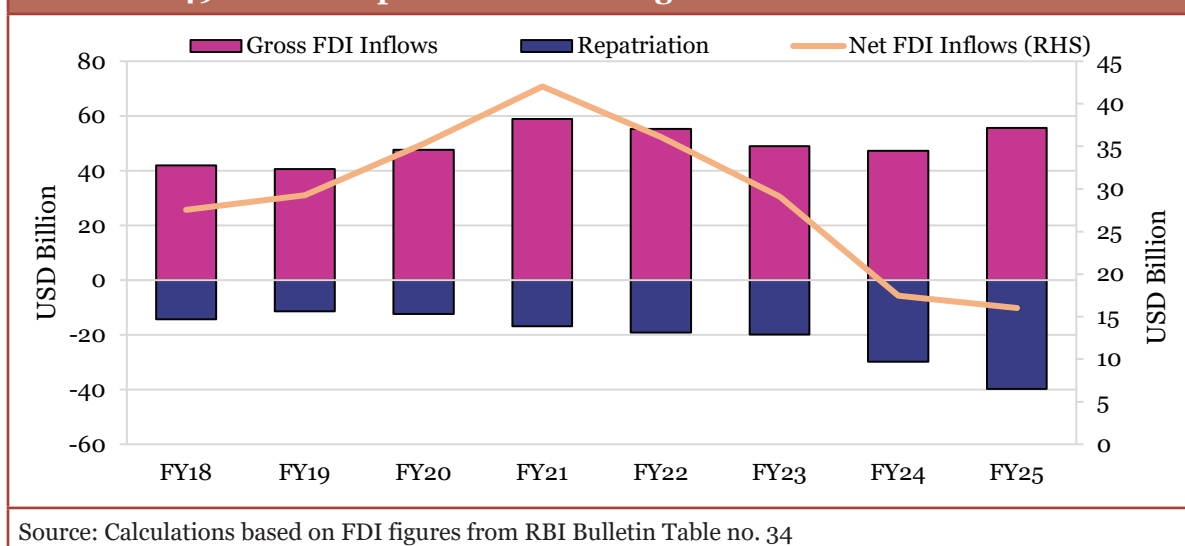
in this critical sector. In addition to the services trade surplus, remittances from abroad led to a healthy net inflow of private transfers. As per the World Bank, India was the top recipient of remittances in the world, driven by an uptick in job creation in OECD economies.³⁴ These two factors combined to ensure that India's current account deficit (CAD) remains relatively contained at 1.2 per cent of GDP in Q2 FY25.



1.56 Comfortable financing of the CAD by the capital account has ensured external sector stability. Within capital flows, gross foreign direct investment (FDI) inflows increased 17.9 per cent YoY in April – November 2024. Gross FDI inflows during April – November in FY25 are higher than the levels witnessed in the corresponding period of any previous years except FY21. Net FDI inflow declined over this period, primarily on account of the uptick in repatriation, which is higher by 33.2 per cent YoY after a growth of 51.5 per cent in FY24. The rise in repatriation through the channels of secondary sales and Initial Public Offerings (IPOs) by multinational companies amid strong stock market performance points to investor confidence in profitable exits for direct investors.³⁵

³⁴ World Bank. (2024, June 26). In 2024, remittance flows to low- and middle-income countries are expected to reach \$685 billion, larger than FDI and ODA combined. <https://tinyurl.com/38esxhzzr>.

³⁵ "Behind India's growth over last 10 yrs—increase in repatriations, steady FDI inflows". <https://tinyurl.com/2tt3pxsf>.

Chart I.49: Rise in repatriation even as gross FDI inflows remain robust

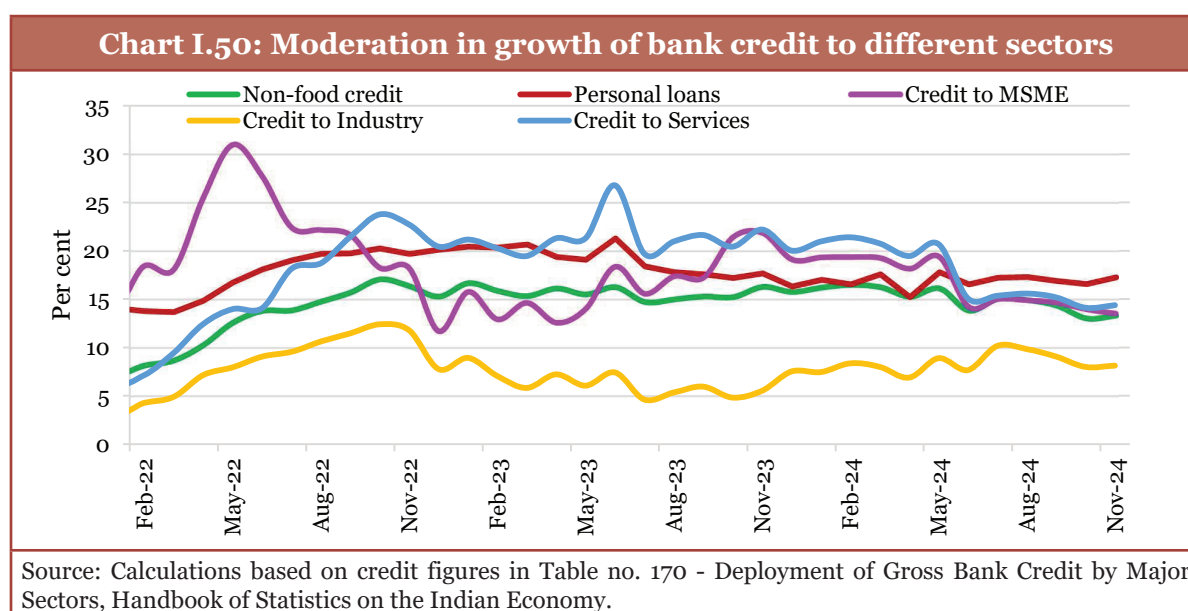
1.57 On the other hand, foreign portfolio investment (FPI) flows have been volatile in the second half of 2024, primarily on account of global geopolitical and monetary policy developments. Net FPI inflows slowed to USD 10.6 billion in April – December 2024 from USD 31.7 billion during the same period the previous year. The inclusion of India’s sovereign government securities (G-secs) of certain tenors in the JP Morgan EM Bond Index induced heightened activity within the debt segment of the FPIs. Further elucidation of the impact of the inclusion of Indian G-secs in global bond indices can be seen in Chapter 3.

1.58 As a result of stable capital flows, India’s foreign exchange reserves increased from USD 616.7 billion at the end of January 2024 to USD 704.9 billion in September 2024 before moderating to USD 634.6 billion as on 3 January 2025. India’s forex reserves are sufficient to cover 90 per cent of external debt and provide an import cover of more than ten months, thereby safeguarding against external vulnerabilities.

1.59 Looking ahead, global policy changes could influence India’s external trade. The evolving trade stance of a few major economies could affect key Indian export sectors such as chemicals, machinery, textiles, and electronics. In the short term, diversifying export markets is essential, while medium-term efforts should focus on increasing market share. Over the long term, India must position itself as a strategic partner in high-value sectors like biotechnology and semiconductors. Strategic technology partnerships provide opportunities for enhanced cooperation in key areas like space, semiconductors, quantum technologies and advanced telecommunications.

Financial sector prospects amid a moderation of growth in credit disbursement

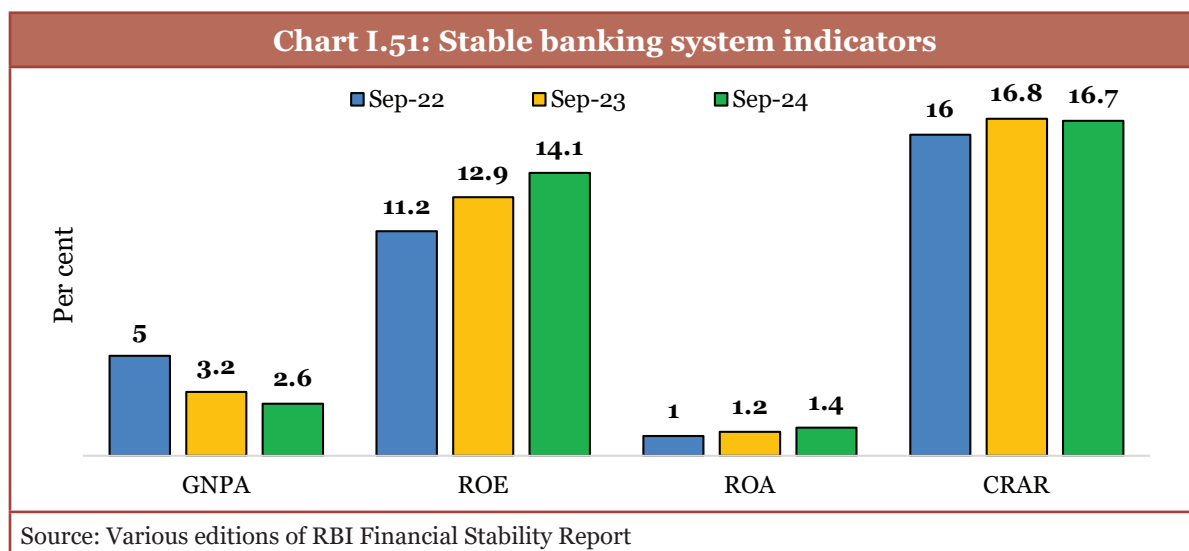
1.60 The banking and financial sector remains stable and well-capitalised, and is catering to the financing needs of the economy. While credit disbursement by scheduled commercial banks (SCBs) is growing in double-digits, there has been a moderation in the growth in recent months. This is on the back of a high base and also due to regulatory tightening in sectors where high growth was observed. In view of high growth in certain components of consumer credit, the RBI had, on 16th November 2023³⁶, raised the risk weights on unsecured retail loans by 25 basis points. However, expansion in the segment continues to be broad-based, with housing loans as the major contributor. Apart from personal loans, credit to the services sector is the other major driver of expansion in gross bank credit. Industrial credit growth is picking up but remains below growth rates in other major sectors.



1.61 Stability in the banking sector is underscored by declining asset impairments, robust capital buffers, and strong operational performance. As per the RBI's Financial Stability Report (FSR), December 2024³⁷, the gross non-performing assets (NPAs) in the banking system have declined to a 12-year low of 2.6 per cent of gross loans and advances. The capital-to-risk-weighted assets ratio (CRAR) for SCBs stands at 16.7 per cent as of September 2024, well above the norm. The profitability of SCBs improved during H1 FY25, with profit after tax (PAT) surging by 22.2 per cent YoY, while the Return on Equity (RoE) and Return on Assets (RoA) have improved on a YoY basis. Macro stress tests suggest that banks' overall capital levels would stay above the regulatory minimum even in adverse scenarios.

36 <https://www.rbi.org.in/scripts/NotificationUser.aspx?Id=12567&Mode=0>.

37 Reserve Bank of India. (2024, December). Financial Stability Report. <https://tinyurl.com/zv662e5d>.



1.62 While the long-term stability of the banking system is safeguarded, there was scrutiny over the short-term dynamics emerging from the mismatch of credit and deposit growth rates. The RBI FSR's (June 2024)³⁸ analysis of previous episodes where credit growth outpaced deposit growth shows that the average duration of such cycles where credit growth exceeds deposit growth is 41 months. The merger of a bank with a non-bank has elongated the cycle in this episode. The analysis reveals that credit growth precedes deposit growth and that convergence is usually achieved through a fall in credit growth.

1.63 Another area of concern within the banking system is the stress on unsecured credit, i.e., personal loans and credit cards. As of September 2024, 51.9 per cent of the fresh addition to the stock of NPAs in the retail loan portfolio emanated from the slippages in the unsecured loan book.³⁹ The RBI FSR (December 2024) notes that nearly half of borrowers with credit card and personal loans also have another active retail loan, often substantial, such as a housing or vehicle loan. When a borrower defaults on any loan category, financial institutions classify all loans of that borrower as non-performing. Hence, their larger, secured loans face delinquency risks due to defaults in smaller personal loans.

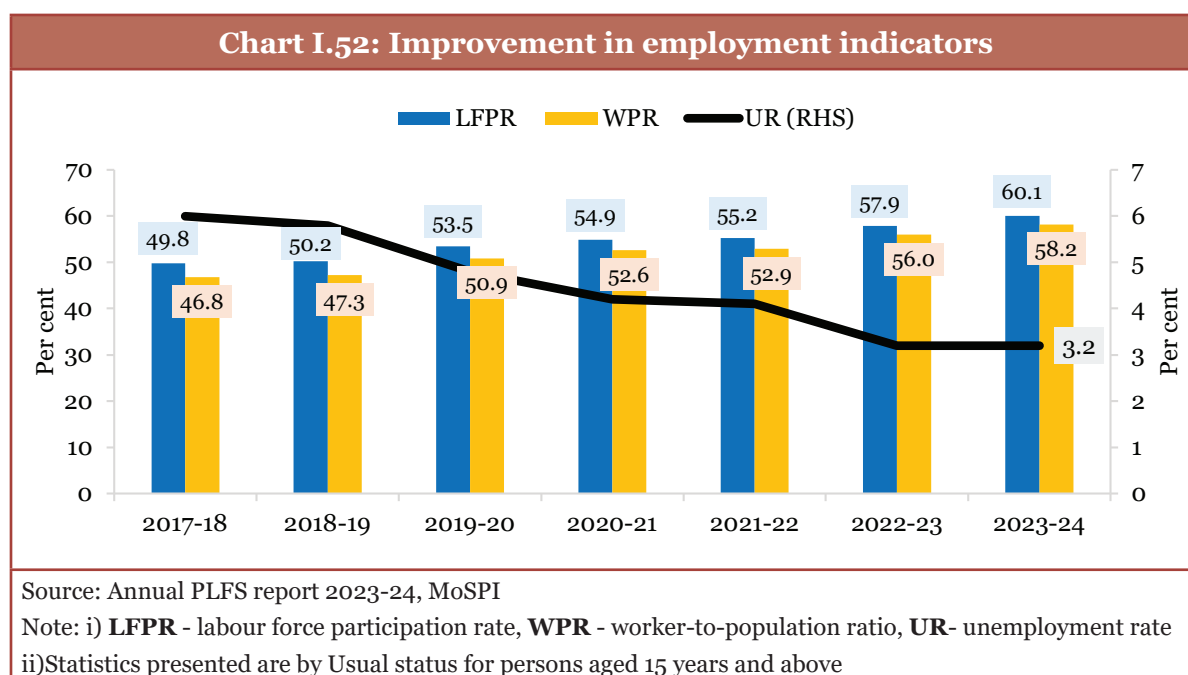
1.64 Apart from active monitoring of the banking system, there is a need to be cautious regarding developments in the Indian and global stock markets. While the Indian financial sector shows resilience, international market conditions may have some influence on India. Any correction in the US stock market could have implications for global markets (See Box II.2 of the Survey for an analysis pertaining to the Indian market).

³⁸ Reserve Bank of India. (2024, June). Financial Stability Report. <https://tinyurl.com/3ba9x6vr>.

³⁹ Reserve Bank of India. (2024, December). Financial Stability Report. <https://tinyurl.com/4wtz3c6u>.

Employment trends

1.65 India's labour market growth in recent years has been supported by post-pandemic recovery and increased formalisation. As per the 2023-24 annual Periodic Labour Force Survey (PLFS) report, the unemployment rate for individuals aged 15 years and above has steadily declined from 6 per cent in 2017-18 to 3.2 per cent in 2023-24. The labour force participation rate (LFPR) and the worker-to-population ratio (WPR) have also increased (Chart I.52). In Q2 FY25, the urban unemployment rate for people aged 15 years and above improved slightly to 6.4 per cent compared to 6.6 per cent in Q2 FY24. Both LFPR and WPR also increased during this period.



1.66 The formal sector in India has seen significant growth, with net Employees' Provident Fund Organisation (EPFO) subscriptions more than doubling from 61 lakh in FY19 to 131 lakh in FY24. In April -November 2024, net additions reached 95.6 lakh, driven largely by youth. Workers aged 18-25 years contributed to 47 per cent of the net payroll additions. This indicates a growing trend towards formal employment, which enhances workers' access to social security and stability. Government initiatives are playing a key role in enhancing the formalisation of the job market.

1.67 Technological developments over recent years have generated much discussion on the impact of Artificial Intelligence (AI) on India's labour market. The integration of AI into India's labour market presents an opportunity to enhance productivity, elevate workforce quality and create employment, provided, systemic challenges are effectively addressed through robust institutional frameworks. For India, a services-driven economy with a youthful and adaptable workforce, the adoption of AI offers

the potential to support economic growth and improve labour market outcomes. Prioritising education and skill development will be crucial to equipping workers with the competencies needed to thrive in an AI-augmented landscape. By capitalising on the global infancy of AI, India has the opportunity to prepare its labour force for a future defined by collaboration between human and machine intelligence. An elucidation of these dynamics can be found in Chapter 13.

OUTLOOK AND WAY FORWARD

1.68 A steady growth trajectory shapes the global economic outlook for 2024, though regional patterns vary. The near-term global growth is expected to be a shade lower than the trend level. The services sector continues to drive global expansion, with notable resilience in India. Meanwhile, manufacturing is struggling in Europe, where structural weaknesses persist. Trade outlook also remains clouded in the next year.

1.69 Inflationary pressures have been easing globally, though risks of synchronised price pressures linger due to potential geopolitical disruptions, such as tensions in the Middle East and the ongoing Russia-Ukraine conflict. Central banks have adopted more accommodative monetary policies. However, the pace of rate cuts varies across regions depending on the growth imperatives and the pace of disinflation, creating potential divergences in economic recovery.

1.70 On the domestic front, rebounding rural demand augurs well for consumption. Investment activity is expected to pick up, supported by higher public capex and improving business expectations. Capacity utilisation in manufacturing remains above the long-term average, and private sector order books have shown steady growth, alongside a rise in investment intentions. However, these gains could be tempered by the global excess capacities in sectors such as steel, leading to aggressive trade policies in search of demand.

1.71 Going forward, food inflation is likely to soften in Q4 FY25 with the seasonal easing of vegetable prices and Kharif harvest arrivals. Good Rabi production is likely to contain food prices in the first half of FY26. Adverse weather events and rise in international agricultural commodity prices, however, pose risks to food inflation. Global energy and commodity prices have softened in the recent past, making the core inflation outlook benign. However, risks remain on account of significant global political and economic uncertainties.

1.72 In brief, there are many upsides to domestic investment, output growth and disinflation in FY26. There are equally strong, prominently extraneous, downsides too.

Nonetheless, the fundamentals of the domestic economy remain robust, with a strong external account, calibrated fiscal consolidation and stable private consumption. On balance of these considerations, we expect that the growth in FY26 would be between 6.3 and 6.8 per cent.

1.73 Navigating global headwinds will require strategic and prudent policy management and reinforcing the domestic fundamentals. The Budget 2024-25 laid out a multi-sectoral policy agenda for sustained growth push. In this context, Chapter 5 elaborates on the need for deregulation and reforms at the grassroots level to improve the overall competitiveness of the economy and to lift trend growth rates, supporting higher levels of economic activity.

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MONETARY AND FINANCIAL SECTOR DEVELOPMENTS: THE CART AND THE HORSE

India's monetary and financial sectors have performed well in the first nine months of FY25. Bank credit has grown at a steady rate in the current financial year, with credit growth converging towards deposit growth. There has been a consistent improvement in the profitability of scheduled commercial banks (SCBs) as reflected in a fall in gross non-performing assets (GNPAs) accompanied by a rise in the capital-to-risk weighted asset ratio (CRAR). The government has also achieved significant progress in financial inclusion, with the Financial Inclusion Index of the Reserve Bank of India (RBI) increasing from 53.9 in March 2021 to 64.2 at the end of March 2024. Rural Financial Institutions (RFIs) have been an important player in facilitating India's financial inclusion journey. Development Financial Institutions (DFIs) have contributed significantly to the country's economic progress by financing infrastructure development projects.

The capital markets have demonstrated strong performance, driving capital formation in the real economy, increasing the financialisation of domestic savings, and supporting wealth creation. As of December 2024, the Indian stock market has recorded new highs, consistently outperforming its emerging market peers despite geopolitical uncertainties and election-driven market volatility challenges. Meanwhile, the insurance and pension sectors continue to perform with the vision of achieving universal coverage and strengthening the financial ecosystem further.

The financial sector is currently undergoing a transformative period marked by several emerging trends. Notably, there is an increase in the share of consumer credit in overall credit extended by banks and a rise in non-bank financing options. Additionally, equity-based financing has gained popularity, with the number of initial public offerings (IPOs) increasing sixfold between FY13 and FY24. While these developments herald a new era for the financial sector, they also introduce potential risks from a regulatory standpoint. The rise in consumer debt, the expansion of unsecured lending, and the growing number of young investors underscore the need for balancing growth and stability. Such regulation should encourage financial sector growth while ensuring stability and resilience.

INTRODUCTION

2.1 Financial institutions play a pivotal role in shaping a country's economic growth trajectory by facilitating savings, investments, and credit for economic activities. The prevailing monetary policies influence the interplay between financial intermediation and economic growth. This chapter examines the key trends and policy changes in monetary policy and the financial intermediation ecosystem in India. These developments are shaped by evolving domestic and global factors, including inflation trends, economic activity projections, and interest rate movements in major economies like the US, EU, and Japan.

2.2 The chapter is structured into two parts. The first part of the chapter explores the evolving monetary policy and key indicators such as Reserve Money (Mo), Broad Money (M₃) and Money Multiplier (MM), among others. The second part focuses on the various developments in the financial sector. It begins with an analysis of the banking sector's performance and credit availability, including the contributions of RFIs and DFIs to economic growth. The next section under the discussion on 'financial sector developments' examines capital market trends, particularly the rise in investor participation in the equity segment. Subsequent sections cover developments in the insurance and pension sectors, followed by an overview of the role of financial sector regulators in maintaining financial stability. The chapter also discusses the government's mechanism for addressing cybersecurity in the financial sector and the role of the Financial Stability and Development Council (FSDC). It concludes with a financial sector outlook, highlighting key challenges for the future.

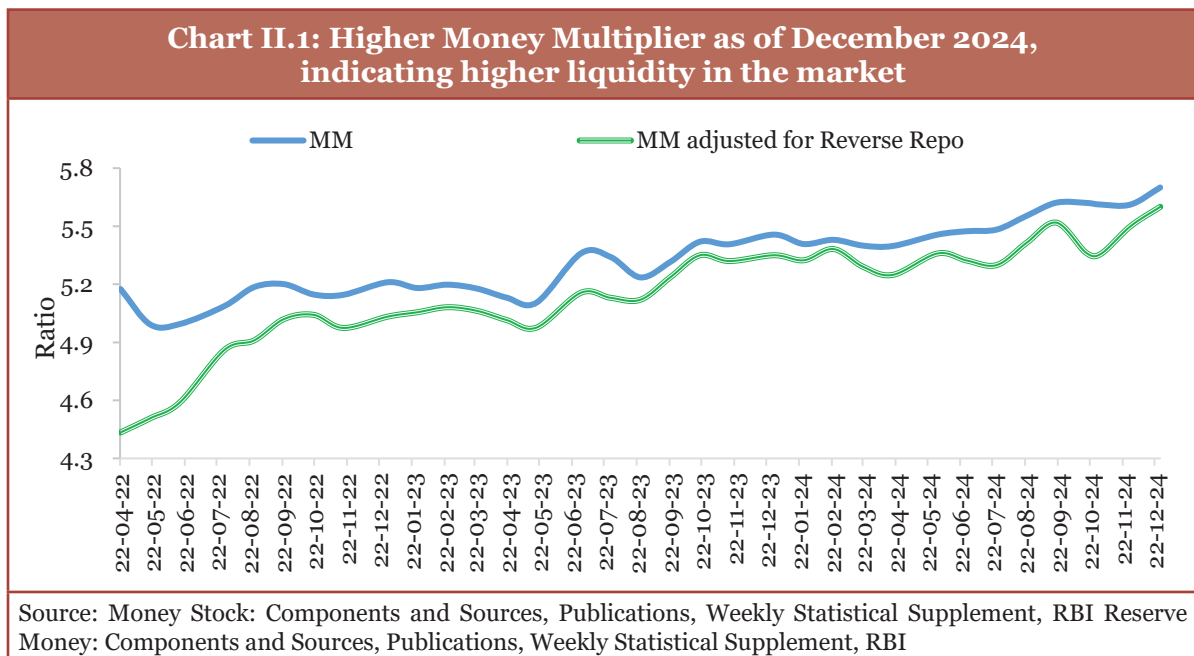
MONETARY DEVELOPMENTS

2.3 The primary objective of monetary policy is to maintain price stability while also considering the goal of economic growth, as stable prices are essential for sustainable growth. The RBI employs various policy instruments, such as manoeuvring the interest rates, conducting open market operations (OMO), altering the cash reserve ratio (CRR) and statutory liquidity ratio (SLR), etc, to achieve this stability.

2.4 During the first nine months of FY25 (April 2024-December 2024), the Monetary Policy Committee (MPC) of the RBI, in its various meetings, decided to keep the policy repo rate unchanged at 6.5 per cent. Until its August 2024 meeting, the committee retained its stance on the 'withdrawal of accommodation' to ensure inflation aligns with the target while supporting growth. Considering the prevailing and expected inflation-growth dynamics, the committee, in its October 2024 meeting, decided to change the policy stance from the 'withdrawal of accommodation' to 'neutral'. In its December 2024 meeting, the MPC announced a cut in CRR to 4 per cent of the net demand and

time liabilities (NDTL) from 4.5 per cent. The decision is expected to infuse around ₹1.16 lakh crore liquidity in the banking system.¹

2.5 Examining the trend in various measures of money supply in the economy, viz., different aggregates that reflect varying degrees of liquidity, it is seen that the monetary base, viz. the most liquid form of money, M0, recorded a year-on-year (YoY) growth of 3.6 per cent as of 3 January 2025, compared to 6.3 per cent a year ago. The growth in M3, excluding the impact of the merger of a non-bank with a bank (with effect from 1 July 2023), was 9.3 per cent (YoY) as of 27 December 2024, compared to 11 per cent a year ago. Component-wise², aggregate deposits were the most significant component and contributed most to the expansion of M3. Amongst sources³, bank credit to the commercial sector was a major contributor to the increase in M3. As of 27 December 2024, MM⁴, i.e., the ratio of M3 to M0, stood at 5.7 against 5.5 a year ago. Adjusted for reverse repo amounts, analytically akin to banks' deposits with the central bank, the adjusted MM was lower at 5.6 as of 27 December 2024.



1 RBI press release dated 6 December 2024, 'Maintenance of Cash Reserve Ratio (CRR)', <https://tinyurl.com/pxkxndd>.

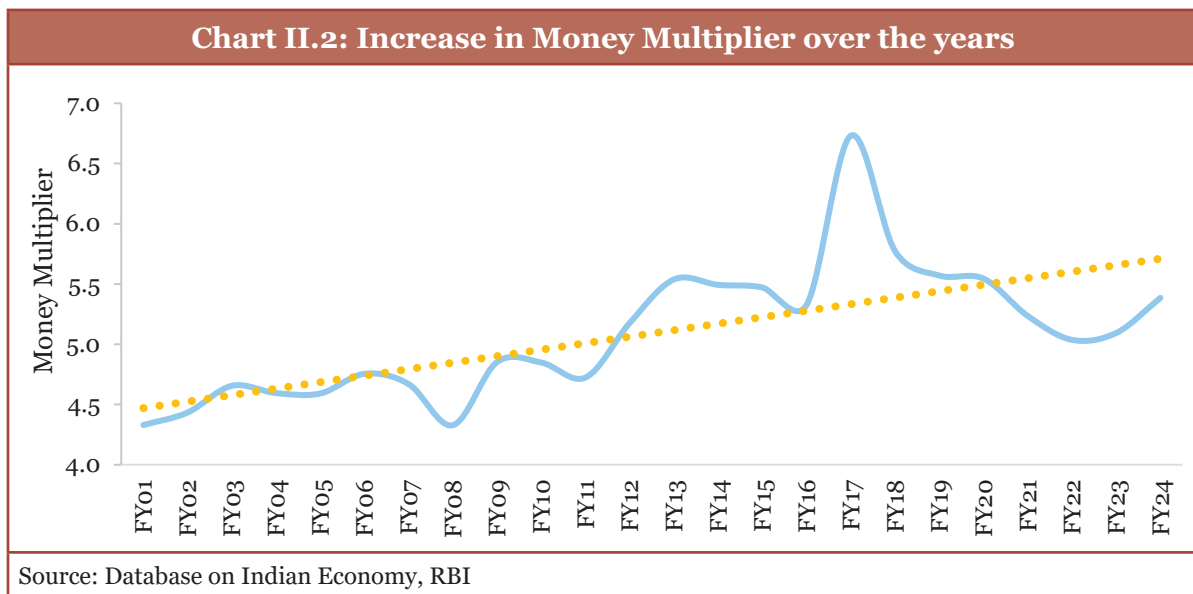
2 Components of Broad Money=Currency with the Public + Aggregate Deposits (Demand Deposits with Banks + Time Deposits with banks + 'Other' deposits with Reserve Bank).

3 Sources of Broad Money=Net Bank Credit to Government + Bank Credit to Commercial Sector + Net Foreign Exchange Assets of Banking Sector + Government's Currency Liabilities to the Public- Banking Sector's Net Non-Monetary Liabilities).

4 The money multiplier measures the maximum amount of money that a banking system generates with each unit of central bank money.

2.6 A country's MM is influenced by two main factors: - the amount of cash individuals (and businesses) hold and the reserves that banks maintain. When individuals keep more cash, the banking system cannot create money, resulting in a lower multiplier. In this case, cash in hand acts as a leakage from the banking system. Similarly, the reserves that banks hold with the central bank also count as a leakage, further decreasing the MM. In India's case, banks hold a portion of their deposits as reserves with the RBI, known as CRR.

2.7 A higher MM indicates that the banking system is generating a greater money supply from the money provided by the central bank. In India, recent efforts to promote financial inclusion have encouraged people to hold less cash in hand relative to their deposits, which partly explains the increase in the MM. Chart II.2 shows that MM has been on an upward trend over the years. It declined during the COVID-19 pandemic as increased economic uncertainty caused individuals to increase their cash holdings, resulting in a fall. However, after FY22, it has resumed its upward trajectory, reflecting enhanced liquidity generation in the economy.



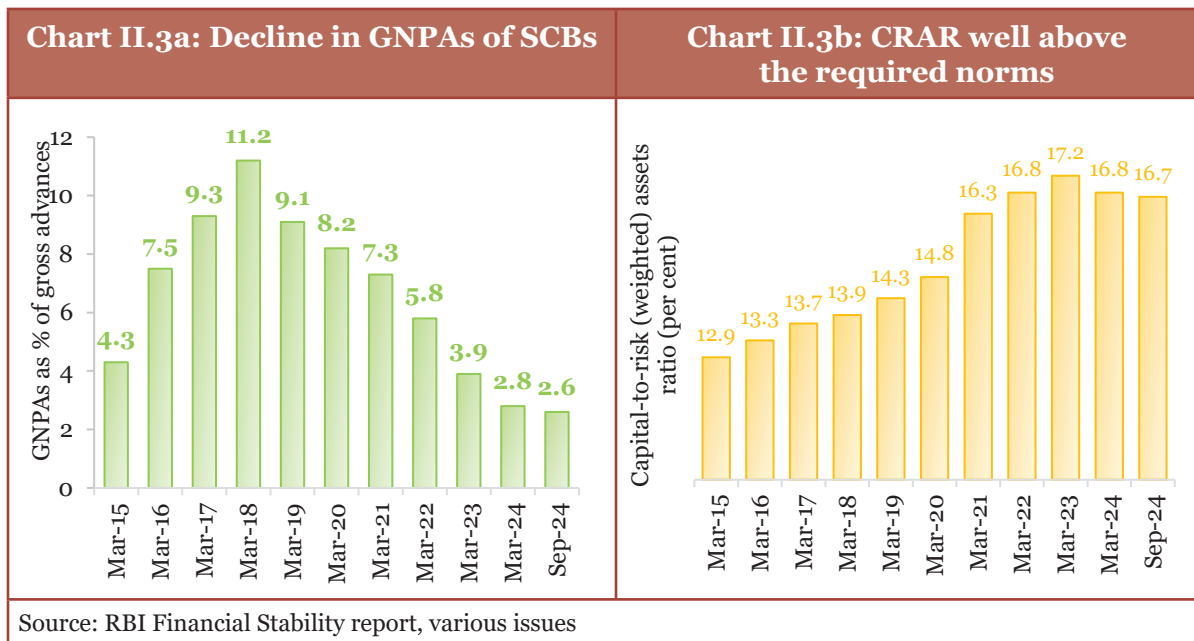
FINANCIAL INTERMEDIATION

2.8 Financial intermediaries are critical in implementing and transmitting monetary policy actions. Policy rates set by the MPC are transmitted to the real economy through financial intermediaries adjusting their lending and deposit rates. Similarly, the CRR and SLR requirements influence the lending capacity of the financial intermediaries. All these policy rates/ratios, in effect, have a bearing on the economic growth, price levels and financial stability of the economy. The performance of financial intermediaries, such as banks, capital markets, insurance, pension sector, etc., is discussed in this chapter section.

Performance of the banking sector and credit availability

Improvement in asset quality of banks

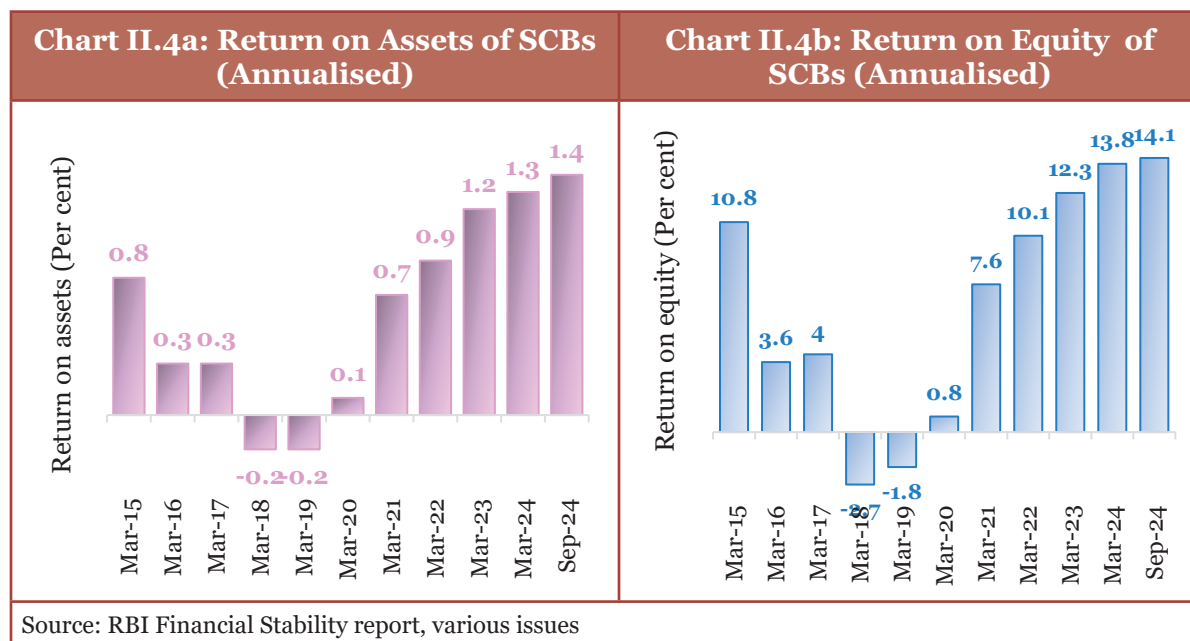
2.9 The GNPA ratio of SCBs has declined consistently from its peak in FY18 to a 12-year low of 2.6 per cent at the end of September 2024. Lower slippages and a reduction in outstanding GNPA through recoveries, upgradations, and write-offs have led to this decrease. Lower GNPA and higher provisions accumulated in recent years also contributed to a decline in net NPAs at around 0.6 per cent at the end of September 2024. Improvements in asset quality parameters were observed across all major bank groups.



2.10 The restructured standard advances (RSA) ratio, which is the share of RSA in total gross loans and advances, for SCBs declined from 1.8 per cent at the end of March 2022 to 0.7 per cent at the end of September 2024. All major bank groups reported a decrease in this ratio. The CRAR of SCBs has increased in the post-asset quality review period, which was conducted from August to November 2015. For FY24, around 93 per cent of the increase in the capital funds was contributed by the rise in Tier-I capital of banks, indicative of the robustness of capital buffers. At the end of September 2024, the CRAR of SCBs stood at 16.7 per cent, and all banks met the Common Equity Tier-1 (CET-1) requirement of 8 per cent.

2.11 The profitability of SCBs improved during H1 of FY25, with profit after tax (PAT) surging by 22.2 per cent (YoY). The cost of funds rose in sync with the tightening monetary policy cycle. During Q2 of FY25, the cost of funds increased marginally for SCBs. As the transmission was faster for lending rates relative to deposit rates and the overall yield on assets remained broadly stable during the last year, the net interest

margin (NIM) has marginally declined across all bank groups. Despite a contraction in NIM, both return on equity (RoE) and return on assets (RoA) ratios improved in September 2024. Further, as the GNPA's and slippages declined, the provision coverage ratio improved further to 77 per cent at the end of September 2024 per cent from 74.9 per cent in March 2023.



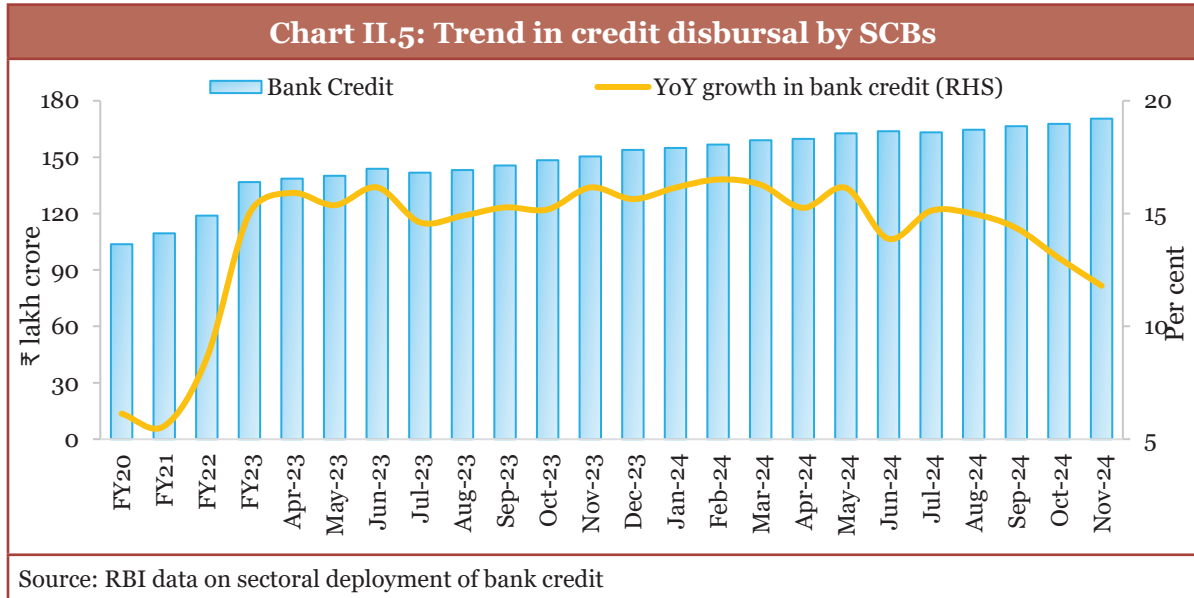
Trends in bank credit

2.12 Against the backdrop of the recent monetary policy tightening cycle in India, bank deposits continue to exhibit double-digit growth. However, their profile has gradually shifted towards schemes offering higher returns. Growth in term deposits continues to outpace the current and savings account deposit growth. As of the end of November 2024, the YoY growth in aggregate deposits of SCBs stood at 11.1 per cent. The growth in bank credit has started converging towards deposit growth. At the end of November 2024, the growth in overall bank credit moderated to 11.8 per cent (YoY) from 15.2 per cent a year ago over the same period.⁵ Moreover, the growth in overall bank credit up to 27 December 2024 in the current financial year moderated to 7.7 per cent.

2.13 In the current financial year, up to 27 December 2024, the growth rate in non-food credit has been 7.5 per cent compared to a growth of 11 per cent over the same period last year. The moderation in credit growth can be attributed to an increase in lending rates (as a result of monetary policy transmission of higher policy rates to higher lending rates) and the imposition of increased capital requirements for unsecured personal loans, credit cards and lending to Non-Banking Financial Companies (NBFCs) by the

⁵ The statistics in this section on bank credit exclude the impact of the merger of a non-bank with a bank.

RBI from 100 per cent to 125 per cent.⁶



2.14 Sector-wise, the growth in agriculture credit as of 29 November 2024 in the current financial year was 5.1 per cent. The growth in industrial credit picked up and stood at 4.4 per cent as of the end of November 2024, higher than 3.2 per cent recorded a year ago. Across industries, bank credit to micro, small, and medium enterprises (MSMEs) have been growing faster than credit disbursal to large enterprises. As of the end of November 2024, credit to MSMEs registered a YoY growth of 13 per cent, whereas it stood at 6.1 per cent for large enterprises. Credit growth to the services and personal loans segments also moderated to 5.9 per cent and 8.8 per cent, respectively, as of the end of November 2024 in the current financial year. Amongst the services sector, the moderation has been driven by a slowdown in credit disbursal to NBFCs. Vehicle and housing loans drove the moderation in the personal loans segment. In terms of increasing risk weights to NBFCs and credit cards, RBI's policy interventions contributed to the moderation of credit growth in those segments.

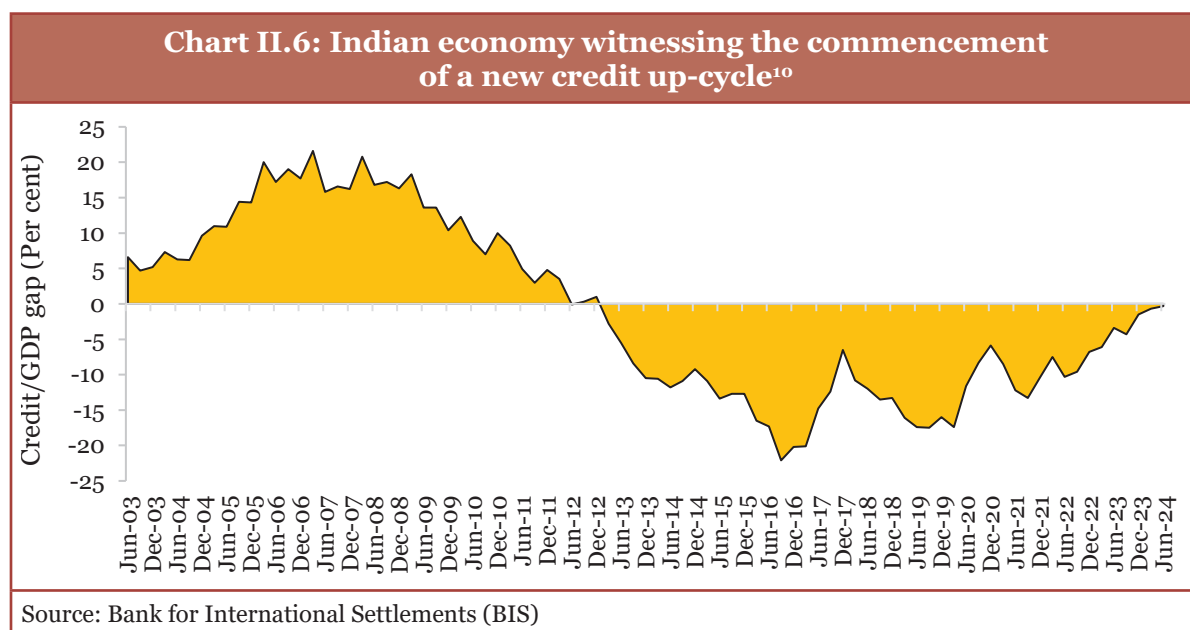
2.15 In December 2024 MPC, the RBI announced an increase in the interest rate ceiling on Foreign Currency Non-Resident [FCNR(B)] deposits with maturities of 1 to 3 years and 3 to 5 years.⁷ Accordingly, banks can now garner fresh deposits under these categories by offering a higher rate of interest. It has also decided to link the foreign exchange retail platform with the Bharat Connect platform to enhance access to foreign exchange for MSMEs. These measures will not only help banks attract investible funds for credit growth but will also help attract more foreign inflows into India. Another

⁶ RBI notification, 'Regulatory measures towards consumer credit and bank credit to NBFCs', dated 16 November 2023, <https://tinyurl.com/ns8rbwjm>.

⁷ RBI press release dated 6 December 2024, 'Interest Rates on Foreign Currency (Non-resident) Accounts (Banks) [FCNR(B)] Deposits', <https://tinyurl.com/mt9uwtx>.

significant measure to improve credit access for small and marginal farmers includes increasing the limit for collateral-free agricultural loans from ₹1.6 lakh to ₹2 lakh.⁸

2.16 The credit/GDP ratio is a good statistic to evaluate where an economy stands in the financial cycle.⁹ If the ratio is significantly greater than its trend value, it may indicate a build-up of stress in the lending sector. On the other hand, if the ratio is lower compared to its trend, it indicates ample room for growth. In the case of India, there was a positive credit/GDP gap (i.e., the difference between the credit-GDP ratio and its long-term trend) between 2006 and 2012, indicating excessive credit growth. This also coincided with the investment boom over that period. A bust followed this in the credit cycle; higher NPAs impaired the banking sector's lending ability, leading to a significant slowdown in credit growth.



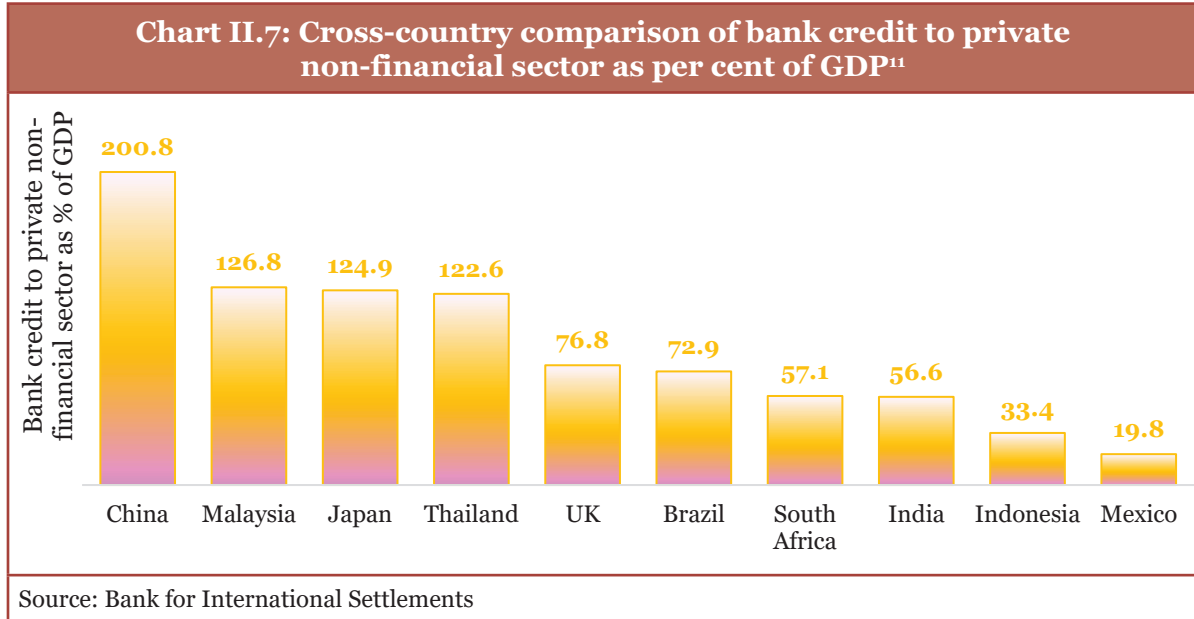
2.17 After tidying over this situation and the recovery from the COVID-19 pandemic, an upward trend in the credit/GDP ratio is observed, with the gap steadily closing. With credit growth outpacing nominal GDP growth for two successive years, the credit-GDP gap narrowed to (-) 0.3 per cent in Q1 of FY25 from (-) 10.3 per cent in Q1 of FY23. Therefore, despite the double-digit growth in bank credit post-April 2022, the credit-to-GDP ratio is below the trend line, indicating that the recent growth in bank credit is sustainable.

8 RBI press release dated 6 December 2024, 'Credit flow to agriculture-Collateral free agriculture' loans, <https://tinyurl.com/2ehsn7ap>.

9 Giese, J., Andersen, H., Bush, O., Castro, C., Farag, M., & Kapadia, S. (2014). The credit-to-GDP gap and complementary indicators for macroprudential policy: Evidence from the UK. *International Journal of Finance & Economics*, 19(1), 25-47, <https://tinyurl.com/4pwcehu4>.

10 Credit/GDP includes all lending sectors (bank and non-bank) and all borrowing sectors (Household & NPISHs, General Government, Non-financial sector and non-financial corporations)

2.18 A cross-country comparison indicates that India’s bank credit to private non-financial sector to GDP ratio is lower than that of Advanced Economies (AEs) such as the US, UK, and Japan. Compared to emerging market economies (EMEs), the ratio is also lower. Still, it is higher than that of Indonesia and Mexico.



2.19 Although pockets of stress have appeared lately, as we shall see later, India's credit landscape highlights the recovery in the credit environment from the crisis of the second decade, now trying to consolidate itself. At the heart of this growth lies a strong policy emphasis on financial inclusion, as reflected in the significant rise in RBI’s Financial Inclusion Index¹² from 53.9 in March 2021 to 64.2 by March 2024. The next section explores the crucial role of Rural Financial Intermediaries (RFIs) in closing the gap between financial services and underserved regions, thereby advancing financial inclusion across the country.

Rural Financial Institutions

2.20 RFIs are vital in ensuring inclusive growth through financial inclusion, credit accessibility, agricultural financing, and empowerment of rural entrepreneurs. These institutions comprise a network of organisations that provide banking and financial services in rural areas. This multi-agency system includes Regional Rural Banks (RRBs), Rural Cooperative Banks (RCBs), SCBs, Small Finance Banks, NBFCs, Micro Finance Institutions, and local area banks. The system supports rural India through a network of banking outlets, which include branches and banking correspondents. The National

¹¹ Average of bank credit to the private financial sector as percentage of GDP in the first two quarters of 2024.

¹² The index measures progress achieved in financial inclusion across 97 indicators in three dimensions: access, usage, and quality of financial services.

Bank for Agriculture and Rural Development (NABARD) oversees the performance and health of RRBs and RCBs, focusing on aspects such as growth, the composition of assets and liabilities, business structure (deposits and loans), and profitability indicators.

2.21 RRBs were established in 1975 under the Regional Rural Banks Act of 1976. Starting from an initial number of five in 1975, they have significantly expanded in reach, branch count, total deposits, and advances. There were 133 RRBs in 2006. Following certain mergers, liquidations, and amalgamations to improve their performance, the number was brought down to 43 in 2023. Their coverage expanded from 523 districts in 2006 to 696 districts, and the number of branches grew substantially from 14,494 in 2006 to 21,856 in 2023. As of 31 March 2024, there were 43 RRBs (sponsored by 12 SCBs) with 22,069 branches, with operations extending to 31.3 crore deposit accounts and 3 crore loan accounts in 26 states and 3 UTs.¹³

2.22 The government approved ₹10,890 crore in recapitalisation assistance to RRBs during FY22 and FY23.¹⁴ This recapitalisation scheme included operational and governance reforms as part of the Sustainable Viability Plan designed to revitalise RRBs. The plan aimed to achieve several objectives, including credit expansion, business diversification, reduction of NPAs, cost rationalisation, technology adoption, and improvements in corporate governance. As a result of this recapitalisation assistance and the implementation of the viability plan, the performance of RRBs at a consolidated level has shown significant improvement over time. During FY24, these banks achieved historic highs across all metrics. The consolidated net profit of RRBs increased from ₹4,974 crore in FY23 to ₹7,571 crore in FY24. The consolidated CRAR rose from 13.4 per cent as of March 2023 to an all-time high of 14.2 per cent by March 31, 2024. The number of RRBs with a CRAR of less than 9 per cent decreased from 9 as of March 2023 to 4 as of March 2024. Additionally, the number of profit-making RRBs grew from 37 in FY23 to 40 in FY24, while the number of loss-making RRBs fell from 6 to 3 during the same period.

2.23 Asset quality of RRBs measured by GNPA as a percentage of gross advances improved from 7.3 per cent in FY23 to 6.1 per cent in FY24, which is the lowest level in the past 10 years. During the same period, net NPAs declined from 3.2 per cent to 2.4 per cent. Credit expansion contributed to an increase in the consolidated credit-to-deposit ratio, which rose from 67.5 per cent as of March 2023 to 71.2 per cent as of March 2024, the highest in 33 years. All RRBs successfully met the regulatory targets and sub-targets set by the RBI under the Priority Sector Lending (PSL) guidelines during FY24.

¹³ NABARD report on 'Empowering Rural Financial Institutions', <https://tinyurl.com/bdh5384b>.

¹⁴ Ibid note 13.

Development Financial Institutions

2.24 DFIs are key players in supporting economic progress. Their main objective is to boost economic expansion through funding infrastructure developments. These institutions offer extended financial and technical aid across different sectors. DFIs supply technical assistance, including reports on projects, studies on their feasibility, and advisory services. By improving access to credit for infrastructure and housing projects, DFIs encourage more loans to be directed towards these critical areas. DFIs play a vital role in India by providing long-term funding for key sectors, supporting economic growth, fostering industrial expansion, improving infrastructure, and helping develop small and medium-sized businesses.

2.25 The early DFIs were set up in the 1950s to 1960s. They included the Industrial Financial Corporation of India (IFCI), Industrial Credit and Investment Corporation of India (ICICI) and Industrial Development Bank of India (IDBI). Over time, these DFIs became universal banks or commercial banks. As two major DFIs converted into commercial banks, there were fewer institutions to address the macro needs of industrial and infrastructure development. Institutions such as Infrastructure Development Finance Company (1997), India Infrastructure Finance Company Limited (IIFCL) (2006), and more recently, the National Bank for Financing and Infrastructure Development (NaBFID) (2021) have focused on funding infrastructure development. The performance of some of these is discussed in the following paras.

2.26 IIFCL has supported India's infrastructure development over the past 18 years. As a long-term financing institution, it is amongst the most diversified public sector infrastructure lenders in terms of eligible infrastructure sub-sectors and product offerings. It is mandated to finance green-field and brown-field projects, covering direct lending, takeout finance, refinance and credit enhancement across all infrastructure sub-sectors as notified by the government in the Harmonised Master List of Infrastructure Subsectors.¹⁵ As of September 2024, IIFCL had approved cofinancing for over 780 projects with a total outlay of over ₹ 13.9 lakh crore. This includes more than 500 public-private partnership (PPP) projects, representing about 28 per cent of the country's total PPP projects. IIFCL's total sanctions and disbursements on a cumulative basis exceed ₹2.8 lakh crore and ₹1.4 lakh crore, respectively, while the outstanding loan book stands at ₹58,995 crore. Overall, IIFCL has accorded loan sanctions to projects having around 31,000 km of highways (22 per cent of India's NH capacity), 95 GW of installed energy capacity (23 per cent of India's installed capacity), 22 GW of installed renewable energy capacity (11 per cent of India's installed renewable capacity) and 880 million tonnes of port capacity (35 per cent of India's total port capacity).¹⁶

¹⁵ Harmonised master list of infrastructure sub-sectors, <https://tinyurl.com/mbd8629x>.

¹⁶ Based on the inputs received from the Department of Financial Services.

2.27 Given the need for a long-term capital provider with a holistic sectoral mandate, as opposed to the niche mandate of other DFIs, the National Bank for Financing and Infrastructure Development (NaBFID) was established as an infrastructure-focused DFI through NaBFID Act, 2021. The RBI accorded it an 'All India Financial Institution' (AIFI) status on 8 March 2022, making it the fifth AIFI after NABARD, Small Industrial Development Bank of India (SIDBI), NHB and Exim Bank. NaBFID has both financial and developmental objectives. Its financial objective is to lend or invest, directly or indirectly, and seek to attract investment from private sector investors and institutional investors in infrastructure projects to foster sustainable economic development in India. The developmental objective of the institution is to coordinate with the central and state governments, regulators, financial institutions, institutional investors, and other relevant stakeholders.

2.28 NaBFID has sanctioned ₹1.3 lakh crore loans as of 30 September 2024. The road and energy sector, including renewable energy, account for over three-fourths of loans sanctioned. The institution has identified a project pipeline across sectors such as roads, power generation, renewables, railways, ports, transmission and distribution, data centres, and social and commercial sectors like hospitals, ropeways, and others. It is targeting sanction (cumulative) of loans aggregating over ₹3 lakh crore by the end of FY26. It offers longer tenor loans (15 to 25 years), longer reset on loans (3 to 5 years), and fixed interest rate loans up to 15 to 25 years, helping infrastructure developers navigate the interest rate cycle and manage risks therein.¹⁷

Use of Artificial Intelligence by banks

2.29 Over the past several decades, banks have consistently adapted the latest technological innovations to redefine customer interactions. Globally, banks introduced ATMs in the 1960s and electronic card-based payments in the 1970s. The 2000s saw the widespread adoption of 24/7 online banking, followed by the rise of mobile banking in the 2010s. Now the world is in the artificial intelligence (AI)-powered digital age, driven by decreasing data storage and processing costs, greater accessibility, and connectivity. These innovations can lead to higher automation and often enhance human decision-making speed and accuracy when correctly managed to mitigate risks.¹⁸

2.30 The use cases of AI and Machine Learning (ML) applications by banks in India range across areas such as credit underwriting, regulatory capital planning, liquidity management, fraud detection and prevention, risk assessment and management,

¹⁷ Ibid note 16.

¹⁸ McKinsey and Company report, 'AI-bank of the future: Can banks meet the AI challenge?', <https://tinyurl.com/2zsxuyhw>.

portfolio optimisation, pricing models, and chatbots. The rapid pace of technological evolution in India, particularly in areas like AI, blockchain, and data analytics, has created new opportunities to reimagine traditional financial services and processes.¹⁹ AI and large language models (LLMs) have enhanced customer service through interactive chatbots and personalised experiences, while blockchain offers secure, transparent, and efficient transactions. Moreover, evolving consumer behaviour and expectations, driven by the rise of digital natives and increasing demand for personalised, seamless, and convenient financial solutions, encourage established companies and newcomers to innovate to remain competitive.

2.31 Along with the benefits, using AI in the banking system entails a few risks. The black-box nature of AI systems can make it difficult to assess the system's reliability or contest its decisions. This lack of transparency can lead to trust concerns and challenges in validating the fairness and accuracy of AI decisions, making it challenging to audit or interpret the algorithms that drive the decisions. Accountability risks include difficulty in tracing decisions to their source and establishing liability. Other risks include those related to (i) human resources, such as inadequate human oversight, over-reliance on AI, and loss of human expertise; (ii) cyber risks; (iii) malicious usages like synthetic identity frauds, rogue trading, and market manipulation; (iv) system related risks such as inability to intervene and market correlations; and (v) third-party dependencies and service provider concentration.²⁰

2.32 International bodies such as the Organisation for Economic Cooperation and Development (OECD) have outlined core principles governing the use of AI²¹, which include inclusive growth, respect for the rule of law, transparency and explainability, robustness and safety, and accountability. The Hiroshima AI Process Comprehensive Policy Framework²² established in December 2023, includes a set of guiding principles and a code of conduct, marking a significant step towards a coordinated global approach for the responsible development of AI. Different techniques are being adopted by regulators across the globe, most of which are focused on principles-based guidance.

2.33 Establishing robust AI governance is the first and crucial step in addressing the challenges that come with the implementation of AI systems. Without an appropriate governance framework, AI systems may operate without clear guidelines or oversight, leading to potential abuse or misuse of technology. As vulnerabilities could evolve with the pace of innovation and degree of AI integration in financial services, regulatory and supervisory effectiveness may take a backseat if financial regulators' AI-related skills

19 PwC India report, 'Mapping the FinTech innovation landscape in India', <https://tinyurl.com/k67efs6v>.

20 Based on the inputs received from RBI.

21 OECD AI principles, <https://tinyurl.com/4sryrmz9>.

22 Hiroshima AI process, <https://tinyurl.com/4sajs5uf>.

and knowledge do not keep pace with developments in this space. Accordingly, the RBI has proactively engaged with regulated entities and experts to assess the ongoing developments while effectively communicating its expectations through multiple engagement forums. It has also created a regulatory sandbox focusing on innovative technology products/services.²³ Further, the RBI announced the establishment of a committee to create a Framework for Responsible and Ethical Enablement of Artificial Intelligence (FREE-AI) in the financial sector.²⁴

Efficacy of Insolvency Law

2.34 While financial intermediaries play their part in providing credit to various agents of the economy for economic activity, debtors may sometimes fail in their endeavours. This requires a mechanism to rescue them and provide an honourable exit to honest debtors or an attempt to resolve the stress and get them back into the business. For this purpose, enacting the Insolvency and Bankruptcy Code, 2016 (IBC/Code) has ushered in a modern and comprehensive insolvency resolution framework for distressed entities. By addressing financial distress and NPAs, the Code has had an indelible impact on the health of the country's banking sector and redefined the debtor-creditor relationship.

2.35 Till September 2024, 1068 resolution plans approved under the Code have resulted in creditors realising ₹3.6 lakh crore, 161 per cent against liquidation value and 86.1 per cent of the fair value (based on 964 cases where fair value has been estimated). The haircut for creditors relative to the fair value of assets was around 14 per cent, while relative to their admitted claims, it was around 69 per cent.²⁵ Further, until September 2024, 79 corporate debtors (CDs) were closed by sale as a going concern under liquidation. These 79 CDs had claims amounting to ₹1.4 lakh crore, as against the liquidation value of ₹4678.2 crore. The liquidators in these cases realised ₹3674.1 crore.

2.36 Resolutions under the Code have spanned across all sectors, from large steel manufacturing companies and real estate projects to small FMCG companies. Out of the 12 large accounts referred by the RBI for resolution under the Code, 10 have been successfully resolved. This highlights that the resolution process under the Code is designed to be sector-agnostic so that all types of distressed entities can find a viable solution to their financial distress.

2.37 The deterrent effect of the Code has led to a significant shift in debtor behaviour. Thousands of debtors are resolving distress in the early stages of distress. They are

23 Das, Shaktikanta (2024), 'Inaugural Address at RBI@90 Global Conference on Digital Public Infrastructure and Emerging Technologies', August 26, Bengaluru, <https://tinyurl.com/5yr33njj>.

24 RBI press release dated 26 December 2024, <https://tinyurl.com/5b5zzmwa>.

25 This realisation does not include the Corporate Insolvency Resolution Process (CIRP) cost and many probable future realisations such as equity, realisation from corporate and personal guarantees, funds infused into Corporate Debtors (CDs), including capital expenditure by the Resolution Applicants, and recovery from avoidance applications.

resolving when default is imminent, on receipt of a notice for repayment but before filing an application, after filing application but before its admission, and even after admission of the application, and making best effort to avoid consequences of resolution process. Most companies are rescued at these stages. Till March, 2024, 28,818 applications for initiation of CIRPs of CDs having underlying default of ₹10.2 lakh crore were withdrawn before their admission.

2.38 The outcomes of the IBC in terms of its efficiency and effectiveness are discernible from various statistics such as the number of resolutions, early resolutions before the financial distress becomes chronic, and time taken for the processes to complete, etc. However, beyond these numbers, the Code has other far-reaching impacts through its interaction with the higher-level systems like the legal, economic, and financial systems. Some of these systemic benefits of the law, flowing through multiple channels, as proven by research, are as follows:

- **Forex hedging by firms**—Research shows that the likelihood for currency mismatches in the corporate sector has reduced after India’s bankruptcy reform. As per BIS research (2018)²⁶ the introduction of the new bankruptcy law raised the probability of currency hedging by 13.7 per cent for firms which originally had a high degree of currency mismatch. Thus, there is an incentive for firms to hedge currency exposure risk better in the presence of a bankruptcy law.
- **Reducing bond credit spreads**—Sengupta and Vardhan (2023)²⁷ highlight that the IBC lowered the credit spreads for bonds issued by non-financial firms from FY17 to FY20 compared to the bonds issued by the finance firms in FY15 and FY16, especially when other issue-level determinants of credit spreads are considered. This shows an encouraging development and reinforces the fact that an effective bankruptcy resolution regime is critical for bond investors to develop confidence in the Indian market. Currently, the bond market is skewed towards high-rated (AAA and AA) bonds, which account for more than 85 per cent of all issuances. Investor confidence in effective bankruptcy resolution will be crucial to developing a deep and liquid market for lower-rated bonds.
- **Exports**—Khan and Chakraborty (2022)²⁸, study a large sample of 4,434 firms between 2000 and 2020 and find that exporting firms in India have benefitted from the bankruptcy reform law by helping them better access credit and get out of financial constraints.

2.39 Macroprudential tools are handy for muting the effects of credit cycles. However,

26 Mohanty, M. S., & Sundaresan, S. M. (2018). FX hedging and creditor rights. BIS Paper, (96b), <https://tinyurl.com/2evkk828>.

27 Sengupta, R., & Vardhan, H. (2023). Bankruptcy regime change and credit risk premium on corporate bonds: Evidence from the Indian economy. Indira Gandhi Institute of Development Research, <https://tinyurl.com/5n8nep6c>.

28 Khan, T. A., & Chakraborty, I. (2022, March). Financial constraints and export behaviour: An analysis of Indian manufacturing firms. <https://tinyurl.com/4pvutkhz>.

a good bankruptcy regime acts as a backstop during downswings, in turn reducing the need for costly macroprudential interventions. A continuously evolving and improving IBC framework is important to achieving a 7-8 per cent growth over the next decade. India's growth aspirations require capital to operate at the frontiers of productivity and efficiency. An efficient bankruptcy system will free up capital, allowing better production, employment, and growth prospects.

2.40 The next step towards insolvency and bankruptcy reform is to improve operational efficiencies to speed up the resolution process. This is especially important for MSMEs, for whom legal costs can prove to be substantial. Improving time efficiencies in the system comes down to using innovative resolution routes such as the pre-pack arrangements for MSMEs, inter-disciplinary capacity building of resolution professionals across legal, financial and industry basics and minimising judiciary delays in proceedings. Operational efficiencies require a balancing act between fairness and fastness of resolution. Further, improvements are also required to ensure the timeliness of the insolvency and bankruptcy processes under the Code. Box II.1 discusses the issue of delays in the processes under the IBC.

Box II.1: IBC and National Company Law Tribunals

The IBC lays a time limit of 180 days from the date of admission for closure of an insolvency process, with a provision for extension by 90 days with the approval of the committee of creditors (CoC) and the adjudicating authority (AA), i.e., the NCLT. The regulations provide detailed timelines for various processes to be undertaken in the corporate insolvency resolution process (CIRP) and liquidation processes. This aspect of the insolvency law has been crucial in determining its performance, and with time, the delays in the completion of processes have become a concern.

Within three years of implementation of the Code, the difficulties in complying with the timelines were evident, and it was amended to provide a 330-day outer limit for a CIRP, including judicial proceedings. Current evidence shows that the 1068 CIRPs, which have yielded resolution plans (as of the end of September 2024), took an average of 582 days (after excluding the time excluded by the AA) for conclusion, and the 2,630 CIRPs, which ended up in orders for liquidation, took on average 499 days for conclusion. This average time for a CIRP does not include the time taken for an application to be admitted and time periods that are excluded by the order of the AA for reasons assigned by it. The time excluded by AA in the cases resolved so far was, on average, 116 days. This constitutes about 64 per cent of the time intended in the Code to complete the entire process. The exclusion of time done by the AA helps address compliance with the Code. Still, it does not address the impact on the erosion of business and economic value of the corporate debtor.

The NCLT/Tribunal was made the AA for insolvency and bankruptcy matters, along with their pre-existing adjudicatory role under the Companies Act 2013 and the Competition Law. The government has taken comprehensive measures to strengthen the NCLT. As of September

2024, 30 courts and 16 benches were functioning headed by the President, and 31 each of judicial and technical members. As of the end of July 2024, the NCLT has, quite notably, reported as adjudicated 34,690 cases under the IBC against 35,501 cases numbered, i.e., close to 98 per cent adjudication and disposed of 29,705 cases. However, there are 2,593 cases awaiting admission and 4,723 pending after admission.²⁹ Further strengthening the number of courts, benches, and members and ramping up physical infrastructure, as envisaged in the Union Budget 2024-25, will help improve the disposal rate.³⁰

Further, addressing issues in the insolvency procedures and the Tribunal's administrative processes would help to reduce pendency in the long term. Delays in admission are of particular concern since, until admission, the company continues to be controlled by the defaulting debtor. While admission is awaited, the opportunities for value shifting, funds diversion and assets transfers increase, leading to further erosion of the value of the CD.³¹ While the prescription is admission in 14 days, in FY21, the average time for admission of 153 applications by operational creditors (under section 9 of the Code) was 468. In FY22, an average of 650 days was taken in the admission of 207 applications.³² Reasons for delay in admission occur as the AA tries to establish the existence of debt and default, as promoters file objections. Including evidentiary proof in the form of contracts, GST filings, etc., is all provided for, but all of this can be contested.

The financial system with digital credit information repositories receipts trading platforms, and the Information Utility (IU),³³ set up under the IBC, is quite robust and should be harnessed, and a means for verification of debt and default may be enabled, especially for applications filed by financial creditors. If developed by the market, such a service would address the problem and may also be monetisable as the applicant creditors will benefit from early admission of applications. Providing in the Code for the use of IU records as conclusive proof about the occurrence of a default in general, with necessary exceptions,³⁴ would enable such services.

Tribunals could improve the time taken for admission with the use of technology and the aid of the court registry for verification, scrutiny, and clearing of defects in the application. The proposed integrated platform for use by various stakeholders can include such features.³⁵ This would eliminate the need for pre-admission hearings and help reduce the time to admit an application. In the case of applications filed by operational creditors a voluntary mediation mechanism, if made applicable, may help address default and hence obviate the need for admission.

Another source of delays at the AA during the CIRP is the adjudication of inter-locutory applications.³⁶ It includes procedural requirements like the appointment of an insolvency

29 National Company Law Tribunal, <https://tinyurl.com/3x8wxcxbx>.

30 Para 61 and 62 of the Union Budget, 2024-25.

31 Standing Committee on Finance, Thirty-second report August 2021 Implementation of the Insolvency and Bankruptcy Code – Pitfalls and Solutions <https://tinyurl.com/23m36yze>.

32 Insolvency and Bankruptcy Board April 2022. Consultation paper on issues related to reducing delays in the corporate insolvency resolution process, <https://tinyurl.com/43nthke9>.

33 <https://nesl.co.in>.

34 Discussion Paper, January 2023, Ministry of Corporate Affairs, <https://tinyurl.com/yc4vmaky>.

35 Insolvency and Bankruptcy Board of India, Quarterly Newsletter Jan-Mar 2023 <https://tinyurl.com/2e4vwz3n>.

36 Insolvency and Bankruptcy Board November 2022. Report of the Colloquium on Functioning and Strengthening of the IBC Ecosystem, <https://tinyurl.com/mt6u5ykv>.

professional, appointment of an authorised representative, consideration of delayed claims, the constitution of the CoC, etc. and frivolous applications. In instances where an objective criterion to determine the achievement of a procedural milestone can be assessed or when decisions are arrived at by consensus among stakeholders, it can be taken on record of the AA. It may not be considered for formal posting before the court. Extending engineering principles, the process, method, and output of repetitive procedural tasks, which are amenable for standardisation, should be standardised such as, the use of template-based submissions and orders. In dealing with frivolous applications, the Tribunal needs to be more stringent, and using prevention by way of the imposition of high costs would have the necessary deterrent effect.

Tribunals have addressed the burden on the traditional judicial system by enabling specialisation in narrower domains to enable speedy relief by reducing formalistic procedures and complexity. Tribunals are envisaged to reduce costs and improve efficiency. The same would be possible if the trappings of the traditional judiciary were avoided both in procedure and stakeholders' mindsets.

The IBC provides a non-adversarial resolution process but has not been enabled in practice at the NCLT. The design and execution of procedures in the NCLT may be revisited, keeping the quasi-judicial nature of the mandate as a foundational tenet. Separate Rules for the NCLT in its role as the AA under the Code may also provide more clarity in dealing with procedural matters and improve the efficiency in its functioning.

Development in capital markets

2.41 Capital markets are central to India's growth story, catalysing capital formation for the real economy, enhancing the financialisation of domestic savings, and enabling wealth creation. As of December 2024, the Indian stock market has achieved new highs, with intermittent corrections, in the midst of geopolitical uncertainties, currency depreciation and domestic market volatility challenges. Investor participation has been a contributor, with number of investors growing from 4.9 crore in FY20 to 13.2 crore as of 31 December 2024. This growth, combined with active listing activity and recent measures by the regulator, viz. Securities and Exchange Board of India (SEBI), to temper excesses, is expected to foster sustainable market expansion.

2.42 **The primary markets** continued to witness heightened listing activities and investor enthusiasm in FY25, notwithstanding the market volatility and geopolitical uncertainties. As per the E&Y Global IPO trends³⁷, Indian stock exchanges provide conducive market conditions for foreign conglomerates to list their local subsidiaries, thereby offering a good opportunity for unlocking value. India's share in global IPO listings surged to 30 per cent in 2024, up from 17 per cent in 2023, making it the leading contributor of primary resource mobilisation globally.

2.43 The total resource mobilisation from primary markets (equity and debt) stands at ₹11.1 lakh crore from April to December 2024, which is 5 per cent more than the

amount mobilised during entire FY24. This also amounts to 25.6 per cent of gross fixed capital formation of private and public corporations during FY24. The number of IPOs increased by 32.1 per cent to 259 during April to December 2024 from 196 in the corresponding period of the previous year, while the amount raised almost tripled from ₹53,023 crore to ₹1,53,987 crore in the same period. The mainboard platform witnessed a significant increase in issue size as the average IPO deal size rose to ₹ 2,124 crore, up from ₹814 crore in entire FY24. In the case of small and medium enterprises (SMEs) IPOs, the average deal size increased to ₹39 crore from ₹31 crore during the same period.

2.44 Reflecting the buoyant market conditions, Qualified Institutional Players (QIPs) emerged as the preferred equity fundraising mechanism for the corporates during FY25, with a 11.4 per cent share in total capital raised. Resource mobilisation through rights issues remains buoyant, with ₹16,881 crore raised during April to December 2024, compared to ₹6,538 crore in the corresponding period of the previous year.

2.45 The domestic **corporate debt market** continued to gain significant traction during the year. The value of corporate bond issuances stood at ₹7.3 lakh crore from April to December 2024, with an average monthly issuance of ₹ 0.8 lakh crore, higher than the average of ₹0.66 lakh crore in the corresponding period of the previous year. Private placements remained the preferred channel for corporates, accounting for 99.1 per cent of total resources mobilised through the bond market. Increasing investor demand and elevated costs of borrowing from banks have made these markets more attractive for corporates for funding requirements.

2.46 In contrast to the equity market, the debt market in India remains under-capitalised. As a percentage of GDP, the corporate bond market is only 18 per cent in India, as opposed to 80 per cent in Korea and 36 per cent in China.³⁸ The market for corporate bonds comprises high-end bonds, with 97 per cent of corporate bond issuances concentrated in the top 3 rating categories (AAA, AA+ and AA). Issuers who are unable to get these ratings are unable to access the bond market. This may explain why most issuers are NBFCs or public sector undertakings (PSUs).³⁹

2.47 An overwhelming majority of corporate bond issuance happens through the route of private placement, which actively deters the participation of retail investors. In FY24, the public placement of corporate bonds stood at ₹19,000 crore against the private placement of around ₹8,38,000 crore.⁴⁰ The financial services sector dominates the issuance of corporate bonds at nearly 60 per cent of the total (International Monetary

38 SEBI Annual bulletin, <https://tinyurl.com/4rntp3xx>.

39 IMF paper, 'India's Financial System-Building the foundation for strong and sustainable growth', <https://tinyurl.com/3xmz39pw>.

40 ORF, 2024 -<https://tinyurl.com/48fzyvwr>.

Fund (IMF), 2023). Outside financial services, real estate and power generation/ supply comprise the rest. Consequently, corporate bond issuance from manufacturing and non-energy infrastructure sectors is a very small proportion of the overall bond market. From April to December 2024, ₹16,456 crore was raised by Real Estate Investment Trusts (REITs) and Infrastructure Investment Trusts (InvITs).

2.48 If liquidity has to enter corporate bond markets, problems such as entry costs, information asymmetry, and the absence of a secondary market must be addressed. For example, insurance and pension funds cannot be invested in bonds that are lower than AA-rated. This effectively crowds out small players in the corporate bond market. Liquidity is also bottled through regulations that prevent provident funds from investing in corporate bonds for more than 3 years. Moreover, insurance funds are not allowed to invest in debt issued by private companies.

Secondary Market: Positive performance amidst volatility

2.49 Turning to the performance of the secondary markets, since the commencement of FY25, they have experienced significant volatility driven by various events. These include the general elections in June 2024, the unwinding of carry trades in Japan in August 2024, the escalation of conflict in the Middle East and the U.S. Presidential Election (November 2024). Notwithstanding the intermittent corrections, the markets showed a consistent upward trend until September 2024, scaling new all-time highs. Strong domestic economic prospects, robust domestic institutional investor inflows, foreign portfolio investments, anticipated policy pivots from major central banks, etc., drove the uptrend. However, this trend has moderated since October 2024, driven by economic stimulus measures in China, the US Presidential elections and valuation concerns. On account of recent corrections, the benchmark index, Nifty 50, delivered a return (in local currency) of 4.6 per cent return from April to December 2024. The highest returns (in USD) were delivered by Hong Kong's Hang Seng (22.2 per cent), followed by Nasdaq Composite (17.9 per cent), Singapore FTSE Straits Times (16.2 per cent) and South Africa's FTSE/JSE All Share index (13.3 per cent) during the same period.

2.50 However, on a longer-term basis, Indian markets have been among the best-performing markets in the world. The compounded annualised returns of Nifty 50 for the past ten years (since March 2014) stand at 8.8 per cent (adjusted for USD), trailing below few indices, such as the US NASDAQ composite index (15.3 per cent) and US Dow Jones (9.2 per cent) among a select set of significant markets as of December 2024. The corresponding CAGR of China's Shanghai Composite indices stands at 3.2 per cent. The positive performance of the Indian stock was driven by strong profitability growth, rapid traction of digital financial infrastructure, expanding investor base and substantial reforms in products and processes. In line with the performance of Indian

markets, India's weight in the MSCI-EM index reached a new high of 20 per cent in July 2024 before settling down at 19.4 per cent at the end of December 2024. This is only the third highest after China and Taiwan.

2.51 On 23 May 2024, the total market capitalisation of BSE-listed stocks closed above the USD 5 trillion milestone for the first time. At the end of December 2024, BSE's market capitalisation increased by 14.2 per cent since March 2024 to reach ₹445.2 lakh crore. BSE market capitalisation to GDP ratio stood at 136 per cent at the end of December 2024, rising significantly over the last 10 years.

Table II.1: Market capitalisation to nominal GDP ratio (percentage)

	India	China	Brazil	Japan	South Korea	United Kingdom	United States
Dec-19	77	60	65	121	89	106	158
Dec-20	95	79	68	129	122	92	195
Dec-21	113	80	50	136	127	108	206
Dec-22	105	65	42	126	96	91	157
Dec-23	124	61	44	147	114	71	179
Dec-24*	136	65	37	157	90	84	213

Source: CEIC Database, IMF and WFE
 Note: The data has been revised based on the 1st advance estimate of GDP released on 7 January 2025. Projected figures: GDP figures are taken from IMF projections, and market capitalisation is taken as at the end of Q2 of FY25 (i.e., Sep-24 end) for the US, India, Japan, Korea, and China, the UK and Brazil market cap figures are as on the end of December 2024. Market capitalisation was taken country-wise as Brazil (Brasil, Bolsa, Balcão), China (Shanghai and Shenzhen Stock Exchange), All India, Japan (Japan Exchange Group Inc.), South Korea (Korea Exchange), United Kingdom (London Stock Exchange) and USA (NYSE and NASDAQ)

Rise in investor participation in capital markets

2.52 The period since the pandemic has seen a surge in individual and household participation as capital market investors through direct (trading in markets through their accounts) and indirect (through mutual funds) channels. Healthy corporate earnings, stable macro fundamentals, efficient and robust technology architecture facilitating efficient trading, clearing, and depository systems, and trust garnered by mutual fund ecosystem and online digital investment platforms have encouraged greater participation in capital markets.

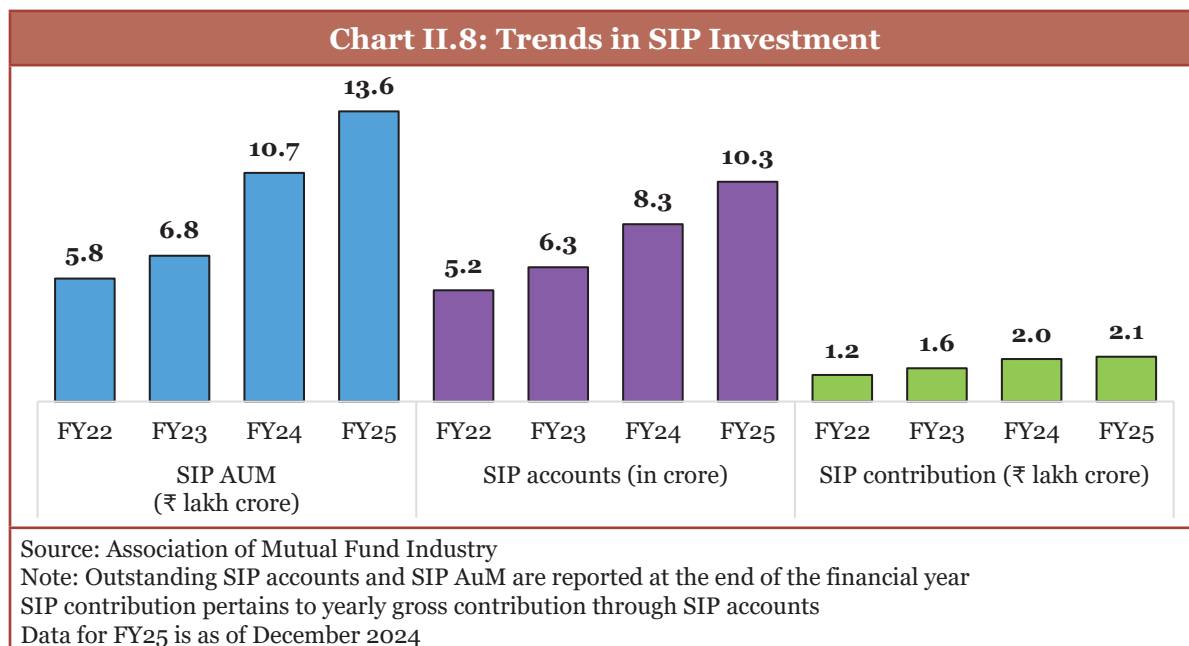
2.53 The incremental addition to demat accounts has been continuously increasing, with the number of demat accounts rising sharply by 33 per cent to 18.5 crore at the end of December 2024 on a YoY basis. In the equity cash segment, individual investor share turnover⁴¹ was 35.6 per cent from April to December 2024. There are 11.5 crore unique investors with demat accounts and 5.6 crore unique investors in mutual funds as of the end of December 2024. Higher investor participation has engendered a self-reinforcing cycle of strong market returns, bringing in even more investors. This, in

⁴¹ Share turnover refers to the ratio of the value of traded shares of individual category to the total turnover in the cash market (BSE and NSE).

turn, will eventually transform the securities market into a more diverse, inclusive, and robust platform for wealth creation.

2.54 The mutual fund industry has grown well in the last few years and is now crucial in channelling financial savings towards risk capital formation and leveraging technology and innovation. The rise in retail participation through mutual funds is reflected in the doubling of unique investors from 2.9 crore in FY21 to 5.6 crore as of December 2024. The total number of folios (excluding FoF domestic schemes) increased from 17.8 crore at the end of FY24 to 22.5 crore at the end of December 2024, and retail investors⁴² held mutual fund units worth ₹18.6 lakh crore. This surge in participation, coupled with strong market performance, has led to a remarkable increase in mutual funds' assets under management (AuM), which rose to ₹66.9 lakh crore as of December 2024, registering 25.3 per cent growth from March 2024.

2.55 The mutual fund segment presently has more than 10 crore Systematic Investment Plan (SIP) accounts, with cumulative SIP inflows of ₹10.9 lakh crore since inception. Monthly average gross SIP flows have more than doubled in the last three years, from ₹0.10 lakh crore in FY22 to ₹0.23 lakh crore in FY25. Aided by these sustained inflows, mutual fund ownership in Indian listed companies has risen to a fresh all-time high of 9.5 per cent⁴³ in the quarter ending September 2024, from 8.7 per cent in FY24.



2.56 Amid the impressive performance of the Indian stock markets, several factors could potentially pose significant risks. Box II.2 discusses these factors in detail.

⁴² Defined as individuals investing ₹2 lakh or below.

⁴³ Includes passive and active (Source: NSE Market Pulse, November 2024)

Box II.2: Risks for the Indian stock market in 2025

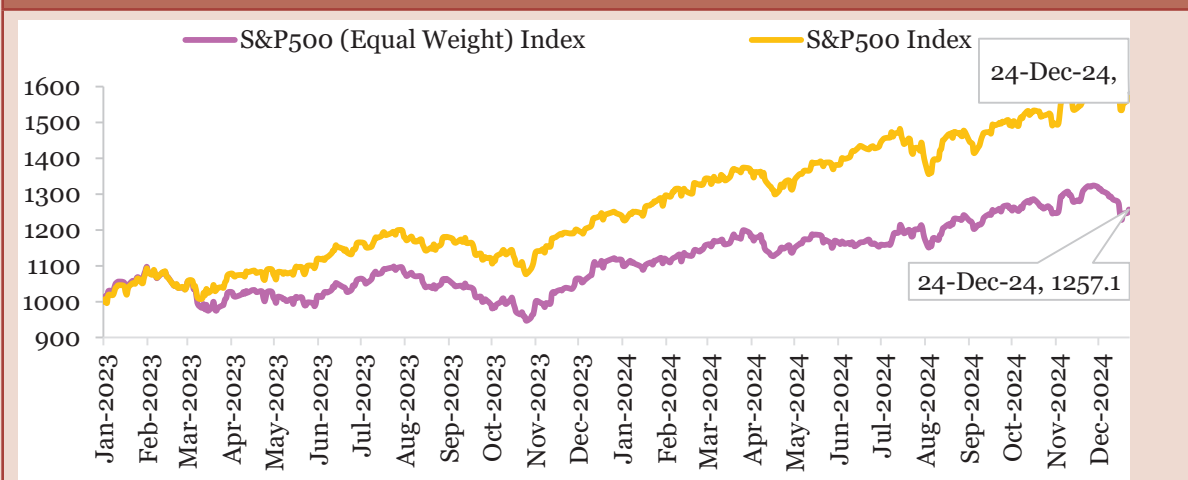
As we move into 2025, the US financial landscape is characterised by high stock market valuations, record corporate profits and extremely optimistic investor sentiment. With the US comprising 75 per cent of the MSCI World Index (as of November 2024), any correction in its market could have profound ripple effects on global markets, including India, underscoring the need for heightened vigilance.

US markets at a record high

Notwithstanding accentuated geopolitical tensions, the US equity markets had a solid run for the second year in a row, outperforming the broader developed market pack. Following a 24 per cent gain in 2023, the S&P 500 Index is well on course to generate a 20 per cent+ return in 2024. This outperformance came on the back of economic resilience, robust corporate earnings that have surged to record-high levels (~USD 4 trillion as of the quarter ending September 2024),⁴⁴ strengthening rate cut expectations early in the year and an all-time high investor confidence. That said, the surge in US stock market valuations to an unattractive zone, currently at their third highest levels as indicated by Shiller’s S&P 500 CAPE ratio (Cyclically Adjusted Price-Earnings Ratio), warrants some caution. Further, the rally over the last two years has been largely driven by a few mega-capitalisation technology companies—Apple, Microsoft, Amazon, Alphabet, and Nvidia. This is reflected in a strong 40 per cent+ year-to-date return in the S&P 500 Top 10 Index.

The performance of the S&P 500 Equal Weight Index, which assigns equal weight to all 500 constituents, effectively diluting the impact of the largest companies, is also a good assessment of the performance of the S&P 500 excluding these companies. The S&P 500 Index has rallied by a total of 56 per cent in 2023 and 2024, more than double that generated by the equal weight index. This, along with tapering rate cut expectations, with the US Federal Reserve’s dot plot now suggesting a 50bps cut in 2025, down from the earlier guidance of 100bps, has added to the potential risks and uncertainties.

Chart II.9: S&P500 vis-à-vis S&P500 (Equal Weight) index (Rebase to 1000)



Source: LSEG Workspace
 Note: Data for the S&P 500 Index and the S&P 500 Equal Weight Index is from January 2023, both rebased to 1000 (as of 3 January 2023). Data is till 24 December 2024

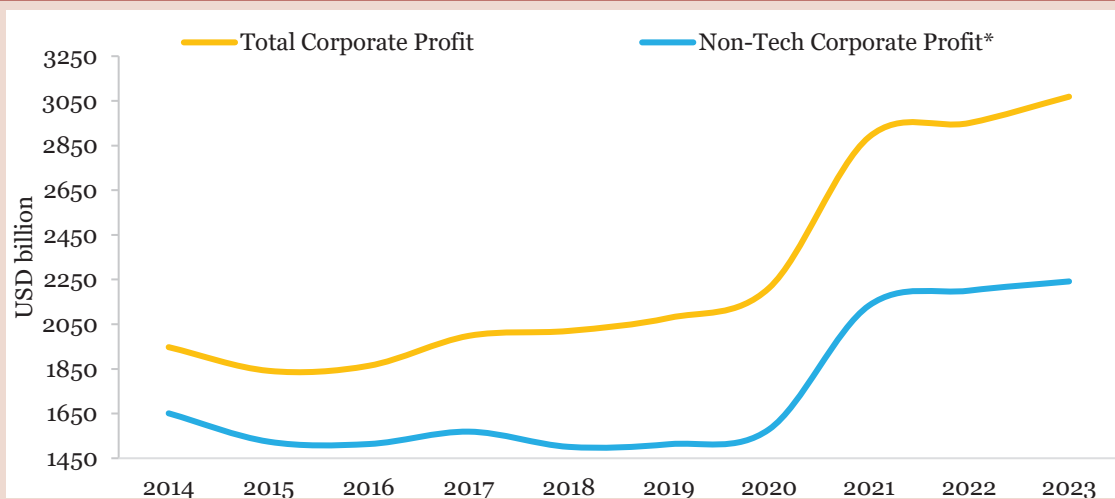
44 Data Source: Federal Reserve Economic Data (FRED), National Income: Corporate Profits Before Tax (Without IVA and CC Adj.), Billions of Dollars, Quarterly, Seasonally Adjusted Annual Rate. <https://fred.stlouisfed.org>.

Interestingly, investor sentiments this time have been heavily influenced by sustained demand for high-growth stocks and extreme and unreasonable optimism, as indicated by an all-time high divergence between the share of respondents expecting an increase in stock prices and income levels (based on the Conference Board Consumer Confidence Survey). However, history shows sentiment-driven rallies are often fragile, with confidence shifting rapidly in response to external shocks, such as geopolitical events, policy changes, or economic slowdowns. This makes the current environment particularly susceptible to volatility, with any unexpected developments potentially triggering significant market corrections.

At the same time, questions are emerging about the sustainability of U.S. corporate earnings, particularly as they are concentrated within a few major technology firms and supported by strong government spending, up 10 per cent YoY to USD 6.75 trillion⁴⁵ from October 2023 to September 2024.

Furthermore, investor demand for structured and complex products, where returns are backed by revenues from unconventional assets such as data centres, music catalogues and solar panels revenues, has surged to the highest level since the Global Financial Crisis (GFC).⁴⁶

Chart II.10: US corporate profits vs. non-tech corporate profits



Source: LSEG Workspace

Note: The technology sector has been identified based on Thomson Reuters sector classification and market capitalisation as of 26 December 2024⁴⁷

Retail participation in India at record high

Indian equity markets have also had a steady run since the onset of the pandemic, driven by factors that extend beyond global influences. One such notable factor has been a surge in retail participation over the last five years, both in terms of investor numbers and trading activity. The unique investor base at the National Stock Exchange (NSE) surpassed the 10-crore mark in August 2024, tripling in the last four years, and currently stands at 10.9

45 US Treasury website, <https://fiscaldata.treasury.gov/americas-finance-guide/national-deficit/>.

46 <https://www.ft.com/content/5219f962-3499-4928-8c73-5610b7a0109e>.

47 This excludes the 85 technology companies within the top 503 companies(S&P500), where corporate profit data has been available for the last 10 years.

crore (as of 26 December 2024). The number of client codes, indicating a number of investor accounts at NSE, has risen from a little under six crore at the end of 2019 to nearly 21 crore as of December 2024.

Regarding activity, the number of individuals that traded at least once a month in the NSE’s cash market segment increased from ~32 lakh in January 2020 to ~1.4 crore in November 2024. The rise in individuals’ participation in Indian equity markets is also reflected in the amount of money invested by them. After remaining on the sidelines for the previous 11 years, individuals turned net buyers of Indian equities in 2020, only to strengthen it further over the ensuing years. In the last five years (2020-24), individuals have invested a net amount of ₹4.4 lakh crore in the NSE’s cash market segment, with net inflows in 2024 (Jan-Nov’24) surging to a record high of ₹1.5 lakh crore. This, along with strong indirect participation via mutual funds, has more than made up for volatile FPI outflows over the last five years. Notably, direct and indirect (via mutual funds) ownership of individual investors at 17.6 per cent (as of September 2024) in the NSE-listed companies is now at par with FPIs. This gap was as high as 7.1 percentage points in FY21.

Participation of individual investors during the 2008 GFC and 2020 COVID-19 pandemic

Chart II.11a: Count of active individual investors

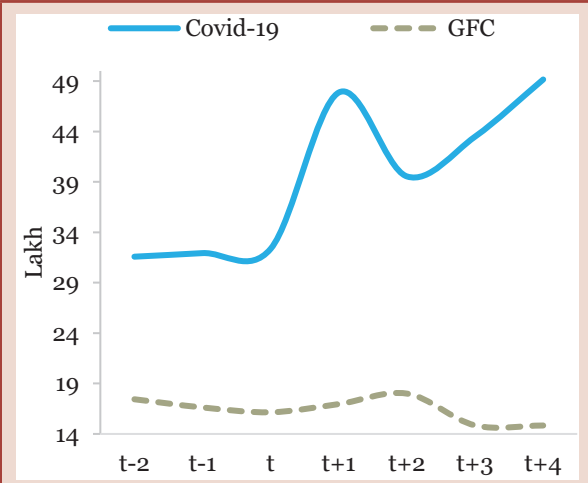
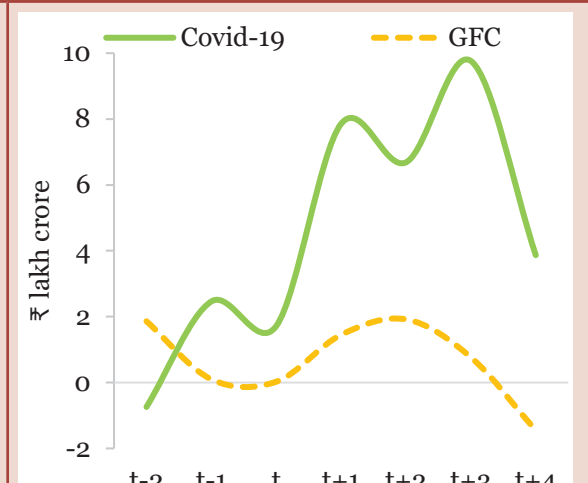


Chart II.11b: Net inflows by retail investors



Source: NSE Economic Policy and Research (EPR)

Note: ‘t’ is the month when the event occurred. For COVID-19, t is February 2020, and for GFC, it is August 2008

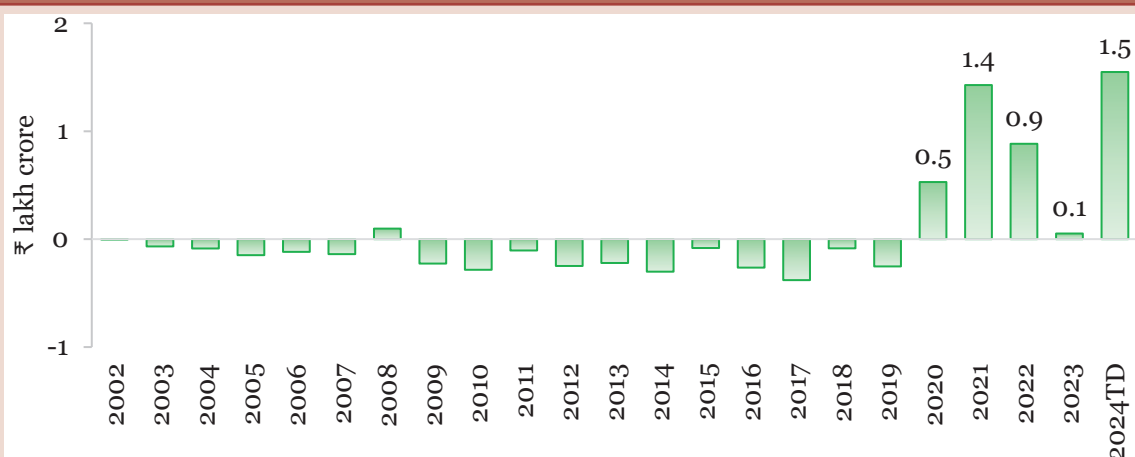
Active investors are those investors who have traded at least once during the month

Individual investors include individual domestic investors, NRIs, sole proprietorship firms and HUFs

Net flows are calculated as buy traded value – sell traded value in the NSE’s cash market segment

Net flows include investments in securities in EQ, BE, SM, and ST series, including ETFs only

Chart II.12: Annual trend of net inflows by individual investors in the NSE's cash market segment



Source: NSE EPR

Note: Individual investors include individual domestic investors, NRIs, sole proprietorship firms and HUFs

Net flows are calculated as buy traded value – sell traded value

Net flows include investments in securities in EQ, BE, SM, and ST series, including ETFs only

Data for 2024

Till Date is for the period January-November24

Deepening individual participation, coupled with robust gains generated by Indian equities, outpacing other asset classes, has created significant household wealth over the last few years.

As per the NSE's estimates, household wealth in Indian equities has increased by over ₹40 lakh crore in the last five years (2020-2024; as of September 2024).

This rise in retail participation aligns with a steady decline in the 5-year rolling beta between the Nifty 50 and the S&P 500 in the last four years, suggesting a reduced sensitivity of Indian markets to U.S. market movements. This decoupling is further evidenced by the increasing resilience of Indian markets during periods of FPI outflows. For example, in October 2024, despite FPI outflows of USD 11 billion, the Nifty 50 index was corrected by only 6.2 per cent, thanks to strong downside support provided by domestic institutional and individual investors. In contrast, during the March 2020 pandemic-driven market sell-off, FPI outflows of USD 8 billion triggered a steep 23 per cent market decline.

Even as the resilience demonstrated by the Indian market, supported by growing retail participation, is promising, the risks associated with a potential US market correction cannot be overlooked, given historical trends.

What does the history tell us?

Historical data and research suggest that the Indian equity market has been notably sensitive to movements in the US market. The Nifty 50 has historically shown a strong correlation with the S&P 500, with analysis of daily index returns between 2000 to 2024 revealing that in 22 instances when the S&P 500 corrected by more than 10 per cent, the Nifty 50 posted a negative return in all but one case, averaging a 10.7 per cent decline. On the other hand, during 51 instances when the Nifty 50 experienced a correction of over 10 per cent, the S&P 500 exhibited positive returns in 13 instances, with an average return of -5.5 per cent.

This underscores the asymmetric relationship between the two markets, highlighting a more pronounced impact of the movement in US markets on Indian equities than the other way around.

Further evidence shows that S&P 500 returns Granger-cause⁴⁸ Nifty 50 returns, meaning that changes in the US market are a leading indicator for the Indian market, especially during shocks, while the reverse is not true. This emphasises that Indian markets tend to react more to trends originating in the US, reinforcing the need for caution in the event of a downturn in the latter's stock market.

Potential risks for India in 2025

Elevated valuations and optimistic market sentiments in the US raise the likelihood of a meaningful market correction in 2025. Should such a correction occur, it could have a cascading effect on India, especially given the increased participation of young, relatively new retail investors. Many of these investors that have entered the market post-pandemic have never witnessed a significant and prolonged market correction. Hence, if one were to occur, its impact on sentiment and spending may be non-trivial.

GIFT City

2.57 The International Financial Services Centres Authority (IFSCA) is poised to play a pivotal role in India's vision for 2047. As a unified regulator, IFSCA is responsible for developing and regulating financial institutions, services, and products within India's International Financial Services Centres (IFSCs). With its internationally aligned regulatory regime, IFSCA aims to create an environment conducive to global financial institutions operating in India. This, in turn, will facilitate the growth of India's financial sector, making it a key player in the global economy.

2.58 GIFT IFSC has been witnessing brisk growth, having more than 720 entities across categories. The international and domestic financial services industry is gravitating to this unique jurisdiction which benefits from unrestricted currency convertibility as it is classified as a non-resident zone under the Foreign Exchange Management Regulations. GIFT-IFSC has continued its ascent as a leading IFSC, improving its rank by five places in the 'Global Financial Centres Index 36' (GFCI 36), rising to 52nd position. It also achieved a notable jump in the FinTech rankings, climbing four places to rank 45. This progress reflects the concerted efforts of IFSCA in fostering a robust FinTech ecosystem.

2.59 The vibrant banking ecosystem in GIFT IFSC comprises foreign and domestic banks set up as branches of the parent bank operating as IFSC Banking Units (IBUs). As of September 2024, the total asset size of IBUs crossed USD 70 billion, and the cumulative value of transactions undertaken by IBUs crossed USD 975 billion. Credit exposure of IBUs stands over USD 51 billion as of September 2024, covering countries

⁴⁸ Granger causality is a statistical concept that determines if one variable can predict another variable based on its past values.

like the US, UK, Singapore, UAE, etc., apart from India. Additionally, the cumulative derivatives trades by IBUs crossed USD 982 billion, while the cumulative non-deliverable forwards (NDF) bookings reached almost USD 500 billion.

2.60 The asset management ecosystem in IFSC is proliferating. It comprises 128 Fund Management Entities, 168 Alternative Investment Funds (AIFs), and three Investment Advisors. By September 2024, AIFs had raised total commitments of USD 12.1 billion. Further, the insurance ecosystem in IFSC currently comprises 37 entities, including 15 IIOs (IFSC Insurance Offices) and 23 IIIOs (IFSC Insurance Intermediary Offices). The total (Re)insurance premium booked by IIOs is USD 427 million, and the total (Re) insurance premium transacted by IIIOs is USD 1,036 million, up to September 2024.

2.61 As of September 2024, 60 entities had registered as FinTechs or TechFins in GIFT-IFSC, reflecting the region's dynamic FinTech landscape. IFSCA has conducted 13 hackathons and received 152 applications from 14 jurisdictions under its FinTech Entity framework, showcasing its commitment to innovation.

Developments in the insurance sector

2.62 The global insurance market is experiencing a dynamic period of growth and transformation, driven by steady economic expansion, strong labour markets, and rising real incomes. Despite considerable challenges in 2023, including persistently high inflation and geopolitical tensions that constrained the global GDP growth, the insurance sector demonstrated a positive growth rate of 2.8 per cent.⁴⁹ The changing macroeconomic environment, climate fluctuations, technological progress, and evolving customer preferences drive transformation in technology, infrastructure, business models, and organisational culture within the insurance industry. Global insurers are actively adopting innovative technologies, expanding their market reach, and prioritising customer-centric approaches to improve efficiency and address emerging demands.⁵⁰

2.63 India's insurance market has also continued its upward trajectory. Total insurance premium grew by 7.7 per cent in FY24, reaching ₹11.2 lakh crore, despite a slight decline in insurance penetration⁵¹ from 4 per cent in FY23 to 3.7 per cent in FY24. Life insurance penetration dropped marginally from 3 per cent in FY23 to 2.8 per cent in FY24, while non-life insurance penetration remained stable at 1 per cent.

49 Swiss Re Institute World Insurance Report 2024, <https://tinyurl.com/bdfc3ma8>.

50 EY August 2024 report, 'Insurance for All: enhancing insurance coverage across India', <https://tinyurl.com/ucapam6y>.

51 Insurance penetration is calculated as the percentage of insurance premiums paid in a year to the country's gross domestic product.

Insurance density⁵² in the country saw a modest rise from USD 92 in FY23 to USD 95 in FY24. Non-life insurance density increased from USD 22 to USD 25, while life insurance density remained consistent at USD 70. This growth in insurance density has been on an upward trajectory since FY17. The gross direct premium of non-life insurers increased to ₹2.9 lakh crore in FY24 from ₹2.6 lakh crore in FY23, registering a YoY growth of 7.7 per cent. Health and motor segments primarily contributed to this growth. The life insurance industry recorded a premium income of ₹8.3 lakh crore in FY24, compared to ₹7.8 lakh crore in FY23, registering a YoY growth of 6.1 per cent. While renewal premiums accounted for 54.4 per cent of the total premium received by the life insurers, new businesses contributed the remaining 45.6 per cent. The life insurance industry paid benefits of ₹5.8 lakh crore in FY24, out of which ₹42,284 crore was due to death claims. The net incurred claims⁵³ of non-life insurers stood at ₹1.72 lakh crore in FY24.

2.64 With an overall insurance penetration rate of 3.7 per cent, below the global average of 7 per cent, there is a notable gap in coverage that presents opportunities for insurers to expand their reach. By targeting tier 2 and 3 cities and rural areas where awareness and accessibility are limited, insurers can tap into new customer segments and stimulate growth. Additionally, insurance density in India is relatively low compared to global standards. Innovative distribution models can facilitate the inclusion of underinsured customers who are already covered by government schemes such as the Pradhan Mantri Jeevan Jyoti Bima Yojana, Pradhan Mantri Fasal Bima Yojana, and Pradhan Mantri Jan Arogya Yojana.⁵⁴

2.65 The Swiss Re Institute has projected India's insurance sector to grow at a rate of 11.1 per cent and is expected to become the fastest-growing market among the G20 nations over the next five years (2024-2028). An expanding middle class, technological advancements, and supportive regulatory measures will likely drive this growth.⁵⁵ In the life insurance segment, there is a noticeable shift towards protection and guaranteed return savings products, which now cover 40 per cent of households, largely due to LIC's extensive network. The non-life insurance sector is expected to double its premium-to-GDP ratio over the next two decades. However, it will remain below the global average.⁵⁶

⁵² Insurance density is calculated as the ratio of insurance premium to population (calculated in USD for international comparison).

⁵³ Net claims incurred is the total outstanding claims at the end of a financial year. It is calculated by adding the claims paid during the year to the outstanding claims at the end of the year and then subtracting the outstanding claims at the beginning of the year.

⁵⁴ Ibid note 50.

⁵⁵ Swiss Re Institute Report, 'India's Insurance Market: Growing Fast with Ample Scope to Build Resilience', <https://tinyurl.com/mryxwhve>.

⁵⁶ Morgan Stanley Investor presentation ASIA, 2023.

2.66 Evolving customer expectations and emerging risks, such as climate change and geopolitical uncertainty, present significant challenges for insurers. Additionally, increasing life expectancy and a growing elderly population pose underwriting risks related to longevity and highlight the widening pension gap. Non-financial risks have gained importance alongside traditional financial risks. The industry must address and manage concerns related to misselling, delayed claims settlements, AI, cybersecurity, and third-party interactions. A clear and quantitative understanding of risk appetite is essential for effective risk management. Insurers must develop strong capabilities to tackle these emerging risks through rapid innovation while ensuring efficiency and productivity through simplification, standardisation, and digitisation.⁵⁷

Developments in the pension sector

2.67 Ensuring financial security in retirement is essential for individuals and societies, especially as many countries face ageing populations' social, economic, and financial challenges. The World Economic Forum (WEF) has highlighted that, for the first time in history, globally, the number of people aged 65 and over has surpassed the number of children aged five and younger.⁵⁸ Retirees face increasing risks due to rising inflation and higher interest rates, which elevate the cost of government debt and strain the government's ability to maintain their current level of services.⁵⁹

2.68 An IMF staff discussion paper⁶⁰ has analysed the global trends in rising government pension expenditure, projecting that public pension spending will increase by an average of 1 per cent of GDP in AEs and 2.5 per cent in EMEs by 2050. In many advanced economies, younger individuals must save significantly more and delay retirement by several years to receive pension benefits comparable to today's retirees. Additionally, countries with ageing and shrinking working-age populations are expected to experience a more pronounced decrease in national savings than those with younger populations.

2.69 According to the Mercer CFA Institute Global Pension Index⁶¹, 2024, India's overall index value has moderated from 45.9 in 2023 to 44 in 2024. The overall index is a weighted average of three sub-indices viz. adequacy (40 per cent), sustainability (35

57 McKinsey report, 'Steering Indian insurance from growth to value in the upcoming 'techade'', <https://tinyurl.com/3xdtknbj>.

58 WEF (2024), 'How communities can step up to provide long-term care for the world's ageing population' <https://tinyurl.com/ys8s7twk>.

59 Mercer CFA Institute Global Pension Index 2024, <https://tinyurl.com/s3btauuu>.

60 Eich, F., Soto, M., & Feher, C. (2014). Public Pension Spending in Advanced and Emerging Market Economies: Past Trends and Projected Outcomes. Bruce and Virginia MacLaury Senior Fellow, The Brookings Institution. Creating equitable and sustainable pensions is one of the main policy challenges of the twenty-first century. Policymakers need to be reminded constantly of the challenges that they need to confront. This timely collection of essays by experts in the field offers an analysis of the core issues which is based on rigorous think, 31, <https://tinyurl.com/mr3sc4y9>.

61 Mercer CFA Institute Global Pension Index, <https://tinyurl.com/y2tk573p>.

per cent), and integrity (25 per cent). A decline in the value of the adequacy⁶² sub-index from 41.9 (as per the 2023 survey report) to 34.2 (as per the 2024 survey report) and a decrease in the net pension replacement rates has driven the moderation in the overall index. On the other hand, the scores for sustainability⁶³ and integrity⁶⁴ sub-indices have improved across the two survey rounds.

2.70 India's pension sector has grown significantly since the introduction of the National Pension System (NPS) and Atal Pension Yojana (APY). As of September 2024, the total number of subscribers reached 783.4 lakh, showing a YoY growth of 16 per cent from 675.2 lakh in September 2023. The number of APY subscribers, which includes its earlier version, NPS Lite, rose from 538.2 lakh in March 2023 to 629.1 lakh in September 2024. APY subscribers comprise approximately 80.3 per cent of the overall pension subscriber base.⁶⁵

2.71 Disaggregated data from the Pension Fund Regulatory and Development Authority of India (PFRDA) indicates significant improvements in terms of gender in the subscriber demographic for APY. The share of female subscribers increased from 37.9 per cent in FY16 to 52 per cent in FY24. Additionally, the age distribution has shifted to favour a younger cohort, specifically those aged 18-25, whose share rose from 29.2 per cent in FY16 to 45.5 per cent in FY24. However, 93.7 per cent of APY accounts correspond to a pension amount of ₹1,000 per month, while 3.7 per cent are for ₹5,000. This overwhelming preference for a low pension amount among APY subscribers can be attributed to several factors, the most significant being that the target population primarily consists of low-income households, where daily consumption needs take precedence over savings. Furthermore, the overall pension coverage for these two schemes has increased from 0.95 per cent of the total population in FY16 to 5.3 per cent in FY24. Additionally, the AuM for these schemes as a proportion of GDP have risen from 0.86 per cent in FY16 to 4 per cent in FY24.

2.72 On 24 August 2024, the government approved Unified Pension Scheme (UPS) for Government employees that will be implemented along with the present NPS, and will be effective from FY26. UPS has features of both old and new pension schemes to offer a wholesome retirement cushion to the employees. The scheme offers a family pension,

62 The adequacy sub-index represents both the benefits of the current pension systems and an assessment of some important system design features. It is calculated based on these indicators: benefits, system design, savings, Government support, home ownership, and growth assets.

63 The Sustainability sub-index focuses on the future and uses various indicators that will influence the likelihood that the existing systems will be able to provide benefits for decades to come. It is calculated based on these indicators: pension coverage, total assets, demography, public expenditure, government debt, and economic growth.

64 Integrity sub-index includes many legislative requirements that influence the overall governance and operations of the system, which affect the level of confidence that the citizens of each country have in their system. It is calculated based on these indicators: regulation, governance, protection, communication, and operating costs.

65 Based on PFRDA data.

a guaranteed pension amount, and a minimum pension for all the people working in government jobs. It guarantees 50 per cent of the average basic pay of the past 12 months preceding the date of retirement as the guaranteed pension for the employee, provided the employee has served the government for at least 25 years. The minimum pension under the scheme is ₹ 10,000 per month for employees who have at least 10 years in the service upon superannuation. In case of death of the pensioner, 60 per cent of the pension amount (which he or she received right before the demise), will be offered to the family.⁶⁶

2.73 Despite this growth, India's pension system has considerable potential for further expansion. Pension assets, including major schemes like the Employees' Provident Fund Organisation (EPFO), account for 17 per cent of the GDP. The NPS contributes an additional 4.5 per cent of the GDP. In contrast, the average pension assets in OECD countries exceed 80 per cent of their GDP.⁶⁷ India's capacity to financially empower its citizens is anticipated to grow as the economy progresses. Additionally, the extension of NPS to children through the NPS Vatsalya⁶⁸ is expected to contribute to this empowerment. Box II.3 discusses further aspects of the pension landscape in the country.

Box II.3: Securing Retirement: Transforming India's Pension Landscape

By design, the benefits of a robust pension system are realised long into the future. The system's liabilities (pension payments) become due far later, while there is always a risk that the assets (contributions from a younger workforce) may change in the meantime. A potential asset-liability mismatch can result in explosive government debt once the future payouts become due. For instance, Greece and Italy suffered pension crises as their populations aged. The UK is predicted to hit a pensions crisis in the next two decades.⁶⁹

What constitutes an efficient pension system in the case of India?

Considering India's unique demographic and labour market characteristics, the pension system must embrace principles of sustainability and scalability. Emphasising sustainability is crucial to ensure that as India moves beyond its favourable demographic window, the burden of an ageing population does not disproportionately affect the younger generation. For a pension scheme to be sustainable, the outflows must be adequately linked to the inflows. In this context, Pay-As-You-Go (PAYGO) schemes⁷⁰ begin to fail when demographic profiles change. Furthermore, the nature of inflation indexation is important, especially in defined benefit schemes. Even small differences in percentage points for indexation can lead to significant variations in the annuities paid out.

66 PIB press release dated 24 August 2024, <https://tinyurl.com/yck3uwjm>.

67 3rd Ranjit Kumar Dutta leadership lecture delivered by Dr. Deepak Mohanty, Chairman, PFRDA, Dibrugarh University, 4 March 2024, 'Progress of Indian Economy and Prospects of Pension Security', <https://tinyurl.com/bdhtkmud>.

68 PIB press release of Ministry of Finance dated 16 September 2024, <https://tinyurl.com/pny4tt45>.

69 Financial Times 2024, <https://tinyurl.com/mr2k8hba>.

70 PAYGO schemes are essentially pay-as-you-go arrangements where the young salaried employees bear the price of pension payments for the older generation. Several OECD nations usually follow this.

Despite significant advancements in the pension sector, 5.3 per cent of the total population is covered by the NPS and APY combined. This highlights another critical aspect of the Indian pension system: scalability. Low costs are essential to enhance coverage meaningfully. Achieving this will require highly competitive, low-cost fund management and minimal transaction costs, which is particularly vital for small-ticket transactions.

In principle, taking into consideration both scalability and sustainability, India's pension system design seems robust and stable. The NPS is one of the lowest-cost pension schemes globally⁷¹ and its framework is based on a defined contribution model, which ensures that future payouts are determined by market fluctuations, thereby reducing the fiscal burden on the government. Additionally, the APY aims to address the retirement needs of the unorganised and informal sectors - first time in India's pension history. While progress under APY has been notable, its scalability in practice remains an area for further development. The key issue moving forward is how to make the pension system more accessible to the informal sector.

Role of financial inclusion in advancing financial literacy: The example of the Unified Payment Interface (UPI) illustrates how a well-designed platform can serve as a cost-effective solution for financial inclusion on a large scale. The widespread adoption of UPI proves that a lack of financial literacy did not hinder its success; rather, the necessity to utilise UPI encouraged the informal economy to open bank accounts. This suggests that financial inclusion can indeed precede financial literacy. Thus, a fundamental step in integrating a significant portion of the informal sector into the pension framework is raising awareness about pension and financial literacy and utilising modern, application-based interfaces that allow seamless access to these services.

Behavioural nudges for scalability: A persistent issue with micro-pension schemes is their low uptake among the poor, who often have a strong urge to allocate limited funds toward immediate consumption.⁷² In this context, increasing participation can be achieved through behavioural interventions. These interventions could involve changing how information is presented, simplifying the enrolment process (for example, using UPI-enabled pension payments), and providing timely reminders.

Young people in India may not feel an immediate need to secure an optimal pension plan. The old-age dependency ratio is about 15.7 per cent, which is significantly lower than in many EMEs. However, this should not lead to complacency. The best time to repair a roof is when the sun is shining, not when it is raining.

Financial sector regulators

2.74 Independent regulators are key institutions established as separate “agencies” at arms’ length from the political system, with delegated powers to implement specific policies in several sectors. Regulators have been set up in the utility sector (energy, telecom, airports), competition, social sector (higher education), financial services (capital markets, insurance, pensions) etc. These regulatory agencies are seen to be

71 Department of Financial Services 2024, <https://tinyurl.com/32efw7wf>.

72 World Bank 2019, <https://tinyurl.com/53uy6655>.

mainly designed to have the authority to deal with intricate issues, providing non-discriminatory access to essential services and guaranteeing “fair and transparent” regulations. The key benefit sought from an institutional framework based around these independent regulators/agencies is to safeguard market interventions from the interference of political and private interests. Further, these independent regulatory bodies (IRBs) can set up and benefit from a specialised workforce with relevant technical knowledge of the area of regulation.

2.75 The financial sector is primarily governed through IRBs – RBI, SEBI, IRDAI, PFRDA and IBBI, with FSDC having a broader financial stability mandate, enabling inter-regulatory coordination and promoting financial sector development.⁷³ Each IRB varies in design, the nature of delegated functions, and the degree of autonomy, which are unique to the socio-political context of its evolution and the regulated domain. However, certain basic structure elements are common to all regulatory bodies: they are backed by a statute, are accountable to the legislature, enjoy a certain degree of autonomy from the government, have legislative, executive and quasi-judicial functions, and engage in specialised and technocratic decision-making processes.

2.76 Regulations are the basic instruments of law through which the IRBs conduct their functions and deliver on their objectiveness. The efficiency and effectiveness of regulatory action are directly dependent on the quality of regulations. The primary responsibility of these IRBs is the making of regulations, the power for which is delegated to the IRBs by statute and is an essential component of the autonomy of IRBs. Box II.4 discusses the regulation-making aspect of the IRBs in the financial sector space, suggesting the approach of regulatory impact assessment for strengthening this process.

Box II.4: Institutionalising regulatory impact assessments in independent regulatory bodies

The regulators in the financial sector space are largely left to regulate themselves in their mandate of ensuring optimal and adequate regulation and assessing themselves. In the existing governance architecture, the performance of IRBs in the financial sector is assessed in the following ways.

Parliament, through the Committee on Sub-ordinate Legislations⁷⁴ in the Rajya Sabha: It is mandated to examine if the powers delegated under a law passed by the legislature have been duly exercised and are within the conferment or delegation and not beyond.

⁷³ Department of Economic Affairs, Government of India. Structure of Financial Stability and Development Council, <https://tinyurl.com/nhbd23t3>.

⁷⁴ Rajya Sabha Practice and Procedure Series No. 13, Committee on Subordinate Legislations No.13 pp 3-4. <https://tinyurl.com/4vtvwxbh>.

Parliament, through the Standing Committee on Finance, can examine the performance of specific sectors and the IRBs. The Committee, in 2024, examined the performance of the insurance sector (66th Report).

Department / Ministry administering the parent statute- These assessments deal with overall performance, utilisation/expenditure of grants, compliance with parliamentary procedure and administrative matters regarding the structure and composition of the IRBs. The quality of regulation usually falls beyond the ambit of regular evaluations.

The Comptroller and Auditor General's (CAG) mandate includes the various audits of autonomous entities, including IRBs. However, the scope of CAG's financial compliance and financial audits do not include the IRB's regulation-making processes. The quality of regulation is beyond the scope of these audits.

Judicial review – Once a regulation is challenged, the courts then review, ex-post, the implementation of the regulations. Such reviews may cover the form, content or implementation of the regulation. Withstanding judicial scrutiny improves the regulation's force and vindicates the regulation maker's decisions. However, the gains from such review are only available after implementation and not during the making of regulations.

The quality of regulations can be broadly assessed based on five criteria: democratic legitimacy, accountability of the regulator, fair, accessible and open procedures, expertise and efficiency.⁷⁵ While these criteria are impacted by many structural and operational factors in the regulator and beyond, using a 'fair, accessible and open procedure' for regulation-making is more practicable than the others. A systematic procedure for regulation-making is one way to ensure that the quality of regulations is right.

Regulatory impact assessment (RIA) has been identified as an effective tool when used as part of the regulation-making process to ensure the quality of regulations. RIA is an administrative obligation or an instrument of public policy analysis for identifying the costs of regulation on certain business sectors (Fischer, Miller and Sidney 2007)⁷⁶ and has been promoted by the World Bank (2010).⁷⁷ OECD laid down the guidelines for the use of RIAs in 2008.⁷⁸ By 2016, 32 of the 35 OECD countries had included RIA in their regulatory frameworks (Deighton-Smith, Erbacci and Kauffmann 2016).⁷⁹ Globally, countries are increasingly adopting and revamping RIA procedures, including countries across all income levels.⁸⁰

75 Baldwin, Robert., Cave, Martin., and Lodge, Martin (2012). *Understanding Regulation: Theory, Strategy and Practice*. 2nd ed, OUP, p. 25.

76 Fischer, F., Miller, G., and Sidney, M. 2007. *Handbook of Public Policy Analysis Theory, Politics and Methods*. Boca Raton: CRC Press.

77 World Bank Group, Investment Climate Advisory Services. 2010. *Making It Work: 'RIA Light' for Developing Countries, Better Regulation for Growth*. Washington, DC: World Bank Group.

78 OECD. 2008. *Introductory Handbook for Undertaking Regulatory Impact Analysis*. Paris: OECD Publishing.

79 Deighton-Smith, R., Erbacci, A., and Kauffmann, C. 2016. "Promoting inclusive growth through better regulation: The role of regulatory impact assessment." *OECD Regulatory Policy Working Papers No. 3*. Paris: OECD Publishing.

80 World Bank Group, *Worldwide Practices of Regulatory Impact Assessments Case study*. 2016.

Financial sector IRBs have been including the elements/aspects of RIA and related regulatory best practices. The RBI has set a Medium-term Strategy Framework - Utkarsh 2022, and the SEBI indicates regulatory plans as part of its annual reports.⁸¹ The IBBI governs the regulation-making process through the IBBI (Mechanism for Issuing Regulations) Regulations, 2018.⁸² It provides for at least 21 days for public consultations while proposing/amending regulations, consultations with stakeholders and advisory committees, and an economic analysis covering the expected costs and benefits to society, economy, stakeholders, and itself on account of the proposed regulation. It also provides for a review of all regulations every three years. It is observed that most regulators practice consultations with stakeholders during regulation-making through discussion papers shared on their websites. A third-party evaluation of the regulatory performance of the IBBI was conducted in 2021 (NCAER, 2021).⁸³

There is vast scope for improvement in the regulatory responsiveness in terms of following participatory processes of the IRBs.⁸⁴ The second Administrative Reforms Commission⁸⁵ recommended including reviews of regulations. The Financial Sector Legislative Reforms Commission⁸⁶ detailed the process for making regulations as part of the draft financial code. The proposed process included a detailed cost-benefit analysis of the proposed regulations alongside the considered alternatives. The Union Budget 2023-24⁸⁷ recommended that the financial sector regulators include public consultations as part of the regulation-making process, issuing subsidiary directions, conducting a comprehensive review of existing regulations and laying down time limits for various applications under different regulations.

As financial sector regulators take steps to address the review of regulations and shortcomings in the regulation-making process, it would be an opportune time to institutionalise a systematic approach such as the RIA. There is vast evidence of the benefits of RIAs in terms of better quality of regulations and reduced compliance burden, thereby reducing the cost of compliance for businesses. RIA is also effective in improving the transparency and responsiveness of the IRBs, thereby improving credibility.

One credible approach to RIA would be to set up an independent agency housed inside the regulator to evaluate the regulations from all angles. This agency will report to the Board and not to the management. It can provide an impartial and objective assessment of the regulatory processes and outcomes, including the economic and social impacts of regulations. An economic and social cost-benefit analysis of regulations will prove useful to

81 Securities Exchange Board of India Annual Report 2023-24 <https://tinyurl.com/mtddd28z>.

82 The IBBI (Mechanism for Issuing Regulations) Regulations, 2018, <https://tinyurl.com/2x9xnuy5>.

83 National Council of Applied Economic Research 2021. Evaluation of the Regulatory Performance of the Insolvency and Bankruptcy Board of India. <https://tinyurl.com/mvvz55xw>.

84 Carnegie India Measuring Regulatory Responsiveness in India: A Framework for Empirical Assessment 2019. <https://tinyurl.com/3u5x7tvb>.

85 Second Administrative Reforms Commission, Organisational Structure of Government of India, Thirteenth Report April, 2009 (Para 6.4.8) pp 156-158

86 Report of the Financial Sector Legislative Reforms Commission Vol II: Draft Law, 2013. <https://dea.gov.in/fslrc>.

87 Government of India, Speech of the Finance Minister, Union Budget 2023-24 Para 99 and 100. <https://tinyurl.com/bdemfe54>.

regulators in making them effective and purposeful rather than broad-based, cumbersome, and inhibiting legitimate economic activity and risk-taking. Such a move will signal that regulators are willing to live by the principles they expect regulatory entities to follow. This will strengthen the credibility of the process regulators follow and improve the acceptance of the proposed measures.

Regulation in the financial sector must strike an optimal balance between the imperative of stability and the goals of fostering innovation, efficiency, and competition. Given the country's low financial literacy and lower-middle-income status, ensuring stability is essential to prevent systemic risks and protect consumers. However, this should not come at the expense of stifling creativity, innovation, or healthy market dynamics. At the same time, an excessive focus on innovation and competition without adequate safeguards can lead to financial instability, resource misallocation, and erosion of trust in the system. Striking this balance is particularly critical for India, considering its vast and diverse economy, growing aspirations, and substantial investment needs to sustain high growth and development. Regulators must consistently strive to achieve this equilibrium, and the suggestions outlined in this box, if implemented, will help them pursue and maintain that balance effectively.

Cybersecurity aspects of India's financial sector

2.77 Cyberspace has emerged as a multifaceted and rapidly evolving global environment where interactions among individuals, software, and services are facilitated by the widespread proliferation of information and communication technology (ICT) devices and networks. With innovative technologies and advanced digital tools, cyberspace has effectively transcended geographical barriers for exchanging information and communication. However, this digital revolution has concurrently introduced new challenges and threats, including the illicit use of cyberspace for criminal activities.

2.78 With technological advancements, the Indian financial sector is witnessing a digital transformation that has enhanced efficiency and accessibility and increased exposure to diverse cyber threats. These threats, ranging from phishing and ransomware to Distributed Denial of Service (DDoS) attacks, SMSing, and fake/malicious mobile applications, pose serious challenges to the financial system's stability. As per the information reported to and tracked by the Indian Computer Emergency Response Team (CERT-In)⁸⁸, the number of observed and handled cybersecurity⁸⁹ incidents stood at 11.6 lakh, 14 lakh and 13.9 lakh during 2020, 2021 and 2022, respectively.

2.79 The financial sector remains susceptible to cyber threats because it manages sensitive data and conducts critical transactions. Criminals often target financial

⁸⁸ Indian Computer Emergency Response Team, Ministry of Electronics and Information Technology, <https://tinyurl.com/yz8tppnp>.

⁸⁹ Cyber security is the application of technologies, processes, and controls to protect systems, networks, programs, devices and data from cyber-attacks. It aims to reduce the risk of cyber-attacks and protect against the unauthorised exploitation of systems, networks, and technologies.

institutions to either gain unauthorised access to assets or disrupt financial activities, jeopardising economic stability. Reports indicate that almost one-fifth of all reported cyber incidents involve financial institutions, with banks being the most affected. According to IMF's April 2024 Global Financial Stability Report, cyberattacks have resulted in extreme financial losses, which have increased fourfold since 2017, amounting to USD 2.5 billion. Beyond these direct losses, indirect costs such as reputational damage and expenditures on enhanced security have also significantly risen.⁹⁰

2.80 National Cyber Security Policy 2013 (NSCP-2013) was released by the Government in August 2013 for public use and implementation with all relevant stakeholders. The objective of the policy is to create a framework for comprehensive collaboration and collective response to deal with issue of cyber security at all levels within the country. The FSDC is the apex body for addressing high-level policy issues and fostering inter-regulatory coordination among key financial sector regulators. The FSDC facilitates inter-regulatory coordination, financial sector development and the maintenance of financial stability. In view of the increasing digitalisation of the financial sector, FSDC has been focusing on cyber security issues as strengthening the cyber resilience of the financial sector is key to maintaining financial stability.

2.81 India's Tier 1 ranking in the Global Cybersecurity Index (GCI) 2024, with a commendable score of 98.49 out of 100, signifies a significant milestone in its cybersecurity journey.⁹¹ This recognition places India among the world's 'role-model' nations in cybersecurity. The GCI evaluates national efforts across five pillars—legal, technical, organisational, capacity building, and cooperation, highlighting India's holistic approach. India has strengthened its cybersecurity ecosystem through robust legal frameworks, targeted education programs, and international collaborations. By promoting awareness, skill development, and research, the country effectively addresses current cyber threats while preparing for emerging challenges, reaffirming its leadership in securing digital infrastructure.

2.82 The RBI, in collaboration with sectoral regulators like Insurance Regulatory and Development Authority of India and PFRDA, oversees the cybersecurity preparedness of the financial sector through regular IT examinations and monitoring of compliance with established guidelines. The primary focus is on the regulations issued by the RBI, emphasising essential elements, including governance, technology risk management, IT services management, cybersecurity operations, business continuity, response and recovery, vulnerability assessments, and third-party risk management. This framework is designed to fortify cybersecurity risk management and supervision across financial institutions in India.

⁹⁰ IMF April 2024 Global Financial Stability Report, <https://tinyurl.com/8wa6fpfw>.

⁹¹ PIB press release of Ministry of Communications dated 20 September 2024, <https://tinyurl.com/2sxewe8m>.

2.83 The Indian banking sector benefits from a comprehensive and modern regulatory structure for cybersecurity, guided by both international and national standards. This framework is anchored by well-recognised international references, such as the ISO 27001 for Information Security Management Systems, the NIST Cybersecurity Framework, and the CPMI-IOSCO Cyber Guidance for Financial Market Infrastructures (FMIs). The RBI has recently introduced regulations on the oversight of IT outsourcing, including cloud services, as well as standards for the cyber resilience of digital payments. This comprehensive approach ensures that cybersecurity measures align with global best practices while addressing the unique challenges of India's financial ecosystem.

2.84 India's strong performance in cybersecurity is driven by a range of initiatives and measures implemented by the government to enhance cyber resilience and establish robust frameworks for cybercrime laws and cybersecurity standards. The country's legal institutions are well-equipped to tackle cybersecurity challenges and combat cybercrime, ensuring the protection of its digital infrastructure. Additionally, Sectoral Computer Incident Response Teams (CSIRTs) provide sector-specific technical support and incident reporting, further bolstering the country's cybersecurity capabilities. Education and awareness are central to India's cybersecurity strategy. Targeted campaigns and educational initiatives have promoted secure online practices across various sectors, including private industry, public institutions, civil society, and academia. The integration of cybersecurity into primary and secondary education curricula underscores the country's commitment to cultivating a knowledgeable and well-prepared digital citizenry.⁹² Moreover, incentives and grants have fuelled skill development and encouraged research and innovation within India's cybersecurity industry. International collaborations and bilateral and multilateral agreements have further strengthened India's capacity-building and information-sharing efforts, solidifying its role as a global leader in cybersecurity.

2.85 India's ascension to Tier 1 in the GCI 2024 clearly indicates the nation's enhanced cybersecurity commitments. This achievement reflects the government's dedication to securing its digital domain and sets a benchmark for other countries.

RISKS PERTAINING TO INDIA'S FINANCIAL SECTOR

2.86 The Indian financial sector is currently at a pivotal moment. The traditional dominance of banks in providing credit is beginning to decline, and other participants and products in the financial sector are increasingly filling this role. This shift is a long-awaited and positive development for a country that aims to become a developed nation by 2047. Various financial innovations such as UPI, Open Credit Enablement Network (OCEN) and T+1 settlement have significantly eased access to credit in India. A recent

⁹² A Study of the Awareness on Cyber Security and Safety among Secondary Students (Class IX to XII), <https://tinyurl.com/4zu4px4u>.

initiative by the RBI, the Unified Lending Interface (ULI), can potentially be a game-changer in MSME financing.

2.87 While there is evidence of increasing reliance on the financial markets as a funding source, the financial markets must work in tandem with the banking sector to bridge the capital requirement gap. The financial markets must grow in line with, but not faster than, the economy's capital needs and overall economic growth. As the country undergoes this significant transformation, it is crucial to be aware of the potential vulnerabilities that may arise. India must prepare itself with appropriate regulatory and government policy measures to intervene and mitigate these risks when necessary. Additionally, banks need to enhance their capabilities to meet the demands of new-age households and the digital economy while maintaining their primary credit creation function. Excessive financialisation can hurt the economy. The costs may be particularly high for a low-middle-income country like India. Box II.5 discusses this in detail.

Box II.5: Can the growth of the financial sector come at a cost?

Lessons from the global financial crisis of 2008 reveal that uninhibited financial sector growth can come with a cost to the real economy. Till the run-up to the crisis, however, conventional wisdom dictated that the financial sector performed best when deregulated.⁹³ To sustain financial growth but prevent a crisis, regulators must be sensitive to the nuanced relationship between financial sector growth and the real economy.

Financial sector and the real economy – relationship

A developed financial system reduces transaction costs, allows better price discovery, and channels the flow of capital into innovative and risky economic activities. Research has established that finance is a causal driver of growth, not a by-product of the development process.⁹⁴ There is evidence that finance aids consumption smoothing and allows firms and households to absorb shocks.⁹⁵ Finance is essential for poverty and inequality reduction.⁹⁶ However, there is an inflexion point at which financial development switches from propelling growth to holding it back. For instance, BIS research shows that Ireland's steep rise in private credit to GDP ratio from 90 per cent in the 1990s to 150 per cent in 2007 shaved away 0.5 percentage points from productivity growth.⁹⁷ In contrast, by reducing its private credit to GDP during the Asian financial crisis, Thailand contributed to its productivity growth by 0.5 percentage points.

93 After the crisis erupted, Former Fed Governor Alan Greenspan admitted that he "made a mistake" in trusting that free markets could regulate themselves without government oversight.

94 Rajan, R. & Zingales, L. (1998). Financial dependence and growth. *American Economic Review* 88, 559-586, <https://tinyurl.com/ycefwwf9>.

95 Kast, F. and D. Pomeranz (2018). Savings Accounts to Borrow Less: Experimental Evidence from Chile. NBER Working Paper 20239, <https://tinyurl.com/pmxz3bs4>.

96 Beck, Thorsten, A Demirgüç-Kunt, and Ross Levine, 2007, Finance, inequality and the poor, *Journal of Economic Growth* 12 (1), 27-49, <https://tinyurl.com/446zcsfz>,

97 Cecchetti, S. and Kharroubi (2015). Why does financial sector growth crowd out real economic growth? BIS Working Paper No 490. <https://www.bis.org/publ/work381.pdf>.

When the economy reaches a state of ‘over-finance’, the financial sector would compete with the real sector for resources. This competition for resources is especially seen in the case of skilled labour, which gets absorbed into the financial sector at the cost of the real economy.⁹⁸ Often financial sector innovation may result in products that do not add value to the real economy. Research also shows that rapid financial sector growth tends to favour high collateral–low productivity projects.⁹⁹ Often, financial booms are associated with the growth of sectors such as construction, where the collateral is high, but productivity growth is relatively low.

Greater levels of financial engineering can create complex products whose risks are not apparent to the regular consumer. At the same time, these products are designed so that the lenders have little ‘skin in the game’.¹⁰⁰ Ultimately, the proliferation of such products can lead to an event such as the financial crisis of 2008. In the run-up to the crisis, mortgages were granted to people with little ability to pay them back. In turn, lenders reduced their exposure to risk by securitising these mortgages at multiple stages. When the mortgage bubble burst, it, in turn, took down with it instruments that were highly securitised, leading to the crises.

The changing influence of financial development on growth can be depicted as a bell-shaped relationship.¹⁰¹ As research by the IMF shows, several developed nations, such as Ireland, the USA, and Japan, are past the point where incremental advances in the financial sector can contribute to growth.¹⁰² In contrast, under-developed and developing countries such as Gambia, Ecuador and Morocco reap dividends to growth through faster financial development.

Sustaining financial development while mitigating financial stability risks – role of regulation

Can a developing economy (nations to the left of the peak of the bell curve) reach a point of over-finance such that advancements to the financial sector hamper its growth prospects? In the presence of weak institutions and poor regulatory quality, it is possible for an emerging economy to reach well past its optimal level of financial development.¹⁰³ Thus, the upper bound to financial development is fixed by the regulatory quality of the emerging market.

98 Ibid note 97.

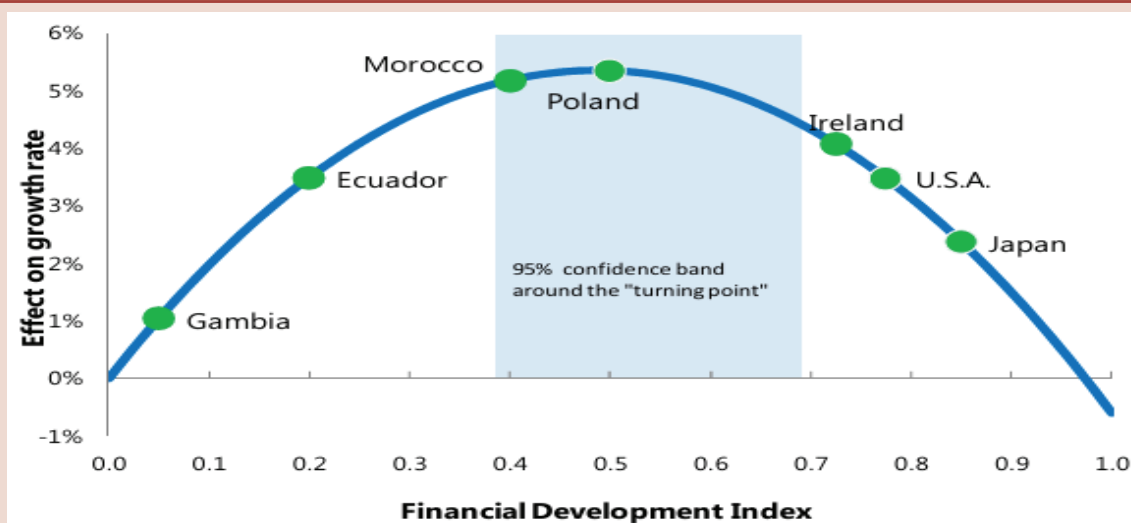
99 Ibid note 97.

100 Zingales, L. (2015). Presidential address: Does Finance benefit society? *Journal of Finance*, 70(4), 1327-1363, <https://tinyurl.com/3zjdzvuu>.

101 This relationship holds, keeping other determinants of growth (such as institutional quality, technological growth, capital formation, etc.) constant.

102 Sahay, R. et al. (2015). Rethinking Financial Deepening: Stability and Growth in Emerging Markets, IMF Staff Discussion Note SDN/15/08, <https://tinyurl.com/55kpyrws>.

103 Ibid note 102.

Chart II.13: Financial development and growth – a bell-shaped relationship

Source – Rethinking financial deepening, IMF Staff Discussion Note, 2015

As the regulatory quality in the financial sector improves, regulators will need to play a delicate balancing act between the goals of financial resilience and growth. On the one hand, building financial resilience would entail higher capital buffers, stricter regulations and reduced risk-taking. On the other hand, this would lead to lower financial growth by limiting profitable investments and innovation. For instance, a system where banks maintain high reserve ratios and only lend to the most creditworthy borrowers may exclude smaller households and businesses from accessing credit.

Managing the trade-offs between financial resilience and efficiency is especially significant for EMEs, which have to undertake large-scale financial inclusion and, at the same time, reduce their vulnerability to crises. In this context, regulatory innovations that use technology such as unified ledgers and digital infrastructure can help advance financial efficiency without compromising on resilience. EMEs such as Brazil and Thailand were making positive steps towards advancing such as technology in their financial system.¹⁰⁴ In India's case, innovations such as the OCEN framework and the ULI provide access to real-time information on the risk profiles of debtors and reduce the need for provisioning based on an overestimation of default risk.

OUTLOOK

2.88 India's financial sector has performed well amidst unfavourable geopolitical conditions. On the monetary front, system liquidity, represented by the net position under the Liquidity Adjustment Facility, remained in surplus during October-November 2024. The financial parameters of banks continue to be strong, reflected in improved profitability indicators. The gap between the growth of credit and deposits of SCBs has

¹⁰⁴ Carstens, A. G., & Nilekani, N. (2024). Finternet: the financial system for the future. Bank for International Settlements, Monetary and Economic Department, <https://tinyurl.com/3h5np8fn>.

narrowed, with deposits keeping pace with loan growth. Capital markets significantly contribute to capital formation, the financialisation of domestic savings, and wealth creation. Strong macroeconomic fundamentals, healthy corporate earnings, supportive institutional investment, robust inflows from SIPs, and increased formalisation, digitisation, and accessibility have all fuelled the market's continued growth. India's insurance sector is performing well and is projected to become the fastest-growing market among G20 nations over the next five years (2024-2028). The pension sector is expected to grow as the economy transitions from a lower-middle-income to an upper-middle-income country.

2.89 The financial sector is witnessing a moment of positive flux, with several changes taking shape. Firstly, there is a rise in the share of consumer credit in overall credit extended by banks.¹⁰⁵ Between FY14 and FY24, the share of consumer credit in total bank credit increased from 18.3 per cent to 32.4 per cent.¹⁰⁶ Secondly, there has been a rise in non-bank-based financing in recent years. Banks' share in total credit has declined from 77 per cent in FY11 to 58 per cent in FY22.¹⁰⁷ Simultaneously, there has been a rise in NBFCs and bond market financing. Thirdly, equity-based financing has catapulted to popularity, with IPO listings growing six times between FY13 and FY24 and India being ranked first globally in terms of the number of IPO listings in FY24.¹⁰⁸ Young investors are also driving the equity boom under the age of 30. As a report by the NSE notes that between March 2018 to September 2024, the proportion of young investors surged from 23 per cent to 40 per cent.¹⁰⁹

2.90 These emerging trends mark the dawn of a new era for India's financial sector. However, they also bring regulatory challenges and potential risks that cannot be overlooked. One critical risk to guard against is the dominance of financial markets in shaping policy and macroeconomic outcomes, a phenomenon known as 'financialisation.' The consequences of financialisation are evident in advanced economies, where it has led to unprecedented levels of public and private sector debt—some visible to regulators and some not. Economic growth in such contexts becomes overly reliant on rising asset prices to offset leverage, exacerbating inequality and asset market considerations that may overly influence public policies, particularly regulatory ones. As India strives to align its financial system with its economic aspirations for 2047, she should strive to maintain the fine balance between financial

105 Sengupta, R., & Vardhan, H. (2021). Consumerisation of banking in India: Cyclical or structural. Ideas for India, <https://tinyurl.com/3rsh6x6w>.

106 RBI Handbook of Statistics, 2024.

107 Sengupta, R., & Vardhan, H. (2022). India's Credit Landscape in a Post-Pandemic World. IGIDR Working Papers, <https://tinyurl.com/3evtf5th>.

108 NSE 2024, Indian Capital Markets: Transformative shifts achieved through technology and reforms, <https://tinyurl.com/5n7sm2d6>.

109 SEBI, 2024, <https://tinyurl.com/3n7ktss5>.

sector development and growth on the one hand and financialisation on the other. It means that the country has to chart its path with respect to its context, considering the levels of financial savings in households, its investment needs, and levels of financial literacy. Ensuring that incentives in the sector are consistent with national growth aspirations is a policy imperative.

EXTERNAL SECTOR: GETTING FDI RIGHT

India's external sector continued to display resilience amidst global headwinds of economic and trade policy uncertainties. Total exports (merchandise and services) have registered a steady growth in the first nine months of FY25, reaching USD 602.6 billion (6 per cent). Growth in services and goods exports, excluding petroleum and gems and jewellery, was 10.4 per cent. Total imports during the same period reached USD 682.2 billion, registering a growth of 6.9 per cent on the back of steady domestic demand.

The evolving global trade dynamics, marked by gradual shifts towards greater protectionism, require assessing the situation and developing a forward-looking strategic trade roadmap. By adapting to these trends and leveraging its strengths, India can accelerate its growth and enhance its presence in global trade. To strengthen its competitiveness and further integrate into global supply chains, the country can focus on reducing trade-related costs and enhancing export facilitation to create a more vibrant export sector. This proactive approach will help India continue to thrive in an ever-changing global market.

On the capital front, foreign portfolio investments (FPIs) have shown a mixed trend in FY25 so far. Uncertainty in the global markets and profit-taking by foreign portfolio investors led to capital outflows. However, strong macroeconomic fundamentals, a favourable business environment, and high economic growth have kept FPI flows positive overall. Gross foreign direct investment (FDI) inflows have shown signs of revival in the first eight months of FY25, though net FDI inflows declined relative to April-November 2023 due to a rise in repatriation/disinvestment.

India's foreign exchange reserves stood at USD 640.3 billion as of the end of December 2024, sufficient to cover approximately 90 per cent of the country's external debt of USD 711.8 billion as of September 2024, reflecting a strong buffer against external vulnerabilities.

INTRODUCTION

3.1 The world is experiencing increasing political and economic uncertainty in the wake of geopolitical conflicts, increasing trends of geoeconomic fragmentation, and recurrent climate events. The Great Election year of 2024, during which more than half of the world's population was exercising their franchise to elect their new governments, meant further declining policy predictability. Such political and economic uncertainty can be detrimental to growth. The International Monetary Fund (IMF) estimates that a one standard deviation increase in uncertainty correlates with a 0.4 to 1.3 percentage point decrease in output growth.¹ Economists like Keynes and Tobin have pointed out that higher uncertainty requires investors to seek more significant compensation for risks, thereby raising risk premia and the overall cost of finance. Additionally, uncertainty increases the likelihood of borrower defaults, leading to higher capital costs. Moreover, uncertainty shocks in advanced economies like the US have often led to lower output and reduced prices.²

3.2 Various indicators are used to monitor global risks and uncertainties and measure policy-related uncertainty's impact on global economic activity. These include the Geopolitical Risk (GPR) index³, which tracks adverse geopolitical events through newspaper articles; the Trade Policy Uncertainty (TPU) index⁴, which covers the frequency of articles mentioning trade policy uncertainty and heightened trade tensions, and the Global Economic Policy Uncertainty (GEPU) index⁵, which is a GDP-weighted average of national Economic Policy Uncertainty (EPU) indices for 21 countries. These indices capture changes occurring in economies constituting about 71 per cent of global output.⁶

3.3 These indices provide valuable insights into how uncertainty from trade issues, geopolitical events, and economic policy measures can impact global economic conditions. As of November 2024, the GEPU index remains high, reflecting ongoing global economic policy concerns. Similarly, the TPU index has risen since December 2023, primarily driven by trade tensions and policy changes among major economies.

1 Döttling, R., Malaika, M., & Terrones, M. (2013). Held Back by Uncertainty: Recoveries are slowed when businesses and consumers are unsure of the future. Finance & Development, 0050(001), A012. <https://tinyurl.com/324z5ux4>.

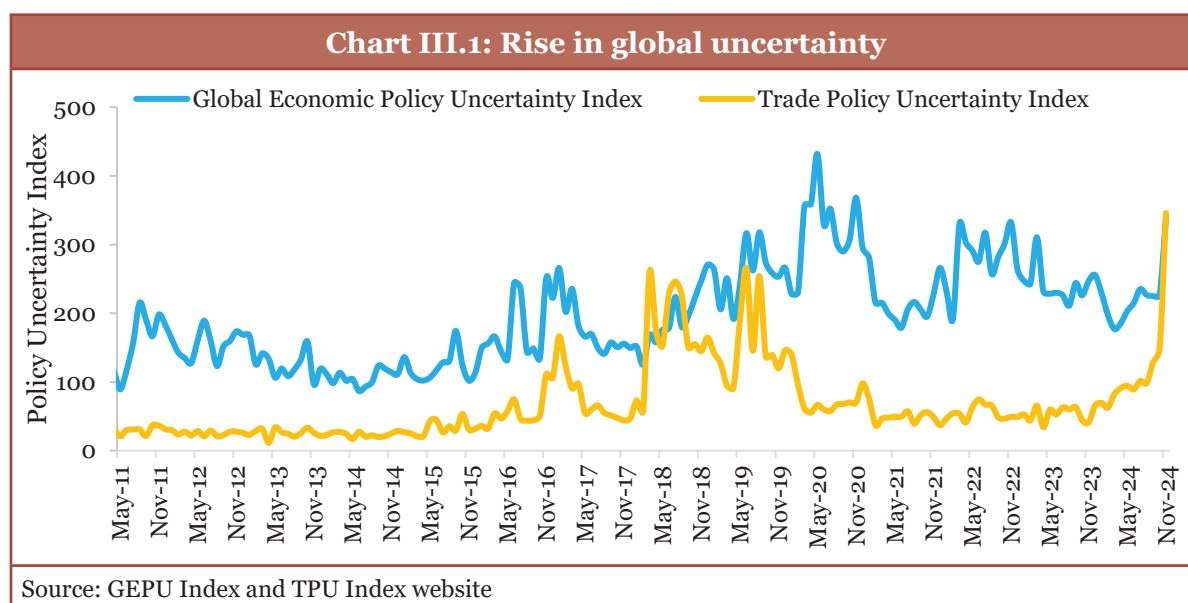
2 Leduc, S., and Liu, Z. (2016). Uncertainty Shocks are Aggregate Demand Shocks. *Journal of Monetary Economics*, 82, 20-35; Kumar, A., Mallick, S., and Sinha, A. (2021). Is Uncertainty the Same Everywhere? Advanced versus Emerging Economies. *Economic Modelling*, 101, 105524, <https://tinyurl.com/6n74paw2>.

3 Geopolitical Risk Index, <https://www.policyuncertainty.com/gpr.html>.

4 Trade Policy Uncertainty Index, <https://www.matteoiacoviello.com/tpu.htm>.

5 Global Economic Policy Uncertainty Index, <https://www.policyuncertainty.com/>.

6 Global output is calculated on the basis of purchasing power parity. If the economies are accounted at market exchange rates the economies constitute roughly 80 per cent of the global economy.



3.4 The Reserve Bank of India (RBI) has developed a policy uncertainty index specifically for India, utilising various global indices. This index leverages internet search data from Google Trends to assess policy uncertainty from domestic and international events. Furthermore, the index is updated in real-time.^{7,8}

3.5 With this backdrop, the chapter presents the performance of India's external sector amidst the prevailing global environment. Section I provides an overview of the global trade dynamics, emphasising tariffs and non-tariff measures (NTMs) and the performance of the global external sector amidst challenges. Section II delves into India's trade performance, highlighting the trends across both the merchandise and services sectors. It examines the performance of India's textile exports and the factors restricting its global expansion. Further, a detailed analysis of India's diversification in exports to new markets has been presented. The key drivers and challenges affecting India's e-commerce export growth are also discussed in depth. Section III discusses the factors restricting export growth and outlines the government initiatives to simplify export procedures to enhance trade performance. Section IV presents India's Balance of Payments (BoP) situation, highlighting current and capital account trends, foreign exchange reserves, exchange rate movements, and India's external debt position. The last section concludes the chapter with an outlook for India's external sector, considering the evolving global and domestic economic landscape.

7 When faced with heightened uncertainty, it is typical of economic agents to 'search' for more information. The Google Trends-based uncertainty index (India-GUI) leverages this behaviour to measure overall uncertainty by using internet search volumes for a list of keywords about fiscal, monetary and trade policy in India. The policy-related keywords are curated, based on mentions in central bank policy statements as well as coverage in the financial press.

Pratap, B., and Priyaranjan, N. (2023). Macroeconomic Effects of Uncertainty: a Google trends-based Analysis for India. *Empirical Economics*, 65(4), 1599-1625, <https://tinyurl.com/5fb373we>.

8 Recalibrating from Divergence to Convergence: The Indian Experience - Inaugural Address delivered by Michael Debabrata Patra, Deputy Governor, RBI - October 21, 2024 - at the New York Fed Central Banking Seminar organised by the Federal Reserve Bank, New York, USA, <https://tinyurl.com/mvajhcj7>.

GLOBAL TRADE DYNAMICS

3.6 Disruptions in the Red Sea that began in November 2023 have forced changes in trade routes, causing higher shipping costs and longer delivery times.⁹ This is particularly true for trade between Asia and Europe, as 40 per cent of this trade passes through the Red Sea region.¹⁰ Similar conflicts in the Hormuz Strait, which channels 21 per cent of global petroleum liquid consumption, have disrupted energy trade and increased prices. Additionally, climate change is enhancing the uncertainties.¹¹ For instance, the recent drought in the Panama Canal jeopardised international trade, affecting approximately 5 per cent of global maritime trade volumes that transit through it. These conditions are creating uncertainty, leading to a slowdown in international trade,¹² reshaping the contours of trade in terms of a rise in protectionist trade policies and shifting global supply chains.

3.7 As evident from Chart III.2, there has been a noticeable rise in the political proximity of trade since late 2022. This indicates a preference for bilateral trade between countries with similar geopolitical stances, i.e., friend-shoring¹³ and nearshoring.¹⁴ Concurrently, there has been an increasing concentration of global trade¹⁵ to favour significant trade relationships. For instance, Russia and China's trade dependence on the EU and the US's dependence on China has declined in recent years. In contrast, the dependence of Russia and Vietnam on China has increased.^{16,17}

3.8 Government interventions, including NTMs, reinforce the change in bilateral trade patterns due to geopolitical considerations. The rise in NTMs, which began after the COVID-19 pandemic, was further fuelled by the conflict between Russia and Ukraine. A report by the United Nations Conference on Trade and Development (UNCTAD)¹⁸ indicates that technical NTMs impact over 30 per cent of products and nearly 70 per cent of global trade. This is discussed further in paras 3.15 to 3.20 of this chapter.

9 UNCTAD rapid assessment, 'Impact to Global Trade of disruption of shipping routes in the Red Sea, Black Sea and Panama Canal', https://unctad.org/system/files/official-document/osginf2024d2_en.pdf.

10 Bonnell and McHugh, 2024, <https://tinyurl.com/5n7wy8xj>.

11 U.S. Energy Information Administration, <https://www.eia.gov/>.

12 IMF Working Paper dated 9 July 2024, 'The Heterogenous Effects of Uncertainty on Trade', <https://tinyurl.com/2xywd48v>.

13 Friend shoring is calculated as trade-weighted political proximity as measured by the United Nations voting patterns.

14 Nearshoring is calculated as the reverse of the trade-weighted average distance in km.

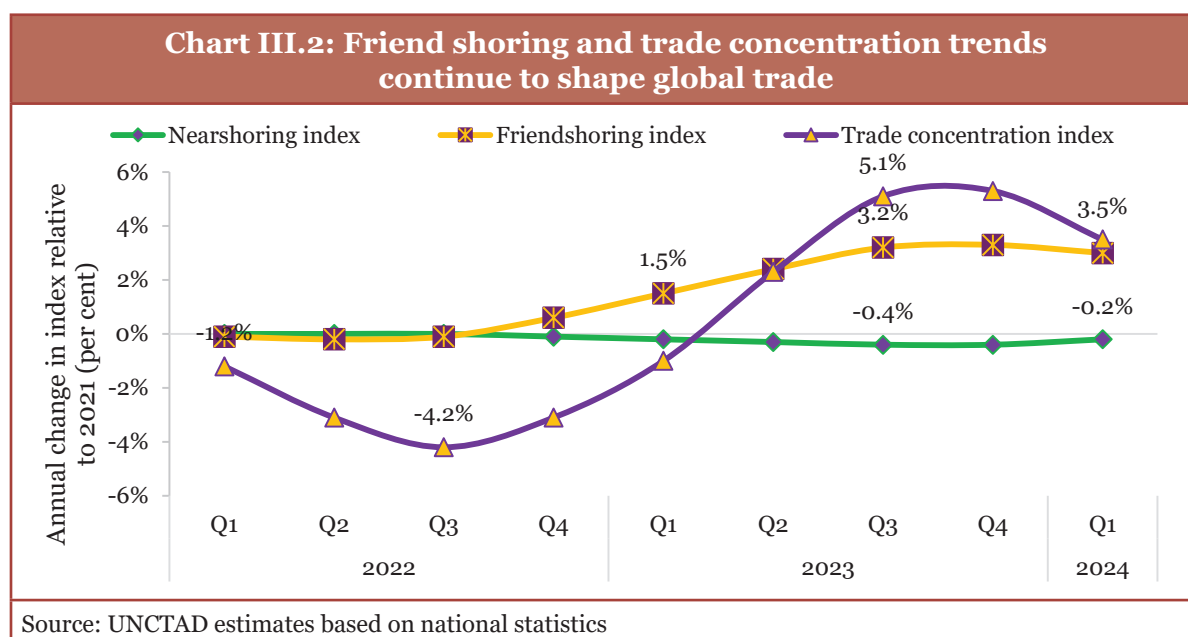
15 Trade concentration is calculated based on the Herfindahl concentration index.

16 UNCTAD estimates based on national statistics (<https://unctad.org/statistics>)

The dependence of an economy on another is calculated as the ratio of their bilateral trade over the total trade of the dependent economy. Annual change is calculated using a trade-weighted moving average over the past four quarters.

17 UNCTAD Global trade update, July 2024, <https://tinyurl.com/uwputbfs>.

18 UNCTAD report, 'Tariff trends mostly downward, but non-tariff measures increasingly used', <https://sdgpulse.unctad.org/trade-barriers/>.



Global trade performance in 2024

3.9 According to the latest trade update by UNCTAD¹⁹, the gradual increase in global trade that began in H2 of 2023 has persisted into 2024. The World Trade Organisation (WTO) database shows a year-on-year (YoY) growth of 3.5 per cent and 3 per cent, respectively, in global merchandise export and import indices in Q3 of 2024 (seasonally adjusted, 2005 Q1=100). Further, the global services exports and imports grew by 7.9 per cent and 6.7 per cent (YoY) during the same period.

3.10 Over the last four quarters, trade growth in developing countries generally exceeded that of developed nations. However, this trend reversed in Q3 of 2024, with positive developments in developed economies driving trade growth. In contrast, trade growth in East Asia stalled, and several major Asian developing economies experienced negative growth.

3.11 According to the UNCTAD nowcast²⁰, the positive momentum in global trade witnessed in the first three quarters of 2024 is expected to continue into Q4. As a result, global trade is set to exceed its 2022 record, reaching nearly USD 33 trillion in 2024. This record high is likely to be driven by a 7 per cent increase in services trade (YoY), while goods trade is projected to grow by about 2 per cent in 2024 but remain below its 2022 peak. Overall, global trade is expected to expand by about USD 1 trillion (or 3.3 per cent) in 2024, with goods and services contributing approximately USD 500 billion each.

19 UNCTAD Global Trade Update December 2024, <https://tinyurl.com/5n8fr7a3>

20 Ibid note 19.

Chart III.3: Rebound in global trade in 2024



Tariff policies

3.12 To promote free trade, encourage investment, and lower trading costs, countries worldwide have established various trade agreements. The number of regional trade agreements (RTAs) in effect has grown substantially, increasing from 22 in 1990 to 369 as of August 2024.²¹ Increased emphasis on free trade and enhanced collaboration in international trade policies under the WTO has reduced border tariffs among nations. For instance, between 2000 and 2024, the average tariff rates on dutiable items in India decreased from 48.9 per cent to 17.3 per cent, while in China, they fell from 16.4 per cent to 8.3 per cent.²² Commodity-wise, between 2012 and 2022, the Most Favoured Nation (MFN) and preferential tariffs declined in agriculture, manufacturing, and natural resources. Globally, the simple average MFN and preferential tariffs for agriculture dropped by approximately 3 per cent and 1.4 per cent, respectively, between 2012 and 2022. The simple average preferential tariffs decreased by about 1 per cent in the manufacturing sector.

3.13 At a broader level, India's import tariff policy has evolved over time, balancing domestic policy goals with the need to integrate into the global economy. Tariffs vary by sector, with considerations like protecting sensitive sectors from foreign competition and permitting access to important raw materials and intermediate goods. India has ensured that tariff policies comply with WTO rules and regulations. Over time, several efforts have been made to rationalise tariffs further and address the inverted duty structures.

3.14 Tariffs are often perceived to have an impact on competitiveness. However, if used in a calibrated way, tariffs can aid the goals of industrial policy and help in the development of desirable sectors in the economy (Box III.1).

21 WTO data on regional Trade Agreements, <https://tinyurl.com/59e3yw6b>.

22 Based on the data available on the WTO Integrated Database, <https://tao.wto.org/>.

Box III.1: Tariffs and successful industrial policy design

Industrial policy refers to measures that target the transformation of an industry in pursuit of a public goal. Tariffs are a standard tool of industrial policy and are often seen as a way to support fledgling industries before they gain traction. However, using tariffs requires a calibrated approach which balances the sector's needs with the costs imposed on the rest of the economy. Tariffs can also be viewed as a lever within a system of tools that can further the goals of industrialisation.

The use of tariffs in industrial policy can be traced back to the Industrial Revolution. Tariffs were commonly used in Western Europe and North America to catch up with the British industrial revolution. As Matthew C. Klein and Michael Pettis note in their book ‘Trade wars are class wars’,

“Freidrich List, who moved from Germany to America in 1825, wrote that a country such as Germany, which was less developed but “possesses the mental and material means” to become wealthy, should instead avoid free trade and “strengthen her own individual powers.” ... The United States levied tariffs on manufactured goods of about 45 per cent from 1870 through 1913...American manufacturers were protected from foreigners but competed within the large—and expanding—domestic market.”

This accords with the observations made by Professor Robert C. Allen on the development history of Europe and North America²³. According to him, North America and Western Continental Europe caught up with the British industrial revolution by adopting the following:

- Internal free market (elimination of internal tariffs)—national single market
- Stable domestic banking system
- High external tariff
- Universal Education
- Infrastructure.

They did not catch up with Britain practising free trade and open capital markets.

Globally, modern-day industrial policies use a mix of policies, including tariff-based protection and other levers such as credit grants and export-related subsidies.²⁴ Illustrative of this fact, tariffs accounted for just 1.3 per cent of all industrial policy interventions between 2010 and 2022.²⁵

Lessons in successful industrial policy design can be gleaned from the support the Korean government extended to its heavy chemicals industry in the Seventies. Korean industrial policy in the heavy chemicals sector led to significant gains in output, labour productivity and long-term comparative advantage of the industry’s exports. Tools such as tariff-based protection and quantitative restrictions were used for a limited period, after which protection

²³ 2013 Gideon Rosenbluth Memorial Lecture delivered by Dr Robert Allen, Canadian Centre for Policy Alternatives, <https://tinyurl.com/7cv2hzu6>.

²⁴ Juhász, R., Lane, N., & Rodrik, D. (2023). The new economics of industrial policy. Annual Review of Economics, 16, (<https://tinyurl.com/3m5f2t2u>).

²⁵ Ibid note 24.

tapered in the 1980s.²⁶ Importantly, in Korea, tariffs were only one element of a composite industrial policy which sought to protect domestic industry and, at the same time, demanded a reciprocal performance obligation on the part of the industry receiving protection.

The recipe for a successful industrial policy lies in the simultaneous use of carrots and sticks, with the sticks often being longer than the carrots. Taking a comprehensive look at the industrial policies of Northeast Asia, Joe Studwell wrote in ‘How Asia Works’ that the region succeeded with its industrial policy because it punished non-performers more than it rewarded performers. As Studwell notes, the emphasis on infant industry protection in Northeast Asian economies went hand in hand with external benchmarking through export performance. There were special privileges for local businesses, but there was accountability for export performance. That is how scale, productivity, efficiency and rapid economic growth were achieved. Studwell repeatedly notes that Korean industrial policy punished its non-performers more than helped performers.

To summarise, the growth experiences of the industrialised West and the miracle growth economies of the East suggest that tariffs were indeed a prominent tool used to further industrialisation. However, tariffs were used in a calibrated way, and a whole-of-government approach was adopted in crafting tariff policies. Finally, industrial policy goals were achieved not by protection alone but by policies which ensured that the protected industries performed in response to the protection afforded.

Non-tariff measures

3.15 The decline in tariffs globally, as discussed above, has been accompanied by an increase in the implementation of NTMs²⁷ across countries. The Global Trade Alert database²⁸ shows that between 2020 and 2024, over 26,000 new restrictions related to trade and investments have been globally imposed. This is further elucidated in Chapter 5. The Technical Barriers to Trade (TBT) affect 31.6 per cent of the product lines, covering 67.1 per cent of the global trade (as of December 2024). This is followed by export-related measures, affecting 19.3 per cent of the product lines and covering 31.2 per cent of the global trade. Sectors most affected by NTMs include agriculture, manufacturing, and natural resources.²⁹

26 Lane, N (2022). “Manufacturing revolutions: industrial policy and industrialization in South Korea”, CSAE Working Paper Series, (<https://tinyurl.com/ye2ahh7k>).

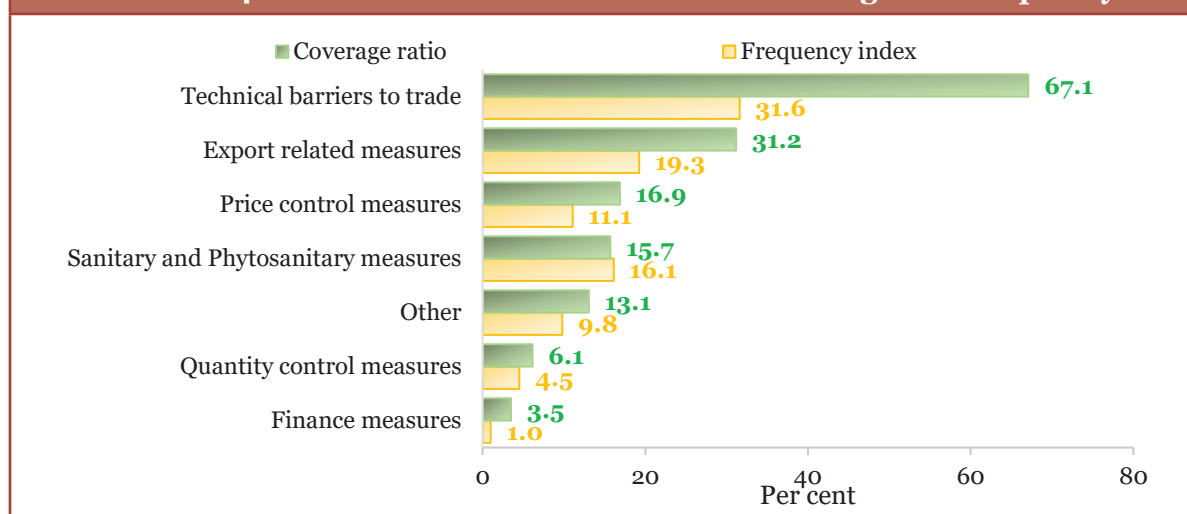
27 UNCTAD defines NTMs as policy measures that are not ordinary customs tariffs but can still significantly impact international trade in goods. These measures can affect either the quantities traded, prices, or both (Classification of NTMs | UNCTAD). NTMs are classified into import-related and export-related categories based on the above classification. Import-related NTMs are further classified as “technical” or “non-technical.” Technical measures comprise sanitary and phytosanitary measures (SPS), technical barriers to trade (TBT), and pre-shipment inspections. Non-technical measures encompass traditional trade policies like quotas, subsidies, and trade remedies, including those addressing unfair trade practices.

In 2006, the UNCTAD established the Group of Eminent Persons on Non-tariff Barriers (NTBs) and the Multi-Agency Support Team (MAST) comprising eight international organisations such as the IMF, OECD, UNIDO, UNCTAD, the World Bank and WTO etc. Over the years, MAST has created a coding system as a foundation for collecting and tallying NTMs. The objective of the International Classification of NTMs (refer: UNCTAD report on International Classification of Non-Tariff Measures, <https://tinyurl.com/mr3mp5uk>) was to provide information and clarification on new and existing measures and to improve their comparability across countries.

28 Global Trade Alert database, https://www.globaltradealert.org/global_dynamics.

29 Based on UNCTAD Trade Analysis and Information System (TRAINS) Database, <https://trainsonline.unctad.org>.

Chart III.4: Classification of NTMs based on coverage and frequency



Source: UNCTAD TRAINS Database

Note: Other includes 'Pre-shipment inspection and other formalities, contingent trade protective measures, non-automatic import licensing, quotas, prohibitions, quantity-control measures and other restrictions not including sanitary and phytosanitary measures or measures relating to technical barriers to trade, measures affecting competition, trade-related investment measures, distribution restrictions, restrictions on post-sales services, subsidies and other forms of supports, government procurement restrictions, intellectual property and rules of origin. The frequency index is defined as the percentage of HS 6-digit lines covered. The coverage ratio is defined as the percentage of trade that is subject to NTMs

3.16 Globally, NTMs, such as subsidies and export-related measures, have risen in aid of nations' industrial policy goals.³⁰ Unlike broad-based tariffs, NTMs tend to be granular in their approach.³¹ They are often less visible, making them harder to assess.³²

3.17 A report by UNCTAD and the UNESCAP³³ shows evidence of increased use of NTMs by countries to adapt and mitigate climate change. According to the report, although climate change-related NTMs account for only 2.6 per cent of total measures, they are concentrated in some of the largest and most CO₂-intensive trade sectors, such as the automotive industry, electricity and heat generation, transformation, and storage. As a result, 26.4 per cent of global trade, valued at USD 6.5 trillion, is covered by climate-change-related NTMs. TBT comprise over 61 per cent of all identified climate change-related NTMs, followed by export-related and price-control measures (as of December 2024). In the future, the imposition of climate-change-related NTMs by the EU in the form of the Carbon Border Adjustment Mechanism (CBAM)³⁴ and European

30 Juhász R, Lane N, Oehlsen E, Pérez VC. 2023. The who, what, when, and how of industrial policy: a text-based approach, <https://tinyurl.com/ytj2rcwp>.

31 Ibid note 30.

32 Kinzius, L., Sandkamp, A., & Yalcin, E. (2019). Trade protection and the role of non-tariff barriers. *Review of World Economics*, 155(4), 603-643, <https://tinyurl.com/dw5pf4w6>.

33 UNCTAD and UN ESCAP report, 'Trade regulations for climate action: new insights from the global non-tariff measures database', <https://tinyurl.com/52sfzu93>.

34 CBAM is the EU's tool to put a fair price on the carbon emitted during the production of carbon-intensive goods that are entering the EU and to encourage cleaner industrial production in non-EU countries.

Union Deforestation Regulation (EUDR)³⁵ is anticipated to have broad implications for exporters in emerging economies such as China, India, and Turkey. ³⁶ Box III.2 discusses CBAM and EUDR and their possible impact on India's exports in detail.

Box III.2: CBAM and EUDR and their likely impact on India's exports

Carbon Border Adjustment Mechanism

Implemented by the EU and under consideration by the UK, CBAM aims to align the cost of carbon emissions for imported goods with that of domestically produced products. As countries/groups like the EU phase out the free allowances they offer their industries under the Emissions Trading System (ETS), they are ushering in CBAM to prevent their consumption from shifting to countries with relatively softer environmental regulations. Under the mechanism, importers will buy carbon certificates corresponding to the carbon price paid by the domestic producers/manufacturers under the EU's carbon pricing rules. Thus, CBAM is effectively a carbon price equalisation measure.

The key sectors covered under the EU CBAM include iron and steel, aluminium, cement, and fertilisers. Reporting requirements for the EU CBAM began on 1 January 2024, with quarterly submissions for the previous quarter. The levy, however, is expected to take effect from 1 January 2026. The UK has also proposed its own CBAM, scheduled to come into force on 1 January 2027, reflecting a broader global shift towards carbon pricing mechanisms. The key sectors covered under the UK CBAM include cement, fertilisers, glass, ceramics, iron and steel, aluminium, and hydrogen. Currently, the EU CBAM addresses only direct emissions from production processes, whereas the proposed UK CBAM intends to cover both direct and indirect emissions. CBAM aims to equalise carbon prices across geographies, thereby negating the comparative advantage of developing members like India and the least developed countries.

The justification offered for the introduction of CBAM is that it prevents carbon leakage.³⁷ Some jurisdictions believe that the aggregate impact of the countries' nationally determined contributions, if fully implemented, would not put the world on a pathway to achieving the Paris Agreement goal. Therefore, the logic behind CBAM is that as long as they did not have the same level of ambition, CBAM was necessary to protect the integrity of climate mitigation efforts in Europe and ensure they were not undermined by carbon leakage. Moreover, the

35 The EUDR requires operators and traders to ensure that the products placed in the EU market are (i) deforestation-free (i.e., must not be derived from a land which is deforested after December 31 2020); (ii) should be produced following the relevant legislation of the country where the product is produced; and (iii) covers the submission of a due diligence statement before placing the products in the EU.

36 UNCTAD Global trade Update December 2023, 'Global trade expected to shrink by nearly 5 per cent in 2023 amid geopolitical strains and shifting trade patterns', <https://tinyurl.com/5n8ueccb>.

37 European Commission Taxation and Customs Union website, <https://tinyurl.com/ysbxy866>.

proposed ban on steel scrap exports from the EU, a key input for steel production, will significantly hinder developing countries' capacity to produce more carbon-efficient steel. This measure can be perceived as the EU attempting to enjoy the benefits of both sides while also imposing trade restrictions.

Likely impact on India

The share of CBAM exports in total Indian exports to the EU has increased substantially from 6.3 per cent in 2014 to 10.5 per cent in 2023.³⁸ Table III.1 presents the commodity-wise exposure of India's exports to the EU, which are likely to be impacted by CBAM.

Table III.1: India's exposure to CBAM Value of exports (USD million)

	2014	2023
Iron and steel	2962.6	5557.1
Aluminium	151.4	1801
Cement	4.2	8.3
Fertilisers	0.7	2

Source: UNCOMTRADE database (2024)

According to the World Bank's Relative CBAM Exposure Index³⁹, India has a score of 0.03, reflecting a high exposure to CBAM.⁴⁰ Countries like India face the twin challenge of achieving higher levels of economic development and dealing with climate change mitigation and adaptation. Therefore, the international community must find a balance that supports both environmental sustainability and the economic development needs of developing economies and LDCs, ensuring that multilateralism remains the cornerstone of global trade relations.⁴¹

European Union Deforestation Regulation

The EUDR (whose implementation will start at the end of 2025 and in 2026 for smaller businesses) seeks to regulate the consumption of products derived from deforested land. The EUDR places several compliances on the operators and traders of the relevant products

38 'Intermingling of Trade and Environment Policy: Implications of EU-CBAM on India and LDCs', EPW, 16 November 2024 <https://tinyurl.com/yb32jhdp>.

39 CBAM exposure index is measured as the mathematical product of two main elements—the share of a country's exports of the CBAM-related product that goes to the EU and the embodied carbon payment per dollar of export to the EU, determined by the carbon emissions intensity of production and the assumed cost of the CBAM certificates. CBAM exposure index is measured by multiplying the export share by the embodied carbon payment per dollar of export to the EU (the exporter's emission intensity times \$100 per ton carbon price).

40 World Bank data on Relative CBAM Exposure Index, <https://tinyurl.com/4hbp64z8>.

41 Based on the inputs received from the Ministry of Commerce and Industry.

covered under the regulation.⁴² It requires the operators and traders to ensure that the products placed in the EU market are (i) deforestation-free (i.e., must not be derived from a land which is deforested after December 31 2020); (ii) should be produced by the relevant legislation of the country where the product is produced; and (iii) covers the submission of a due diligence statement, including supply chain integrity through an elaborate trace and track system before placing the products in the EU.

The regulation also entails devising a country-level benchmarking system indicating the forest degradation and deforestation risk by the EU. The benchmarking system would be based on a three-tier system for classifying countries as low, standard, or high risk, which would be determined based on internationally recognised information and data on whether a country is active in reducing deforestation. High-risk countries would be required to exercise higher due diligence for the relevant products compared to low or standard-risk countries. This categorisation of countries would be used to identify the checks to be carried out by the EU authorities. High-risk countries would be subject to more rigorous checks than countries categorised as having low-risk.⁴³

The regulation covers products such as soy, beef, palm oil, wood, cocoa, coffee, rubber, and their derived products, such as leather, chocolate, tyres, or furniture.⁴⁴ It puts the onus of proving compliance on the operator or trader who wishes to sell these products in the EU markets.⁴⁵ The costs of complying with the regulation include information requirements, risk assessment, risk mitigation and reporting obligations. These costs are not border measures but affect the competitiveness of a country's exports vis-à-vis other countries' compliance costs. Therefore, the Regulation would change the trade costs (increase) for the EU's trading partners in specific commodities.

As per a GTRI study⁴⁶, as far as India's exports are concerned, coffee, leather hide and skin preparations, oil cake, paper, paperboard, and wood furniture could be highly impacted by the Regulation. It also compares the tariff lines covered under the Regulation vis-à-vis

42 The Regulation defines an "operator" as natural or legal person who, in the course of a commercial activity, places relevant products on the market or exports them and a "trader" as any person in the supply chain other than the operator who, in the course of a commercial activity, makes relevant products available on the market.

43 As per the Regulation dated 31 May 2023, "In respect of relevant products from countries or parts thereof classified as high risk, the respective operators and traders and the volumes of their share of relevant commodities and relevant products, a twofold approach that provides comprehensive coverage should apply. Competent authorities should thus be required to check on a certain percentage of operators and traders, whilst also covering a specific percentage of relevant products. In respect of relevant products from countries or parts thereof classified as low or standard risk, competent authorities should be required to check at least a certain percentage of operators and traders. The level of checks should be higher for relevant products from high-risk countries or parts thereof whereas it could be lower for standard or low-risk countries or parts thereof."

44 The list of products covered under the Regulation is available at Annex I of the Regulation dated 31 May 2023, available at <https://tinyurl.com/bddmuysp>.

45 Article 2 (15) of the Regulation states, "An operator is a natural or legal person who places relevant products on the Union market or exports them from the Union market in the course of commercial activity."

46 GTRI brief dated 1 August 2023, 'Deforestation and Compliance Challenges: A Blow to India's Agri Exports as EU's Deforestation Regulation (EUDR) Deadline Looms', <https://gtri.co.in/gtriFlagshipRep12.pdf>.

CBAM, out of which the latter is wider in its coverage. The CBAM and EUDR are expected to affect USD 9.5 billion of India's exports to the EU, which amounts to 9 per cent of India's exports to the world or 12.9 per cent of India's exports to the EU. The study informs that the regulation effectively encourages local production and export of selected agricultural commodities by erecting more barriers against imports in the name of climate.

According to the United Nations Food and Agriculture Organisation, around 420 million hectares of forest were lost globally due to deforestation between 1990 and 2020, an area the size of the EU.⁴⁷ In Europe, conversion to cropland accounted for about 15 per cent of deforestation during the same time period.⁴⁸ European agriculture could not have come up without deforestation, and the imposition of EUDR reeks of double standards. Thus, that a region that has resorted to significant deforestation to expand crop production is implementing the EUDR to regulate the consumption of products sourced from deforested land, appears quite contradictory, even as it is unsurprising.

In short, it is hard to shake off the conclusion that both CBAM and EUDR are trade protection measures garbed in the language of climate and environment. The game and the end goals are the same, but the tactics keep changing. Labour standards, gender, democracy, emissions and deforestation, the innovative list will keep evolving with time. Institutions and practices evolve with development. Today's developed countries do not conform to the standards that they expect from developing countries at a similar stage of development. But then, intellectual consistency is not really the goal here.

3.18 NTMs are playing an increasing role in international trade due to a decline in the usage of tariffs worldwide via successive agreements under the General Agreement on Tariffs and Trade/WTO and due to growing consumer concerns about food safety, quality, and environmental protection.⁴⁹ A UNCTAD report⁵⁰ notes that NTMs can serve as legitimate policy instruments, fulfilling important roles such as protecting human health and the environment. In some cases, they may even enhance trade. For instance, when an exporting country implements high sanitary and phytosanitary standards, consumers in importing countries tend to have greater confidence in the quality of the food products, which can lead to increased demand. Stricter domestic food safety standards can also help local exporters meet the requirements of their trade partners, further boosting trade opportunities.

3.19 Though many NTMs aim primarily to protect public health or the environment, they also adversely impact trade by increasing information, compliance, and procedural costs. This is significant for exporters and importers because accessing and benefiting from markets increasingly depends on adherence to trade regulations, such as sanitary

47 United Nations Food and Agriculture Organisation, <https://tinyurl.com/3fzythxj>.

48 <https://tinyurl.com/44mu2hnj>.

49 UNCTAD document, 'non-tariff measures: definitions and basic facts', <https://tinyurl.com/y7hwd55u>.

50 UNCTAD report, 'Trade costs of non-tariff measures now more than double that of tariffs,' <https://tinyurl.com/55tk5fut>.

standards and product quality requirements. For instance, a regulation that limits pesticide residues in food products seeks to achieve a significant public health goal of protecting human health and nutrition. However, this regulation imposes additional compliance requirements on firms in exporting countries, and some may find that exporting is no longer profitable. Consequently, such regulations can restrict trade, leading to lower incomes in exporting countries and higher prices for consumers in importing countries. This issue mainly affects smaller exporters and low-income countries, as they often bear a disproportionate burden from these NTMs.⁵¹

3.20 NTMs can indirectly affect FDI through their impact on imports. A firm might decide to bypass an NTM by engaging in FDI if the costs associated with this approach are lower than the costs of exporting. Additionally, NTMs can encourage inward FDI to the country that imposes them, as these measures raise barriers to market access. Research has demonstrated that NTMs have a positive impact on FDI. For example, if the average number of NTMs applied to a product increases from 2.5 to 3.5 NTMs per product, FDI could increase by 12 per cent. Certain NTMs, such as intellectual property rights, local content requirements, and TBT in specific sectors, appear to affect FDI significantly.⁵²

TREND IN INDIA'S TRADE PERFORMANCE

3.21 India's trade sector has demonstrated remarkable stability and growth, achieving milestones despite global economic headwinds. Following a dip in FY20 amid the global downturn and the pandemic, overall exports rebounded strongly in FY22, reaching a record high in FY23. This momentum continued into FY24, with overall exports surpassing the previous year's record, even as imports moderated slightly.

3.22 India's total exports (merchandise+services) have shown positive momentum in the first nine months of FY25, reaching USD 602.6 billion, witnessing a YoY growth of 6 per cent. This increase demonstrates the resilience of exports, which have been building on a steady upward trend in recent years despite global economic challenges. Total imports during April-December 2024 reached USD 682.2 billion, registering a YoY growth of 6.9 per cent. This positive import growth indicates a steady demand for goods in the Indian market, supporting domestic consumption and production needs. A more significant increase in overall imports compared to exports led to a rise in the overall trade deficit from USD 69.7 billion during April-December 2023 to USD 79.5 billion in the corresponding period of FY25.

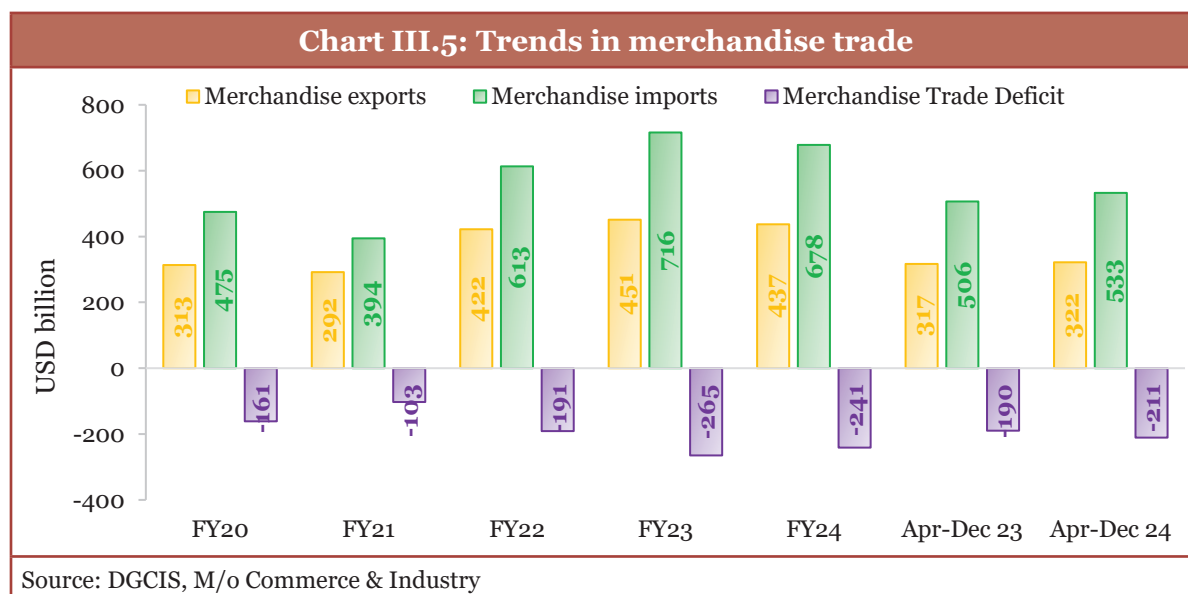
3.23 During April-December 2024, non-petroleum exports were up by 7.1 per cent. Over the same period, non-petroleum and non-gems and jewellery exports rose by 9.1 per cent. Specific sectors like drugs and pharmaceuticals, electronic goods, engineering

⁵¹ UNCTAD document on 'Introduction to NTMs', <https://tinyurl.com/mr3a95en>.

⁵² Ibid note 50.

goods, and chemicals saw an increase in exports, growing by 6.4 per cent, 28.6 per cent, 9.9 per cent, and 5 per cent, respectively, during April-December 2024 on a YoY basis. Textile exports⁵³ also saw a YoY increase of 7.6 per cent during the same period. Rising inflationary pressures on cereals, pulses, and edible oils limited the exports of agricultural and allied products. Overall, merchandise exports registered a modest growth of 1.6 per cent (YoY basis) primarily attributed to a decline in the value of petroleum product exports due to a fall in international commodity prices.

3.24 Merchandise imports grew by 5.2 per cent during April-December 2024. This increase was largely due to a rise in non-oil, non-gold imports, which reached USD 352.1 billion in the first nine months of FY25 compared to USD 340.5 billion during the same period last year, indicating a rebound in domestic consumption despite the inflationary impact. Gold imports increased due to higher international prices, driven by frontloading ahead of festival spending and demand for safe-haven assets. Among the major non-oil, non-gold imports, non-ferrous metals, machine tools, machinery, electrical & non-electrical goods, and transport equipment witnessed remarkable growth in the first nine months of FY25, reflecting growing demand for capital goods. Electronic goods also maintained consistent momentum, signalling a rise in discretionary consumer spending. Additionally, imports of pulses and cotton rose to support domestic production and control inflation.



3.25 The faster pace of increase in merchandise imports compared to exports contributed to the widening of the merchandise trade deficit to USD 210.8 billion in April-December 2024, compared to USD 189.7 billion in the same period last year.

⁵³ Textile exports include Cotton Yarn/Fabrics/made-ups, Handloom Products, Man-made Yarn/Fabrics/made-ups, etc., RMG of all Textiles, Jute Mfg. including Floor covering, carpet and Handicrafts, excluding handmade carpet.

Textile exports

3.26 India's textile sector has been a matter of pride and strength to the nation for centuries. From the unique prints and weaves to the rich dyes and handwork, the textile sector weaves various aspects of our cultural, social, and historical heritage. India is the sixth-largest exporter of textiles and apparel globally. The textile and apparel industry contributes 2.3 per cent of GDP, 13 per cent to industrial production, and 12 per cent to exports.⁵⁴ It is also one of the largest employment generators after agriculture, with over 45 million people employed directly, including many women and the rural population.⁵⁵ As further evidence of the inclusive nature of this industry, nearly 80 per cent of its capacity is spread across Micro, Small and Medium Enterprises (MSME) clusters in the country.⁵⁶

3.27 India exported textile items worth USD 34 billion in 2023, with apparel constituting 42 per cent of the export basket (USD 14.6 billion), followed by raw materials/semi-finished materials at 34 per cent (USD 11.7 billion) and finished non-apparel goods at 30 per cent (USD 7.8 billion).⁵⁷ Europe and the US consumed nearly 66 per cent of India's apparel exports, 58 per cent of finished non-apparel goods and 12 per cent of raw materials/semi-finished materials. Other prominent destinations include the UK (8 per cent of apparel exports) and the UAE (7 per cent).



3.28 Generally, the Indian textile export basket is skewed towards cotton and cotton-based products. In 2023, for example, eight out of the top 10 textile exports (by value) consisted of cotton and cotton-based products. For India's major textile export category,

⁵⁴ <https://www.ibef.org/industry/textiles>.

⁵⁵ Ibid note 54.

⁵⁶ Invest India report, 'Textile & Apparel Industry: The Change Agent of India', <https://tinyurl.com/mtzhfarh>.

⁵⁷ Analysis based on UN COMTRADE data at the tariff level.

i.e., apparel, the country enjoyed a market share of 2.8 per cent globally in 2023. However, this is much lower than that of key players in the industry, such as China (30 per cent), Bangladesh (9 per cent), and Vietnam (7 per cent). Further analysis at the HS-6 levels reveals that while India offers stiff competition to other exporters⁵⁸ for nearly USD 3 billion worth of apparel exports, the remaining apparel basket is yet to match our competitors' comparative advantage.

3.29 Textile exports remained resilient throughout the COVID-19 period between 2020 to 2022, but their performance has been weak over a decadal timeframe. Box III.3 elaborates on potential factors that impede export growth and opportunities that must be tapped for the sector to reach its goal of USD 150 billion in textile exports by 2030.⁵⁹

Box III.3: Time to be deft about our warp and weft!

Costs that chip away at textile export growth

India's textile production occurs across multiple independent and clustered Small and Medium Enterprises (SMEs) spread across the country. Take cotton production, for example, which is spread across Gujarat, Madhya Pradesh, and Andhra Pradesh. The fresh produce of cotton then travels down to Tamil Nadu, where cotton yarns are produced. The yarns then travel to parts of Maharashtra and Gujarat before being weaved into cotton fabric. A lack of localisation and the complexity of the value chain, in turn, results in higher costs relative to global competitors. In contrast, vertically integrated 'fibre-to-fashion' firms in competitor nations such as China and Vietnam export low-cost products, maintain consistent quality and are nimble enough to adjust to the fast-changing nature of the industry. Simple and liberal customs procedures further reduce regulatory costs and lend a competitive edge to the exports of global textile competitors such as China and Vietnam.

On the other hand, in India textile exporters are constrained by complex procedures, which, for instance, require exporters to meticulously account for every square centimetre of fabric, buttons and zippers used. Similarly, pre-shipment inspection certificates are required for textile imports, which slows down logistics and raises costs for the textile business.⁶⁰

58 Exports at the HS-6 level enjoy a market share that is within the periphery or higher than the market share of China, Vietnam, Indonesia, and Bangladesh.

59 PIB press release of Ministry of Textiles dated 18 November 2024, <https://tinyurl.com/jhvcuttm>

60 GTRI report, July 2024, 'How complex procedures, import restrictions and domestic interests hinder India's garment exports', <https://tinyurl.com/yxjxjyz>.

Apart from possessing structural attributes (such as vertical integration, liberal labour laws, etc.) that allow for cost advantages, competitors in the textile market also have the added benefit of FTAs with consumer countries. In effect, Indian apparel exports do not face a level playing field compared to its competition. For instance, as noted by Mukherjee et al. 2019⁶¹, even though India has a significant comparative advantage in exporting silk shawls and scarves, the country faces a high tariff rate of 11.3 per cent in the US. In comparison, competitors like Korea face zero tariffs on their silk scarf exports due to trade agreements such as the US-Korea FTA.

In general, the costs for the textile industry are likely to rise over the coming years. A global structural shift towards sustainable sourcing would drive this. Often, such a shift is necessitated by regulatory changes. The EU, for instance, has as many as 16 pieces of legislation spanning the entire fashion value chain, which came into force between 2021 and 2024.⁶² As the EU accounts for nearly 20 per cent of our exports, such a shift poses a challenge for small enterprises who need to shift to environmentally sustainable production methods.

Changing trends in the global textile industry

India has a great opportunity to align with the evolving global shifts in apparel demand. While our comparative advantage lies in cotton and cotton-based products, global demand has shifted to products made from man-made fibre (MMF). MMF-based products range from yoga pants and athleisure wear to technical textiles in aviation, aerospace, and automobiles.

As per International Cotton Association, MMF comprised 77 per cent of global fibre consumption in 2024, whereas it was just 22 per cent for cotton.

By tapping into the MMF value chain, India will benefit from the steady rise in global MMF demand. India's share of global MMF production is currently 9.2 per cent, and the potential to catch up with the production levels of global leaders like Vietnam, China, and Taiwan is high.⁶³

To match the quality of our competition and reap value gains from MMF production, our MMF sector must move towards vertical integration and significantly invest in research and development and sustainable production techniques.

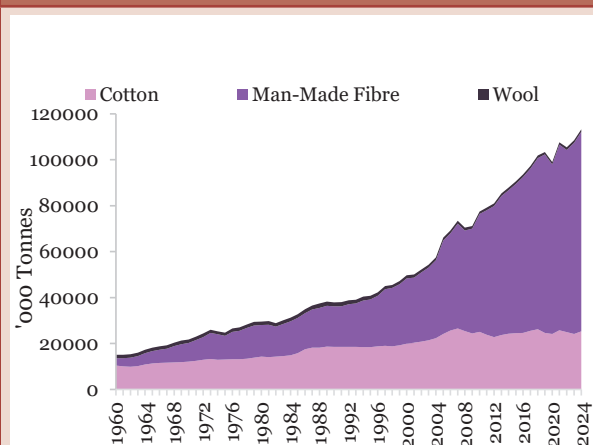
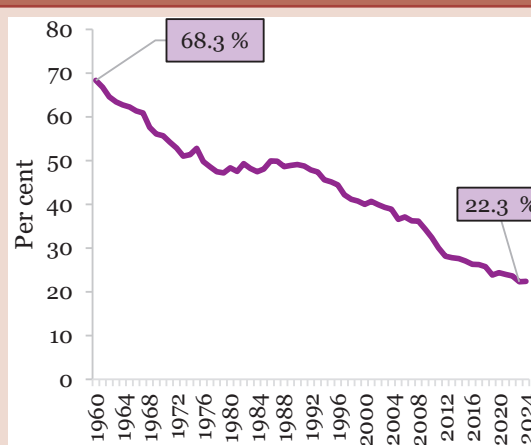
Fashioning India's textile exports to a global audience—recent schemes and opportunities ahead

In recent years, the government has announced many policies in response to the changing nature of global demand and high relative costs faced by Indian exporters. A PLI scheme has been put in place for the sector with an outlay of ₹10,683 crore, which rewards capacity

61 Ideas for India, 'Trade agreements and their impact on India's apparel exports', <https://tinyurl.com/22exauh4>.

62 McKinsey article, 'Reimagining the apparel value chain amid volatility', <https://tinyurl.com/2nhedse4>.

63 As per World Textile Demand Report, 2024; <https://tinyurl.com/52m82u5k>

Chart III.7: World consumption of major textile fibres

Chart III.8: Cotton's market share in the global market for fibres


Source: International Cotton Association (ICA)

creation through investments in the industry. As MMF products require heavy research and development suited to different use cases, the National Technical Textiles Mission (NTTM) has been approved with an outlay of ₹1,480 crore. As of 2024, 168 research projects (worth ₹509 crore) were approved under the NTTM mission.⁶⁴

In response to the need for a vertically integrated textile industry, the government-sanctioned Pradhan Mantri Mega Integrated Textile Region and Apparel (PM-MITRA) parks across seven sites in 2022 to create world-class plug-and-play infrastructure and invite FDI into the textile sector. World-class, standardised infrastructure will also aid textile exporters in responding better to changing ESG requirements in the industry. To help with cost competitiveness, the Government approved the continuation of the Scheme for Rebate of State and Central Taxes and Levies (RoSCTL) for export of Apparel/Garments and Made-ups up to 31 March 2026 in the interim Union Budget FY25⁶⁵. Further, deep FTAs such as the UAE-India CEPA (2022) have helped reduce India's textile tariffs with a significant market. India is actively working towards negotiating trade deals with top importers such as the EU and the UK.

India's textile sector has several tailwinds working in its favour. For instance, as per McKinsey's chief procurement officer survey, the share of procurement officers looking to form long-term strategic partnerships (including volume commitments) has more than doubled between 2019 and 2023.⁶⁶ Further, more than 40 per cent of procurement officers surveyed plan to increase their sourcing from India, Bangladesh, and Vietnam.

64 PIB press release of Ministry of Textiles dated 12 November 2024, <https://tinyurl.com/4kf8sdnz>.

65 PIB press release dated 1 February 2024, <https://tinyurl.com/35faj878>.

66 McKinsey article, 'Reimagining the apparel value chain amid volatility', <https://tinyurl.com/2nhedse4>.

While there are tailwinds which will support the growth of India's textile exports, these cannot be fully exploited without lowering the costs of the textile basket and deepening our market share in the MMF sector. These objectives would require the industry to step up its research efforts and vertically integrate and tailor products to international quality and sustainability requirements.

Simplification, consolidation, and elimination of processes that consume the financial and managerial bandwidth of our exporters is a low-hanging fruit. Addressing these challenges can significantly reduce costs and ease the burden on exporters, helping them become more efficient and competitive.

Diversification of India's exports to new markets

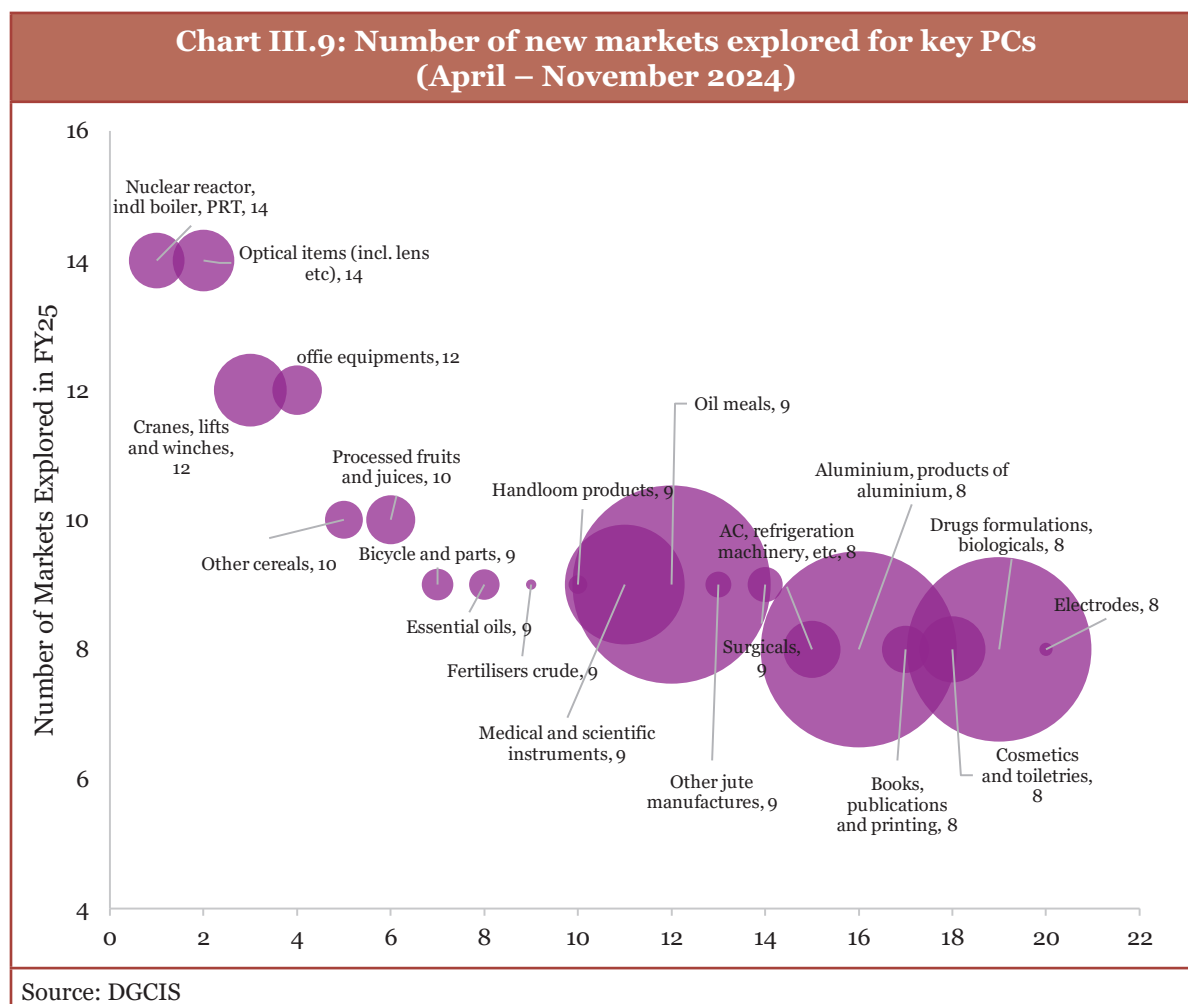
3.30 As discussed in a Collection of Essays of the Department of Economic Affairs⁶⁷, over time, India has added a large number of new products to its export basket. Between 1994 and 2022, India has not just carved out new markets but has become the market leader in some of the new product categories. For instance, India is a top exporter of shipping vessels (with nearly 33 per cent market share). Similarly, it is a leading exporter of iron and steel alloys, an unexplored market before 1994.

3.31 Between April and November 2024, India's exports saw significant growth and expansion into diverse markets despite high global challenges. The analysis depicts the number of diverse markets, consisting of absolutely new markets where no exports were observed between April and November 2023, but exports happened in the corresponding period of FY25. It also includes new markets where export share was 0-0.1 per cent from April to November 2023 and rose to over 0.1 per cent with growth in value greater than 25 per cent in the corresponding period of FY25. Further, promising markets, where export share was 0.1-1 per cent in April to November 2023 and rose to over 1 per cent with growth in value greater than 25 per cent in April to November 2024. The size of the dot reflects the value of exports. The analysis has been done based on the data available for key Principal Commodities (PCs).

3.32 These 20 PCs were selected based on two criteria: firstly, the PCs were sorted in descending order of the number of new markets explored, and secondly, the PCs had an export value of more than USD 100 million. For instance, Chat III.15 shows that optical items had an export value of USD 16.6 million from April to November 2024 and were exported to 14 new markets (Zimbabwe, Vietnam, Tanzania, Uganda, Tunisia, Romania, Qatar, Philippines, Mozambique, Kuwait, South Korea, Iraq, Ghana, Finland). Similarly, the export of cranes, lifts and winches had a value of USD 23.1 million from April to November 2024, which has been exported to 12 new markets (Taiwan, Somalia, Portugal, Myanmar, Morocco, Madagascar, Lithuania, Jordan, Honduras, Cameroon, Armenia). Further, office equipment & medical-scientific instruments have an export value of USD 10.7 million (exported to 12 new markets) and USD 62.7 million (exported

⁶⁷ Re-examining Narratives: A Collection of Essays, <https://tinyurl.com/4rap2xpx>.

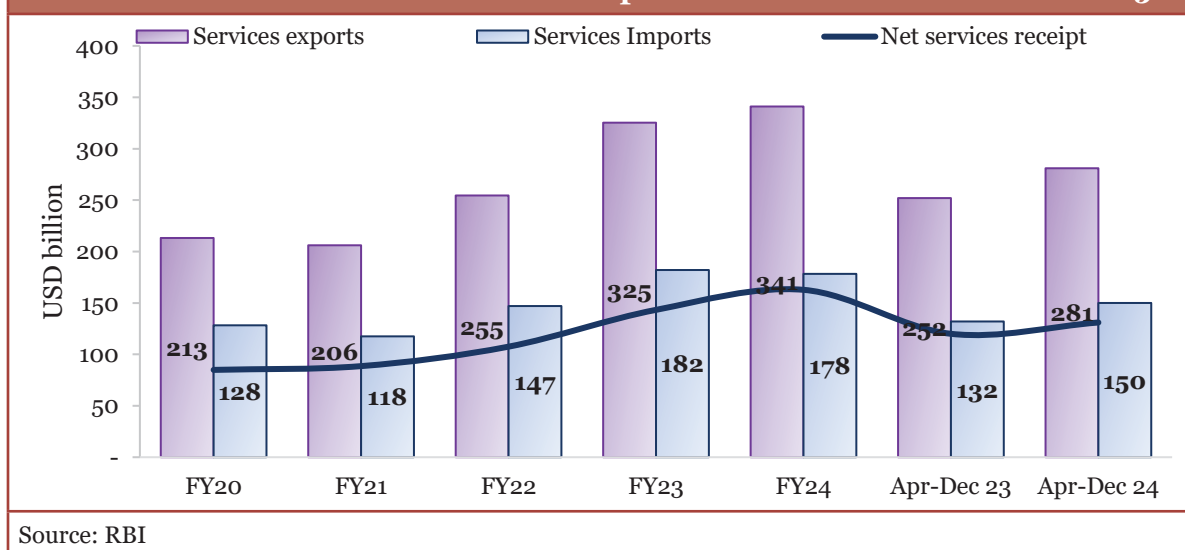
to 9 new markets), respectively. Surgicals has also been exported to nine new markets with a total value of USD 5.4 million.



3.33 These trends reflect India's ability to maintain and even strengthen its presence in established markets. It also highlights the country's resilience and adaptability in navigating evolving global landscapes. Simultaneously, the exploration of new markets signifies a proactive approach to expanding its export reach and reducing dependency on any single market or region. This diversification strategy mitigates risks associated with market fluctuations and positions India as a more competitive player in the international trade landscape while contributing to the country's economic development.

Services trade remained resilient amidst global challenges

3.34 Services sector exports have demonstrated resilience, while merchandise exports have witnessed moderation in recent months. They grew at 11.6 per cent in the first nine months of FY25 amidst unfavourable geopolitical conditions. The rise in services exports contributed to an increase in net services receipts from USD 120.1 billion in the first nine months of FY24 to USD 131.3 billion during the corresponding period of FY25.

Chart III.10: Rise in net services receipts in the first nine months of FY25

3.35 Services exports from India have shown a multi-sectoral presence in global exports, with notable contributions across several sectors. India's share in global services exports has more than doubled, reaching around 4.3 per cent in 2023 from 1.9 per cent in 2005.⁶⁸ In 'Telecommunications, Computer, & Information Services', India commands 10.2 per cent of the global exports market (ranking 2nd largest exporter in the world), reflecting its strong position in IT outsourcing, software development, and digital services. The 'Other Business Services sector' also plays a crucial role, with India holding 7.2 per cent of the world share (ranking 3rd largest exporter in the world), driven by its expertise in professional and consulting services.⁶⁹

3.36 'Travel' and 'Transport' services represent areas where India holds a relatively smaller share in global exports, at 2.1 per cent and 2.2 per cent, respectively, likely facing competition from other worldwide tourism and logistics hubs. There are opportunities for further growth, especially in enhancing international tourism infrastructure and global transport networks. India's financial services sector lags behind the global average, highlighting the potential for growth in global banking, insurance, and investment services. On the other hand, with a global share of 3.4 per cent in 'Personal, Cultural, & Recreational' services and 3.5 per cent in 'Construction services,' India ranks 6th and 8th, respectively, demonstrating its competitive edge in cultural exports and international infrastructure projects.

3.37 India remains a global leader in IT and business services, but there is considerable untapped potential in travel, transport, and financial services. As the country becomes a hub for Global Capability Centres and continues to innovate, focusing on skill development and strategic policy interventions will be key to sustaining this momentum. Strengthening emerging sectors and improving global competitiveness will ensure

68 UNCTAD Stats, <https://tinyurl.com/2s42av87>.

69 Based on UNCTAD-WTO Stats.

India remains a dominant player in the services sector in the times to come.

India's e-commerce exports

3.38 The e-commerce industry in India has experienced swift expansion over the past few years, driven by various elements such as the rise of technology-powered advancements like online payments, localised delivery services, data-driven interactions with customers, and digital marketing. According to a report, the global B2C e-commerce market is expected to grow from USD 5.7 trillion in 2022 to USD 8.1 trillion by 2026 at a CAGR of 9.1 per cent. Correspondingly, India's B2C e-commerce market was worth USD 83 billion in 2022, and it is anticipated to grow to USD 150 billion by 2026, showing a CAGR of 15.9 per cent.⁷⁰ However, by current market size, India's e-commerce market makes up a small fraction, about 1.5 per cent of the global market, and it is projected to stay around 2 per cent in the coming years. These exports generated an estimated USD 4 to 5 billion in exports during FY23 and are expected to increase to USD 200 to USD 300 billion by 2030.⁷¹ Box III.4 discusses the factors and policies that have played a key role in enhancing India's e-commerce exports.

Box III. 4: Factors driving India's e-commerce exports

Expanding data connectivity, increased penetration of smartphones, a rise in availability and use of digital wallets and safer online payments, increased customers' income levels and growing familiarity with digital shopping platforms have provided an impetus to India's e-commerce exports. Customers increasingly prefer customised products from skilled artisans, and India can leverage its rich tradition of handcrafted items to meet this demand. Additionally, exporters can increase their profits by reducing costs associated with intermediaries like agents and shopkeepers, making e-commerce a lucrative option for selling products.⁷²

Government initiatives, such as Make in India and *Aatmanirbhar Bharat*, have enhanced support and focus on MSMEs and e-commerce exports, thereby paving the way for more domestic sellers going global. These initiatives have provided a conducive environment for businesses to thrive and expand their reach. Recognising the relevance of e-commerce exports, the Foreign Trade Policy (FTP) 2023 has laid down provisions for fostering cross-border digital trade and promoting e-commerce and other emerging export channels. These include the *Niryat Bandhu* scheme⁷³, financial assistance to e-commerce exporters under the Market Access Initiative (MAI) scheme, export and packing credit⁷⁴, e-commerce exporthubs⁷⁵,

70 ASSOCHAM and EY report, 'Enabling e-commerce exports from India', <https://tinyurl.com/ye29x47m>.

71 PIB press release of Ministry of Commerce and Industry dated 31 March 2023, <https://tinyurl.com/ny9psh8e>.

72 GTRI report dated March 2023, 'Making e-commerce exports a Bigger Success Story than IT: A Blueprint for Realising India's E-Commerce Exports Potential', <https://gtri.co.in/gtriRep8.pdf>.

73 Handholding and outreach programs, capacity building and skill development building to boost e-commerce exports from the country.

74 Offering collateral-free, low-interest financing for both pre-and post-shipment stages to improve cash flow and aid manufacturing costs, <https://tinyurl.com/5cfwwxtx>.

75 Through a Public Private Partnership (PPP) model, it aims to centralise facilities (storage, packaging, labelling, certification, testing etc.) and infrastructure for cross-border e-commerce activities.

*Dak Niryat Kendra*⁷⁶, and electronic Bank Realisation Certificate (e-BRC).⁷⁷ Further, the GST regime offers the benefit of zero-rated supplies⁷⁸, and e-commerce exporters are eligible for GST refunds.⁷⁹

In the recent past, various initiatives have been undertaken by state governments in collaboration with e-commerce market players to boost exports. These have included organising e-export Haat⁸⁰ and signing a Memorandum of Understanding (MoU) with leading e-commerce players to drive e-commerce exports, etc.⁸¹ The Uttar Pradesh government has recently implemented measures to enhance packaging and export capabilities by leveraging design, technology, and market access. The government is also planning to set up e-commerce hubs to facilitate small producers to sell to aggregators.⁸² The government of Telangana has announced a new MSME policy which, inter-alia, envisages an increase in e-commerce penetration in MSMEs by encouraging the participation of sellers on the ONDC portal and GeM portal.⁸³

The central government's E-Commerce Export Hub (ECEH) initiative aims to revolutionise India's cross-border e-commerce. These hubs connect SMEs, artisans, and One District One Product (ODOP) producers to global markets, boosting logistics efficiency and economic inclusion in Tier 2 and Tier 3 cities. On the Government e-Marketplace (GeM), revised pricing slabs now cap charges at ₹3 lakh for orders above ₹10 crore, significantly reducing transaction costs. The *Bharat Mart* in Dubai provides Indian MSMEs affordable access to the Gulf Cooperation Council, African, and CIS markets, enhancing exports to these regions.⁸⁴

The e-commerce export ecosystem in India presents opportunities for growth alongside a few challenges related to regulatory frameworks and compliance obligations. For example, the roles of sellers and e-commerce platform operators are not yet clearly defined. This requires collaboration between sellers and e-commerce operators at various stages of export and payment processes. Presently, exports are facilitated through two primary modes, courier and cargo, with a courier export value limit of USD 12,000 (₹10 lakh), which is less compared to other countries.⁸⁵

76 Scheme for promoting e-commerce exports through postal route to work as a hub and spoke model in collaboration with Foreign Post Offices to enhance e-commerce exports through postal route.

77 Pilot of enhanced electronic bank realisation certificate (e-BRC) system basis in which the exporters can self-certify their e-BRC.

78 As per section 2(47) of the CGST Act, 2017, a supply is said to be exempt, when it attracts nil rate of duty or is specifically exempted by a notification or kept out of the purview of tax (i.e., a non-GST supply).

79 This enables the exporter to claim a refund of tax paid on such supplies and a refund of unutilised input tax credit under the Letter of Undertaking.

80 Amazon news, 'WBICS, Amazon and FICCI join hands to promote e-commerce exports from West Bengal', <https://tinyurl.com/4jsratx6>.

81 Amazon news, Amazon signs an MoU with Government of Karnataka to drive e-commerce Exports for lakhs of MSMEs in the state', <https://tinyurl.com/5afkc7zs>.

82 Indian Trade and Logistics news, 'Flipkart opens new fulfilment centres in Unnao, Varanasi', <https://tinyurl.com/37zs4h4v>.

83 Draft Export Strategy Framework of Telangana, <https://tinyurl.com/ysf69a8z>.

84 <https://pib.gov.in/PressReleasePage.aspx?PRID=2079986>.

85 In the case of China, the consignment limit for e-commerce exports is USD 50,000, https://content.dgft.gov.in/Website/EcommExportHandbokMSME_E.pdf.

Additionally, the absence of distinct customs supervision codes for traditional and e-commerce exports leads to delays in customs verification, and hinders data collection for further policy interventions.⁸⁶

The RBI manages the Foreign Exchange Management Act (FEMA) of 1999, which requires foreign exchange receipts within nine months of shipment. This timeline supports efficient transactions but may pose challenges for e-commerce operators handling shipments sold over 12 to 18 months. It opens the door to exploring more flexible reconciliation timelines. The Export Data Processing and Monitoring System (EDPMS) aids in payment reconciliation, with costs ranging from USD 18 to USD 36 (₹1,500-₹3,000). There is a need for cost optimisation, particularly for small-value shipments. Additionally, reimporting of e-commerce refunds/rejects is exempted from duty only when it can be proven that the reimported goods, are the same as those exported, which is a cumbersome process. Simplifying these further could improve operational efficiency.⁸⁷

India's e-commerce exports hold immense potential to grow significantly and become a key contributor to the country's GDP. Addressing some of the existing challenges can further unlock opportunities for the sector to achieve its full potential and strengthen its position among leading global e-commerce exporters.

EASE OF DOING BUSINESS INITIATIVES FOR EXPORTERS

3.39 An important area of focus is enhancing logistics efficiency to strengthen India's manufacturing and export capabilities. The development of logistics hubs, investments in infrastructure, and policy reforms to improve supply chain efficiency are measures in this direction. Such efforts aim to lower costs for Indian businesses, making exports more competitive and enabling quicker, smoother movement of goods domestically and internationally. This approach aligns with the government's commitment to the National Logistics Policy.

3.40 The paperless e-BRC system has reduced costs for 2.5 million e-BRCs annually by over ₹125 crore, streamlined processes and helped exporters benefit from schemes under the FTP. It has cut down both administrative and environmental expenses. Small exporters, especially in e-commerce, have benefitted from the system's efficiency in handling high-volume, low-cost transactions, enabling them to claim benefits and refunds more effectively.

3.41 A new Directorate General of Foreign Trade (DGFT) 'Trade Connect e-Platform' has been launched which is a single window initiative enabling exporters to add newer markets. The e-platform aims to transform the international trade landscape for Indian exporters, especially MSMEs. The platform, developed in collaboration with key partners, including the Ministry of MSME, EXIM Bank, Department of Financial Services, and the Ministry of External Affairs, is set to address information asymmetry by offering exporters comprehensive support and resources. It is a one-stop solution,

⁸⁶ Ibid note 70.

⁸⁷ Ibid note 70.

providing exporters with near real-time access to critical trade-related information while seamlessly connecting them to key government entities such as the Indian Missions abroad, the DoC, Export Promotion Councils, and other trade experts. Whether a seasoned exporter or a new entrant, the platform is designed to assist businesses at every stage of their export journey. This e-platform shall connect more than 6 lakh IEC (Importer Exporter Code) holders, over 180 Indian Mission officials, and over 600 Export Promotion Council Officials, besides the officials from DGFT, DoC, banks, etc.

3.42 The DGFT Trade Facilitation Mobile App provides all information on FTP Updates, Import/Export Policy, Export/Import Statistics, the status of applications, and 24×7 virtual assistance. The department also provides 24×7 auto-generation of e-IEC. This enables users to not wait for any approval for an IEC. The IEC details are automatically validated against CBDT, MCA, and PFMS systems.

BALANCE OF PAYMENTS: RESILIENCE AMID CHALLENGES

3.43 Against the backdrop of uncertainties in the external trade and investment environment, India's Balance of Payments (BoP) position has remained stable, led by resilient services exports, benign crude oil prices, renewed foreign portfolio inflows, and a revival in FDI flows. These trends are discussed in this Section.

Current account

3.44 India's current account deficit (CAD) moderated slightly to 1.2 per cent of GDP in Q2 of FY25 against 1.3 per cent of the GDP recorded in Q2 of FY24. The recent rise in the CAD can be attributed to an increase in the merchandise trade deficit, which rose to USD 75.3 billion in Q2 of FY25 from USD 64.5 billion in the corresponding quarter of the previous year. The rising net services receipts and increase in private transfer receipts cushioned the expansion in the merchandise trade deficit. Net service receipts increased to USD 44.5 billion in Q2 of FY25 from USD 39.9 billion in the corresponding quarter in FY24.

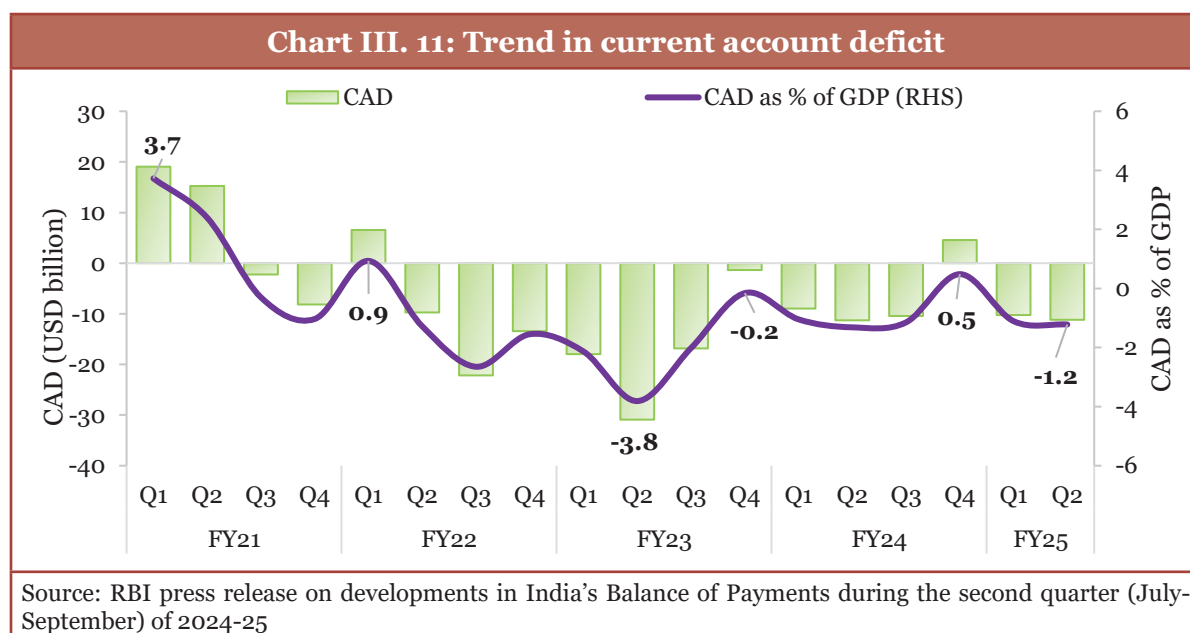
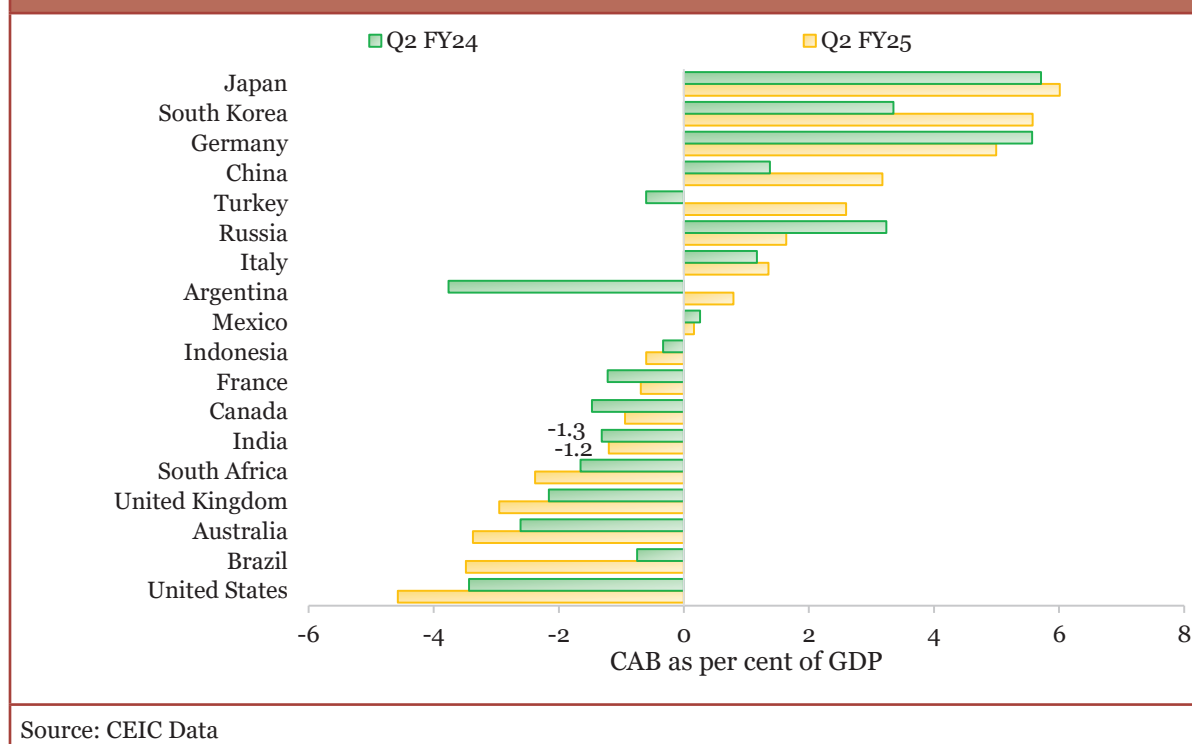


Chart III. 12: Current account balance (CAB) as a per cent of GDP (India vs select countries)



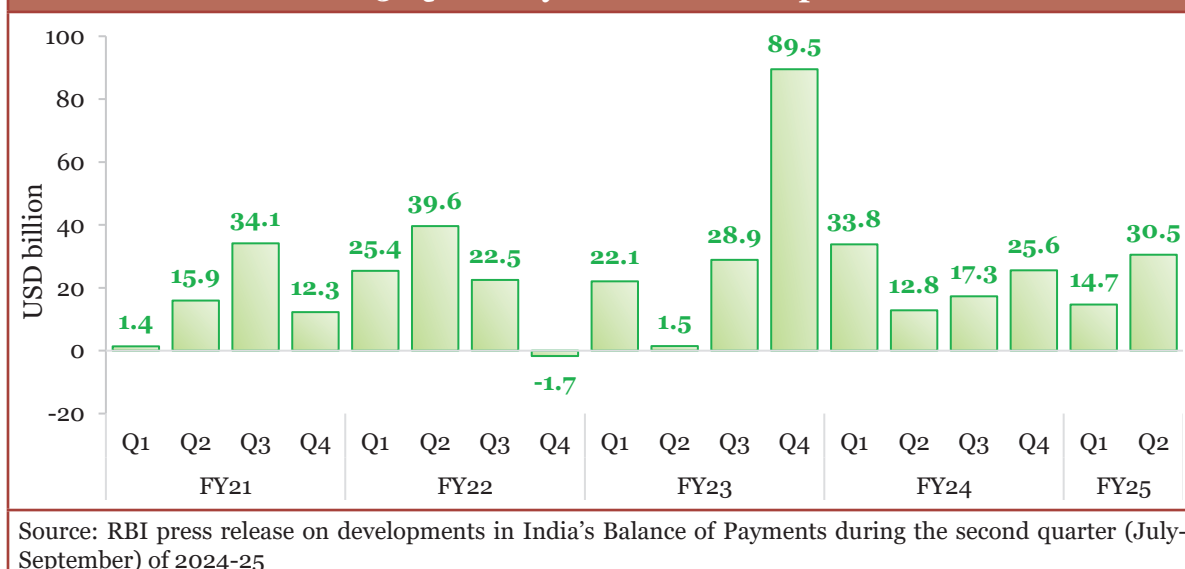
3.45 India's CAD has remained relatively contained compared to other G20 economies, such as Brazil and Australia, which have faced similar external pressures, including higher commodity prices and weaker global demand.

3.46 Private transfers, mainly driven by remittances by Indians employed overseas, formed the bulk of net transfers, growing steadily from USD 28.1 billion in Q2 of FY24 to USD 31.9 billion in Q2 of FY25. This growth reflects the continued strength of India's diaspora and robust remittance inflows despite global economic uncertainties.

Capital and Financial Account

3.47 The Capital and Financial Account is a vital segment of the BoP, serving as the primary mechanism for financing the CAD and strengthening foreign exchange reserves. Over the period from Q1 of FY23 to Q2 of FY25, India has generally recorded surpluses in the capital account, largely driven by robust inflows from FDI, FPI, and external loans. These inflows have supported the country's external position and contributed to building foreign exchange reserves.

Chart III.13: Quarterly trends in net capital inflows

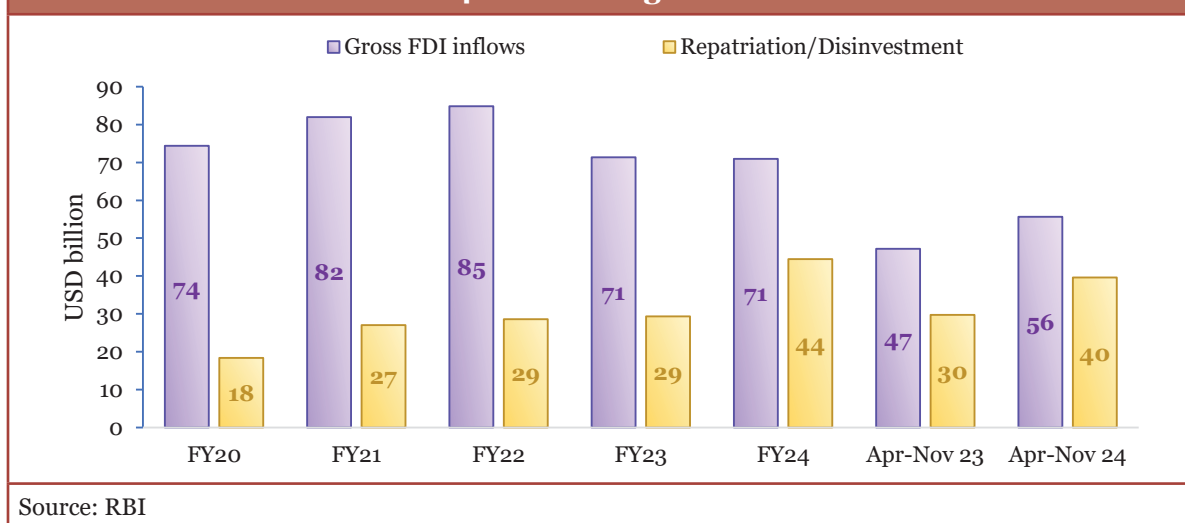


3.48 The growth trajectory of capital inflows has shown signs of revival in recent quarters. In Q2 of FY25, net capital inflows stood at USD 30.5 billion, a significant increase from the USD 12.8 billion recorded during the same period in the previous year. This rise can be primarily attributed to increased FPI inflows, external commercial borrowings, and NRI deposits.

Performance of FDI flows

3.49 FDI recorded a revival in FY25, with gross FDI inflows⁸⁸ increasing from USD 47.2 billion in the first eight months of FY24 to USD 55.6 billion in the same period of FY25, a YoY growth of 17.9 per cent.

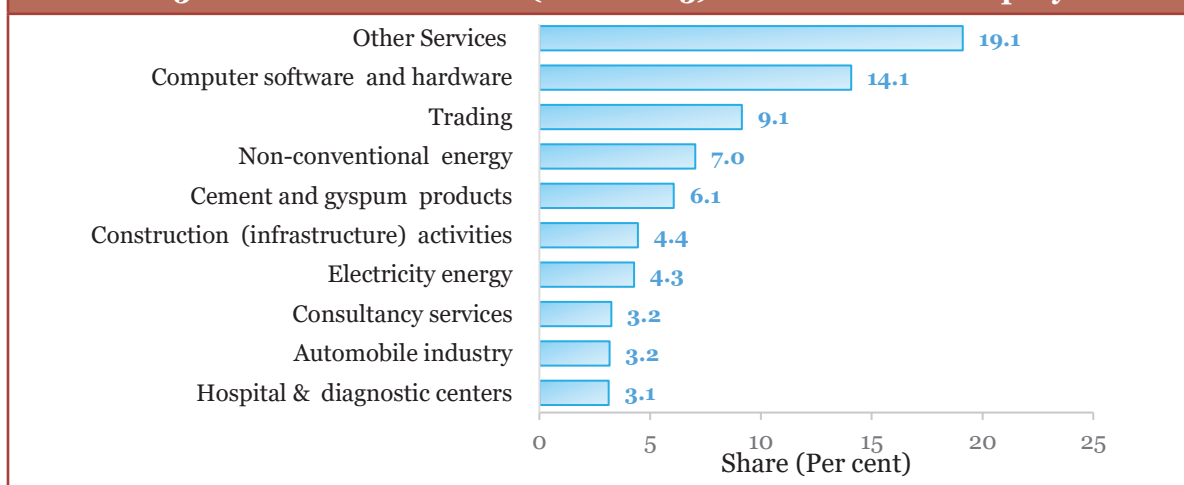
Chart III.14: Trends in gross FDI inflows



3.50 Over the long term, FDI inflows into India have surpassed the USD 1 trillion mark from April 2000 to September 2024, solidifying the country's position as a safe and significant global investment destination. According to data from the Department for Promotion of Industry and Internal Trade (DPIIT)⁸⁹, the cumulative FDI inflows, which include equity inflows, reinvested earnings, and other capital, reached USD 1,033.4 billion during this period.

3.51 From a sectoral perspective, the services sector⁹⁰ remains the largest recipient of FDI, accounting for 19.1 per cent of total equity inflows in H1 of FY25. Other significant sectors attracting foreign investments include computer software and hardware (14.1 per cent), trading (9.1 per cent), non-conventional energy (7 per cent), and cement & gypsum products (6.1 per cent).⁹¹ Despite the short-term volatility in global markets, triggered by factors such as inflationary pressures, rising interest rates in developed economies, and geopolitical tensions, the long-term outlook for FDI in India remains favourable. India's robust economic fundamentals, ongoing structural reforms, and growing consumer market position make it a key destination for foreign investments.

Chart III.15: Sectoral trends in FDI (H1 of FY25)-share in total FDI equity inflows



Source: DPIIT

89 DPIIT data on FDI flows, <https://tinyurl.com/4hhws2cz>.

90 The Services sector includes Financial, Banking, Insurance, Non-Financial / Business, Outsourcing, R&D, Courier, and Tech. Testing and Analysis, Other.

91 Sector-wise data on FDI inflows is released by DPIIT. RBI gives data on repatriation/disinvestment of FDI flows from India.

3.52 FDI into India has recently been scrutinised due to concerns about declining inflows. However, a broader analysis⁹² reveals that FDI flows globally have been hampered by economic uncertainty, geopolitical tensions, and rising borrowing costs. Even though gross FDI inflows to India have increased in the first eight months of FY25, it has been accompanied by a rise in repatriations as international companies realised returns from investments. Many multinational companies have capitalised on India's strong stock market through secondary sales and Initial Public Offerings, indicating investor confidence. In 2024, private equity-backed exits increased, supported by India's stable macroeconomic environment and investor-friendly policies. As per Avendus Spark analysis based on DPIIT data, Private Equity and Venture Capital exit from Indian stock markets stood at USD 19.5 billion from January to September 2024, higher than USD 18.3 billion in the corresponding period of the previous year.⁹³ The depth and resilience of the Indian capital market offer profitable exits for direct investors, boosting future investments.⁹⁴

3.53 India remains a strong destination for FDI, ranking high in greenfield project announcements and international project finance deals. However, the country has to pay heed to numbers. As per the data published by RBI, net FDI to India during the first eight months of FY25 stood at USD 0.48 billion compared to USD 8.5 billion in the corresponding period of FY24.⁹⁵ Similarly, for FY23, the figure stood at USD 19.8 billion. For FY24 as a whole, the net FDI was USD 10.1 billion. The last two financial years have indeed seen much larger repatriation from India. The amounts were USD 29.3 billion and USD 44.5 billion, respectively, in FY23 and FY24. In the current year, up to November, the repatriation amount is USD 39.6 billion. At this rate, the full-year figure might exceed last year's figure.

3.54 To a large extent, this is a success story as foreigners take profits. Second, much of it was sold to portfolio investors. In other words, the large portfolio inflows in FY24 were the other side of the coin of large repatriation. At a gross level, FY23 and FY24 have seen a decline in gross FDI, including earnings retained in India. This has broken the steadily rising trend seen since FY14. The period between FY13 and FY22 witnessed

92 "Behind India's growth over last 10 yrs—increase in repatriations, steady FDI inflows". <https://tinyurl.com/2tt3pxsf>.

93 Avendus Spark Strategy-Macro Alert-Net FDI inflows fall to a record low in H1 of FY25, <https://www.avendus.com/india/reports>.

94 <https://www.ft.com/content/0575e216-8dae-4df6-bf50-312f78468e99>.

95 Net FDI is calculated as follows: -

- (1) FDI by foreigners: Foreign direct investment inflows+retained earnings-repatriation
- (2) FDI by Indians: Indian investment overseas +retained earnings-repatriation
- (3) The net FDI figure: (1)-(2)
- (4) Then, there are Portfolio Investment flows: -
- (5) Foreign Portfolio Investors' net flows – Indians' Portfolio Investment (Indians' portfolio investment overseas is small)
- (6) Total Investment flows: (1)-(2) +(3)

ultra-low interest rates and quantitative easing policies in the developed world. The cost of funds was much lower. Interest rates in developed countries rose sharply in 2022 and 2023. The Federal Funds Rate topped 5 per cent. Other Asian countries such as Thailand, Malaysia and Indonesia also witnessed declines in inward FDI in 2023, according to UNCTAD.

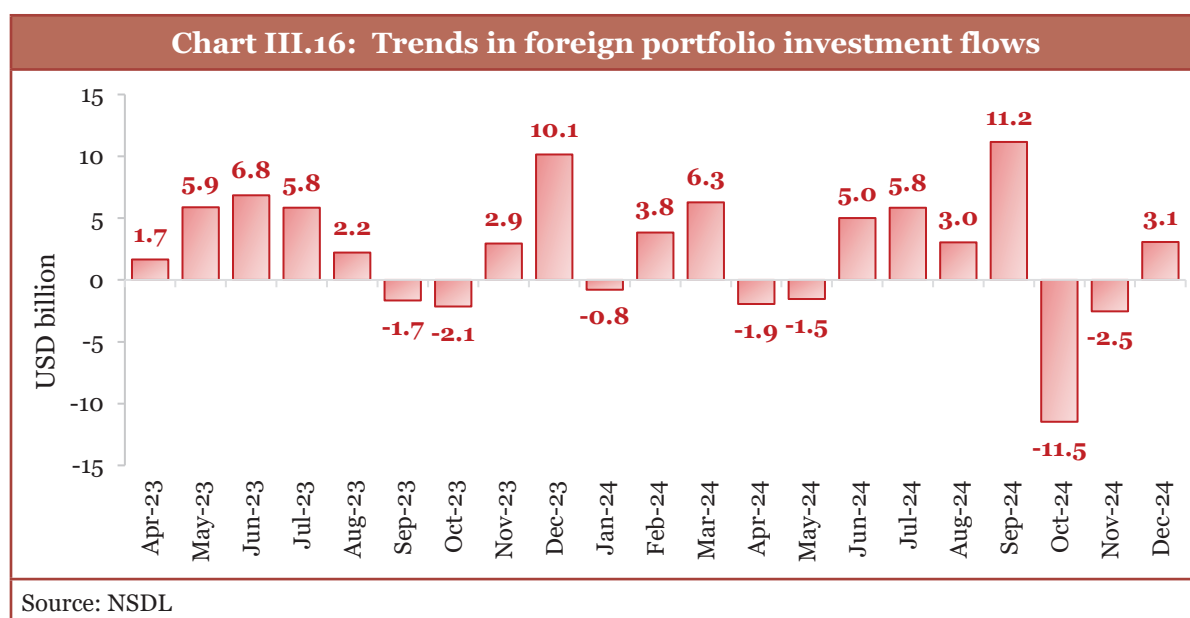
3.55 However, India runs a CAD, and its investment needs are much larger considering the size of its economy. Supplementing domestic savings with reasonably large foreign savings expands the scope for capital formation. If, for various reasons, capital flows are going to be problematic, it raises questions as to the level of sustainable CAD for India. It may not be 2.5 per cent to 3 per cent as before, but it is much lower. It used to be said that a country can run as large a CAD as the Rest of the World (RoW) is willing to finance. If the RoW is unwilling or unable to do so for various reasons, then the size of the CAD will have to be lower. Developed countries, too, are wooing investments, and India is not competing with other emerging economies alone. So, India has two options.

3.56 One, we must pull out all the stops wooing FDI and making itself more attractive for foreign investors. India has been doing so. For example, most sectors in the country are open for foreign investors under the automatic route. The large amount of repatriations, as witnessed in the data, also suggests that it is easy to transfer the returns on investment made in India. However, there is room to improve tax certainty and tax stability in matters such as APA (Advance Pricing Agreement). India has simplified many of its laws, rules and regulations over the years leading to a regime shift in terms of the ease of doing business compared to yester years. At the same time, all statutory and regulatory authorities must bear in mind that international investors benchmark countries cross-sectionally and not longitudinally. That will determine the success of the government's goal to make global companies produce in India for the world, making India a part of the global supply chain.

3.57 The second option is to make the available and existing investments deliver more. In other words, if the investment rate cannot be increased because of capital constraints, then investment efficiency has to go up. That is where deregulation and 'Ease of Doing Business' come into play. That is why the main theme of this Survey is about deregulation. Therein lies the clue to improving India's investment efficiency. Most of the chapters peer into regulations and recommend deregulation. The deregulation theme is explored in greater detail in Chapter 5.

Performance of Portfolio flows

3.58 FPIs became net buyers in the Indian equity market starting in June 2024 after being sellers in the first two months of FY25. This trend continued until September 2024, showcasing a clear preference for Indian equities as FPIs injected substantial capital into the market over those months. However, this trend reversed in October and the first half of November 2024, resulting in a net outflow of USD 11.5 billion and 2.5 billion, respectively. Factors such as concerns about slowing earnings growth, high valuations, rising geopolitical tensions, and recent developments in China⁹⁶ led FPIs to withdraw significant funds from Indian equities. However, during the latter half of November 2024, FPIs became more optimistic about the Indian stock market, reversing the significant selling seen in October and early November 2024. This positive trend in FPI inflows continued in December 2024, with net inflows amounting to USD 3.1 billion in December 2024. Factors such as India's strong macroeconomic fundamentals, favourable business environment and robust economic growth have encouraged investors to reverse the outflow trend. On a cumulative basis, the net FPI inflows⁹⁷ into India slowed to USD 10.6 billion from April to December 2024 from USD 31.7 billion during the same period the previous year. The volatility in portfolio flows underscores the susceptibility of equity and bond markets to global developments. However, the sound economic and corporate fundamentals in India underpin the long-term attractiveness of the Indian equity market for foreign investors.

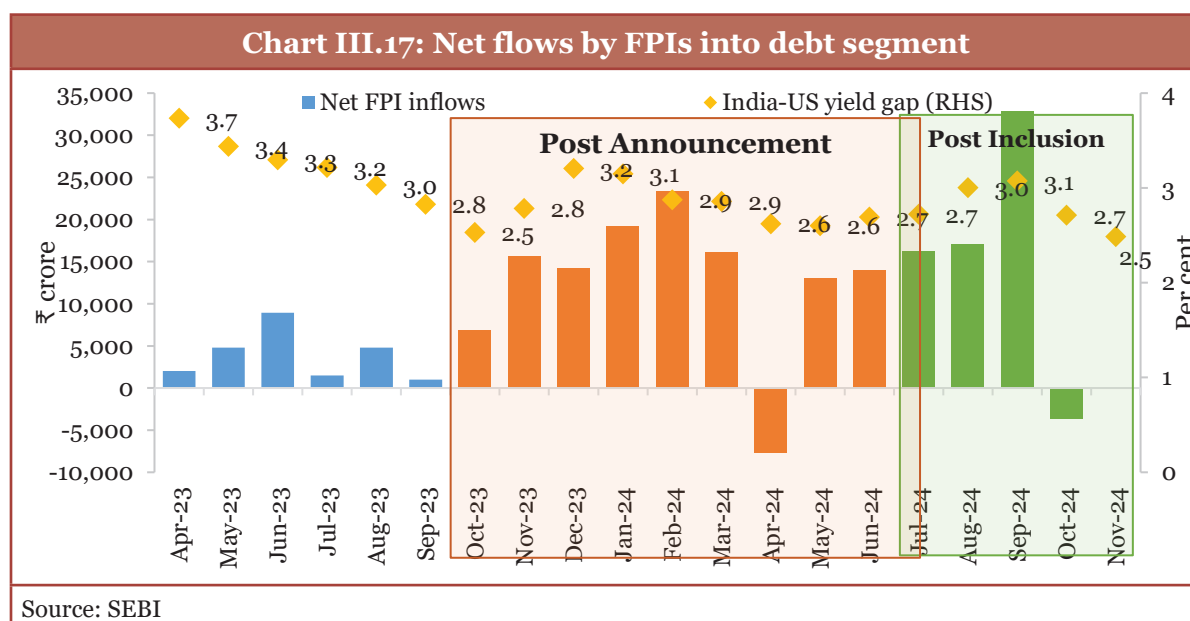


⁹⁶ These include the stimulus measures announced by the Chinese Government and the cheap valuation of Chinese stocks.

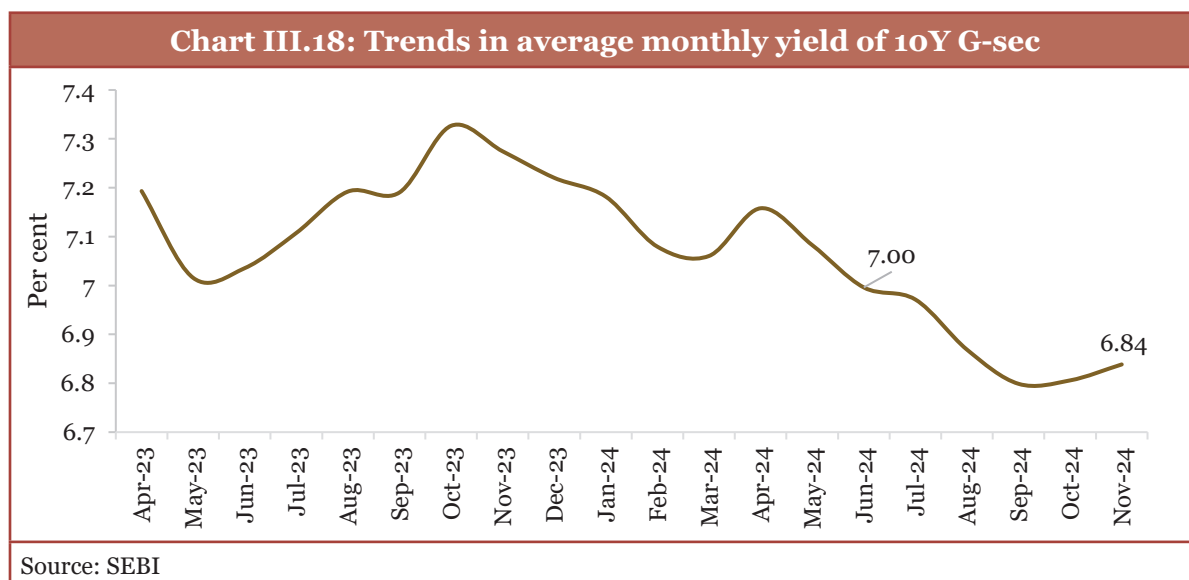
⁹⁷ Net FPI inflows is the sum of equity and debt inflows.

3.59 The inclusion of Indian Government Bonds (IGB) in some global bond indices this year has significantly supported debt inflows. Since the announcement of inclusion in JP Morgan index in October 2023, there has been heightened activity in the FPI debt segment with cumulative flows of ₹ 1.1 lakh crore from October 2023 to June 2024. Post effective date of inclusion, FPIs invested ₹ 62,431 crore in the debt segment from July to November 2024. Assets under custody, which reflects the total market value of the holdings, shows that FPI's cumulative investment in Fully Accessible Route (FAR) securities crossed the USD 20 billion mark within nine months of the announcement of their inclusion in the JP Morgan EM Bond Index. In FY25, as of 15 December 2024, inclusion already resulted in a net inflow of more than USD 3 billion in Indian FAR bonds, with assets under custody of India FAR bonds standing at USD 28 billion as of 15 December 2024.⁹⁸

3.60 Since the investor sentiment/perception of the trajectory of Fed rates and the interest rate differentials are the key drivers of FPI flows in India, it will be interesting to analyse the trends in FPI debt flows and the yield differential between India and the US. Chart III.17 compares the FPI debt flows and the yield gap between India and US10 year yields, which shows that a widening yield differential in India's favour leads to higher inflows (November 2023 to March 2024) and vice-versa. India's strong growth fundamentals and range-bound inflation also made it a preferred choice amongst foreign investors despite the narrowing yield differentials seen from May to July 2024.



98 Based on the inputs received from the Securities and Exchange Board of India (SEBI).



3.61 The increase in demand for India's G-Secs is also set to have a positive externality in terms of lowering the borrowing costs for the government as the yields soften due to heightened demand and limited supply dynamics. The preliminary impact of this is already visible in the Indian 10Y G-Sec yields. The inclusion of Indian bonds in global indices signals a growing appetite amongst foreign investors to include Indian government securities in their investment portfolios, trust in India's growth prospects, and financial stability in the Indian markets.

Others

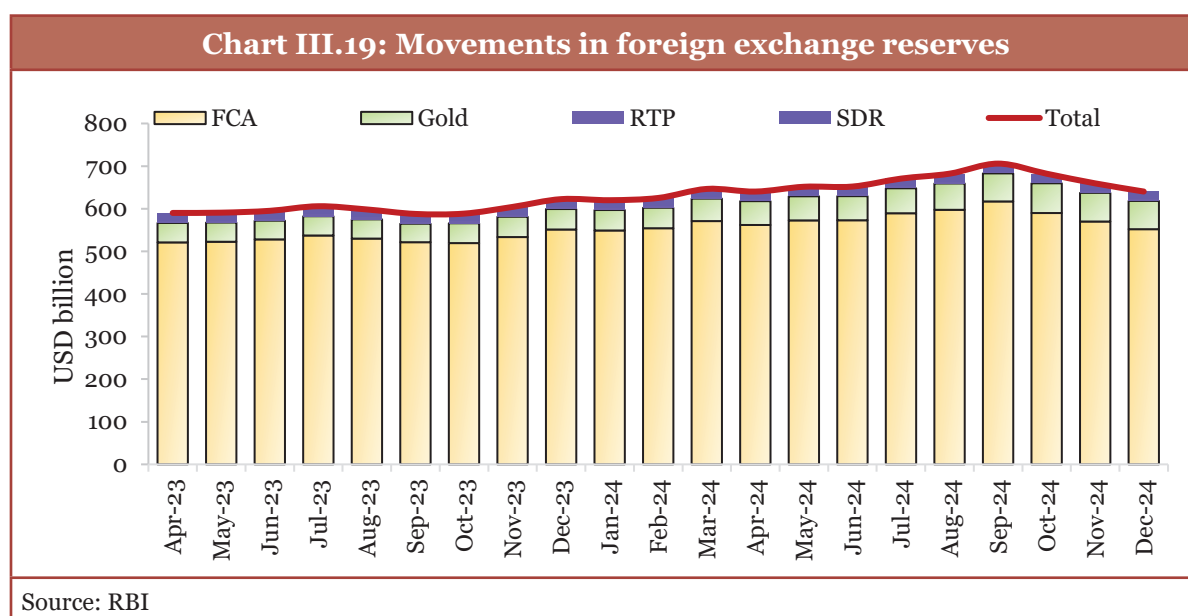
3.62 NRI deposits, external commercial borrowings (ECBs), and short-term trade credit have contributed additional buffers to India's capital account, though each component exhibits varying degrees of stability. ECBs have shown an upward trajectory in recent months, with net inflows rising to USD 9.2 billion from April to October 2025, up from USD 2.8 billion in the corresponding period of the previous year, reflecting a greater appetite for borrowing from foreign sources. Similarly, Non-Resident Indian (NRI) deposits have also surged significantly, with net inflows increasing to USD 10.2 billion during H1 of FY25, compared to USD 5.4 billion in the same period of the previous year. This growth can be attributed to continued strong remittance inflows and a favourable exchange rate environment, which incentivised NRIs to park their savings in India.

Foreign Exchange Reserves

3.63 India's foreign exchange reserves comprise foreign currency assets (FCA), gold, special drawing rights (SDRs) and reserve tranche position (RTP) in the IMF. After surpassing the USD 700 billion benchmark, India's foreign exchange reserves moderated to USD 640.3 billion as of the end of December 2024. The reserves are sufficient to

cover approximately 90 per cent of India's external debt of USD 711.8 billion as of September 2024, reflecting a strong buffer against external vulnerabilities. As of 2024, India has secured its place among the world's largest foreign exchange reserve-holding countries, ranking 4th globally, following China, Japan, and Switzerland. Supported by net positive capital inflows, India's forex reserves witnessed a notable increase of USD 27.1 billion in 2024. FCA constituted the bulk of this increase, strengthening India's overall reserve position.

3.64 The import cover, a crucial indicator of external sector stability, stood at 10.9 months as of December 2024. This increase enhances India's ability to weather external shocks, with reserve adequacy significantly surpassing the IMF's recommended three-month import cover for emerging economies.⁹⁹ The BoP surplus of USD 63.7 billion in FY24, supplemented by a modest valuation gain of USD 4.3 billion, was the key driver of this improvement. In H1 of FY25, forex reserves rose by USD 59.4 billion, driven by a BoP surplus of USD 23.9 billion and a valuation gain of USD 35.5 billion.



3.65 A global rise in uncertainty has led to fluctuations in the composition of foreignexchange reserves. CY24 saw gold bullion holdings nearing their highest level since World War II, which was largely driven by an accumulation of gold by emerging market central banks.¹⁰⁰ As per the IMF, steady changes are underway in the global reserve system, including a gradual movement away from dollar dominance and a rising role of non-traditional currencies.¹⁰¹

99 IMF survey: Assessing the need for Foreign Currency Reserves, <https://tinyurl.com/3knsb5se>.

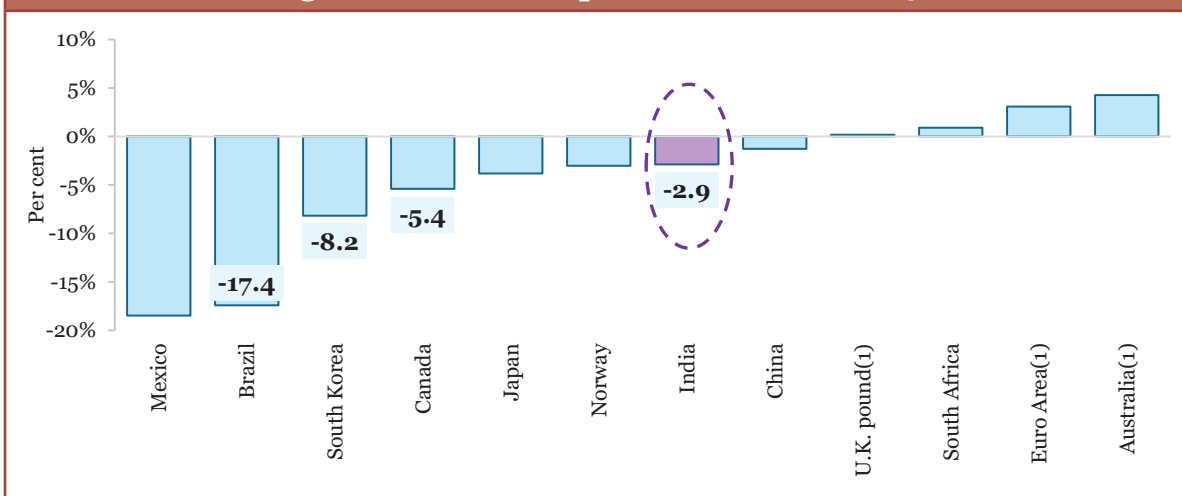
100 IMF, Dollar Dominance in the International Reserve System: An Update 2024, <https://tinyurl.com/26dn5srxr>.

101 Ibid note 100.

Exchange Rate

3.66 The value of the Indian Rupee (INR) is market-determined, with no target or specific level or band. Various domestic and global factors influence the exchange rate of the INR, such as the movement of the Dollar Index, trends in capital flows, level of interest rates, movement in crude prices, current account deficit, etc. In the first nine months of FY25 (up to 6 January 2025), the INR depreciated a modest 2.9 per cent, performing better than currencies such as the Canadian Dollar, South Korean Won and the Brazilian Real, which depreciated by 5.4 per cent, 8.2 per cent and 17.4 per cent, respectively, during the same period. One of the primary factors behind the rupee depreciation during 2024 has been the broad-based strengthening of the USD amidst geopolitical tensions in the Middle East and uncertainty surrounding the US election.

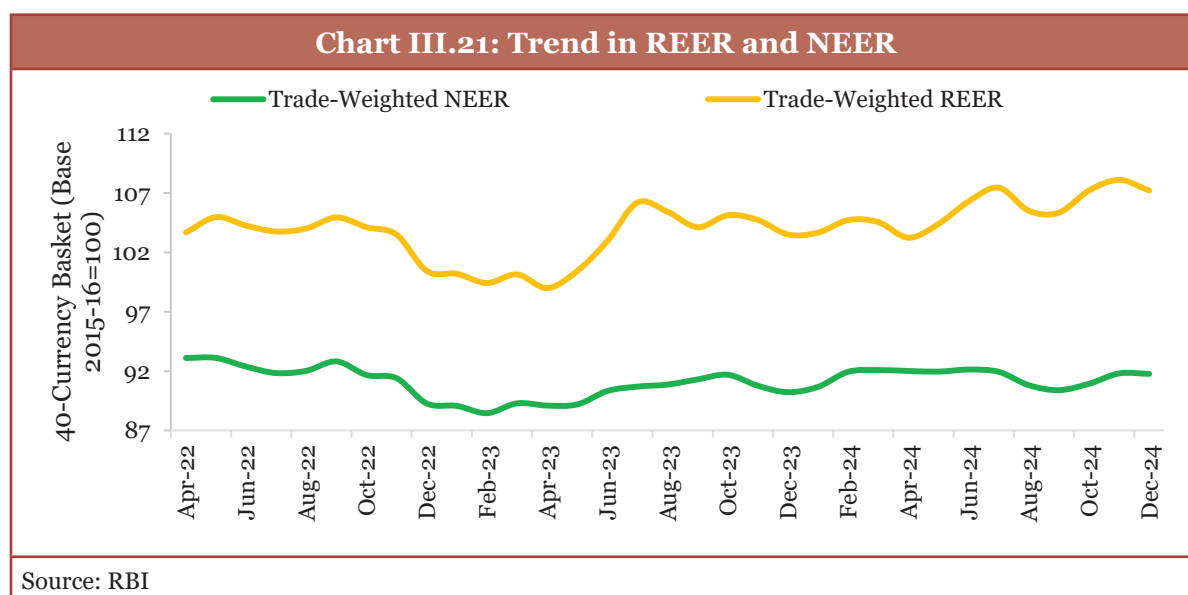
Chart III.20: Changes in the bilateral exchange rates of the major countries against USD from April to December 2024



Source: IMF

Note: The euro (€) is the official currency of 20 out of 27 EU member countries constituting the Eurozone, officially called the euro area.

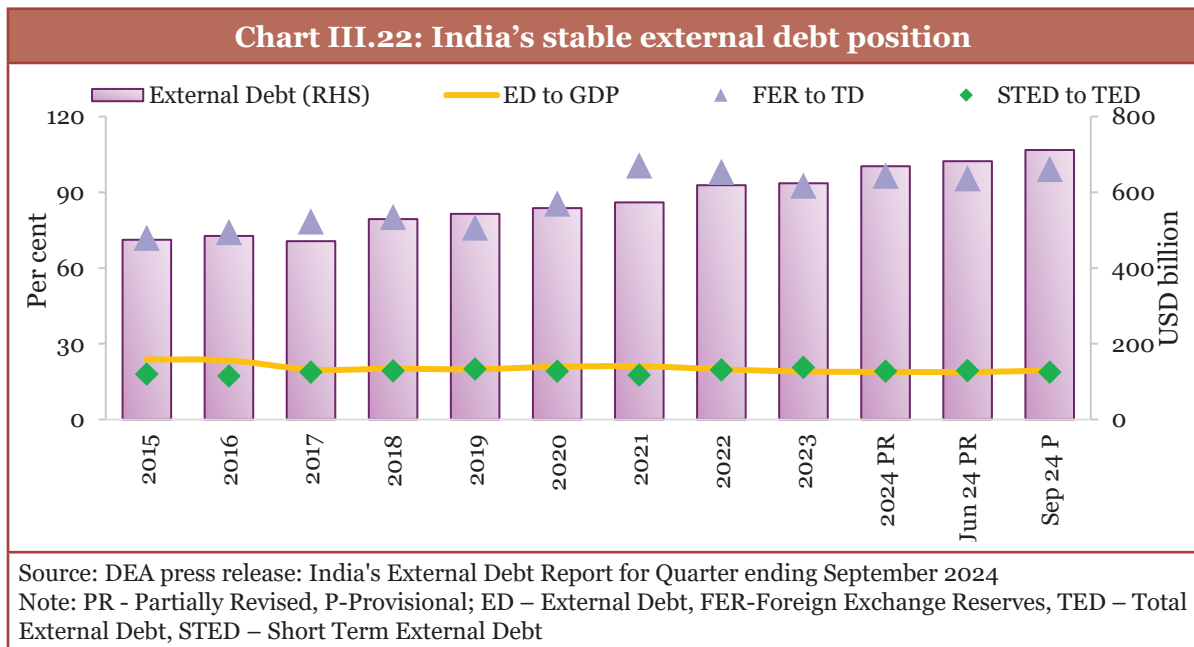
To determine currency appreciation or depreciation, the representative exchange rates of major countries are expressed in currency units per U.S. dollar. Exceptions, marked with (1), are presented as U.S. dollars per currency unit.



3.67 After adopting the floating exchange rate regime, Effective exchange rates have become a prominent measure of external competitiveness of an economy's tradable sector relative to the foreign tradable sector. The Nominal Effective Exchange Rate (NEER) for the INR remained stable in the 90-92 range from April to November 2024, indicating relative stability in the currency amidst external uncertainties. The Real Effective Exchange Rate (REER), which reflects the real purchasing power of the currency, steadily appreciated from 103.2 in April 2024 to 107.2 in December 2024.

External debt position

3.68 India's external debt has remained stable over the past few years. A stable external debt position has helped maintain external sector stability, significantly when the rest of the world is affected by geopolitical headwinds. The external debt to GDP ratio rose slightly from 18.8 per cent of the GDP at the end of June 2024 to 19.4 per cent at the end of September 2024. The share of short-term debt (with original maturity of up to one year) in total external debt decreased to 18.8 per cent at the end of September 2024 from 19.4 per cent at the end of June 2024. Similarly, its ratio to foreign exchange reserves decreased to 18.9 per cent at the end of September 2024 from 20.3 per cent at the end of June 2024. Across currencies, the external debt remained primarily denominated in the US Dollar (53.4 per cent), followed by the INR (31.2 per cent), SDR (5 per cent), and the Euro (3 per cent).



OUTLOOK

3.69 India's external sector has performed well amidst unfavourable geopolitical conditions. On the current account front, though merchandise exports have displayed moderate growth owing to a slowdown in external demand, merchandise imports have shown remarkable growth supported by strong domestic demand. Increased net services receipts and growing remittances have cushioned the rise in the merchandise trade deficit. On the capital front, the economy has been witnessing net positive capital inflows. Gross FDI inflows have shown a higher growth in the first eight months of FY25 compared to the corresponding period of the previous year. However, a surge in repatriation has reined in the expansion in net FDI. FPI inflows have shown volatility in the first nine months of FY25, showing mixed trends.

3.70 Global trade dynamics have changed significantly in recent years, shifting from globalisation to rising trade protectionism, accompanied by increased uncertainty. This calls for a new strategic trade roadmap for India. To remain competitive and enhance its participation in global supply chains, India must continue reducing trade costs and improving facilitation to boost export competitiveness. Much remains to be done to enhance trade competitiveness. The good news is that doing so is entirely in our hands. On its part, the industry must continue to invest in quality.

3.71 The state produces governance, and the private sector produces goods and services. If both these actors focus on quality and efficiency, then despite the trade tensions and protectionism that are likely to come in the way of expanding global trade, India can increase its share in overseas markets and generate resources to sustain a higher level of capital formation. Then, it will be possible for us not just to dream of but actually realise higher economic growth rates on a sustained basis.

PRICES AND INFLATION: UNDERSTANDING THE DYNAMICS

In gauging the health of the global economy, understanding the trends in inflation is essential. While global inflation peaked in 2022 due to supply chain disruptions and geopolitical tensions, it has declined since then, aided by policy measures. In India, retail inflation eased in FY25 due to timely interventions by the government and the Reserve Bank of India. Core inflation reached its lowest point in a decade, while food inflation was affected by supply chain disruptions and adverse weather conditions.

Onion and tomato prices are affected by the decline in production, partly due to extreme weather conditions and monsoon-induced supply chain disruptions. On pulses, despite being a major producer, India faces a gap in demand and supply. The government has undertaken several measures to rein in the prices of vegetables like onion and tomato which included procurement and buffer stocking of onion under price stabilisation fund and subsidised sale of onion and tomato. Also, many administrative measures have been taken-up to address the price pressures in pulses such as subsidised retail sale, stock limits and easing imports.

Estimates suggest that India's retail price inflation will align progressively with the target. Global commodity prices are expected to decline, potentially easing core and food inflation. Long-term price stability could be achieved by robust data systems for monitoring prices, developing climate-resilient crops, reducing crop damage and post-harvest losses.

INTRODUCTION

4.1. In the ever-evolving landscape of global economics, understanding the dynamics of inflation is crucial. The persistent inflationary pressures pose several challenges for policymakers and the general public. On the global front, central banks are cautiously unwinding their restrictive policies to balance inflation control with economic recovery. In India, the various government initiatives and monetary policy reviews are helping to keep inflationary pressure at check.

4.2. Global inflation peaked at 8.7 per cent in 2022, driven by supply chain disruptions and geopolitical tensions, to 5.7 per cent in 2024¹. In India, retail inflation moderated from 5.4 per cent in FY24 to 4.9 per cent in FY25 (April-December) despite challenging food price dynamics. Food items constitute about two-fifths of the consumer price index in India. Hence, the Consumer Food Price Index (CFPI) is a significant determinant of retail inflation. In recent years, food inflation has been a major contributor to headline inflation. However, an increase in prices is not widespread across all food categories. It is primarily driven by a few items.

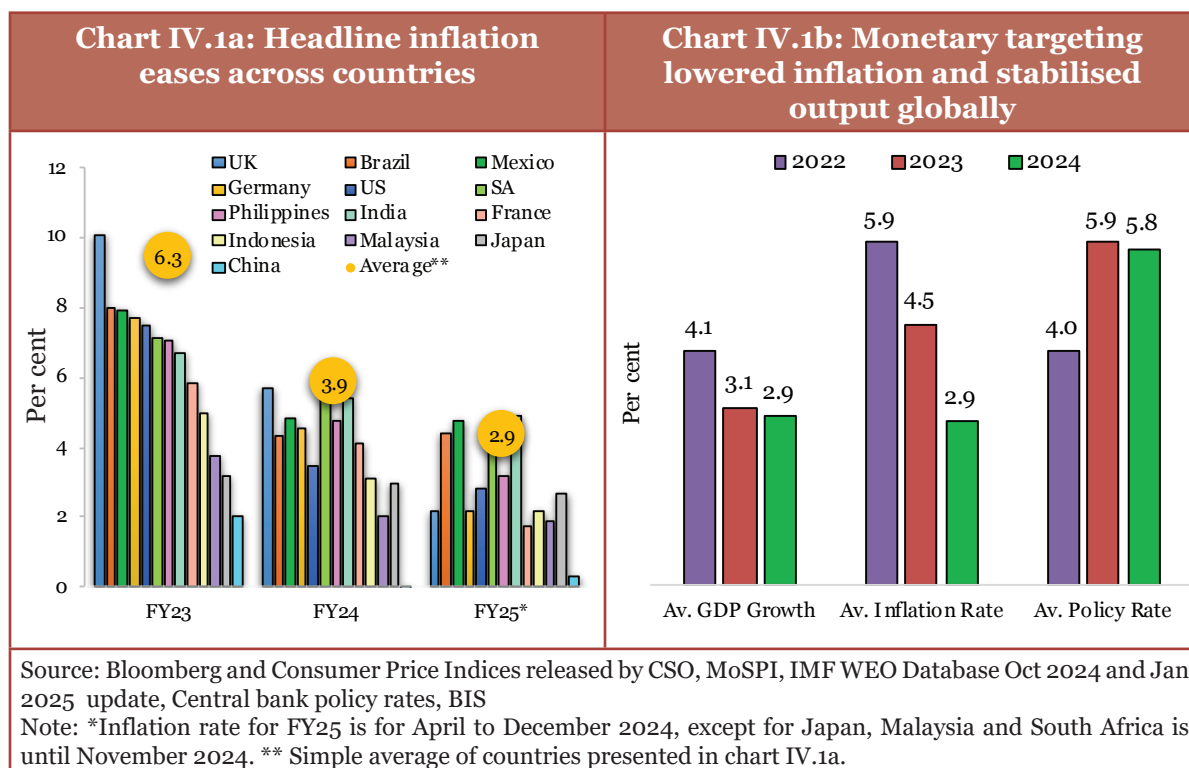
4.3. Given this context, the chapter is organised into four sections. Section 2 analyse the global inflation, while Section 3 examines the domestic inflation trends and discusses the proximate factors affecting inflation dynamics. The chapter concludes with a set of recommendations in Section 4. The idea behind this presentation plan is to give an overview about inflation dynamics to policymakers and stakeholders to help them navigate the complexities of managing inflation.

GLOBAL INFLATION

Global resilience amid synchronised monetary policy tightening

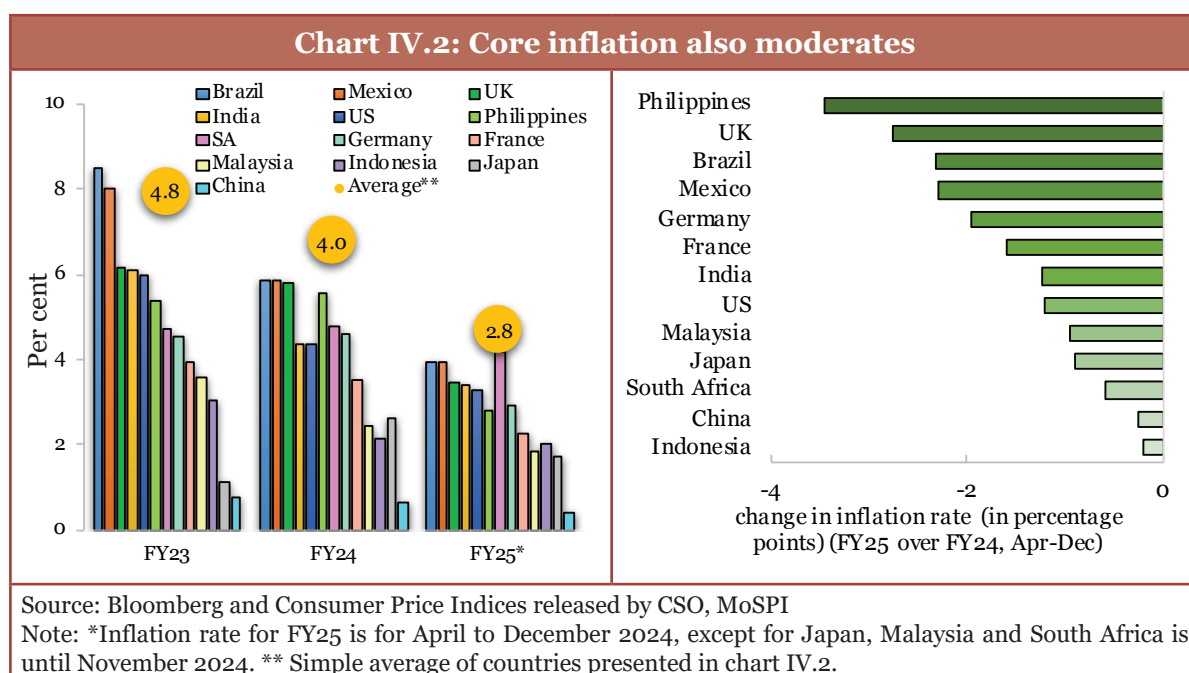
4.4. Despite the sharp and synchronised tightening of monetary policy across countries, the global economy has demonstrated an unusual level of resilience in output growth throughout the disinflationary process. This resilience is reflected in the steady decline of the headline inflation rate in most countries during FY24 and the current year. The concerted efforts by central banks to curb inflation through increased interest rates and other policy measures have yielded positive outcomes, resulting in a significant reduction in inflationary pressures.

¹ International Monetary Fund (2025, January) *World Economic Outlook Update-Global growth: Divergent and Uncertain*. Washington, DC. (<https://tinyurl.com/29ussy2x>)



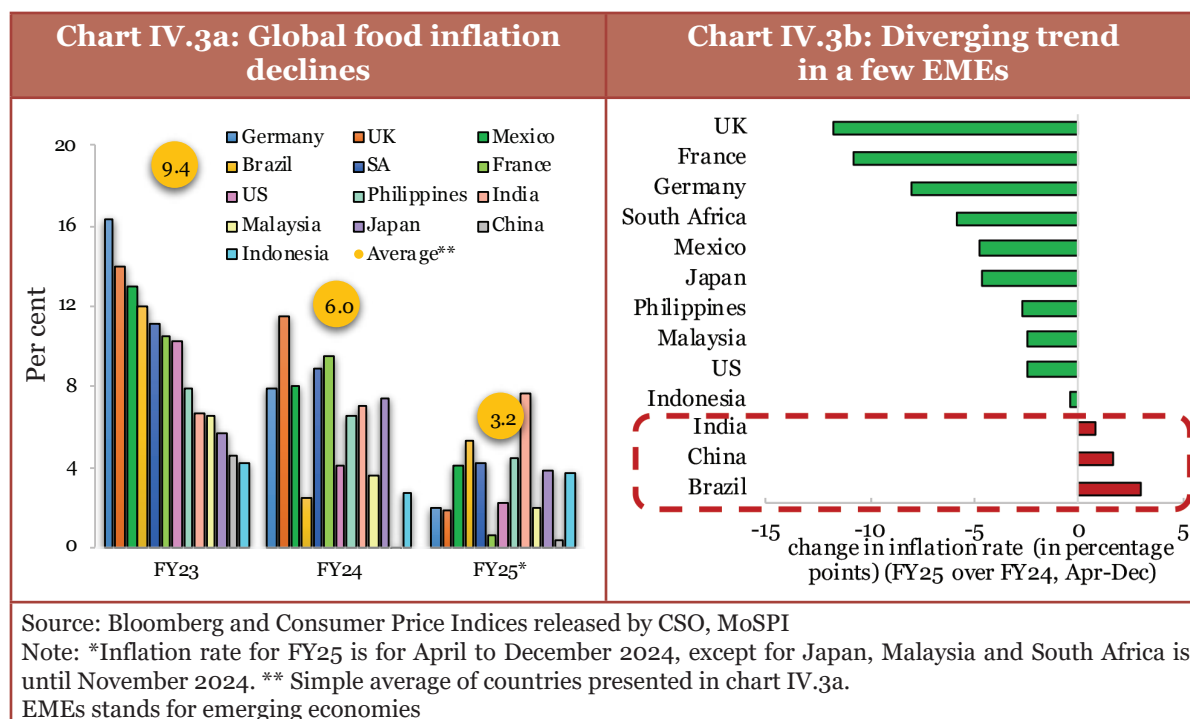
Decline in core inflation

4.5. In alignment with the downward trend in headline inflation, core inflation, which excludes volatile food and energy prices has also decreased in most countries. The decline can be predominantly attributed to a moderation in international commodity prices. This trend highlights the effectiveness of policy interventions in stabilising prices across various sectors.



Global food inflation eases with divergence in a few EMEs

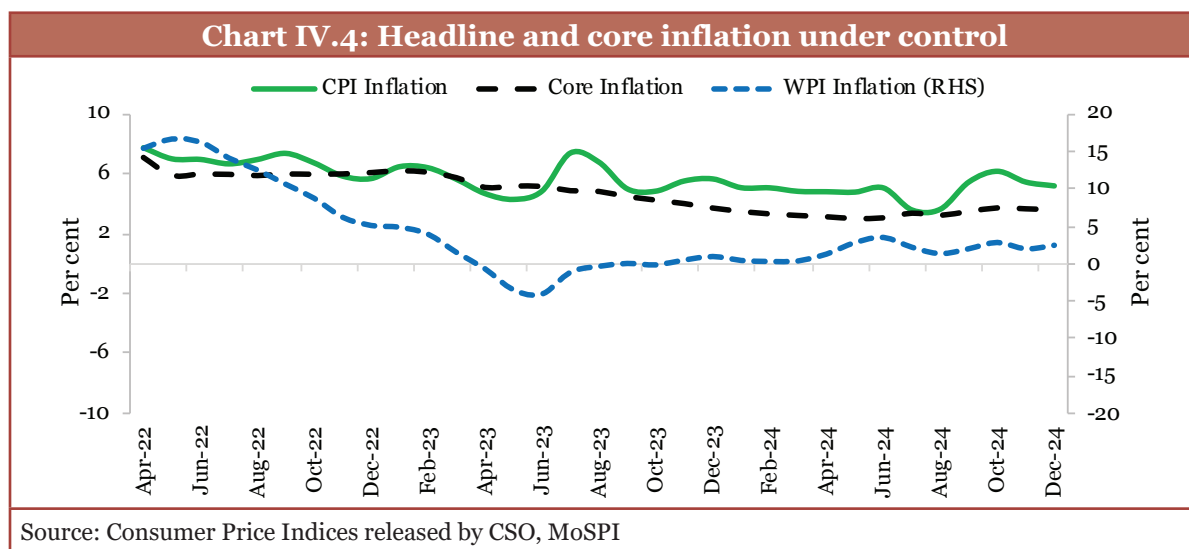
4.6. Global food inflation is on a downward trend, aligning with the patterns observed in both headline and core inflation. Improving global supply conditions due to solid harvests and favourable growing conditions contributed to the softening of food prices². However, some emerging economies, such as Brazil, India, and China have a contrasting pattern.



DOMESTIC INFLATION

Softening core inflation cools headline inflation

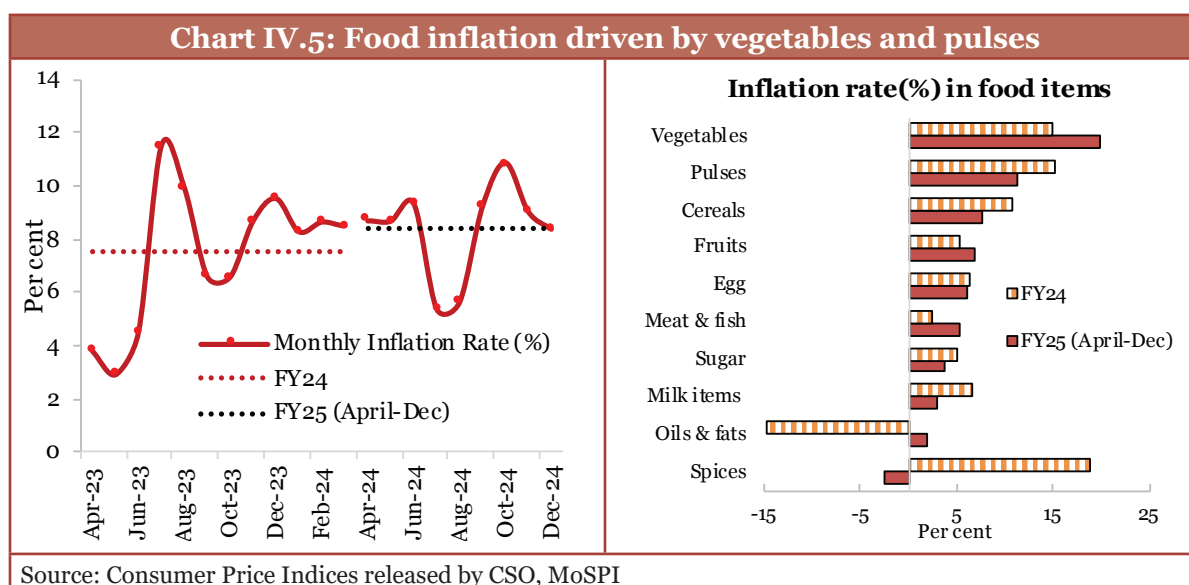
4.7. India's headline inflation, measured by the Consumer Price Index (CPI), has moderated in FY25 (April-December) compared to FY24. This decline is primarily due to a significant decrease in core inflation, which dropped by 0.9 percentage points between FY24 and FY25 (April-December). The sharp decline in core inflation was largely driven by core services inflation, which was lower than core goods inflation. A decrease in fuel price inflation has also contributed to the moderation in headline inflation, alleviating pressure on household budgets. In general, the decline in retail inflation can be attributed to a reduction in input prices, as reflected in wholesale price inflation, which was in the deflationary zone (-0.7 per cent) in FY24 and remained low in FY25 (April-December).

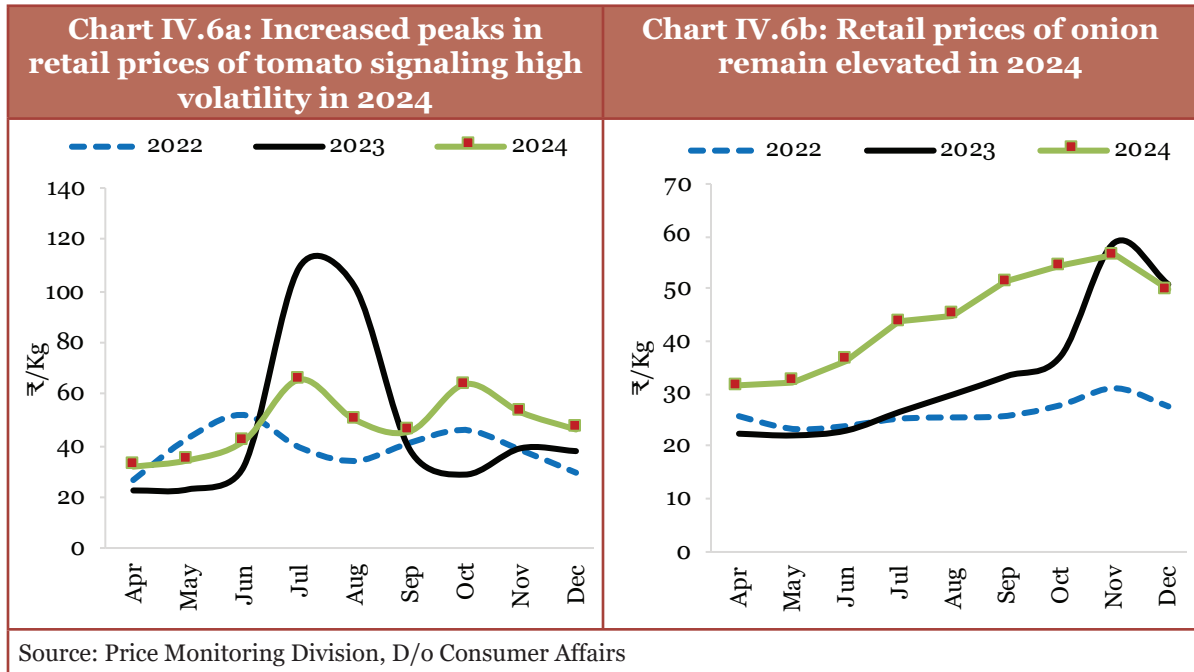


Food Inflation is majorly driven by very few food items

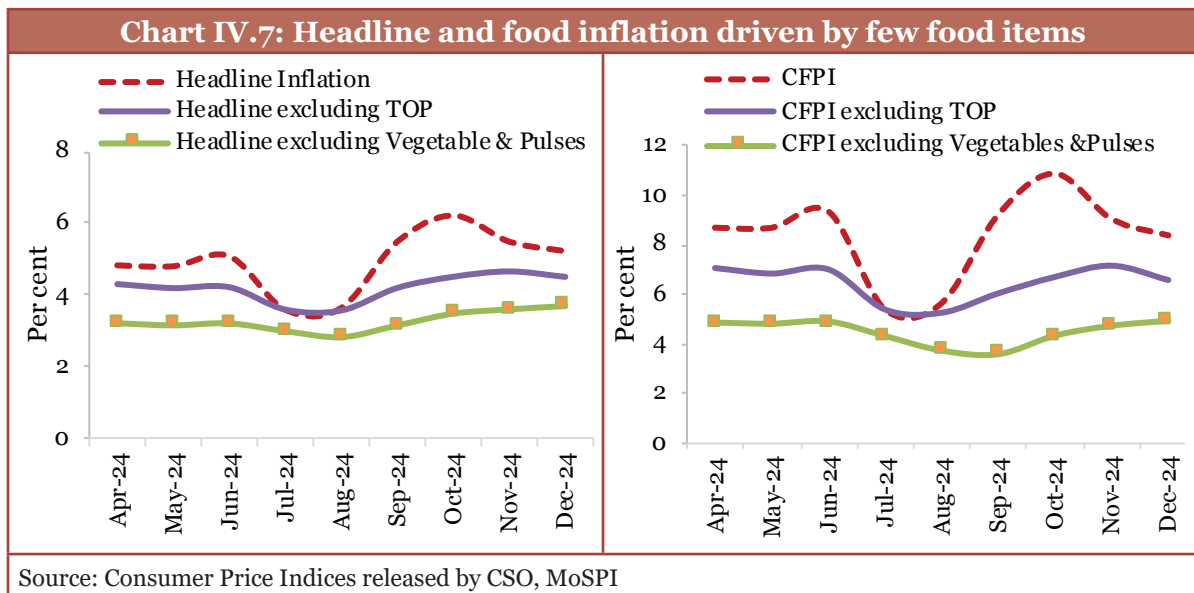
4.8. Over the past two years, India's food inflation rate has remained firm, diverging from global trends of stable or declining food inflation. This can be attributed to factors such as supply chain disruptions exacerbated by extreme weather events and reduced harvest of some food items.

4.9. Food inflation, measured by the CFPI, faced pressures in FY25 (April-December), primarily driven by a few food items such as vegetables and pulses. Vegetables and pulses together holds a total weightage of 8.42 per cent in CPI basket. However, their contribution to the overall inflation stood at 32.3 per cent in FY25 (April to December). When these items are excluded, the average food inflation rate for FY25 (April-December) was 4.3 per cent, which is 4.1 per cent lower than the overall food inflation. Similarly, the average headline inflation would be 3.2 per cent when the vegetables and pulses inflation rate were excluded, 1.7 per cent lower than the actual headline inflation.





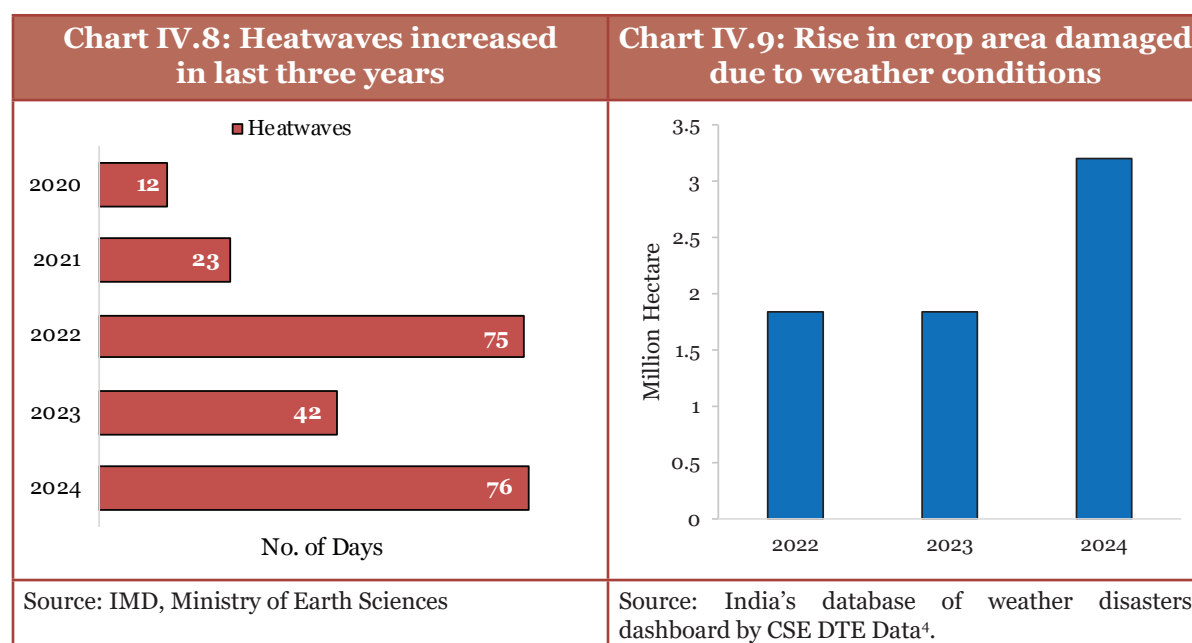
4.10. Uneven monsoon-induced supply disruptions in certain regions caused price pressures, mainly in tomatoes and onions, contributing to higher inflation rates in vegetables and overall food inflation. When we exclude the three most price-sensitive vegetables (tomato, onion and potato (TOP)) from the CPI basket, the average food inflation rate in FY25 (April-December) was 6.5 per cent, which is 1.9 per cent lower than the current food inflation. Similarly, average headline inflation is 4.2 per cent when excluding TOP, which is 0.7 per cent lower than the current headline inflation. Given that tomato and onion prices have been drivers of food inflation, and consequently headline inflation in recent months, the next section will explore the causes of price pressure in these vegetables.



Extreme weather conditions impact vegetable production and prices

4.11 Vegetables are more susceptible to uneven weather compared to food grains, as highlighted by various studies. Extreme weather events such as cyclones, heavy rains, floods, thunderstorms, hailstorms, and droughts impact vegetable prices. Further, evidence indicates that inflationary pressure in horticultural commodities in 2023-24 was driven by unseasonal rainfall during the pre-monsoon season, which damaged crops in major horticulture-producing states³. The coexistence of good areas sown coupled with greater price volatility suggests that extreme weather events significantly impact production and supply chains, thereby affecting retail prices.

4.12. The data accessed from the India Meteorological Department (IMD), Ministry of Earth Sciences indicates a notable increase in the frequency of extreme weather conditions, particularly heatwaves. On an average, during 2022-2024, India experienced heatwaves on 18 per cent of days compared to 5 per cent of days in 2020 and 2021.



4.13. Data published by the Centre for Science and Environment (CSE) and Down to Earth (DTE)^{5,6} finds that the total crop area damaged in 2024 was higher compared to the last two years due to extreme weather events.

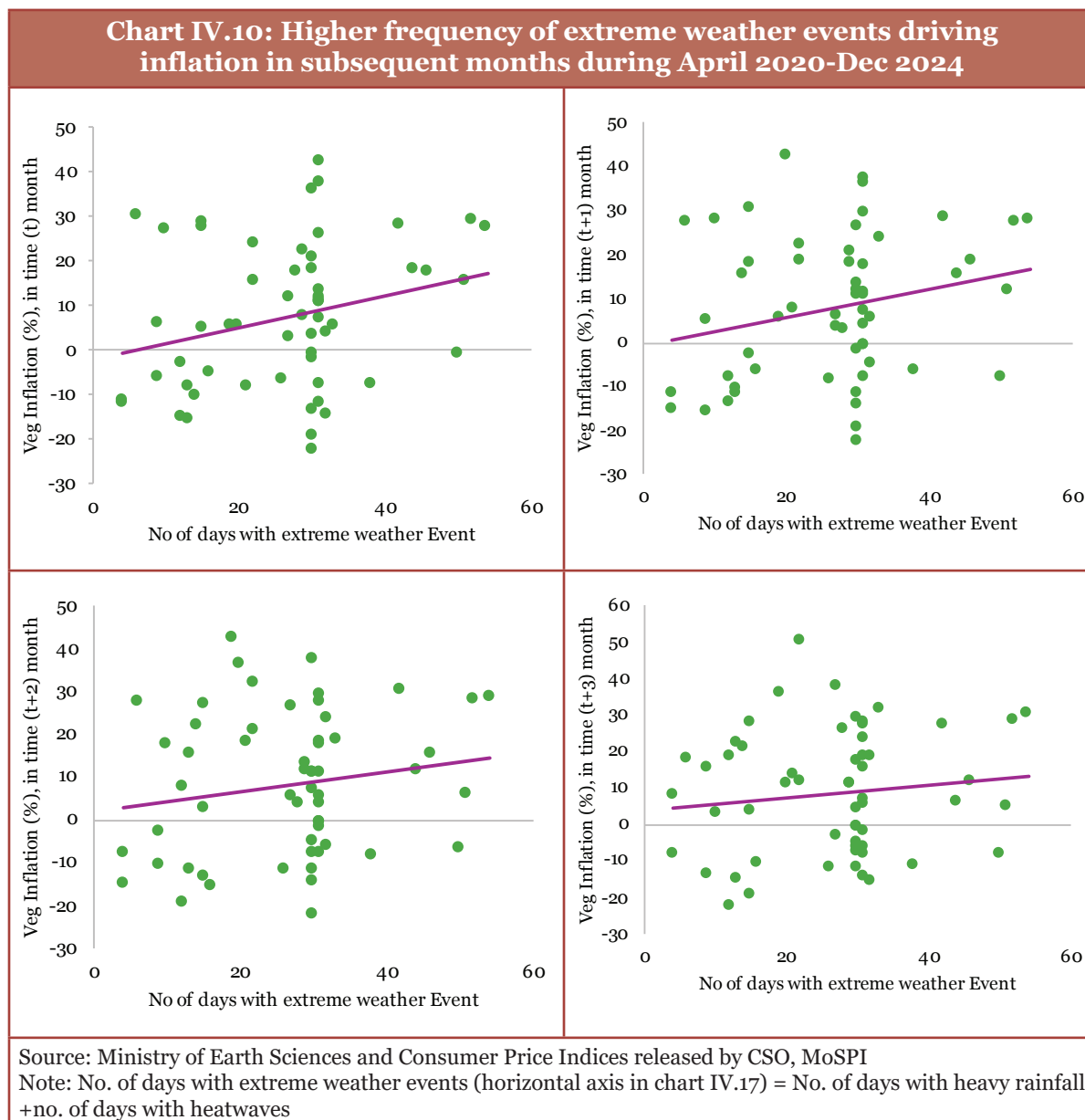
³ Raya, D., & Roy, R. (2023). Unseasonal Rainfall and Price Rise in Horticulture Crops. *Climate-roofing Agriculture. Agri-Food Trends and Analytics Bulletin Vol 3, Issue-1*. (<https://tinyurl.com/yyr8fzek>)

⁴ Data sourced from the Disaster Management Division Union Ministry of Home Affairs, India Meteorological Department and media reports

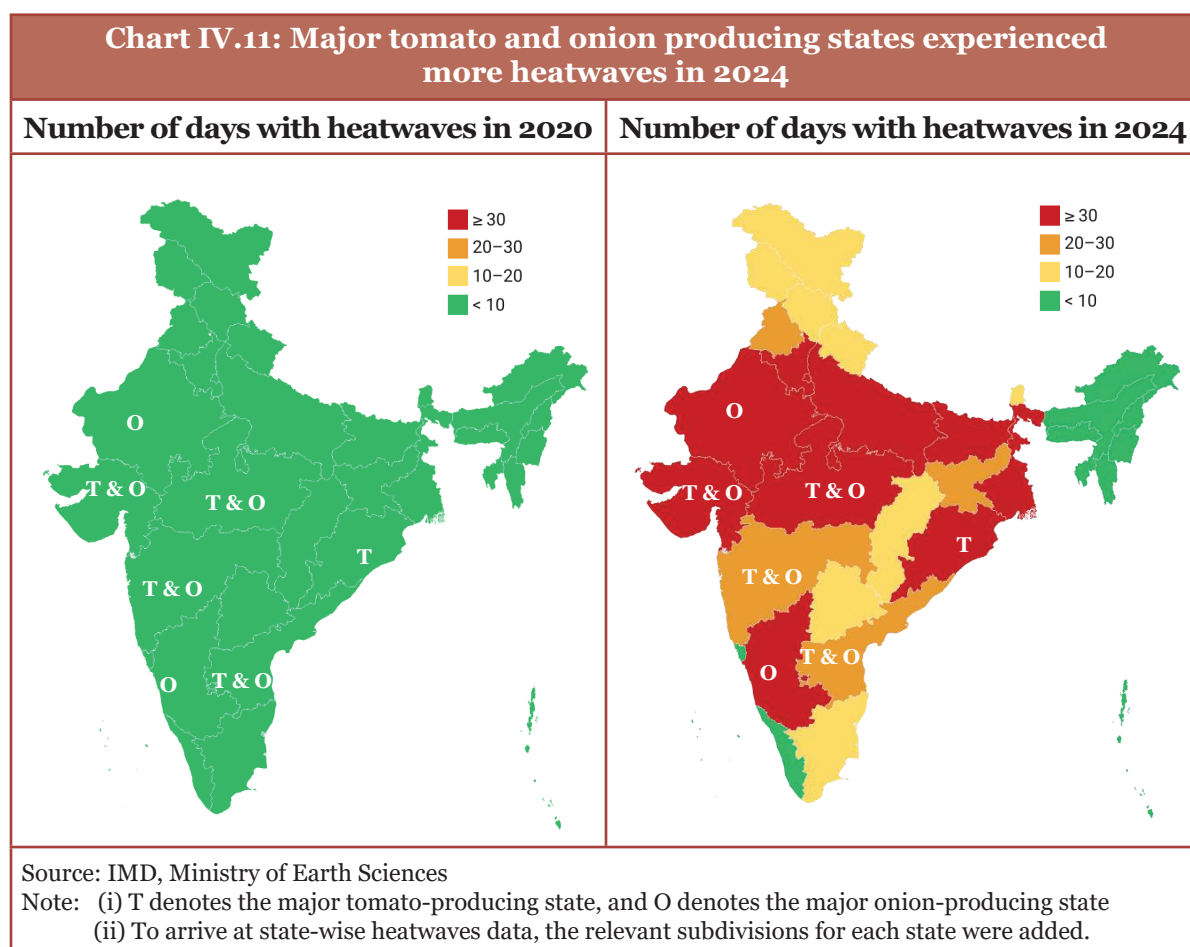
⁵ Centre for Science and Environment and Down to Earth. (2024). *Climate India 2024: An assessment of extreme weather events*. November. <https://tinyurl.com/2r5r85dw>.

⁶ CSE/DTE tracks each day's report from the IMD website and maps out the events by state and Union Territory (UT) and event type.

4.14. The increasing frequency of extreme weather events—specifically uneven and unseasonal rainfall and heat waves - impacts vegetable production, thereby increasing prices. These adverse weather conditions also present significant challenges to storage and transportation, resulting in temporary disruptions to the supply chain and causing an increase in vegetable prices. This phenomenon is also corroborated by a positive correlation between the frequency of extreme weather events occurring within a given month and the vegetable inflation rates observed in the subsequent months, with notable effects evident for up to three months following such events.



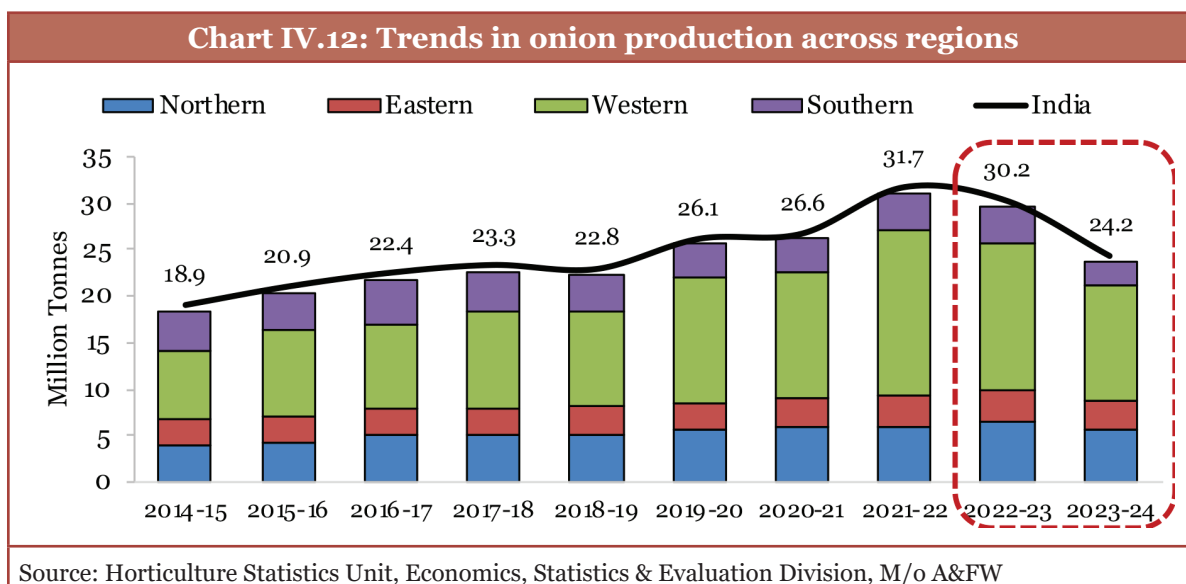
4.15. Furthermore, the fall in onion and tomato production in the last two years can be partially explained by higher extreme weather events in major producing states compared to other regions.



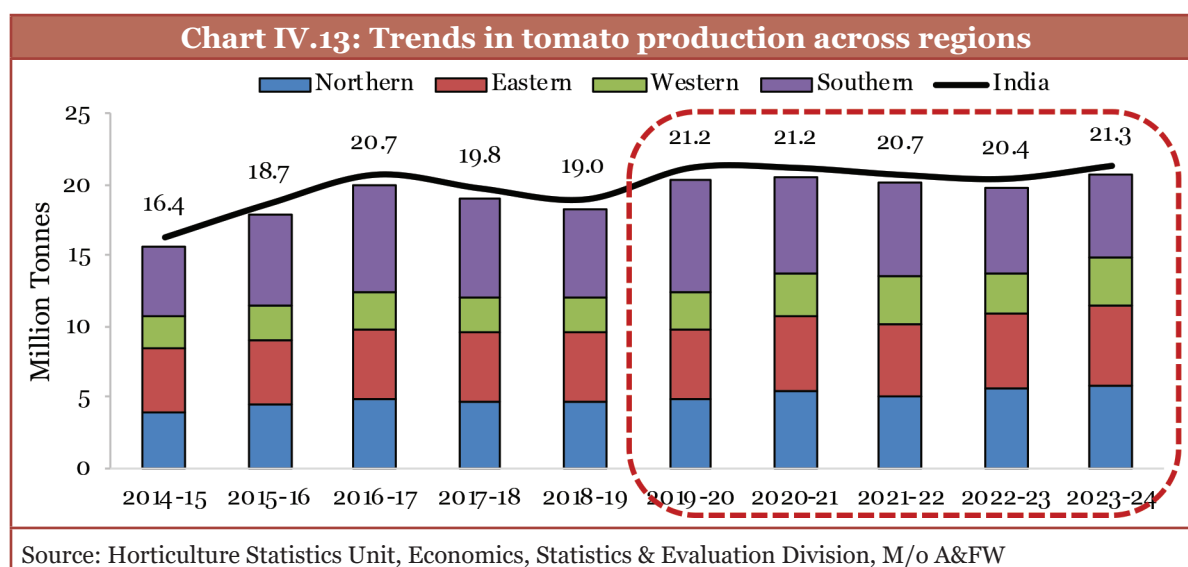
Trends in onion and tomato production and prices

4.16. The inflationary pressures in onion remained firm in FY24 and the current year, despite prompt measures by the government to contain prices due to constrained supply resulting from reduced production. Onions are grown in both the Kharif and Rabi seasons, with around 70 per cent of production occurring during the Rabi season⁷. Fresh onions generally last about 2-3 months when stored in a cool, dry, and well-ventilated place, with their shelf life further extendable under a dehumidified environment. Thus, onions produced in one year - specifically Rabi onions harvested from March onwards are typically available for consumption in the following year, influencing inflation dynamics in that year. The lower production in 2022-23 and 2023-24 has consequently led to inflationary pressures in onions for FY24 and FY25 (April-December)(Chart IV.6b).

⁷ Ministry of Consumer Affairs, Food & Public Distribution (2024, July 5). *Kharif sowing area for onion set to be 27% higher than last year; 30% sowing completed in Karnataka* [PIB Release]. (<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=2031043®=3&lang=1>)



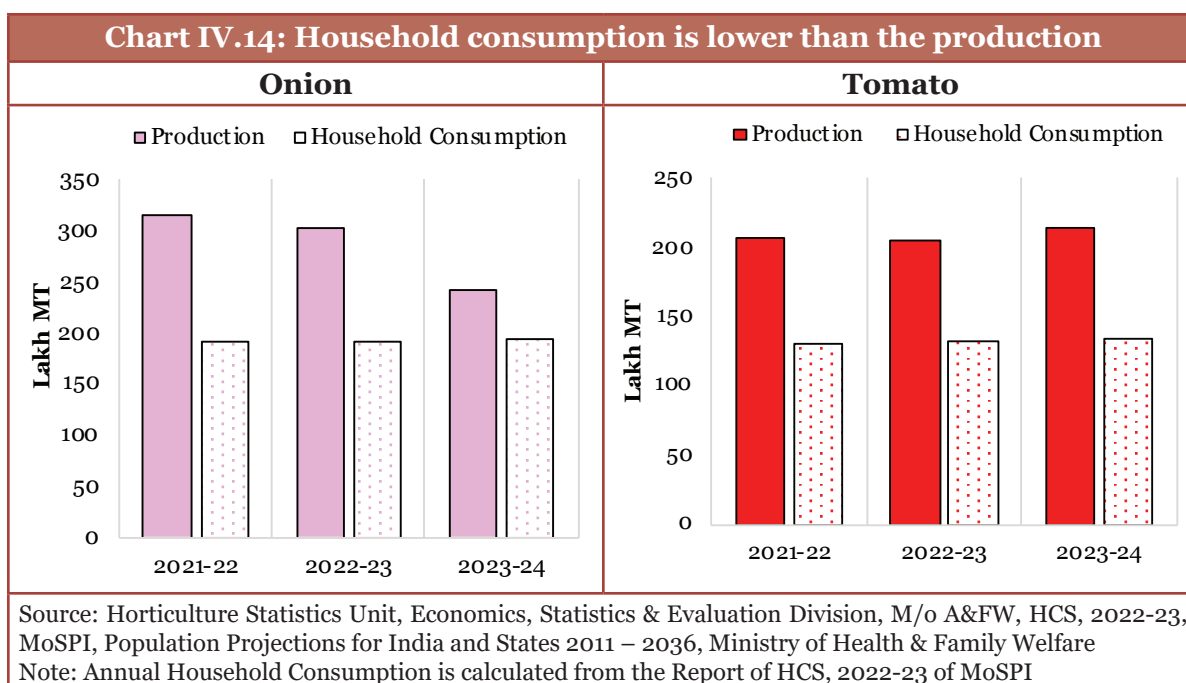
4.17. The price pressures in tomatoes remained intermittently high since FY23 due to constrained supply (Chart IV.6a). This occurred despite earnest efforts by the government to improve supply conditions in deficient regions by procuring from producing regions. The inflation dynamics of tomatoes are influenced by multiple factors. Unlike onions, tomatoes have short crop cycles and are highly perishable, creating challenges in storage and transportation and leading to supply shortages and price spikes. Fresh tomatoes have a shelf life of only about 1-2 weeks when stored properly. Tomato production is mainly concentrated in states such as Madhya Pradesh, Andhra Pradesh, Karnataka, Gujarat and Odisha. This regional concentration makes the supply chain vulnerable to disruptions in any of these areas. Similar to onions, a major portion of tomato production - more than 65 per cent⁸ - occurs in the Rabi season.



⁸ Roy, R., et al. (2024). *Vegetables Inflation in India: A Study of Tomato, Onion and Potato (TOP)*. Department of Economic and Policy Research, RBI Working Paper Series No. 08. (<https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=22723>)

Consumption and seasonality in production of onion and tomato

4.18. Analysis of production and consumption trends over the past three years shows that domestic household consumption is lower than production for both tomatoes and onions. Horticultural Statistics at Glance 2021⁹, indicates that approximately 15 per cent of production is used for bulk consumption in hotels, marriages etc. Even while treating this as a net additionality to household consumption, the production is still higher. Therefore, it turns out that price pressures are not fundamentally due to a shortfall in production but to post-harvest losses, seasonal production, and regional dispersion in production. Also, onion exports averaged more than 6 per cent of domestic production during FY20 to FY24.



4.19. For instance, tomato prices typically rise from July to September, the lean production season coinciding with the monsoon, adding to challenges related to distribution and increased transit losses. Onion prices tend to increase from October to December, representing a lean season for onion production. India's status as the major producer and consumer of onion and tomato significantly limits the potential to import during times of seasonal supply and demand imbalances. Given that India and China contribute about half of the total production of onion¹⁰, the import options for India during periods of demand-supply imbalances are quite limited. The next eight major producing countries only contribute around 18 per cent of the production. Also, the highly perishable nature of tomatoes restricts import options from neighbouring countries, which are not significant producers of tomatoes. Consequently, India faces challenges in importing these essential commodities.

⁹ Horticultural Statistics at Glance, 2021, Horticulture Statistics Division Department of Agriculture & Farmers Welfare, Ministry of Agriculture & Farmers Welfare

¹⁰ Food and Agriculture Organisation of United Nations. (2023). FAOSTAT statistical database. Rome:FAO.

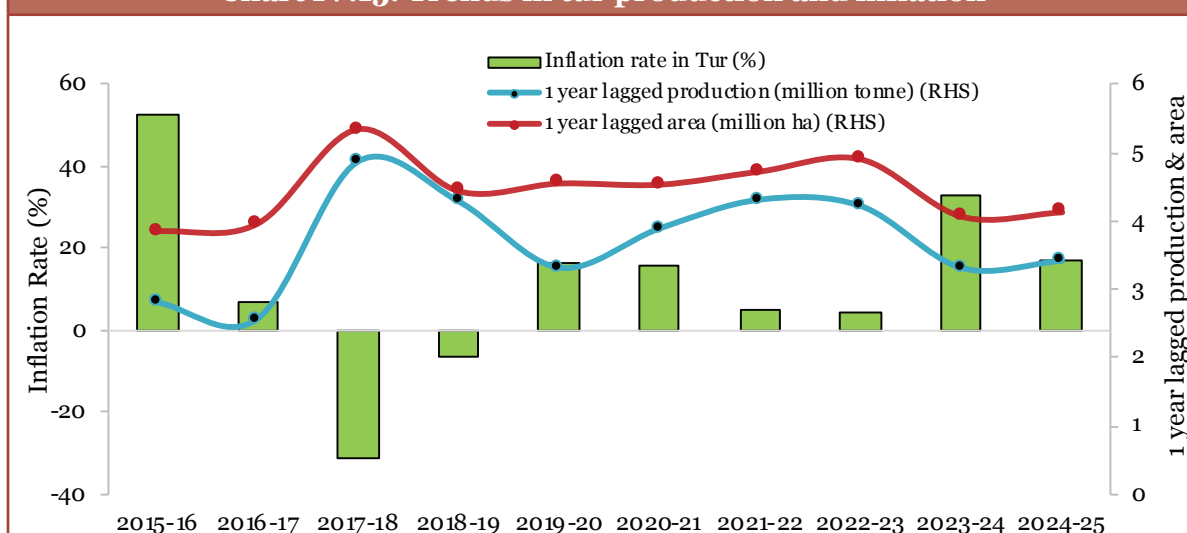
Table IV.1: Onion and tomato crop calendar

Vegetable	Share in Production	Season	Transplanting	Harvesting Period
Onion	30%	Kharif	Jul-Aug	Oct-Dec
		Late Kharif	Oct-Nov	Jan-Mar
	70%	Rabi	Dec-Jan	End of Mar to May
Tomato	33%	Kharif	May-Jul	Jul- Sept
	67%	Rabi	Oct-Nov, Jan-Feb	Dec-Jun

Source: PIB releases, Ministry of Consumer Affairs, Food & Public Distribution¹¹

Trends in production and inflation rate of tur

4.20. In addition to tomato and onion, tur dal also contributed to food inflation in India. The deficient production of tur in 2022-23 and 2023-24 has indeed led to high price pressures in tur dal during FY24 and FY25 (April-December), despite various measures by the government to shore up the supply in consuming regions. Production declined by 13.6 per cent in 2022-23 and 10.8 per cent in 2023-24 compared to the last 5-year average, affecting the supply. Over the past decade, there has been a strong negative correlation (-0.8) between the annual inflation rate and the 1-year lagged production, indicating that lower production in one year typically results in higher inflation in the following year. As a major Kharif pulse, tur is harvested from November to January, with its price impact mainly observed in the subsequent financial year.

Chart IV.15: Trends in tur production and inflation

Source: Ministry of Agriculture and Farmers Welfare, Consumer Price Indices released by CSO, MoSPI

¹¹ <https://pib.gov.in/PressReleasePage.aspx?PRID=2074016>.
<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=2031043®=3&lang=1>

4.21. Despite these challenges, the government is actively working to ensure an adequate supply of tur dal to consumers. To ensure that the produced quantity reaches the market and to prevent stockpiling, the government is taking proactive measures by periodically imposing stock limits for tur, and active monitoring through the stock disclosure portal. Further, to meet the demand for tur, the country imported 7.7 lakh tonnes of tur in FY24, mainly from Mozambique, Tanzania, Malawi, and Myanmar.

Box IV.1: Administrative measures to control food inflation

Food items	Measures undertaken
Cereals	<ul style="list-style-type: none"> • Stock limits on wheat from 24 June 2024 to 31 March 2025. • Open Market Sale Scheme: Offloaded wheat and rice from the central pool • Sale of wheat flour and rice under Bharat brand
Pulses	<ul style="list-style-type: none"> • Sale of chana dal, moong dal and masur dal under Bharat brand • Stock limits on tur and desi chana from 21 June 2024 to 30 September 2024 • Allowed duty-free import of desi chana, tur, urad and masur until 31 March 2025. • Allowed duty free import of yellow peas until 20 February 2025.
Vegetables	<ul style="list-style-type: none"> • Buffer Stock of Onion: A total of 4.7 lakh MT of rabi onion has been procured under Price Stabilisation Fund. • 20 per cent export duty on onion since 13 September 2024. • Subsidised sale of onion at ₹35 per kg from September -December 2024. • Subsidised sale of Tomato at ₹65 per kg in October 2024

Source: Various PIB releases

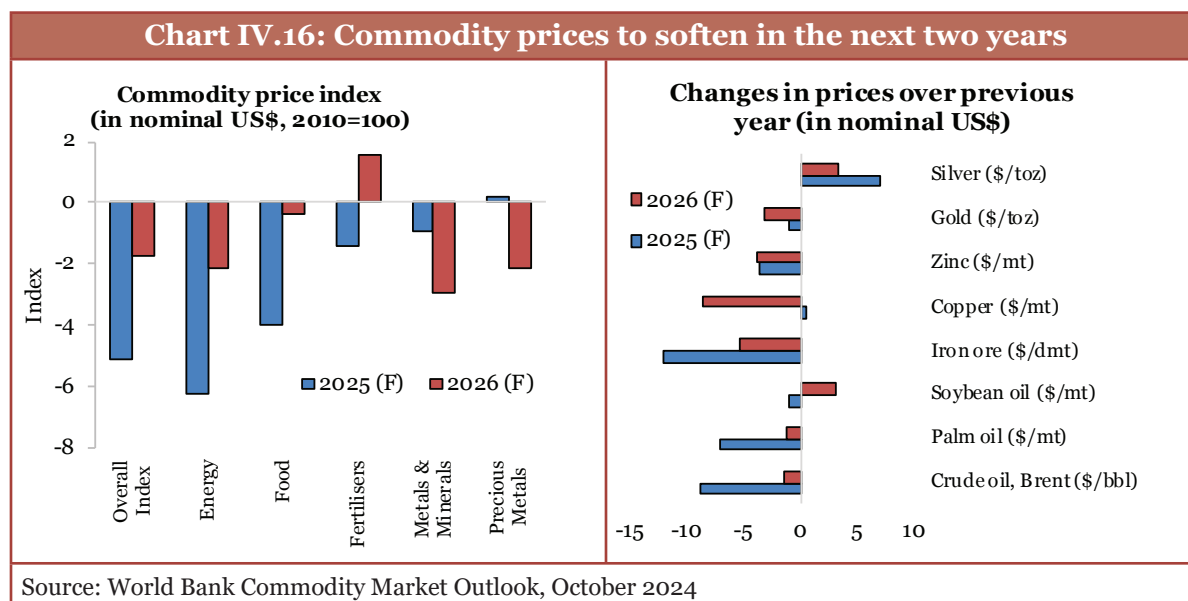
OUTLOOK AND WAY FORWARD

4.22. The RBI and the IMF have projected that India's consumer price inflation will progressively align towards the inflation target in FY26. In the December 2024 RBI's Monetary Policy Committee report revised its inflation projection from 4.5 per cent to 4.8 per cent in FY25. Assuming a normal monsoon and no further external or policy shocks, the RBI expects headline inflation to be 4.2 per cent in FY26. IMF has projected an inflation rate of 4.4 per cent in FY25 and 4.1 per cent in FY26 for India.

4.23. As per World Bank's Commodity Markets Outlook¹², October 2024, commodity prices are expected to decrease by 5.1 per cent in 2025 and 1.7 per cent in 2026. The projected declines are led by oil prices but tempered by price increases for natural gas and a stable outlook for metals and agricultural raw materials. Among precious metals, gold prices are expected to decrease while silver prices are expected to increase. Prices for metals and minerals are expected to decline, primarily due to a decrease in iron ore

12 Commodity Markets Outlook, World Bank, October 2024, (<https://tinyurl.com/dyduh9tu>)

and zinc prices. In general, the downward trend movement in the prices of commodities imported by India is a positive for the domestic inflation outlook.



4.24. A normal southwest monsoon in 2024 has improved the water levels in reservoirs, ensuring sufficient water for irrigation during the rabi crop production. As per the first advanced estimates of agricultural production for 2024-25, Kharif food grain production is expected to increase by 5.7 per cent. The production of rice and tur, the most important Kharif food grains, is expected to increase by 5.9 per cent and 2.5 per cent, respectively, as compared to 2023-24. This could lead to softening of food inflation pressures over the course of the year. However, rising international vegetable oil prices may pose an upside risk to food inflation. The government has focused on controlling food inflation through various supply side measures, which include strengthening the buffer stock of essential food items and periodic open market releases, subsidised retail sale of essential food items in specified outlets, easing imports of the essential food items through rationalisation of duties, prevention of hoarding through imposition/revision and monitoring of stock limits. The budget 2024-25 has envisaged measures like large-scale clusters for vegetable production, promotion of farmer-producer organisations, cooperatives and start-ups for vegetable supply chains and measures for achieving self-sufficiency in pulses and oilseeds.

4.25. The following options may be worth considering from the perspective of ensuring long-term price stability.

- India faces a persistent deficit in the production of pulses and oilseeds, along with frequent fluctuations in tomato and onion production, leading to price pressures. To address this, focused research is needed to develop climate-resilient crop varieties, enhancing yield and reducing crop damage. Efforts to expand the area under pulses in rice-fallow regions are likely to help.

- Promoting extension activities is crucial. Farmers should receive training on best practices, the use of high-yield and disease-resistant seed varieties, and targeted interventions to improve agricultural practices in the major growing regions for pulses, tomatoes, and onions.
- Implementing robust data collection and analysis systems to monitor prices, stocks, and storage and processing facilities is essential in various tiers of government. This data should be used to identify areas for improvement and make informed policy decisions. High-frequency price monitoring data for essential food items collected by various agencies within the country may be linked to quantify and monitor price build-up at each stage from the farm gate to the final consumer.

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MEDIUM TERM OUTLOOK: DEREGULATION DRIVES GROWTH

May we live in interesting times!¹ This Chinese proverb, often understood as an indication of impending turbulence, is pertinent. Worldwide, we see a backsliding of economic integration with geo-economic fragmentation replacing globalisation. Economic realignments and readjustments are imminent. The rise of China as a manufacturing powerhouse and its impact on the manufacturing aspirations of other nations, as well as the supply of minerals, materials, machinery, and equipment needed for energy transition, pose challenges.

Amidst this, India is in the middle of a change that represents an unprecedented economic challenge and opportunity. This chapter examines the India Story in this context. It suggests policy responses with special emphasis on the importance of domestic growth levers and the shedding of regulatory compliance burden. Enhancing economic freedom for individuals and small businesses is arguably the most important policy priority to define and bolster India's medium-term growth prospects.

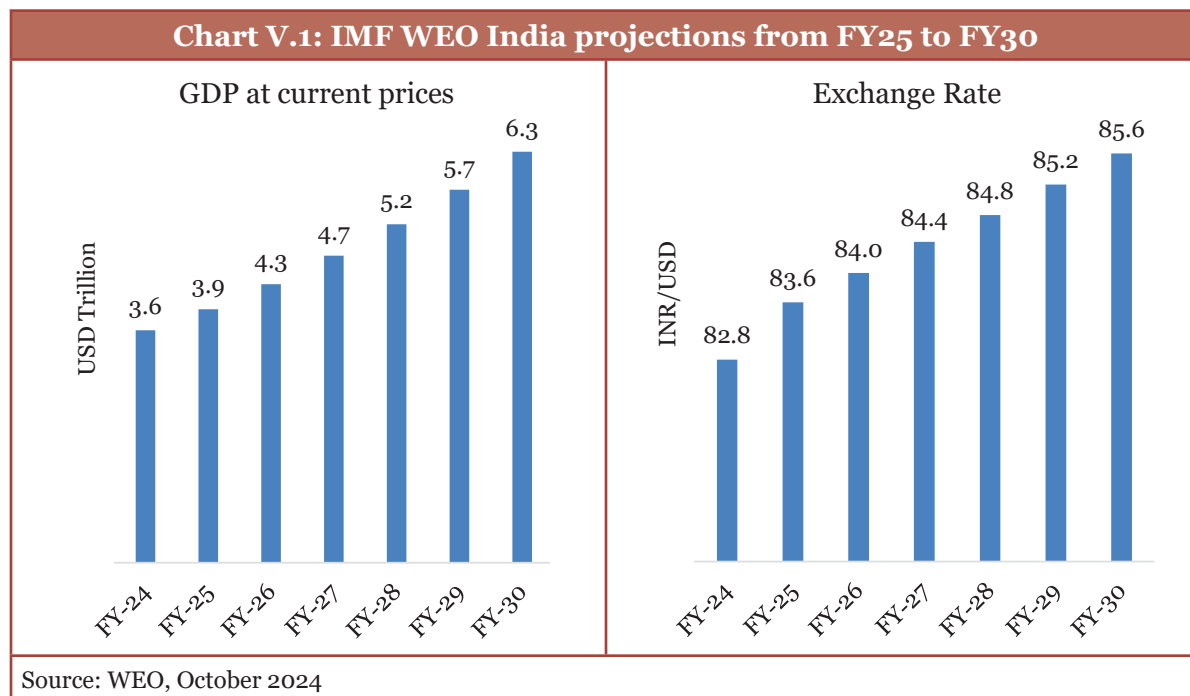
INDIA'S MEDIUM-TERM OUTLOOK

5.1 To realise its economic aspirations of becoming Viksit Bharat by the time of the centenary of independence, India needs to achieve a growth rate of around 8 per cent at constant prices, on average, for about a decade or two. While the desirability of this growth rate is unquestionable, it's important to recognise that the global environment – political and economic – will influence India's growth outcomes.

5.2 The projections for India from the lens of the World Economic Outlook (WEO) of the International Monetary Fund (referred to as IMF or the Fund interchangeably in the rest of this chapter) as recently as October of FY25 are sanguine. The IMF WEO projects India to become a USD 5 trillion economy by FY28 and reach a size of USD 6.307 trillion by FY30 [Chart V.1]. This translates into an annual nominal growth rate

¹ This quote is understood as an apocryphal English interpretation of an ancient Chinese curse and has been inaccurately attributed to a number of individuals. Van Norden, Bryan William (2011). "II. Criticisms and Confucianism". Introduction to Classical Chinese Philosophy. [p. 257]

of nearly 10.2 per cent in USD terms for FY25 to FY30.² To put this in context, in the thirty years between FY94 and FY24, India's dollar gross domestic product (GDP) grew at a compounded annual rate of 8.9 per cent. So, the IMF expects India to grow at a significantly higher rate of 10.2 per cent in dollar terms in the next five years.



5.3 In rupee terms, India's nominal GDP grew at a compounded annual rate of 12.4 per cent in the three decades ending FY24. In the next five years, the IMF projects that India's nominal GDP will grow at around 10.7 per cent annually. So, in effect, given the projected growth rate of only 10.2 per cent in dollar terms, the Fund expects the rupee to weaken, on average, only by 0.5 per cent per annum in the next five years, compared to the 3.3 per cent annual depreciation experienced in the three decades up to FY24. The projected mild rupee depreciation is a recognition of India's growth potential, its attractiveness as an investment destination and the expectation of convergence of India's inflation rate with that of the United States. The Fund also projects that India's current account deficit will rise gently and gradually to 2.2 per cent of GDP by FY30. To reiterate, given the current state of the world and its likely evolution, the realisation of these projections will be a very good thing for India.

5.4 The Ministry of Statistics and Programme Implementation reckons in the first advance estimate the economy will grow at 6.4 per cent in constant prices. For FY26, we project a growth rate of between 6.3 per cent and 6.8 per cent in the first chapter of this Survey. This is in line with the Fund's projection of the growth rate of India's

² India's GDP growth at constant prices adjusted for the inflation differential between India and the USA gives us the estimate of GDP in USD terms. Thus, GDP expressed in a numeraire currency like the USD accounts for prices. That is why it is also a measure of 'real' GDP.

GDP at constant prices at around 6.5 per cent between FY26 and FY30. This chapter explores the policy action agenda to help us achieve or exceed these growth rates.

5.5 It begins by sketching out the global economic and political environment. The first section delves into the reality of geo-economic fragmentation and examines its implications for global growth. The second section outlines the case for acknowledging the elephant [and the dragon] in the room that will have a bearing on the growth projections – fundamental shifts in the global economic order combined with China's manufacturing prowess and strategic dominance. The third section probes into a key channel of the slightly less acknowledged but critical aspect of China's dominance, viz., dependency of the global economy on it for energy transition efforts. India has ambitious goals for energy transition despite being one of the lowest per capita emitters of greenhouse gases. Dependence on China-made goods to achieve that transition enhances the complexity of the challenge for India. The fourth section sheds light on the need to focus on domestic growth levers for India, given the global context and challenges outlined. It makes a case for trusting the ingenuity of people and organisations and using policy to enhance their economic freedoms, which will give impetus to growth in line with the projections of WEO. The last section takes a deep dive into specific aspects of systematic deregulation that need to be focussed on to facilitate economic freedom for individuals and businesses so that India's medium-term growth prospects remain strong.

GEO-ECONOMIC FRAGMENTATION – THIS TIME MAY BE DIFFERENT

5.6 In one of his seminal pieces, *'The Economic Consequences of Peace'*, John Maynard Keynes writes about early twentieth-century London, *'the inhabitant of London could order by telephone, sipping his morning tea in bed, the various products of the whole earth, in such quantity as he might see fit, and reasonably expect their early delivery upon his doorstep; he could at the same moment and by the same means adventure his wealth in the natural resources and new enterprises of any quarter of the world, and share, without exertion or even trouble, in their prospective fruits and advantages'*.

5.7 Keynes was describing a state of affairs not unlike the one to which we have become accustomed over the past few decades of hyper-globalisation, wherein the flows of capital, goods, services, and people have transformed our world, helped by the spread of new technologies and ideas. These forces of integration have boosted productivity and living standards, tripling the size of the global economy and lifting 1.3 billion people out of extreme poverty.

5.8 However, just like Keynes' description of how the prosperity of Londoner was destroyed by '*the projects and politics of militarism and imperialism, of racial and cultural rivalries, of monopolies, restrictions, and exclusion*', we can draw uncomfortable parallels with the present-day era wherein the global economy is once again confronted with the challenge of geo-economic fragmentation (GEF). This time, it is of a scale, scope and complexity that is likely more severe in its impact than what the world witnessed in the early 20th century.

5.9 The decades since the 1980s have witnessed significant globalisation, marked by remarkable shifts in global trade, investment, and economic activity. Here are some key statistics:

Global trade growth: In 1980, global trade accounted for about 39 per cent of world GDP. By 2012, this share had risen to 60 per cent, reflecting the deep integration of global markets.

Foreign direct investment (FDI): Global FDI inflows grew from USD 54 billion in 1980 to over USD 1.5 trillion in 2019, showcasing the increasing role of multinational corporations in cross-border investments.

Economic growth and poverty reduction: The global economy grew from USD 11 trillion in 1980 to over USD 100 trillion in 2022 (nominal).

Extreme poverty rates (those living on less than USD 2.15 a day) fell from 42 per cent of the global population in 1981 to 8.4 per cent in 2019, driven by rapid economic growth in countries like China and India.

Global population and urbanisation:

The global population grew from 4.4 billion in 1980 to 8 billion in 2022, with urbanisation rates rising from 39 per cent in 1980 to 57 per cent in 2022, fuelling economic activity and connectivity.

Internet penetration: In 1980, internet connectivity was virtually non-existent. By 2022, over 5.3 billion people, or 66 per cent of the global population, had access to the internet, revolutionising communication, trade, and innovation.

These statistics illustrate the profound changes globalisation has brought, driving economic integration and altering the global economic landscape. But, the next two decades are more likely to be about economic fragmentation.

5.10 Aiyar *et al.* (2023)³ define 'geo-economic fragmentation' as a policy-driven reversal of global economic integration often guided by strategic considerations. This process encompasses different channels, including trade, capital, and migration

³ Aiyar, S, J Chen, C Ebeke, R Garcia-Saltos, T Gudmundsson, A Ilyina, A Kangur, S Rodriguez, M Ruta, T Schulze, J Trevino, T Kunaratskul and G Soderberg (2023), "Goeconomic Fragmentation and the Future of Multilateralism", IMF Staff Discussion Note SDN/2023/01, <https://tinyurl.com/ym4jdfy8>.

flows.⁴ Despite the benefits of integration, hyper-globalisation has also brought about associated complacencies. People have been left behind as industries have changed amid global competition. Rising geopolitical tensions and the breakout of war have further intensified these underlying fissures in the global economy.

5.11 In a re-enactment of the cold war era, countries are once again getting grouped into two blocs and phrases like friend-shoring have come to play centre-stage in global policymaking. Tensions over trade, technology standards, and security have been growing for many years, undermining growth and trust in the current global economic system. Therefore, fragmentation - economic, social and cultural - is a direct consequence of the imposition of a 'one-size-fits-all' emission, as well as social and labour standards by western nations. These developments have growth implications.

Growth implications of geo-economic fragmentation

5.12 The consequences and costs of GEF are propagated via all the channels whereby countries engage with each other economically. Trade is the main channel through which fragmentation is reshaping the global economy. The capacity of trade to incentivise within-industry reallocation and generate productivity gains is getting increasingly stifled. This is most evident in the increase in the trade-restrictive measures imposed by countries. As per figures released by the World Trade Organization (WTO) as part of the WTO Director-General's annual overview of global trade developments, there is a sharp rise in the coverage of trade-restrictive measures by WTO members between mid-October 2023 and mid-October 2024, compared to the last Trade Monitoring Report in November 2023 [Chart V.2].

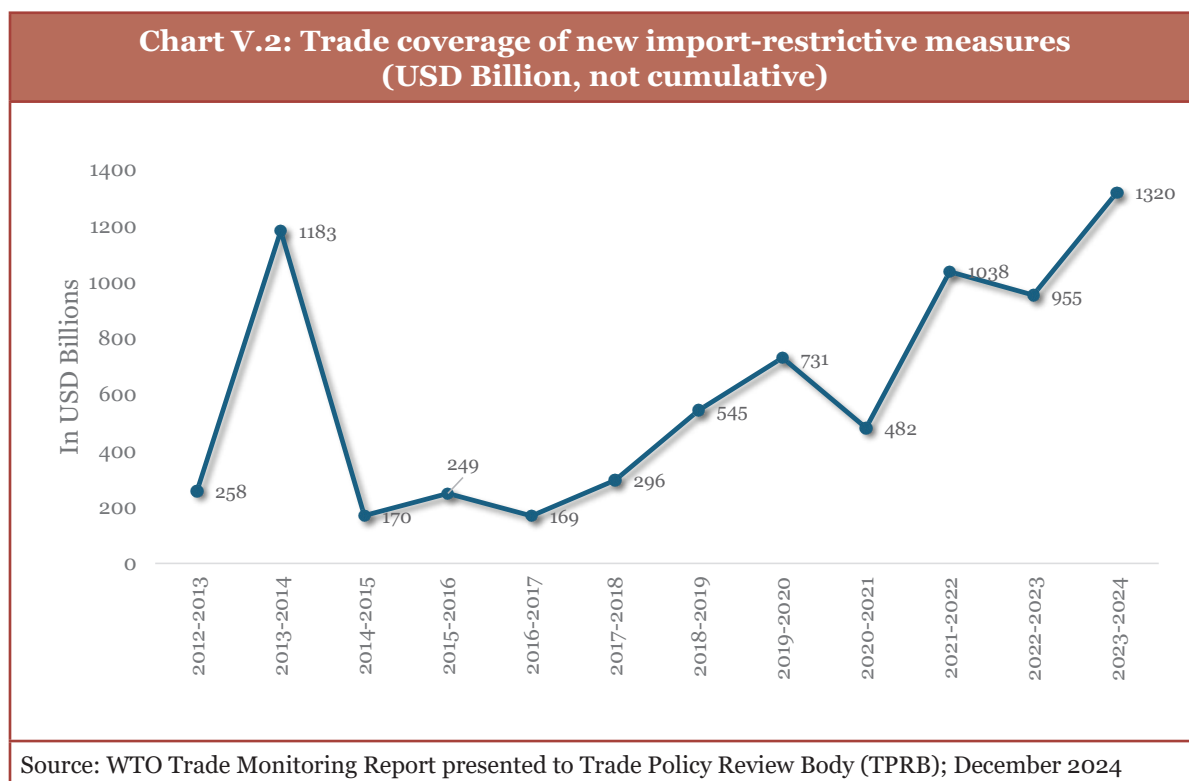
5.13 As per estimates, the value of trade covered by the 169 new trade-restrictive measures introduced between October 2023 and October 2024 is USD 887.7 billion, which is half a trillion dollars more than the value of trade covered by restrictions introduced in the preceding year, which stood at USD 337.1 billion.⁵ IMF⁶ observes that trade fragmentation is much more costly this time because, unlike the start of the cold war when goods trade to GDP was 16 per cent, now that ratio is 45 per cent. Less trade implies less knowledge diffusion, a key benefit of integration, which could also be reduced by fragmentation of cross-border direct investment. One way to visualise trade restrictiveness is to quantify the trade coverage of new import-restrictive measures, apart from the number of restrictive measures presented earlier (Chart V.2)⁷.

⁴ Ibid Note 3.

⁵ World Trade Organisation Annual Report by the Director General, 2024, <https://tinyurl.com/5n6k4wb4>.

⁶ 'Geopolitics and its Impact on Global Trade and the Dollar', Talk delivered by Gita Gopinath (IMF FDMD) in the Series on the Future of the International Monetary System (IMS) at Stanford Institute for Economic Policy Research, May 7, 2024, <https://tinyurl.com/2ma3wkjw>.

⁷ Ibid Note 5.



5.14 The impact of GEF is seen in global FDI flows, which are increasingly concentrated among geopolitically aligned countries, particularly in strategic sectors. This relocation of FDI increases the vulnerability of several emerging markets and developing economies. The output losses associated with this FDI relocation emerging from friend-shoring and re-shoring are especially severe for emerging markets and developing economies. They face heightened restrictions from advanced economies, which are their major sources of FDI.⁸

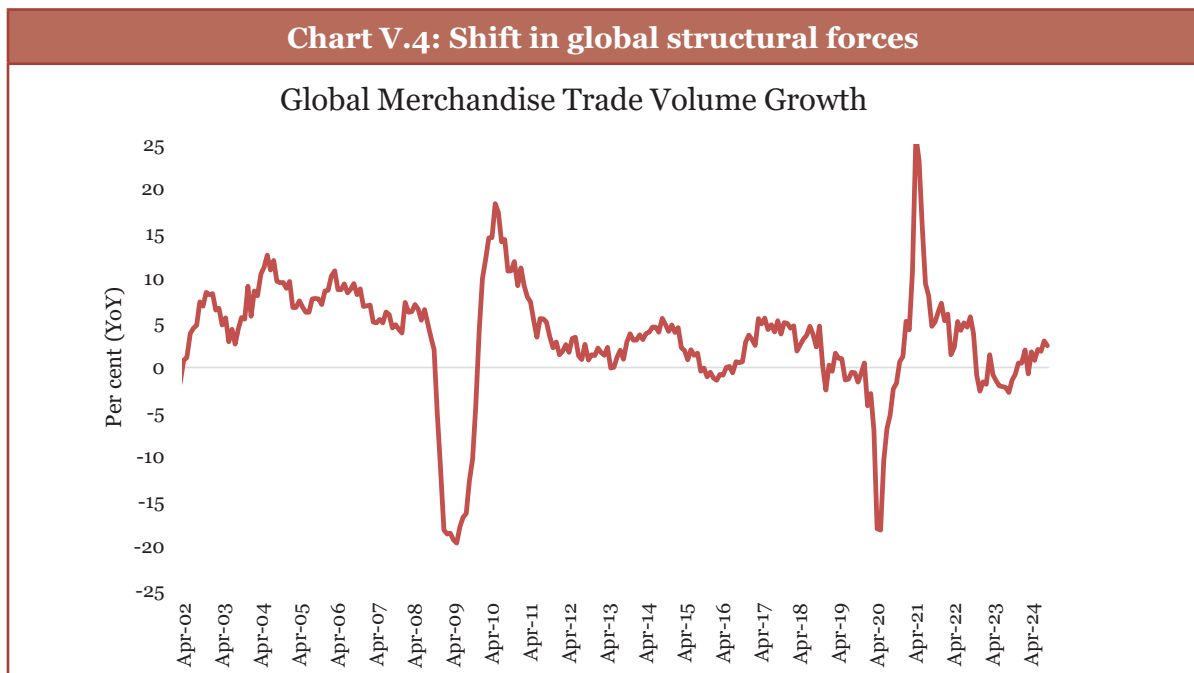
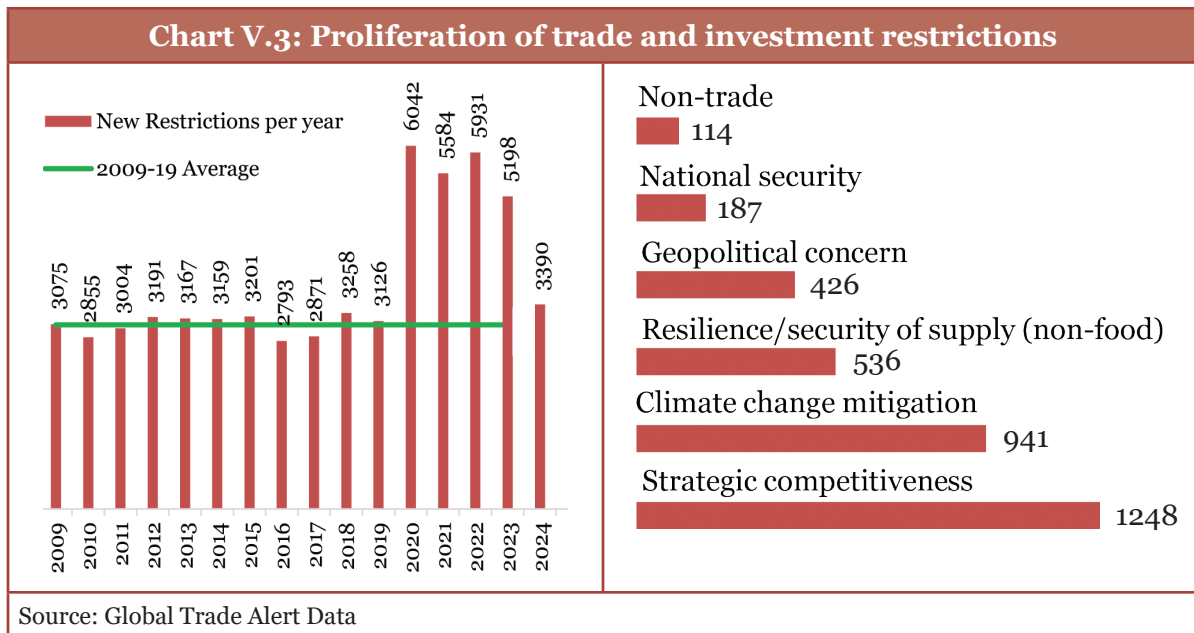
5.15 Depending on the modelling assumptions, it is estimated that the cost to global output from trade fragmentation could range from 0.2 per cent (in a limited fragmentation/low-cost adjustment scenario) up to 7 per cent of the GDP (in a high fragmentation/high-cost adjustment scenario). When we add likely technological decoupling to the mix, the output loss is predicted to be as high as 8-12 per cent of GDP in select countries. The overarching impact of such a denouement would mean that as the global economy slows down, global capital tends to look for economies with sustainable growth.

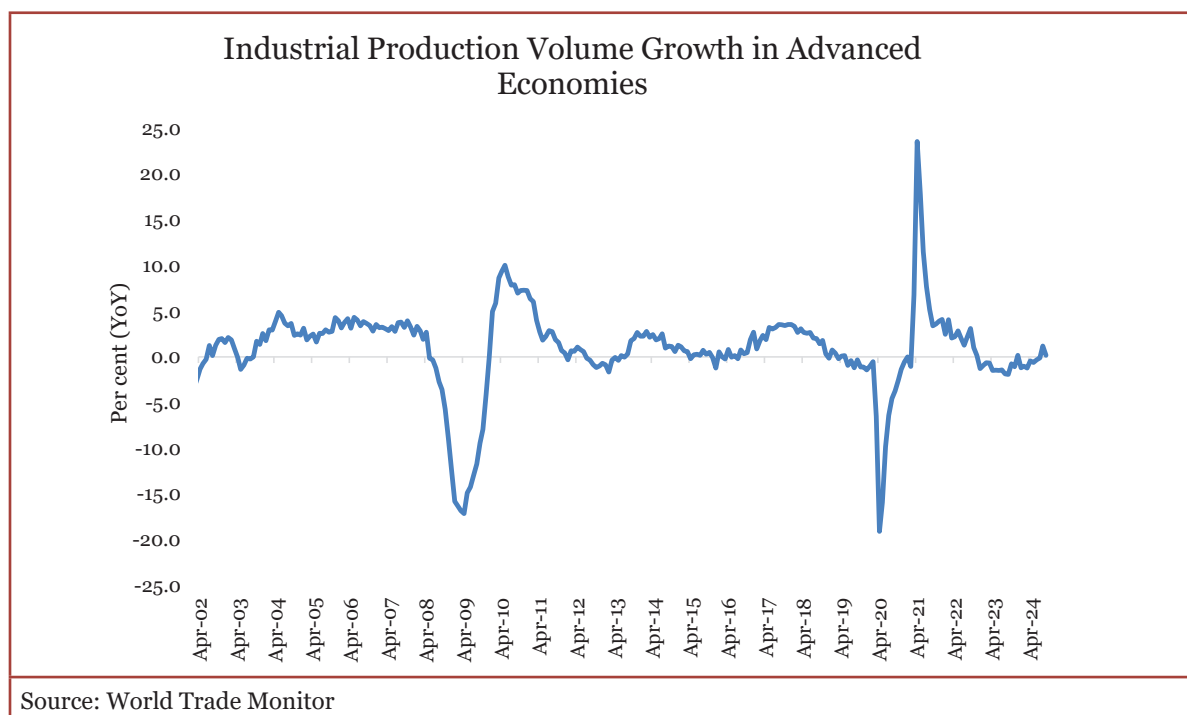
THE ELEPHANT AND THE DRAGON IN THE ROOM

5.16 Fundamental shifts in global economic engagement are underway with the proliferation of trade and investment restrictions. Between 2020 and 2024, over

⁸ International Monetary Fund. Research Dept. (2023). "Chapter 4 Geoeconomic Fragmentation and Foreign Direct Investment". In World Economic Outlook, April 2023: A Rocky Recovery, <https://tinyurl.com/5n7etwfw>.

24000 new restrictions related to trade and investments have gone into place globally [Chart V.3]. The impact of this shift in global structural forces is reflected in global trade growth, which has slowed down significantly, and signs of secular stagnation in the global economy are beginning to emerge [Chart V.4]. The Preface to this document also devoted considerable space to the unfavourable global backdrop for India's growth prospects.



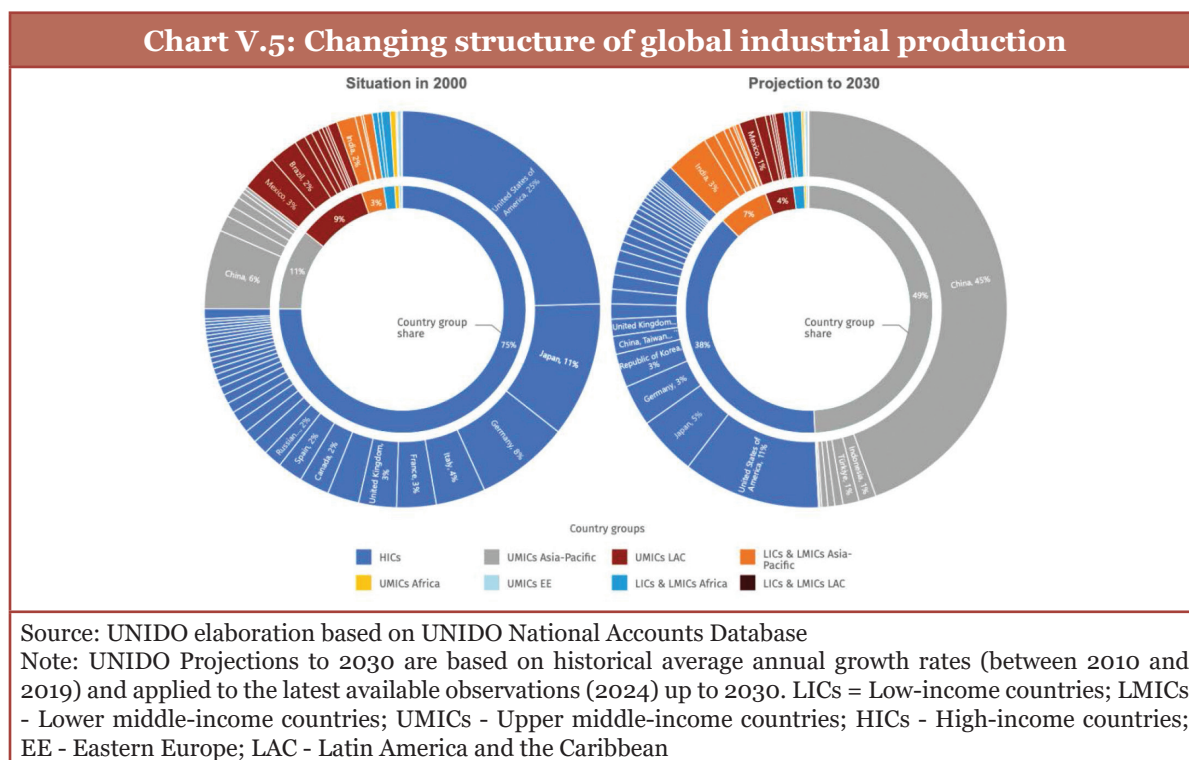


5.17 The global economy is at a significant juncture where long-held principles and practices are being re-evaluated and, in some cases, losing their relevance. Adding to this shift is China's prominent role in global supply chains, which continues to reshape the economic landscape. As a result, many countries now operate in an environment markedly different from what they were accustomed to, with traditional rules being reconsidered and uncertainty surrounding what might replace them.

5.18 China is a dominant force in the global manufacturing and energy transition ecosystems. It has gained a strategic advantage leveraging its competitiveness and economic policy to access and control key resources recognised today as critical for global supply chains. *"In the year 2000, the United States and its allies in Asia, Europe, and Latin America accounted for the overwhelming majority of global industrial production, with China at just 6 per cent even after two decades of rapid growth. Just thirty years later, UNIDO projects that China will account for 45 per cent of all global manufacturing, singlehandedly matching or outmatching the US and its allies. This is a level of manufacturing dominance by a single country seen only twice before in world history – by the UK at the start of the Industrial Revolution and by the US just after World War 2. It means that in an extended war of production, there is no guarantee that the entire world united could defeat China alone"* (Chart V.5).^{9,10}

⁹ UNIDO National Account Database; <https://stat.unido.org/data/table?dataset=national-accounts>.

¹⁰ Noah Smith, 'Manufacturing is a war now', 4th December 2024, <https://tinyurl.com/bdhdzrma>.



5.19 The effects of the rise of China as a manufacturing colossus are seen in automobile (especially electric vehicles) manufacturing, mining and refining capacity for critical minerals (Copper, Lithium, Nickel, Cobalt, Graphite, etc.) and in clean energy equipment, etc. China's rise in the global auto market has disrupted the long-term incumbents in economies like Germany and Japan, and it dominates the global distribution of critical minerals and other economic resources, creating potential dependencies for posterity. China's resurgence was foretold in 1904 by British geographer and diplomat Halford Mackinder.¹¹ Courtesy of these developments, the world's modus operandi of outsourcing manufacturing to China pursued vigorously in the globalisation era is poised for a reset.

CLIMATE TRANSITION, CHINA AND GEOPOLITICS

5.20 Climate is a global public good. It impacts everyone, everywhere, in ways that are still being examined and understood. Edward N. Lorenz famously wondered in a 1972 paper, 'Does the Flap of a Butterfly's Wings in Brazil Set Off a Tornado in Texas'¹²? This perhaps holds now more than ever.

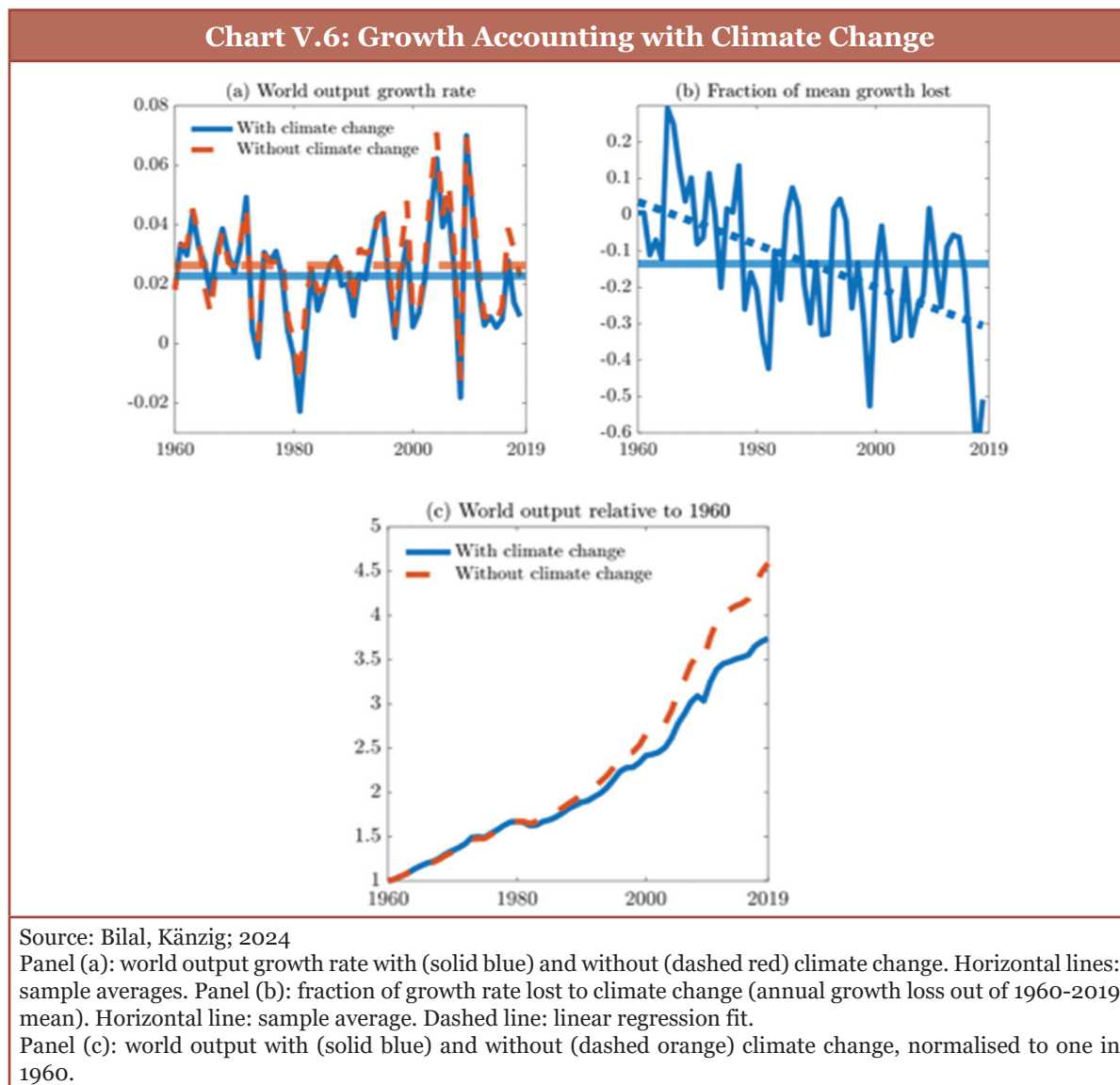
5.21 The economic impact of climate change is well documented. The direct cost of climate change has received significant academic attention.¹³ Studies have quantified

¹¹ Bloomberg column, 'The man who predicted today's world over a century ago', 2025, <https://tinyurl.com/4xdmk8nm>.

¹² Predictability: Does the Flap of a Butterfly's Wings in Brazil Set Off a Tornado in Texas? (Lorenz, 1972).

¹³ Bilal, A., & Känzig, D. R. (2024). The Macroeconomic Impact of Climate Change: Global vs. Local Temperature (No. w32450). National Bureau of Economic Research, <https://tinyurl.com/bddr29yt>.

that a 1 Deg. Celsius warming reduces global GDP by 12 per cent, and global temperature strongly correlates with extreme climatic events. The output growth rate modelled with and without climate change from 1960 to 2019 is shown in Chart V.6 (Bilal, Känzig; 2024).¹⁴

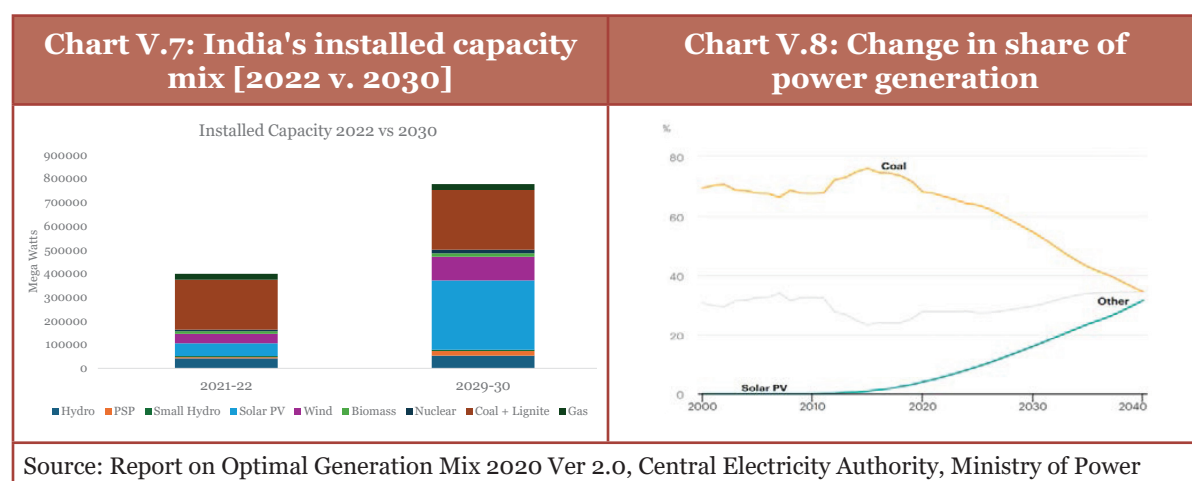


5.22 China, the United States, the EU, and other G7 economies produce more than 50 per cent of global greenhouse gas emissions. All have target dates of 2050 to reach net-zero emissions. These economies depend heavily on each other in the trade of environmental goods and technologies central to developing renewable energy and reducing emissions. Hence, trade conflicts between these economies will pose significant risks to the green energy transition, imposing huge costs on the global economy.

5.23 As for India, the five nectar elements distil our commitment to climate action (Panchamrit).¹⁵ This would significantly impact how India produces, procures and meets its energy requirements, and the shift would necessitate a change in our energy mix. A projection of the installed capacity in 2030 [as compared to 2020]¹⁶ shows that the share of renewable energy, especially solar and wind, in the installed capacity is likely to increase substantially. In contrast, the share of Coal and Lignite is likely to fall sharply [Charts V.7, 8].

5.24 As the world navigates the challenges of climate change, the road to energy transition runs through China.

5.25 Over the last decade, global solar photovoltaic cell (PV) manufacturing capacity has increasingly moved from Europe, Japan and the United States to China, which has invested more than USD 50 billion in new PV supply capacity – ten times more than Europe.¹⁷ The dominance of China in the environmental goods sector deserves serious consideration. China's share of solar panels (polysilicon, ingots, wafers, cells, and modules) exceeds 80 per cent in all the manufacturing stages. Interestingly, this is more than double China's share of global PV demand. China's contribution to the manufacture of various solar PV components from 2010 to 2021 is captured as under (Charts V.9, 10). In addition, the country is home to the world's top 10 suppliers of solar PV manufacturing equipment.¹⁸ While this has been a major contributing factor in bringing down the costs of solar PV equipment worldwide, the level of geographical concentration in global supply chains also creates supply disruption risks that must be kept in mind.

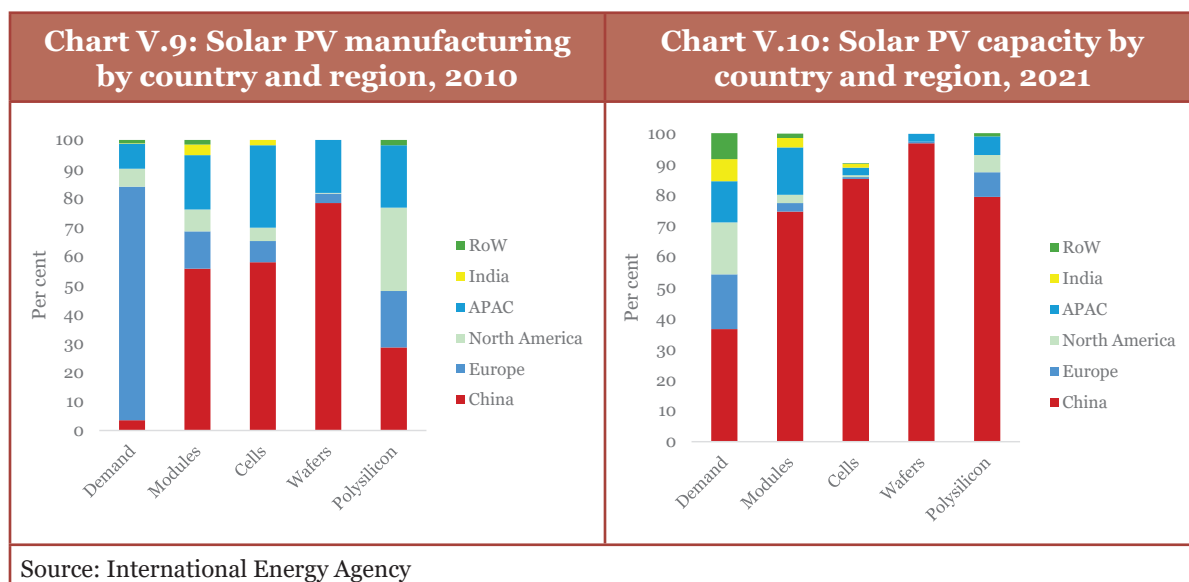


15 PIB Press release by Ministry of Environment, Forest and Climate Change dated 03 February, 2022, <https://tinyurl.com/39sxxub5>.

16 Report on Optimal Generation Mix 2020 Ver 2.0, Central Electricity Authority, Ministry of Power, <https://tinyurl.com/3bbuyuwe>.

17 International Energy Agency; Special Report on Solar PV Global Supply Chains (2022), <https://tinyurl.com/yz7nsa83>.

18 Ibid Note 17.



5.26 About 60 per cent of the world's wind installed capacity is sourced from China. China also houses nearly 80 per cent of the world's battery manufacturing capacity, pivotal to the energy transition.¹⁹ In 2022 alone, China allocated USD 546 billion towards various investments in solar and wind energy, electric vehicles, and battery technologies vis-à-vis US and EU investments in these sectors, which amounted to USD 321 billion in the same year.²⁰

5.27 On the solar front, China controls the supply of primary materials, manufacturing, installed capacity, and recycling capacity and produces at least 80 per cent of the main components of PVs.²¹ China's vertical integration across the entire electric vehicle (EV) supply chain, from mining to EV manufacturing, has enabled it to retain its global dominance in this sector. It is also pertinent to note that about 70 per cent of the world's rare earth minerals, which are critical resources for high-storage batteries, are processed by Chinese companies²² (See Box V.1)

Box V.1: Supply Chain Considerations for Electric Vehicles

Mitigating road transport emissions, which comprise nearly 75 per cent of the emissions from the transportation sector,²³ is critical to India achieving its Net Zero goals by 2070. Electric mobility is an important element in India's path to Net Zero. India has made impressive strides

19 <https://tinyurl.com/2sf8fu6d>.

20 <https://tinyurl.com/mryusnud>.

21 Chadly, A., Moawad, K., Salah, K., Omar, M., & Mayyas, A. (2024). State of global solar energy market: Overview, China's role, Challenges, and Opportunities. Sustainable Horizons, 11, 100108, <https://tinyurl.com/3rtee8d9>.

22 Goldman Sachs, 2023, 'Resource realism: The geopolitics of critical mineral supply chains', <https://tinyurl.com/3rv7ren6>.

23 Ritchie, H., & Roser, M. (2024a): "Cars, planes, trains: where do CO₂ emissions from transport come from?" Our World in Data. <https://ourworldindata.org/co2-emissions-from-transport>

in promoting the domestic manufacture of Electric Vehicles (EV). However, to sustain the growth momentum, there are some important considerations to keep in mind. For instance, manufacturing an Electric Vehicle, relative to a conventional car, requires nearly 6 times more minerals to produce²⁴, most of which are utilised in producing the EV battery. This is an important consideration as many minerals crucial to EV manufacturing are scarcely available or processed in India while simultaneously being concentrated in very few countries. The Ministry of Mines has analysed the 33 critical minerals vital to India's economic security and found that 24 are currently at high risk of supply disruptions²⁵.

China commands a significant share of critical mineral processing and production globally. Across key commodities such as Nickel, Cobalt, and Lithium, China alone is responsible for processing 65 per cent, 68 per cent and 60 per cent of the global output, respectively²⁶. Similarly, in the case of Rare Earth Minerals, China contributes to 63 per cent of global mining and 90 per cent of global processing output. Moreover, lithium-ion batteries will dominate other technologies for quite some time, and their demand is expected to grow at a CAGR of 23 per cent by 2030²⁷. The lack of viable alternative battery technologies reinforces China's dominant position in Lithium-ion batteries.

The pursuit of India's vision to decarbonise road transportation has been accompanied by impressive strides in the promotion of domestic manufacturing facilitated by schemes such as FAME India, the Production Linked Incentive (PLI) Scheme for Auto Components, and the Scheme for Promotion of Manufacturing of Electric Passenger Cars in India (SPMEPCI) among others. These schemes demonstrate the Government of India's awareness of the need to build domestic supply chains. These are good foundations. Future policies will have to broaden their scope of coverage in a manner that adapts to the growing needs of the EV industry. As demand for EVs is expected to grow, dependence on imported components such as DC motors, e-motor magnets, and other electrical parts will likely rise²⁸. Leading EV manufacturers have noted an increasing proportion of Chinese imports in their total material expenditures, reflecting a significant dependence on China for certain resources and technical knowhow.²⁹

Initiatives such as the PLI Scheme for Advanced Chemistry Cell Manufacturing and the setting up of Khanji Bidesh India Limited (KABIL) have been undertaken to deal with such risks. Going forward, policies for electric vehicles must focus on de-risking supply chains by promoting a more self-reliant ecosystem powered by increased R&D in advanced battery technologies, such as Sodium-ion and Solid-State Batteries. Securing intellectual property in this domain can prove invaluable. Additionally, facilitating investment in battery recycling

24 IEA. (2021): "Minerals used in electric cars compared to conventional cars – Charts – Data & Statistics", International Energy Agency, <https://tinyurl.com/maj5r9zu>.

25 Ministry of Mines. (2023): "Critical Minerals of India", Report of the Committee on Identification of Critical Minerals, Government of India.

26 Ibid Note 22.

27 Navigating the EV Battery Ecosystem. Bain & Company, <https://tinyurl.com/yc86x5sn>.

28 India Electric Vehicle Report 2023. Bain & Company.

29 <https://www.outlookbusiness.com/explainers/india-incs-ev-play-continues-to-face-the-chinese-dilemma>.

infrastructure can yield greater long-term gains for the Indian automotive sector. In the interim, PLI Schemes can also reward the making of EV cells (Lithium-ion cells), as most manufacturing and value addition happens up to the cell-making stage. Furthermore, India must aim to establish technology transfer agreements with other nations that are also seeking to diversify their supply chains. Partnerships with other aspiring nations can help distribute the high costs of securing a comparative advantage in the global market.

5.28 Expanding the public transportation network is another avenue of reducing dependence on overseas supply chains that E-Mobility entails and will entail for quite some time to come. Indian cities are making heavy investments – and rightly so – in metro rail networks and expanding their coverage. In Brazil and China, more than 50 per cent of urban residents enjoy convenient access to mass transit. However, in India, only 37 per cent of urban residents have easy access to public transportation. To replicate the success of other nations, India must focus on developing integrated transport systems that efficiently connect buses, metro rails, and other modes of transit. Investing in making public transportation more efficient, reliable, comfortable, accessible, and safe will also be a significant step towards achieving Net Zero goals while reducing our dependence on imports. Moreover, a robust public transportation system will also help reduce traffic congestion, promote energy efficiency, and ensure that the benefits of clean mobility are accessible to all socioeconomic groups, unlike private e-mobility solutions, fostering a more resilient and equitable energy transition.

5.29 It may be emphasised that India has made significant strides in promoting renewable energy and boosting domestic manufacturing of renewable energy equipment through initiatives such as the Production-Linked Incentive (PLI) scheme. The PLI scheme aims to enhance India's manufacturing capabilities in key sectors, including solar panels, wind turbines, and battery storage, by offering incentives to domestic manufacturers. The domestic manufacturing efforts under the PLI scheme are expected to significantly support India's renewable energy targets by reducing costs, improving energy security, and boosting employment. Domestic capacities are being built. For now, India sources 75 per cent of lithium-ion batteries from China, and it has near negligible production capacity for key components like polysilicon, ingots, and wafers.

5.30 In a hypothetical scenario, the IMF shows that where the trade of critical minerals between blocs is disrupted, investment in renewable energy and EVs could be lower by

as much as 30 per cent by 2030 compared to an unfragmented world.³⁰ The nature and threat of GEF are augmented by the fact that basic institutional structures that safeguarded the principles of multilateralism also find themselves at a crossroads. With this global backdrop, we turn to how India could achieve its growth and development goals.

IMPLICATIONS FOR INDIA'S GROWTH PROSPECTS

5.31 Viksit Bharat@2047 envisions India as a developed nation by 2047, the centenary of our independence.³¹ This would entail sustained economic growth of close to 8 per cent every year for at least a decade. To achieve this growth, the investment rate must rise to approximately 35 per cent of GDP, up from the current 31 per cent. Additionally, it will be essential to develop the manufacturing sector further and invest in emerging technologies such as AI, robotics, and biotechnology. India will also need to create 78.5 lakh new non-farm jobs annually till 2030,³² achieve 100 per cent literacy, develop the quality of our education institutions, and develop high-quality, future-ready infrastructure at scale and speed.

5.32 India has carried out a series of structural reforms in the last decade. From the Goods and Services Tax (GST), which has been verily described as India's EU moment, to the Insolvency and Bankruptcy Code (IBC), which established a framework for dealing with corporate renewal, to the RERA (Real Estate Regulation Act), which helped clean up the real estate sector and rapid roll-out of digital infrastructure - the India Stack (UID, UPI, DBT). The introduction of GST in July 2017 marked a significant shift in India's indirect tax structure, aiming to create a unified, streamlined taxation system across the country.

5.33 The implementation of GST generated a host of positive externalities through enhancement in ease of doing business, giving impetus to digitalisation, fostering economic integration via the creation of a single market, and adding to the buoyancy of revenue generation and collection. Similarly, IBC has led to faster resolution of non-performing assets (NPAs) in banks and created a more efficient bankruptcy process, boosting investor confidence and India's Digital Public Infrastructure (DPI) has emerged as a game-changer in the country's journey towards a more inclusive and efficient economy. By leveraging digital tools and platforms, DPI has not only enhanced the accessibility of services but also brought transformative benefits across various sectors.

30 IMF Blog, 2023, 'Goeconomic fragmentation threatens food security and clean energy transition', <https://tinyurl.com/57s7z7rt>.

31 PIB Press release by the Ministry of Youth Affairs and Sports dated 21 November 2024, <https://tinyurl.com/mrxf5bc5>.

32 PIB Press release by the Ministry of Finance dated 22 July 2024, <https://tinyurl.com/46nx4fr9>.

5.34 Besides the above, India recognises the critical role of micro, small, and medium enterprises (MSMEs) in driving economic growth, employment generation, and innovation. The government has implemented several policies and initiatives over the last decade to support and promote the growth of MSMEs. These efforts focused on improving access to finance, enhancing technological capabilities, providing market linkages, and addressing structural challenges MSMEs face. However, while these initiatives have made significant strides in promoting MSMEs, some challenges in the regulatory environment remain. Regulatory compliance burden holds back formalisation and labour productivity, limits employment growth, chokes innovation and depresses growth.

5.35 There is an observed tendency for firms in India to remain small. By staying small, firms lose access to institutional capital, skilled talent, and technology infusion and often function outside formal supply chains. This creates a parallel informal economy and contributes to low labour productivity. The logic for staying small often is to remain under the regulatory radar and steer clear of the rules and labour and safety laws. Ironically, the biggest casualties are employment generation and labour welfare, which most regulations were originally designed to encourage and protect, respectively.

5.36 Much has been done in this space through policy action to incentivise firms to grow. Part of the solution lies in digitisation, decriminalisation and divestment of functions. Measures such as the PAN 2.0 project focusing on paperless processes while establishing PAN as a common identifier for all digital systems of specified government agencies are steps in the right direction.³³ Similarly, the Jan Vishwas Act 2023 decriminalised 183 provisions in 42 central Acts administered by 19 ministries/ departments.³⁴ The Joint Parliamentary Committee reviewed the Jan Vishwas Bill and subsequently recommended extending the exercise to further Acts, ensuring the continuous modernisation of India's regulatory framework – Jan Vishwas 2.0.³⁵ Thus, it is true that much has been done, and it is also true that much remains to be done for at least two reasons. One is our size; two, as the economy grows, hitherto unseen and non-binding constraints emerge and become binding. Hence, there is a constant need to evolve.

5.37 Chapter 5 of the Economic Survey of FY24 identified various structural reforms and strategies across sectors to focus on from a medium-term perspective. These included suggestions regarding creating an enabling policy and regulatory environment for the upgradation of capacity and know-how of component manufacturers, increasing the availability of trained human resources, addressing resource bottlenecks and regulatory impediments to accelerate India's gross fixed capital formation, strategy for growth and

33 PIB Press release by the Ministry of Finance dated 26 November 2024, <https://tinyurl.com/yz7y7jba>.

34 PIB Press release by the Ministry of Commerce and Industry dated 02 August 2023, <https://tinyurl.com/ukhabyzz>.

35 PIB Press release by the Ministry of Commerce and Industry dated 28 September August 2024, <https://tinyurl.com/mpnbvp6m>.

expansion of India's Mittelstand and helping it to expand via deregulation and policy actions at the level of states and local governments; undertaking reforms that help remove the growth impediments in the agriculture sector; a strategy to leverage the rapidly growing pool of global green capital from sovereign wealth funds, global pensions, private equity, and infrastructure funds for securing green transition finance; working towards bridging the education-employment gap and enabling the New Education Policy to realise its objective and potential; and building state capacity and capability.

5.38 To succeed with these structural reforms, a fundamental pre-requisite is to accelerate and amplify the deregulation agenda already underway in the last ten years and work towards giving people back their agency and enhancing the economic freedoms of individuals and organisations. The Preface again has underscored the importance of this eloquently.

5.39 Amidst this new and emerging global reality, the best way to succeed with these structural reforms is to start relying on the internal engines and domestic levers of growth, focusing on a central element – the economic freedom of individuals and organisations to pursue legitimate economic activity. Unburdened by licensing, inspection and compliance requirements, the people and small enterprises of India, with their high aspirations and intrinsic inventiveness, will find answers to the pressing challenges of growth, employment and development. Accelerating and amplifying the deregulation agenda already underway in the last ten years is the need of the hour. Also, every state in the country can learn from the best practices of other states in different areas so that all progress in unison. The next section shows the way forward.

REINVIGORATING THE INTERNAL ENGINES OF GROWTH - ENHANCING ECONOMIC FREEDOM THROUGH DEREGULATION

5.40 As outlined in the sections above, the global economy is now transitioning to a phase where the traditional, fundamental policy levers that were once effective may no longer be applicable or even relevant. Across the world, the focus of policymaking globally has shifted inwards. The promise of shared benefits from a globalised world with open trade, free flow of capital and technology, and sanctity for rules of the game may be behind us. It is as unwelcome and unfortunate as it is real.

5.41 To be clear, we do not suggest India closes itself to the world. On the contrary, the current tendencies in the rest of the world necessitate that India redoubles its efforts to boost exports and attract investment. One way to do this is to benchmark ourselves to the rest of the world rather than our past. However, given the uncertain global environment and fraught geopolitics, expectations of the external sector's contribution to our economic growth must be realistic. Therefore, we need to intensify our efforts on the domestic front.

5.42 To achieve a sustained rise in living standards, the Indian economy will need to grow by around 8 per cent in real terms every year for at least a decade. Achieving this growth will require an increase in the investment rate to around 35 per cent of GDP from the current level of around 31 per cent. It is deemed desirable, in general, for the investment rate to rise so that a higher GDP growth rate is achieved. That has been the experience of East Asian economies, starting with Japan post-WWII and ending with China in the last four decades.

5.43 The context has changed dramatically, as elaborated in the previous sections. Therefore, as discussed in Chapter 3, the amount of investment that can be supported by external savings supplementing domestic savings must be reassessed. It means that raising the efficiency of investment matters more for economic growth than raising the investment rate. The investment efficiency rate is improved by reducing the time taken for investment to generate output and by generating more output per unit of investment.

5.44 Unleashing the potential of domestic-led growth in India via enhancement of investment and economic efficiency will entail a combination of efforts, viz., assessing the actual/true cost of regulation, undertaking systematic deregulation to reduce/remove the same by liberalising standards and controls and designing policy prescriptions that reduce the cost and burden of undertaking an economic activity, for citizens and businesses alike. India must pursue economic growth by undertaking policy actions that enhance economic freedom, i.e. citizens' unhindered ability to pursue legitimate economic and entrepreneurial aspirations.

Deregulation and economic freedom: A catalyst for growth

5.45 Deregulation is more critical for MSME growth than large enterprises. Compliance costs in terms of time and financial resources are non-trivial for MSMEs. Large enterprises usually find a way around compliance. Management and financial bandwidth are limited for smaller enterprises. Therefore, deregulation is a policy agenda for small businesses. Over the past decade, India's policy focus has demonstrated an awareness of this approach, recognising the importance and urgency of deregulation while establishing a framework for comprehensive process and governance reforms. The first phase of these reforms focused on reducing the compliance burden, streamlining and digitising systems, processes and information and providing incentives for specific sectors. The union government has undertaken deregulation by implementing process and governance reforms, simplifying taxation laws, rationalising labour regulations, and decriminalising business laws. For example, the union government brought to Parliament reforms to our forest regulations that stood in the way of enterprises doing something as simple as building a passageway from their property to the main road.³⁶

³⁶ Forest Conservation (Amendment) Act, 2023 (No. 15 of 2023).

5.46 On their part, states have also participated in deregulation by reducing compliance burdens and simplifying and digitising processes. States have tried to reduce the cost of regulations by engaging with businesses to identify pain points. For example, Haryana and Tamil Nadu amended their building regulations 12 times in the past decade to make it easier to build.³⁷ Similarly, Punjab conducted grievance redressal sessions with industries and liberalised several building, labour, and fire regulations.³⁸ In the same vein, Andhra Pradesh, Karnataka and Haryana have relaxed the prohibitions on employing women in night shifts for Information-Technology-Enabled-Services (ITES) industries by instituting conditional exemptions, and Uttar Pradesh has relaxed building regulations for hotels.³⁹

5.47 The assessment of states as per the Business Reform Action Plan (BRAP) formulated by the Department for Promotion of Industry and Internal Trade confirms the above hypothesis and shows that deregulation helps spur industrialisation. Chart VII.21 in the Industry Chapter of this Economic Survey shows a positive correlation between the ease of doing business in states and the level of industrial activity, suggesting the need for deregulation and enterprise-friendly reforms in aspiring and emerging states. These findings are aligned with international experiences that countries have had while undertaking deregulation, such as an increase in consumer welfare, facilitating competition and innovation in industry and an overall positive effect on economic growth (Winston, 1993).⁴⁰

5.48 Such efforts have laid the foundation for states to embark on the next round of reforms now, the need for which is urgent and the scope for which is immense. Many states have set targets of becoming billion to trillion-dollar economies over the next two decades. However, current regulations act as binding constraints on growth by increasing the cost of market entry, force-fitting inefficient models for operations, and prolonging industrial sickness. Regulations hurt businesses' ability to start and grow over time. For example, factory regulations make it cheaper for a business to run two 150-worker factories than one 300-worker factory,⁴¹ discouraging economies of scale. Regulations also hurt workers by discouraging job creation, limiting wages, and encouraging informal employment. For example, Indian workers cannot formally work overtime because the law requires employers to pay at least twice the regular wage.

37 Anand, B.; Roy, S. & Kaur, S. (2024, April 17). "Trends in amendments to building regulations. <https://prosperiti.substack.com/p/24-trends-in-amendments-to-building>.

38 Business today, 2023, 'Sarkar Sanatkar Milni: Industrialists appreciate Punjab CM's initiative in Jalandhar', <https://tinyurl.com/3h4m9uc5>.

39 Conditions for women's employment at night in Haryana: <https://tinyurl.com/msemuxke>.
Conditions to employ women at night in Karnataka: <https://tinyurl.com/yc3fmrur>.
Uttar Pradesh amends building regulations for hotels: <https://tinyurl.com/uus6bjm4>.

40 Winston, C. (1993). Economic Deregulation: Days of Reckoning for Microeconomists. *Journal of Economic Literature*, 31(3), 1263–1289. <http://www.jstor.org/stable/2728241>.

41 Chapter V, Factories Act, 1948 (No. 63 of 1948).

Indian workers accept informal employment to receive overtime pay.

5.49 Regulations increase the cost of all operational decisions in firms. For example, factory owners must dedicate time and resources to obtain the Change of Land Use license and ensure compliance with zoning regulations. Factory owners must also invest in transportation, additional land, construction of rooms for rest and canteens, and paperwork to employ women on night shifts. Current regulations also discourage innovation and creative destruction. Similarly, Indians cannot undertake apprenticeships while undergoing formal education due to working hour limits on apprentices.

5.50 In many cases, current regulations are gold-plated, i.e. they are set with an inflated assumption of regulatory capacity and the capacity of regulated entities to comply. There is some scope for making many of the current regulations less restrictive, in line with comparable standards recommended by international bodies and adopted by other countries.

5.51 Given their economic capacity, Indian firms cannot adhere to applicable regulations without jeopardising growth opportunities and hurting investments and job creation. For instance, if there is a surge in orders during specific months in the year, exporting firms should have the flexibility to deploy more labour hours and lower them during lean seasons. This flexibility is needed. Indian regulations force employers to redirect resources away from potential growth and employment opportunities to meet compliance requirements. For example, an Indian factory owner with a 5,000-square-metre plot can be required to forgo up to 69 per cent of their plot to comply with building standards. This tract of lost land can cost up to ₹ 1.58 crore and could have been used to create up to 509 additional jobs.⁴²

5.52 In sum, the faster economic growth that India needs is only possible if the union and state governments continue to implement reforms that allow small and medium enterprises to operate efficiently and compete cost-effectively. Regulations must be rationalised to ensure that the regulation is the minimum necessary to achieve its objectives and the maximum feasible given the limited managerial and other resources at the disposal of small and medium enterprises. The focus of reforms and economic policy must now be on systematic deregulation.

⁴² https://prosperiti.org.in/wp-content/uploads/2024/01/State-of-Regulation-Report_Building-Standards_December-2023.pdf.

5.53 States can undertake systematic deregulation by systematically reviewing regulations for their cost-effectiveness by following a three-step process:

Identifying areas for deregulation: Ease of Doing Business (EoDB) 2.0 should be a state government-led initiative focused on fixing the root causes behind the unease of doing business. States are rule-making bodies and not just implementing agencies. States have exclusive jurisdiction to regulate List II subjects like land, buildings, water, and local trade and commerce. States can regulate concurrently with the union government on List III subjects like labour welfare, electricity, and mechanical vehicles.⁴³ States can systematically deregulate laws on all these subjects by amending the primary law. Where the union government sets the primary law, states also have the option to deregulate by amending subordinate regulations. States should consider these options while identifying opportunities for deregulation. States may consider the following areas of regulations as a starting point to identify reform opportunities:

Table V.1: List of areas of regulation and provisions affecting businesses

Area	Examples of regulations
Legal Status and admin	Municipal laws, citizen charters, accountability in public service delivery
Land	Land revenue, land reform, town and country planning, land ceiling
Building and Construction	Town and country planning, building bye-laws, fire safety laws
Labour	Rules under Union Codes, factories, contract labour, shops laws
Utilities	Water, electricity, building bye-laws, municipal laws
Transport	Motor vehicles laws, motor transport workers laws, carriage of goods
Logistics	Warehousing and logistics policies, building bye-laws
Buying and Selling	Agricultural Produce and Livestock Market Committee laws
Environment	Laws for prevention and control of pollution of water, air
Sector Specific	Excise, food safety, legal metrology

In each of these areas of regulation, the state issues mandates, including permits, standards, price and quantity controls, fees and taxes, compliances, inspections, and penalties. Each substantive mandate increases the cost, time, and uncertainty of starting and operating a business, discouraging intensive economic activity and

⁴³ Seventh Schedule, Constitution of India, 1950.

the growth of enterprises. Liberalising standards and controls, revising licensing norms, modifying regulatory thresholds, blunting barriers to enterprise growth, and instituting procedural safeguards are some examples of reform actions needed. Thereafter, states must implement line-by-line corrections to regulations to allow greater freedom in decision-making.

Thoughtfully comparing the regulations with other states and countries:

States should learn from inter-state and inter-country comparisons of regulations to identify opportunities for growth-inducing reforms. States can learn from each other's recent deregulation experiences and creative solutions deployed towards common problems. Learning from the example of other states that have deregulated could save discovery time. For example, until the early noughties, all states prohibited women from working night shifts. Over the years, states like Andhra Pradesh, Karnataka, and Haryana began deregulating women's opportunities by moving to a permissions-based system and then to a conditions-based system.⁴⁴ Some states have completely deregulated women's participation in the IT industry. Such initiatives and experiences hold important lessons for all states.

Moreover, international experiences with regulation also hold some important lessons. On many issues, other countries (and states within other countries) have moved from a more controlling position to a more deregulated context. In the Asian neighbourhood alone, there are many context-appropriate examples of deploying less onerous regulations without jeopardising citizen welfare. For example, Japan allows mixed-used development in densely populated urban areas, and Korea allows weekly working hour limits to be averaged over 6 months.⁴⁵ Farther afield, there may be even more useful lessons. For example, some parts of the United States have adopted an "as-of-right development" stance, reducing the number of pre-construction approval steps.⁴⁶ The rise of competitive federalism in India allows states to apply such international experiences in simplifying and reducing regulatory burdens to draw investments. However, some caution must be exercised in emulating what may be seen as best practices. Instead of only looking for 'best practices', states should identify the 'minimum necessary, maximum feasible' option for regulation.

44 Karnataka: Karnataka Shops and Commercial Establishments (Amendment) Act, 2002 (No. 14 of 2002) Haryana: Notification No. 6/35/2002-1Lab.

Andhra Pradesh: G.O.Ms.No.16, LET&F (Lab.II) Deptt., dt:30.05.2002.

45 Japan: City Planning Act, Act No. 100.

South Korea: Labour Standards Act, Act No. 11270.

46 United States: Massachusetts General Laws c. 40A.

Estimating the cost of each of these regulations on individual enterprises:

Every regulation imposes monetary, opportunity, and state capacity costs. Most regulations require businesses to spend some money to ensure and demonstrate compliance. This monetary cost is often coupled with foregone entrepreneurial opportunities. In addition, every mandate requires the ability to check and enforce compliance. States must systematically account for the unit-level impact of every regulation before they are passed. For example, Indian states require factories with a 10,000 square metre plot to forgo between 1,164 to 3,522 square metres of land for setbacks. As a result, setback regulations cost Indian factories the productive value of land valued up to ₹97.5 lakh and the opportunity to create up to 521 jobs.⁴⁷ This is not to argue that setbacks are to be done away with but to make the case that regulation must reckon with the deadweight loss and the opportunity cost of every such imposition.

States must also anticipate the unintended consequences of regulations. States often set regulations to achieve some welfare objective without recognising how the regulations may affect businesses in the long term. For example, many states classify strips of land beside public roads as 'protected forests'. States classified these 'strip forests' in the first two decades after independence to increase protections for tree cover in populated areas. Over the years, this simple classification has resulted in businesses spending over 250 days obtaining approval for simple passageway access. These costs are disproportionate to the benefit of protecting tree cover in populated areas and were entirely unintended. Such standards set unrealistic expectations given the binding constraint under which the Indian State operates – the still-evolving state capacity. Often, these standards mimic those set in high-state capacity nations without commensurate functionalities. For example, today, only 644 working inspectors are available to oversee compliance in 3,21,578 factories,⁴⁸ with each overseeing around 500 factories. Under low-state capacity administrative systems, unrealistic expectations can lead to "premature load-bearing".⁴⁹ In the future, States may consider the following list of approaches [See Table 2] as a guide to designing reform options for each regulation:

47 Anand, B.; Roy, S.; Kaur, S. (2024). 'State of Regulation: Building standards reforms for jobs and growth'.

48 Directorate General of Factory Advice Service and Labour Institutes (DGFASLI) (2022). 'Standard Reference Note'.

49 Andrews, Matt; Pritchett, Lant; Woolcock, Michael. (2017, January). 'Premature load bearing: Doing too much too soon'. Building State Capability: Evidence, Analysis, Action (Oxford, 2017; online edn, Oxford Academic, 16 Feb. 2017), <https://tinyurl.com/53we9579>.

Table V.2: List of potential approaches for reforming laws affecting businesses

Approach to reform	Description	Status
Reduce compliance burden	Reduce administrative costs incurred by businesses to demonstrate adherence to laws.	Already pursued in Phase 1 of EoDB
Streamline systems, processes and information	Modify processes for business-government interactions to remove redundancies, simplify process flow, and increase transparency and accountability of government services.	
Digitise systems, processes and information	Establish digital means of interacting with businesses to improve efficiency.	
Provide incentives	Extend special benefits to key sectors or clusters of businesses.	
Liberalise standards and controls	Minimise controls that distort markets, adopt a 'minimum necessary, maximum feasible' approach to setting regulations	This may be pursued in Phase 2 of EoDB
Set legal safeguards for enforcement	Ensure adherence to due process norms to encourage a facts-based resolution of disputes	
Reduce tariffs and fees	Minimise or remove mandated charges inflating utility costs	
Use risk-based regulation	Tailor legal norms to the risk profile of businesses, involve third parties in enforcement	

5.54 States have undertaken four of these eight approaches in the first phase of EoDB reforms. In the next phase, they must break new ground on liberalising standards and controls, setting legal safeguards for enforcement, reducing tariffs and fees, and applying risk-based regulation.

- **Liberalising standards and controls:** States can reduce the cost of compliance by liberalising standards and controls on Indian businesses. Indian regulations require firms to invest time and money and forgo growth opportunities to ensure compliance. These regulations must be examined to ensure they impose the lowest

cost necessary to achieve their social objectives. Specific examples in this regard have been outlined in Box V.2.

- **Setting legal safeguards for penalties and enforcement:** States can enforce many regulations through punitive actions like civil penalties and cancellation of licences. These punitive actions can limit businesses' ability to operate within legal limits. States can improve the investment climate by increasing the accuracy and transparency of such punitive action. See specific examples in Box V.2.
- **Reducing tariffs and fees:** States impose direct costs on the operation and growth of Indian businesses by imposing tariffs and taxes. While these regulations support public spending, these regulations can also reduce the competitiveness of Indian businesses. States can encourage sustained growth by rationalising tariffs and fees in line with standards from other jurisdictions, sub-national or international. See specific examples in Box V.2.
- **Applying risk-based regulation:** States impose similar regulations on businesses that pose differing risks of some socially undesirable consequence, viz. fire, pollution and building collapse. This often results in low- and medium-risk businesses bearing an inordinately high cost of compliance. Under such general regulations, state departments also struggle to scrutinise riskier businesses adequately. By adopting risk-based regulation, state departments can optimise public resources to generate social benefits like fire safety and environmental protection. Under risk-based regulations, low- and medium-risk businesses would also face lower compliance costs without substantial public safety and health reductions.

Box V.2: Making a case for EoDB 2.0

A. Liberalising standards and controls

Removing prohibitions on women from working in factory processes: Indian states prohibit women from many factory processes. India's ten most populous states collectively impose 139 prohibitions on women from participating in specific factory processes. Governments impose these prohibitions given the dangerous nature of the processes. However, inter-state comparison and scientific literature indicate that these prohibitions are enforced without evidence of special health risks to women workers. For example, some states allow women to participate in abrasive blasting (used to clean metal surfaces), but others prohibit women from participating in the same process. Similarly, women are prohibited from participating in any process to manufacture lead or its compounds. However, scientific literature indicates that lead is not likely to pose special health risks to women. These prohibitions exclude women from high-paying jobs, making the prohibitions counterproductive.

Rationalise parking norms to reduce land loss in industrial and commercial plots: Commercial buildings in many Indian states must build more floors to get the same floor space as some frontier states and countries. This makes Indian commercial

buildings artificially slender, wastes valuable commercial land, and increases the cost of construction. This happens due to restrictive setbacks and ground coverage regulations that force commercial buildings to have a higher slenderness ratio than in other countries. Therefore, an entrepreneur must build more floors to have the same built-up area if the ground floor were available, incurring a higher construction cost. Many state governments have designated 'tourism and hospitality' and 'information technology' as thrust sectors. States should increase the productivity of commercial land used by hotels and offices to provide impetus to these industries.

B. Setting legal safeguards for penalties and enforcement

Adding safeguards to reduce chances of arbitrary administrative action:

States enforce compliances without being bound by standards that ensure proper use of punitive powers. As per administrative law norms, states should only impose punitive measures after ensuring that the accused person is:

1. Issued a show-cause notice with adequate facts about the alleged violation,
2. Allowed an opportunity to represent their side of the argument,
3. Issued a reasoned order detailing the reasons for the final decision by states and
4. Allowed appeals against decisions.

However, Indian regulations do not require states to adhere to these procedural safeguards while pursuing punitive action. For example, many states do not require

departments to issue detailed show-cause notices, allow representations by the accused person, or issue reasoned decisions before sealing or demolishing buildings. Without these safeguards, states are more likely to make inaccurate or bad-faith decisions about the use of buildings in Indian cities. Guaranteeing procedural safeguards by law can reduce the legal risk of investments and job creation, encouraging rapid growth.

C. Reducing tariffs and fees

Reducing electricity tariff markup for industrial users: States impose a high markup on the sale of electricity to industries. This high markup discourages industries from formally operating and growing over time. Across states, industrial users can pay a 10–25% markup over the cost of electricity supply. Other countries impose lower rates for electricity use. For example, Vietnam sets the electricity sale price at a 10% lower rate than the cost of generating electricity. Such differences in energy costs reduce the global competitiveness of Indian factories, discouraging growth.

D. Applying risk-based regulation:

Increasing the role of private parties in building approvals and inspections:

Indian states give private parties limited opportunities to participate in enforcement processes for building safety. This limits the ability of Indian states to enforce regulations and encourage compliance. Indian states only allow private parties to participate in the approval of the initial building plan. However, all subsequent approvals and inspections are conducted by government officers. Given the paucity of officers, state departments cannot enforce building regulations in growing cities without augmenting state capacity with private parties.

Other countries have had positive experiences involving third parties in enforcement processes for building safety. For example, Australia and Canada adopted the 'Public-Private Partnership' (PPP) model to enforce building safety regulations. Close to seventy per cent of applicants chose to obtain licences from private parties due to their speed of service, availability and specialisation. The PPP model also engendered competition between public and private agencies, encouraging greater enforcement and improved safety outcomes.

Increasing the validity of fire NOC for low- and moderate-risk buildings: States set a low validity period for fire NOCs. The low validity periods discourage applicants from obtaining NOCs. In most states, industries are only issued a Fire NOC for one to three years. Industrial owners must repeatedly submit similar information to renew NOCs. In many states, applicants are required to answer many questions about the building and plot's structure and the instalments to obtain a Fire NOC every two years. Even if applicants apply for NOCs, some state departments do not have sufficient administrative strength to decide on all applications. By raising the validity period, state departments can reduce their administrative burden and reduce compliance costs for applicants without jeopardising fire safety.

Renewed paradigm for medium-term growth

5.55 Complementing the efforts of the Centre, States must pursue systematic deregulation as a policy priority so that economic freedom of factors of production is augmented. Factor market regulations, i.e. laws that affect the use of land, labour and building, are the right place to begin since these regulations affect decision-making in all enterprises. States can begin the deregulation exercise by identifying regulations that affect decision-making in enterprises. Next, states can compare their regulations on these issues with those in other states and countries. Finally, after identifying alternatives, states must examine the economic impact of their current regulation on a single sample enterprise. States need not undertake a complex analysis of all economic effects. Instead, states may undertake a data-informed exercise of mapping how much resources, time, and risk a single enterprise must devote to compliance.

5.56 The call for enhancing economic freedom through deregulation has renewed momentum in today's rapidly evolving global economy. Over-regulation stifles innovation and economic dynamism. In many instances, regulations, while intended to protect consumers, workers, and the environment, can unintentionally create barriers to entry, reduce competition, and slow the pace of innovation. By reducing excessive regulatory burdens, governments can help businesses become more efficient, reduce costs, and unlock new growth opportunities. Strategic and systematic deregulation can catalyse growth, innovation, and competitiveness.

5.57 Systematic deregulation is as critical, if not more, as investments in infrastructure and incentives to encourage innovation and create a viable Mittelstand, i.e. India's SME sector. The focus on Mittelstand has played a pivotal role in the economic success of countries like Germany, Switzerland, Japan, and Singapore. These nations have leveraged the strength of their Mittelstand to drive innovation, foster high-quality manufacturing, and create a robust export economy. With deregulation, India's Mittelstand can help the states weather economic shocks, enable India to realise its manufacturing aspirations, attract long-term investments, and encourage growth. Such growth would be sustainable and 'employment-sensitive', i.e., enhancing workers' long-term welfare.

5.58 Even as large companies invariably tend to prioritise capital-intensive growth over labour-intensive growth, small and medium enterprises are likely to have a better balance between the two, encouraging employment generation. That is a compelling reason to ensure that the state does not hinder their growth. States have an opportunity to undertake regulatory reforms that fundamentally change the nature of interaction between governments and small and medium businesses. States can encourage a facilitative and collaborative relationship by adopting regulations sensitive to businesses' economic capacity and minimising opportunity costs.

5.59 Countries worldwide have instituted programs for a sustained focus on deregulation. For example, the United States has created the Office of Management and Budget. This office examines all proposed legislation in the Federal Government based on cost-effectiveness. The incoming administration in the US has set a great store of deregulation by setting up a new Department of Government Efficiency. In an op-ed in the Economist, the Argentinian President argued for economic prudence and reduced regulatory burdens⁵⁰. Similarly, the United Kingdom Parliament has adopted the Better Regulation Framework. As part of this framework, the Parliament enacts all new legislation in adherence to the 'one-in, two-out' principle', requiring every pound of new regulatory burden on businesses to be offset by identifying and removing two pounds of existing burdens from other areas of the regulation⁵¹. New Zealand has established a Ministry of Regulation to examine laws and propose repeals and amendments to improve compliance experience. Indian states must examine these global experiences and carry key lessons relevant to their contexts.

5.60 The need to find growth avenues in an export-challenged, environment-challenged, energy-challenged, and emissions-challenged world means we need to act on deregulation with a greater sense of urgency. The focus on domestic growth levers is not an option but a compulsion. Without deregulation, other policy initiatives will not

⁵⁰ XX Milei, Javier (2024, November 20). 'Argentina: the making of an economic miracle?' <https://tinyurl.com/yeybxa85>.

⁵¹ Department for Business Innovation and Skills (2014). 'The Ninth Statement on New Regulation'.

deliver on their desired goals. The right balance of regulation and freedom can unleash the creative and productive capacities of India's small and medium entrepreneurs, leading to innovation, greater competition, and overall prosperity. By empowering small businesses, enhancing economic freedom, and ensuring a level playing field, governments can help create an environment where growth and innovation are not only possible but inevitable. India's growth aspirations require nothing less.

5.61 The areas suggested for deregulation in this chapter are merely illustrative. But, there are multiple benefits and likely unintended beneficial consequences once they are set in motion. Concerted actions by states towards deregulation will lift sentiment, enhance faith and trust in governance, and even improve compliance as the relationship between the governing and the governed turns into a partnership. Second, once some regulations are repealed or simplified, the remaining ones become progressively easier. It is like peeling an onion. Once one layer is removed, the other layers come into view and become easier to peel off. Third, it may set off a 'butterfly effect', referred to in a different context earlier in this chapter. The butterfly effect means that small actions can have large consequences. Small acts of deregulation may set off big waves of entrepreneurship, investment, innovation and growth.

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INVESTMENT AND INFRASTRUCTURE: KEEPING IT GOING

Building infrastructure – physical, digital and social - has been a central focus area for the Government in the last five years. This has had various dimensions – increase in public spending on infrastructure, creation of institutions to de-bottleneck approvals and execution and innovative modes of resource mobilisation. In FY25, capital expenditure has gathered momentum post-elections.

The government has recognised the importance of continuing the pace of infrastructure building and the increasing need to promote sustainable construction practices. It is also clear that public capital alone cannot meet the demands of upgrading the country's infrastructure commensurate with the requirements of Viksit Bharat@2047. We need to ensure increasing private participation in infrastructure by improving their capacity to conceptualise projects and their confidence in risk and revenue-sharing mechanisms, contract management, conflict resolution and project closure. The efforts of the Union Government would need to be supplemented with wholehearted acceptance of the need for public-private partnerships in infrastructure across the country. Equally important, the private sector must reciprocate, too.

INTRODUCTION

6.1 India's development aspirations require a substantial investment in infrastructure over the next decade. While estimates of the required spending differ in scale^{1,2,3}, there is general agreement that current infrastructure spending needs to be increased to achieve these objectives. Keeping this in view, the government has laid a special focus on infrastructure in the last five years. Reflecting this intent, the capital expenditure by the union government on major infrastructure sectors⁴ has been increased at a trend rate of 38.8 per cent from FY20 to FY24.

1 Asian Development Bank (2017). Meeting Asia's Infrastructure Needs. Manila. <https://tinyurl.com/h2668mpb>.

2 Athar, S., White, R., & Goyal, H. (2022). Financing India's urban infrastructure needs: Constraints to commercial financing and prospects for policy action. Washington, DC: World Bank. <https://hdl.handle.net/10986/38306>.

3 CRISIL (2023, October). CRISIL infrastructure yearbook 2023. <https://tinyurl.com/36muuvrf>.

4 Infrastructure sectors include atomic energy, civil aviation, telecommunications, renewable energy, power, road, rural development, ports, housing & urban affairs and railways.

6.2 The government has also instituted many complementary mechanisms to expedite planning, clearances and execution of projects. The National Infrastructure Pipeline (NIP) was launched with a forward-looking approach, targeting a projected infrastructure investment of around ₹111 lakh crore from FY20 to FY25. The NIP serves as a centralised platform for hosting projects of states, union territories and central ministries to facilitate their monitoring and review. Currently, it encompasses over 9,766 projects and schemes across 37 sub-sectors. These projects are tracked and reviewed through the integrated India Investment Grid (NIP-Project Monitoring Group) portal.

6.3 The government is bringing in innovative frameworks for attracting investment in infrastructure projects. To boost private investment in brownfield assets, the National Monetisation Pipeline (NMP) was launched in August 2021. This initiative laid down the framework for monetisation policy and identified a pipeline of potential core assets with an indicative value of ₹6.0 lakh crore for the period FY22 to FY25⁵. For the period FY22 to FY24, against the target of ₹4.30 lakh crore, transactions of ₹3.86 lakh crore in terms of accruals or private investments were completed under the core asset monetisation. Sector-wise, roads, power, coal, and mines led the performance, supported by market-tested models and reforms. For FY25, the aggregate monetisation target is set at ₹1.91 lakh crore.

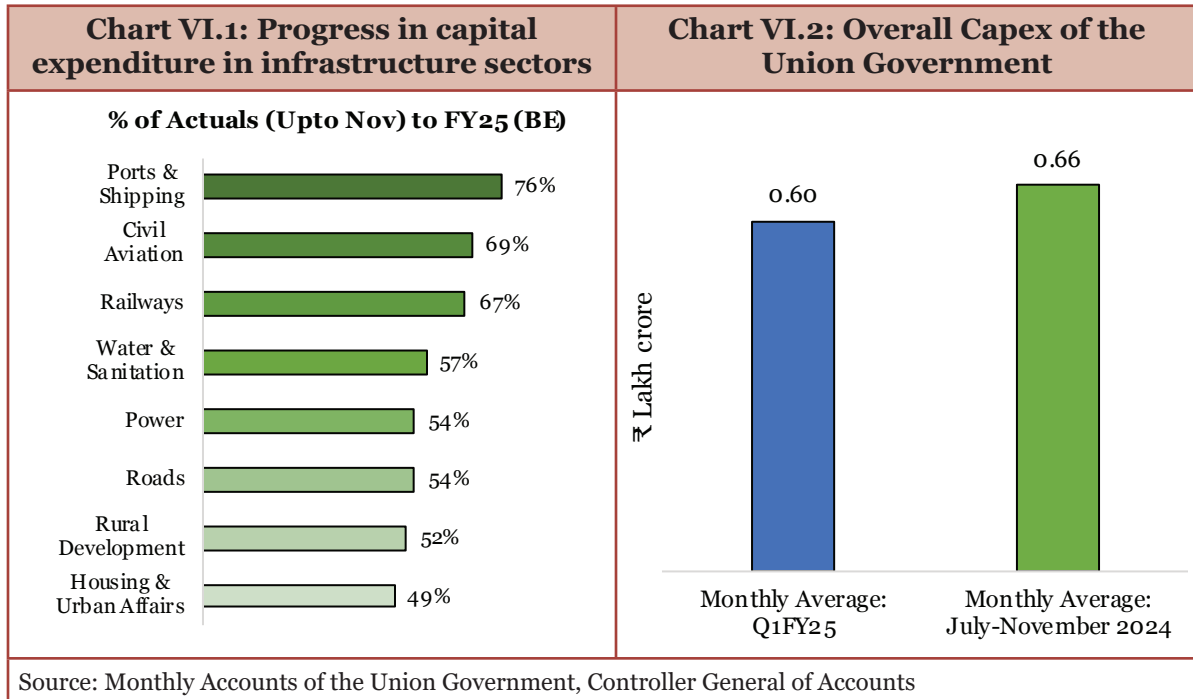
6.4 Despite such earnest efforts by the union government and quite a few state governments and public sector undertakings supplementing these efforts with increased capex, there is still a significant unmet demand for infrastructure development. While this is typical of a dynamic, developing economy, India's goal of Viksit Bharat necessitates the progressive filling of this gap with innovative modes of financing and greater private participation. This sets the context for the discussion in this chapter.

INFRASTRUCTURE CAPEX IMPROVES POST-ELECTION

6.5 The pace of the Union Government's capital expenditure in major infrastructure sectors⁶ was affected during Q1FY25, largely due to the model code of conduct during the general elections. The unusual patterns of the last monsoon season also slowed down the progress of work. Hence, a year-over-year comparison may not be appropriate for Q1FY25.

5 NITI Aayog (2021, August 10). Transforming India's mobility: NITI Aayog's initiatives. Government of India. [PIB Release]. <https://tinyurl.com/4nsnxt5s>.

6 Infrastructure sectors include atomic energy, civil aviation, telecommunications, renewable energy, power, road, rural development, ports, housing & urban affairs, and railways.



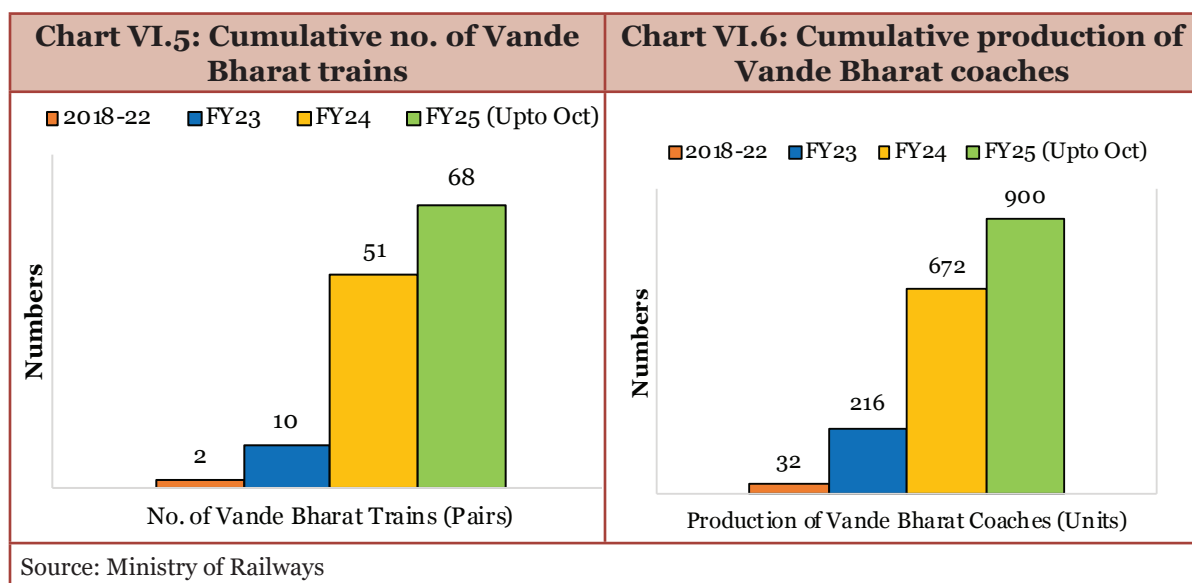
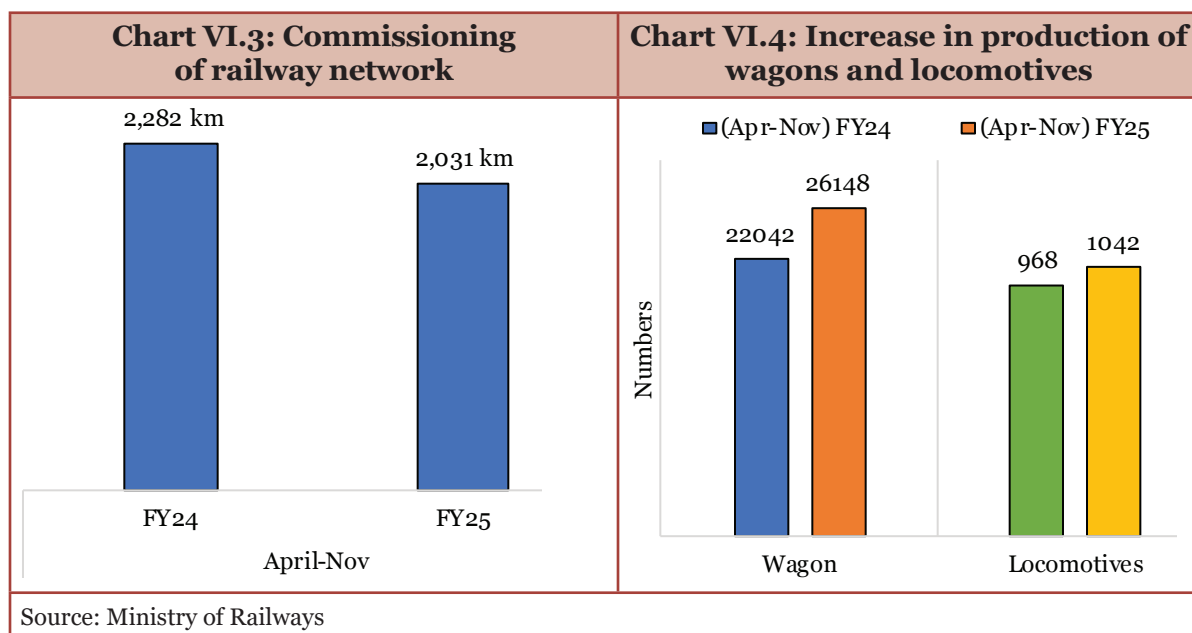
6.6 As the electoral process settled, capital expenditure saw an uptick in July-November 2024 (Chart VI.2). Capex in infrastructure sectors is expected to gain further momentum in the remaining months of the current fiscal. On an average, ministries related to infrastructure sectors utilised 60 per cent of the budgeted capex during April to November 2024. This compares favourably with the progress achieved in the same period in FY20 when the 17th Lok Sabha elections were held.

PHYSICAL CONNECTIVITY

6.7 Notwithstanding the electoral timetable, the capacity addition in physical connectivity sectors stayed on course during FY25. This section examines developments in major components of physical connectivity.

Railways

6.8 During FY25 so far, the progress in the expansion of the railway network stayed at levels comparable to the previous year, while the addition of rolling stock increased considerably. Between April and October 2024, 17 new pairs of Vande Bharat trains were introduced to the network, and 228 coaches were produced. The details of progress in major railway projects are given in Box VI.1.



Box VI.1: Recent developments in railways

Recent initiatives in the rail system

- **Gati shakti multi-modal Cargo Terminal (GCT):** 91 GCTs commissioned and 234 locations approved by October 31, 2024.
- **Net zero carbon emission:** Indian Railways targets 30 GW of renewable energy by 2029-30, with 375 MW of solar and 103 MW of wind commissioned as of October 2024.
- **Major economic corridors:** 434 projects valued at ₹11.17 lakh crore have been identified under three railway corridors, mapped on the PM GatiShakti portal.

- **Public Private Partnership (PPP):** 17 projects have been completed (₹16,434 crore) and 8 ongoing (₹16,614 crore) under the PPP model.

Major projects

- **Mumbai-Ahmedabad High-Speed Rail Project:** Sanctioned in December 2015, this 508 km project, supported by Japan, has a revised cost of ₹1.08 lakh crore. As of October 2024, it has achieved 47.17 per cent physical progress with an expenditure of ₹67,486 crore.
- **Dedicated Freight Corridors (DFCs):** As of November 2024, 2,741 km (96.4 per cent) of the planned 2,843 km DFC network has been commissioned. DFCs have transformed logistics in India by facilitating increased freight volumes without passenger train interference.

6.9 The focus on railway station infrastructure and modernisation of locomotives and coaching stock have improved passenger amenities in the railway sector (Box VI.2).

Box VI.2: Steps for enhancing passenger amenities in railways

Indian Railways is undertaking several initiatives to enhance passenger experience and station amenities. Key projects mainly focus on station redevelopment, affordable healthcare, improving catering services and supporting local artisans.

- **Amrit Bharat Station Scheme:** Under this initiative, aimed at enhancing railway station amenities, 1337 stations have been identified for redevelopment; work has started in 1197 of them.
- **Pradhan Mantri Bhartiya Janaushadhi Kendras (PMBJKs):** In the pursuit to enhance the wellness and welfare of passengers passing through railway stations, 50 PMBJKs were started in railway station premises. In addition, on November 13, 2024, 18 new PMBJKs were inaugurated, providing affordable medications and healthcare services at railway stations.
- **Food and catering services:** A new policy for managing mobile catering was introduced on November 14, 2023. As of November 23, 2024, this has resulted in the establishment of 557 Base Kitchens servicing 468 pairs of trains.
- **One Station One Product Scheme:** This scheme is operational at 1,900 stations, featuring 2,163 outlets that benefit 79,380 local artisans by providing sales opportunities for their products.
- **Passenger amenities:** Train Indication Boards have been provided at 1,351 stations, Coach Guidance Systems at 866 stations, and Wi-Fi availability at 6,112 stations, enhancing passenger experience.

6.10 Box VI.3 gives the key initiatives to improve signalling systems in railways.

Box VI.3: Key initiatives to improve signalling systems in railways

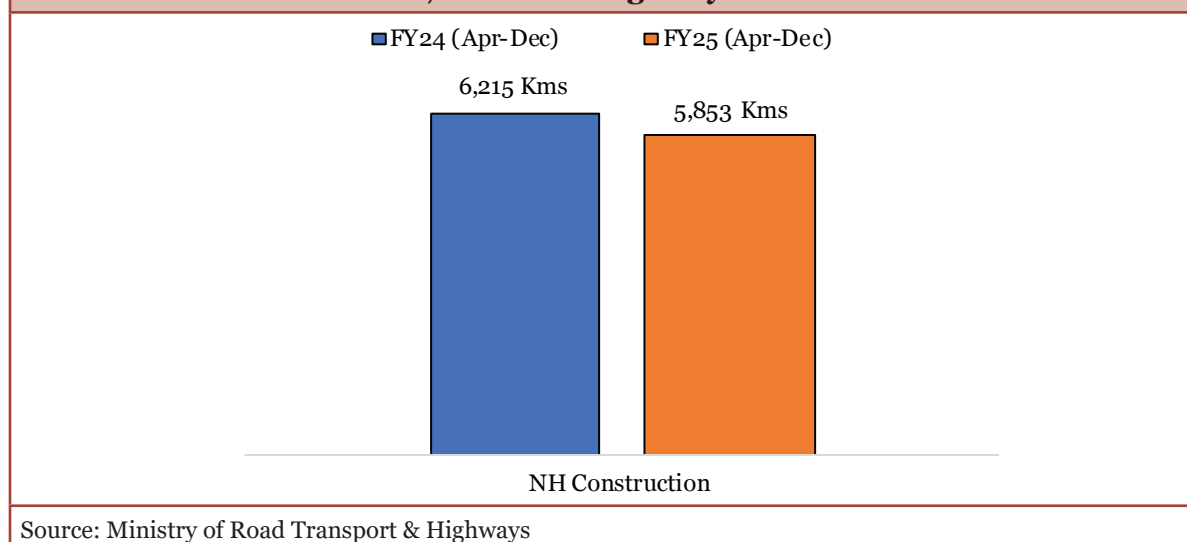
Indian Railways is modernising its signalling and safety systems to enhance operational efficiency and safety across its vast network. Here are the key updates

- **Elimination of mechanical signalling:** Indian Railways is replacing mechanical signalling with Electrical/Electronic Interlocking systems. In FY25, 25 out of 62 pending stations have been upgraded to electrical/electronic interlocking systems, with 9 zonal railways now free from mechanical signalling.
- **Kavach:** This indigenously developed Automated Train Protection system has seen ₹1,547 crore invested (till November 2024). The specification version 4.0 was approved on July 16, 2024.
- **Electronic interlocking:** EI systems have been installed at 227 stations in FY25, increasing the coverage to a total of 3,576 stations. The first Direct Drive Interlocking system was commissioned in November 2024 at Tajpur station.
- **Automatic Block Signalling (ABS):** ABS is being installed to enhance capacity on high-density routes. 720 route kilometres have been completed this fiscal year, increasing the coverage to a total of 4,906 kilometres.
- **Signal design automation tool for electronic interlocking:** This tool automates route control chart generation for station yards. Version 5.0 was released on September 19, 2024.

Road transport

6.11 India has a total road network of 63.4 lakh km, including National highway (NH) network of 146,195 km. NH network forms the arterial backbone of road transport network as even though it comprises only 2 per cent of total road network yet it carries about 40 per cent of the overall road freight traffic.

6.12 The National Industrial Corridor Development Programme aims to create advanced industrial cities in India, positioning them as major manufacturing and investment hubs. In Phase 1, a total of 383 plots, covering 3,788 acres, have been allocated for industrial use in sectors such as electronics and semiconductors, renewables, automobiles and auto-ancillaries, white goods, pharmaceuticals, textiles, and apparel

Chart VI.7: National highway construction

in four cities/townships. These four cities include Dholera in Gujarat, Shendra Bidkin in Maharashtra, Greater Noida in Uttar Pradesh and Vikram Udyogpuri in Madhya Pradesh. Work has started in another four cities, namely Tumakuru in Karnataka, Krishnapatnam in Andhra Pradesh, Nangal Choudhary in Haryana and Dadri in Uttar Pradesh. In addition, 12 new industrial cities have been approved for development, incorporating Industry 4.0 standards alongside the previously approved eight projects. The evolving approach to national highway development is detailed in Box VI.4.

Box VI.4: Development of national highways – progress from a project-based approach to a corridor-based approach

The shift from project-based national highway development to corridor-based approach helped increase the highway length from 91,287 km in 2014 to 1.46 lakh km in 2024. This approach takes into account evolving regional and national needs.

- **Bharatmala Pariyojana:** Launched in October 2017, it aims to develop 34,800 km of National Highways. By 2024, approximately 76 per cent of the projects (26,425 km) has been awarded, and 18,926 km have been constructed.
- **Char Dham Mahamarg Pariyojna:** As of 2024, road project to connect all four dhams through highway with total length of 825 km and 620 km has been completed.
- **National High-Speed Corridors (HSCs):** Length of HSCs expanded from 93 km in 2014 to 2,474 km in 2024.
- **4-lane and above - National Highways (excluding HSCs):** The length grew approximately 2.5 times, from about 18,300 km to 45,900 km between 2014 and 2024.

6.13 The government has introduced a number of sustainable practices in highway development including new-age technologies, sustainable construction raw materials and high-tech machinery. These measures have significantly improved the logistic efficiency and safety of road transport (Box VI.5).

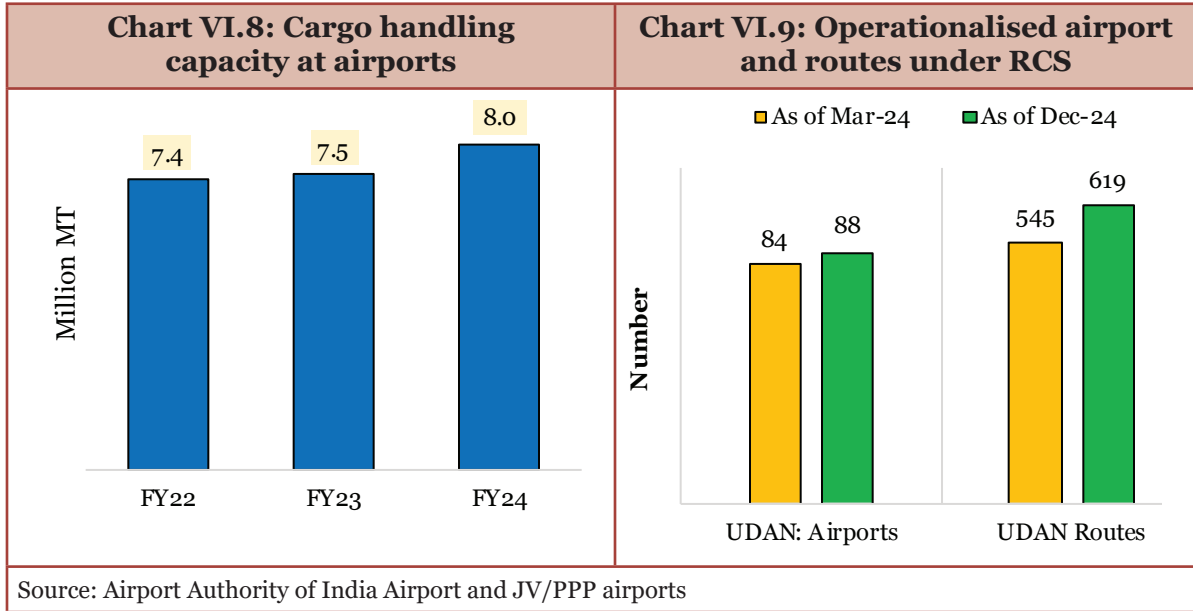
Box VI.5: Key Initiatives for logistics efficiency in road connectivity

To improve road connectivity, key initiatives undertaken include advanced traffic management on highways, establishment of logistics parks, sustainable vehicle scrapping, and ongoing ropeway projects.

- **Advanced traffic management system:** Installed about 4,000 km of national highways for efficient traffic management and emergency response.
- **Multi-Modal Logistics Parks (MMLP):** Till December 2024, Six MMLPs in Chennai, Indore, Nagpur, Jalna, Jogighopa and Bangalore have been awarded.
- **National highway maintenance policy:** Contractual maintenance for the entire NH network is managed through Performance-Based Maintenance Contracts (PBMC) of 5-7 years or Short-Term Maintenance Contracts (STMC) of 1-2 years. Additionally, long-term maintenance contracts of around 20 years are undertaken through the Toll Operate and Transfer mode and Investment Trust.
- **Vehicle scrapping policy:** Incentive/disincentive-based policy with 82 Registered Vehicle Scrapping Facilities (RVSFs) operational across 19 States/UTs, having scrapped about 1.62 lakh vehicles. An additional 65 RVSFs are under construction, which will add one more State.
- **Ropeways projects development:** Fifteen projects are in progress. Projects at Varanasi, Dhosi Hill, Bijli Mahadev, and Ujjain have been awarded, and ten more are under bidding.

Civil aviation

6.14 Airport operators and developers, including the Airports Authority of India, are pursuing a capital expenditure plan exceeding ₹91,000 crore from FY20 to FY25. About 91 per cent of this has been achieved by November 2024. New airports and improved regional connectivity under the Ude Desh ka Aam Naagrik (UDAN) scheme have improved air connectivity considerably. Under the Regional Connectivity Scheme (UDAN), 619 routes connecting 88 airports, including two water aerodromes and 13 heliports, have been operationalised so far. The airport's cargo handling capacity has been gradually increasing, reaching 8.0 million MT in FY24.



Ports and shipping

6.15 Port capacity improved significantly in FY25, leading to improvements in operational efficiency and reduction in average container turnaround time. On waterway transport connectivity, the Sagarmala programme aims to harness India's coastline and waterways fully, improving logistics efficiency. Progress under the programme highlights the highest project completion rates in port modernisation and port-led industrialisation. This is followed by advancements in port connectivity, coastal community development, coastal shipping, and inland water transport. Details of the major initiatives in the port sector can be found in Box VI.6.

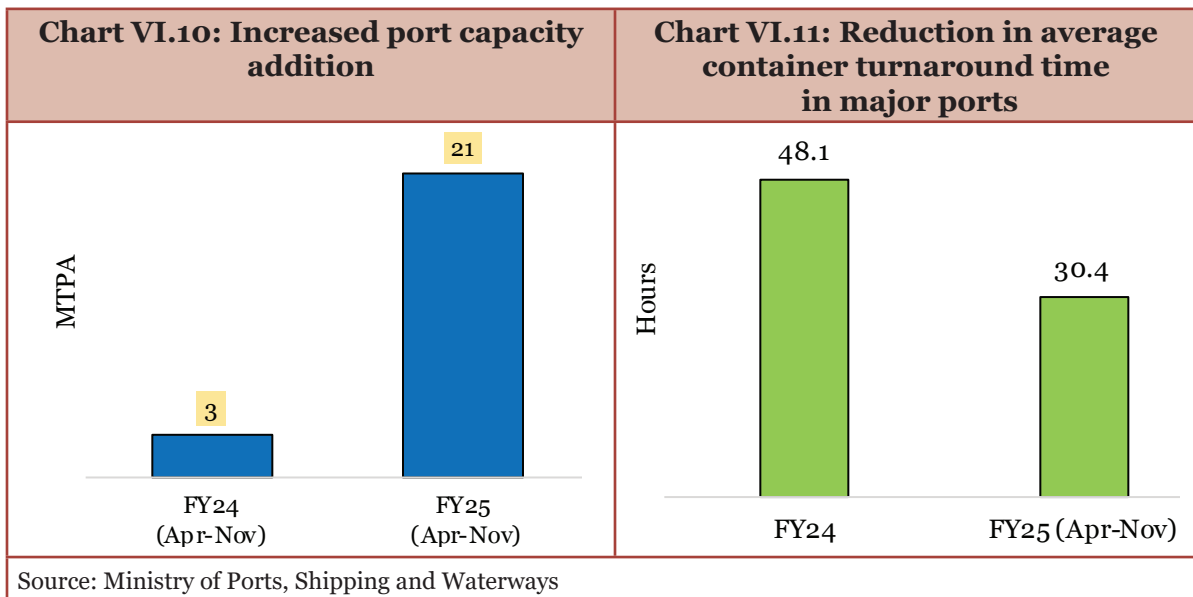
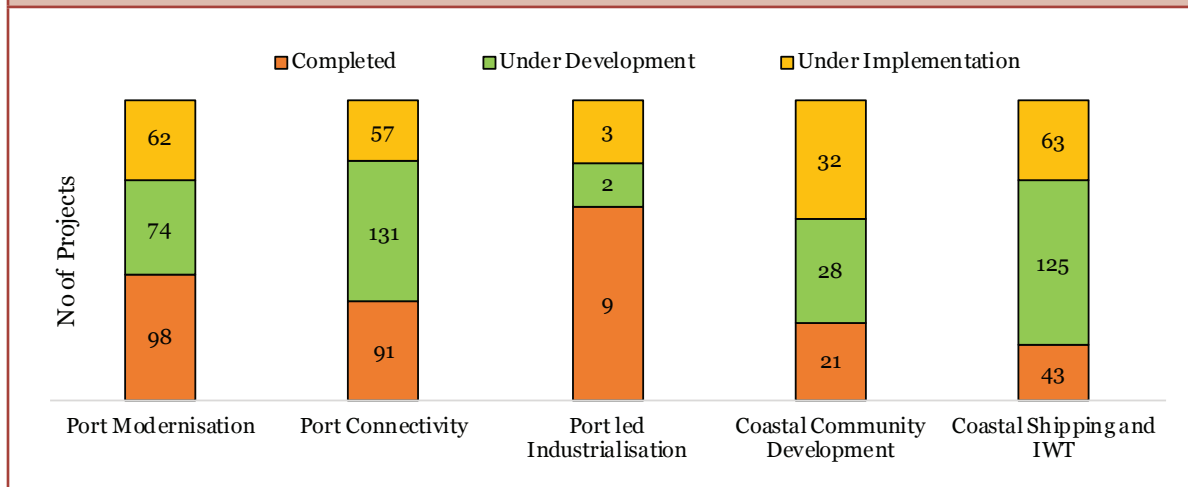


Chart VI.12: Progress in the Sagarmala programme (As on Nov 2024)



Source: Ministry of Ports, Shipping and Waterways

Note: IWT stands for Inland water transport

Box VI.6: Major achievements and initiatives in port sector

Infrastructure Development

- **Vadhavan Mega Port:** The port is being developed with over ₹76,000 crore investment; this port will have nine container terminals and various berths.
- **Tuticorin International Container Terminal:** Inaugurated in September 2024, it is designed to handle 6 lakh twenty-foot equivalent units (TEUs) annually and accommodate container vessels up to 10,000 TEUs.
- **Outer harbour at Tuticorin:** This project aims to boost port capacity by 4 million TEUs with two 1,000-meter terminals.

Port-led Industrialisation

- **Port-Led Industrialisation:** Union Cabinet approved 12 new industrial smart cities with an investment of ₹ 28,602 crore across 10 states, along with 8 additional sanctioned projects.
- **Utilisation of salt lands:** Around 25,000 acres of salt lands have been identified to enhance port sector infrastructure.

International Linkages

- **Chabahar Port and INSTC:** Shahid Beheshti Port at Chabahar connects Mumbai to Eurasia via the INSTC, reducing transport costs and time, leading to a 43 per cent increase in vessel traffic and a 34 per cent rise in container traffic for FY24.
- **Sittwe Port, Myanmar:** Sittwe Port, part of the Kaladan Project, offers an alternative route to north-eastern states, reducing transport costs between Kolkata and Mizoram.

PPP Projects

- The Central Government approved 98 PPP projects, including 23 captive projects, worth around ₹69,800 crore, excluding the Vadhavan Port Project with a PPP investment of ₹38,000 crore. Currently, 56 projects valued at ₹41,480 crore are operational, increasing port capacity by approximately 550 million tonnes per annum (MTPA).

6.16 There have also been key improvements in maritime infrastructure and urban waterways. In October 2024, the National Maritime Heritage Complex in Lothal was approved, featuring a museum with 14 galleries, the tallest lighthouse museum, India's largest Navy gallery and themed amusement parks. To coordinate maritime initiatives and develop master plans, State Maritime & Waterways Transport Committees were formed in 22 states and Union Territories. The international container transshipment port at Galathea Bay, Great Nicobar Island, has been planned to enhance cargo transshipment from Indian East Coast ports and neighbouring countries.

6.17 Urban Waterways Projects, valued at ₹1,303 crore, are underway, with 16 of the 30 projects already completed. These developments have benefited over 35 lakh passengers while facilitating the transport of more than five lakh vehicles and one lakh cargo trucks. In addition, the transformation of inland waterways has been notable, as detailed in Box VI.7.

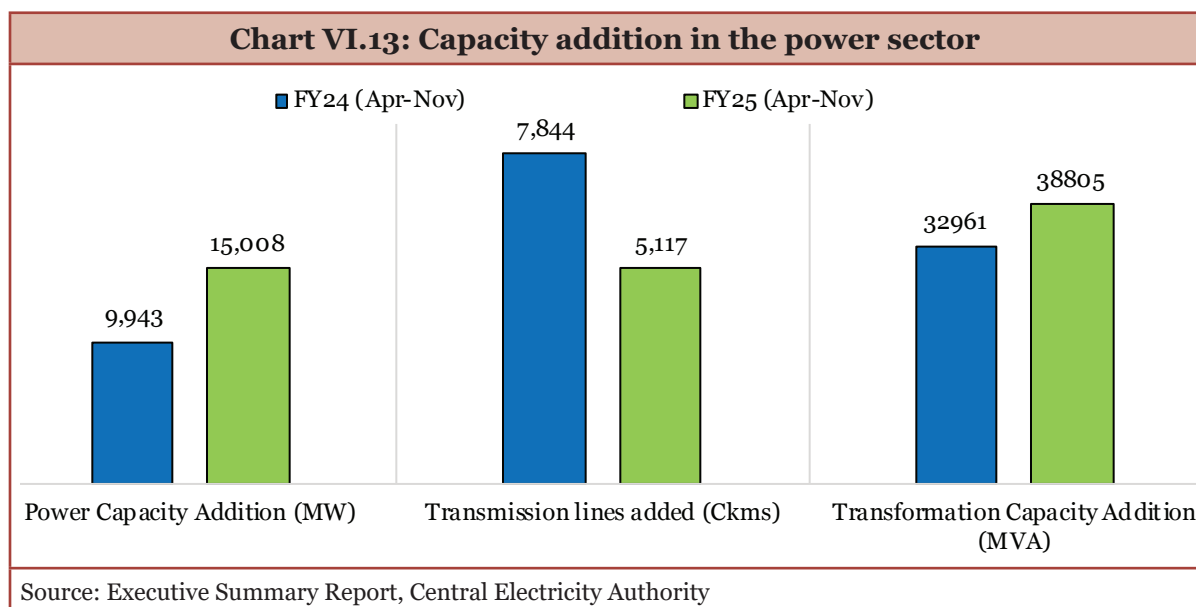
Box VI. 7: Inland waterways transformation: key projects and initiatives

India is enhancing waterway connectivity to the North-East by developing waterways in Bangladesh and funding 80 per cent of the ₹305 crore project. India is also investing ₹1,010 crore to improve the Brahmaputra and Barak rivers and the Indo-Bangladesh Protocol route. Key initiatives include:

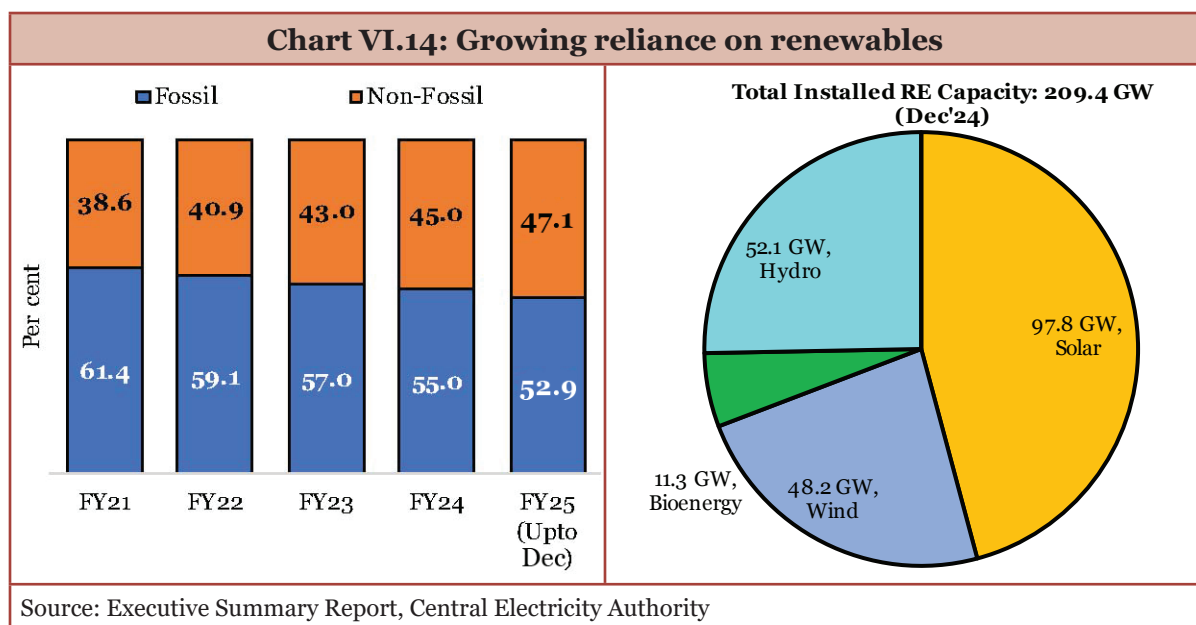
- **Harit nauka Guidelines:** Launched in January 2024, these guidelines aim to green 1,000 inland vessels over the next ten years.
- **Cargo promotion Scheme:** This initiative encourages cargo owners to switch from rail and road to inland waterways transport, promoting it as a sustainable alternative.
- **River cruise tourism:** Improved waterways have benefited both cargo and tourism, with 82,587 passengers on day cruises by October 2024 and a fivefold increase in night cruise passengers to 11,431 in FY24 compared to FY19.
- **Jal Marg Vikas Project on NW-1:** This project enhances cargo transport on the Ganga-Bhagirathi-Hooghly river system, achieving 65 per cent physical progress with a revised cost of ₹5,061.15 crore.
- **Jal Marg Vikas Project II (Arth Ganga):** Focused on sustainable development, this project includes the construction of community jetties and navigation improvements, with 49 out of 60 approved community jetties already commissioned.

POWER SECTOR

6.18 The power sector network continues to expand, with installed capacity rising by 7.2 per cent year-on-year to 456.7 GW as of November 2024. The addition of transformation capacity also gained momentum this year (Chart VI.13). However, the addition of transmission lines was affected by the heavy monsoon conditions that hampered work.



6.19 In the shift towards renewable energy, the power sector has been bolstered primarily by large-scale solar and wind initiatives. By the end of December 2024, the country's total renewable energy installed capacity increased by 15.8 per cent year-on-year, reaching 209.4 GW, up from 180.8 GW in December 2023. Renewable energy now constitutes about 47 per cent of India's total installed capacity (left panel of chart VI.14) , highlighting a growing dependence on cleaner, non-fossil fuel-based energy sources.



6.20 The Government of India implemented multiple initiatives aimed at ensuring uninterrupted power supply to every household. Under the Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY), Integrated Power Development Scheme (IPDS) introduced in

2014, and the Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA), introduced in 2017, about ₹1.85 lakh crore has been invested to boost distribution infrastructure across various states. Consequently, 18,374 villages have been electrified under DDUGJY, and 2.9 crore households have gained access to electricity through SAUBHAGYA⁷.

6.21 The government has also been implementing the Revamped Distribution Sector Scheme since July 2021 to enhance the quality and reliability of power supply for consumers. This initiative aims to create a financially sustainable and operationally efficient distribution sector. With a total outlay of ₹3.0 lakh crore and gross budgetary support of ₹97,631 crore allocated for the period from FY22 to FY26, projects worth ₹2.8 lakh crore have been approved to develop distribution infrastructure and implement smart metering solutions⁸.

6.22 Aided by these measures, the daily average power supply has improved from 22.1 hours in FY14 to 23.4 hours in FY24 in the urban areas and from 12.5 hours in FY14 to 21.9 hours in the rural areas. The gap between energy demand and supply has also declined from 4.2 per cent in FY14 to a mere 0.1 per cent by December 2024⁹.

Box VI.8: Measures initiated in February 2024 to facilitate consumers

To enhance the energy infrastructure following additional measures have been undertaken to simplify rooftop solar installations, support EV charging, expedite new electricity connections and facilitate better consumer experience.

- **Rooftop solar PV simplification:** Rules were amended in February 2024 to ease and accelerate the installation of rooftop solar systems. Approvals for systems up to 10 kW no longer require feasibility studies, and timelines for larger systems and commissioning were significantly reduced.
- **EV charging connections:** Consumers can now obtain separate electricity connections for charging electric vehicles, supporting India's Net Zero goal by 2070.
- **Faster new connections:** Timelines for obtaining new electricity connections were reduced to three days in metropolitan areas, seven days in municipal areas, and fifteen days in rural areas.
- **Consumer choice in metering:** Residents of group housing societies and residential colonies can choose either individual or single-point electricity connections. This has promoted transparency and flexibility.
- **Meter reading accuracy:** If a consumer disputes their meter reading, the licensee must install an additional meter within five days to verify consumption over three months, ensuring billing accuracy.

⁷ Ministry of Power (2024, December 12). Collation of replies to Lok Sabha starred and starred questions. Government of India. P.51,72. <https://tinyurl.com/mwv66z83>.

⁸ Ministry of Power (2024, December 12). P.51.

⁹ Ministry of Power (2024, December 12). P.59.

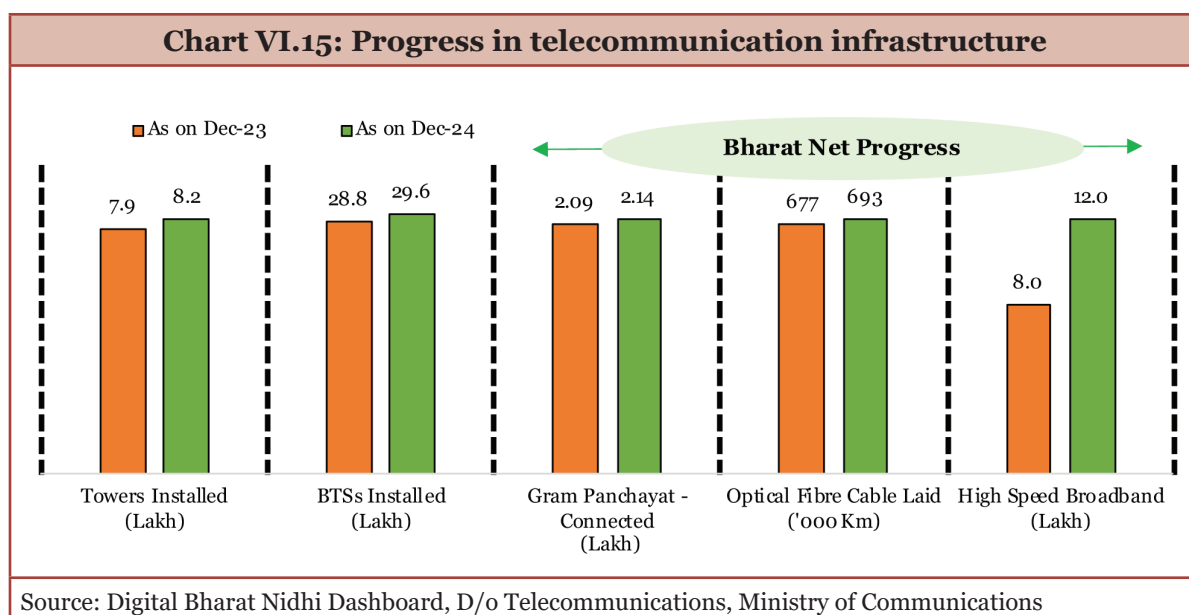
DIGITAL CONNECTIVITY

6.23 Digital connectivity has made major advancements in digital inclusion, technological innovation, and regulatory reforms this fiscal year, all in line with the government's vision for a Digital India.

Telecommunications

6.24 The rollout of 5G services, along with the introduction of new policies aimed at enhancing telecommunications infrastructure and user experience, has played a crucial role in digital connectivity. By October 31, 2024, 5G services were launched in all states and union territories. Currently, 5G services are available in 779 out of 783 districts¹⁰. Over 4.6 lakh 5G Base Transceiver Stations (BTSS) have been installed nationwide.

6.25 In July 2022, the Union Cabinet approved a project to provide 4G mobile services to 24,680 uncovered villages in remote areas and upgrade 6,279 villages, which were then using 2G/3G networks. By December 2024, 7,815 sites covering 10,706 villages have been commissioned.



6.26 In August 2024, the Universal Service Obligation Fund, providing financial support for telecom services and subsidising mobile services, broadband connectivity and infrastructure in rural and remote areas was rechristened Digital Bharat Nidhi (DBN). The progress of activities supported under DBN is presented in Box VI.9.

Box VI.9: Providing connectivity in difficult terrains

Telecom infrastructure is being strengthened through Bharat Net Project, extending broadband to villages, and enhancing mobile coverage in the North-East, border areas, and islands. Key efforts include:

- **Bharat Net Project** to connect all Gram Panchayats and villages with broadband. As of December 2024, 6.92 lakh km of Optical Fibre Cable (OFC) has been laid, 2.14 lakh GPs are service-ready (including 5,032 via satellite, 12.04 lakh FTTH connections have been installed).
- **Comprehensive telecom development plan for north-eastern region:**
Mobile Services: 1,358 sites providing services in uncovered villages and highways. Arunachal Pradesh and Assam: 671 towers cover 1,178 villages. Meghalaya: 433 towers cover 622 villages and 3 highways.
- **Telecom development for islands:**
 - Andaman & Nicobar Islands: Submarine OFC connectivity completed, with 205 Gbps bandwidth utilised and satellite bandwidth increased from 2 Gbps to 4 Gbps.
 - Lakshadweep Islands: Submarine OFC project (1,869 km) commissioned in January 2024, enabling 5G and FTTH services.
- **Mobile services in uncovered areas:**
 - Border Villages Scheme: 319 villages covered with 4G (295 towers).
 - LWE-Phase I & II: 297 towers upgraded to 4G under Phase I. 1,106 towers commissioned under Phase II, covering 1,162 locations.
- **Aspirational districts scheme:**
 - 502-Village Scheme: 215 towers commissioned, covering 251 villages across 112 districts in 4 states.
 - 7,287-Village Scheme: 2,497 sites commissioned, covering 3,804 villages in 5 states.

Information Technology

6.27 The GI Cloud initiative, known as MeghRaj, is a key component of India's information technology strategy, aimed at delivering ICT services via cloud computing to Central and State/UT Departments. As of November 30, 2024, the National Informatics Centre supports 1,917 applications on its cloud. The government has empanelled 23 public and private cloud service providers to address the cloud needs of user departments.

Box VI.10: Capacity advancement in data centre

India's data centre market is witnessing significant growth, fuelled by the expansion of infrastructure and a rising demand for digital services. The following literature provides evidence to support this trend:

- India's colocation data centre capacity reached 977 MW¹¹ in 2023. Capacity of 258 MW

¹¹ Cushman & Wakefield (2024, July). Potential for 5x capacity expansion to fuel digital transformation. <https://tinyurl.com/4w4x34a4>.

was added in the year, reflecting a 105 per cent year-on-year growth. The total capacity under construction for 2024-2028 is 1.03 GW, with an additional 1.29 GW planned.

- The data centre market in India is expected to grow from US\$4.5 billion in 2023 to US\$11.6 billion by 2032, at a CAGR of 10.98 per cent¹².
- India benefits from lower construction costs, owing to its well-established IT and digitally enabled services ecosystem, as well as relatively affordable real estate with a median of US\$6.8 million per MW in 2023, compared to US\$9.17 million in Australia, US\$12.73 million in Japan, and US\$11.23 million in Singapore¹³.

RURAL INFRASTRUCTURE

Rural Drinking Water and Sanitation

6.28 The Jal Jeevan Mission (JJM) aims to ensure long-term water security for rural households by providing reliable access to safe piped drinking water. When it was launched in August 2019, only 3.23 crore (17 per cent) of rural households had tap water connections. Since then, over 12.06 crore families have been added, increasing the total to more than 15.30 crore (79.1 per cent) out of approximately 19.34 crore rural households as of November 26, 2024. Eight states, namely, Arunachal Pradesh, Goa, Haryana, Himachal Pradesh, Gujarat, Punjab, Telangana and Mizoram, and three union territories, namely, Andaman & Nicobar Islands, Dadra Nagar Haveli & Daman Diu and Puducherry have achieved 100 per cent coverage. There are 2,160 water quality laboratories, 1,570 of which are accredited by National Accreditation Board for Testing and Calibration Laboratories, ensuring the safety of drinking water.

Box VI.11: Impact of Jal Jeevan Mission

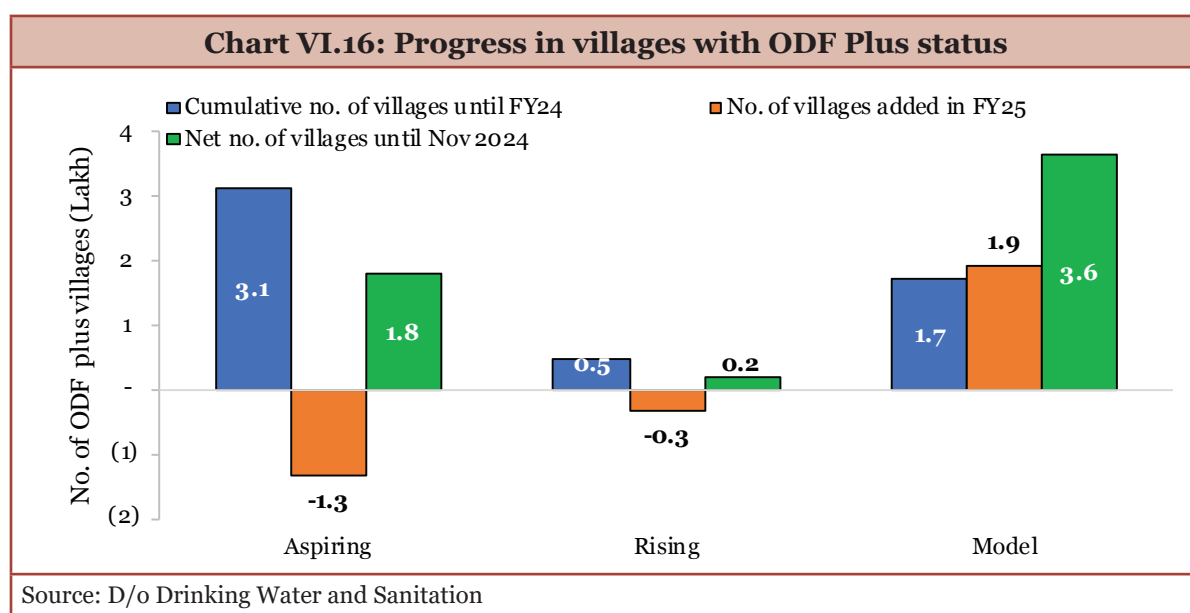
The mission improved access to safe drinking water in rural areas, particularly in regions affected by water quality issues like arsenic and fluoride. Its impact includes better health outcomes and enhanced water security for vulnerable populations.

- **Coverage of quality-affected Areas:** At the time of the launch of JJM, out of 19.4 crore rural households, over 75.2 lakh households lived in quality-affected areas that lacked safe drinking water. Since its implementation, 69.23 lakh rural households in quality-affected areas are getting safe piped water supply.
- **Arsenic-affected and fluoride-affected habitants:** Arsenic-Affected and Fluoride-Affected Habitants: Safe drinking water has been provided to more than 23 lakh households in arsenic-affected habitations and 11.43 lakh households in fluoride-affected habitations.
- **Community Water Purification Plants (CWPPs):** 618 CWPPs have been installed under JJM, out of which 573 are installed in arsenic and fluoride-affected areas.

¹² India Brand Equity Foundation (2024, October,01). Booming data centre growth in India. India Brand Equity Foundation. <https://tinyurl.com/mbcbah7f>.

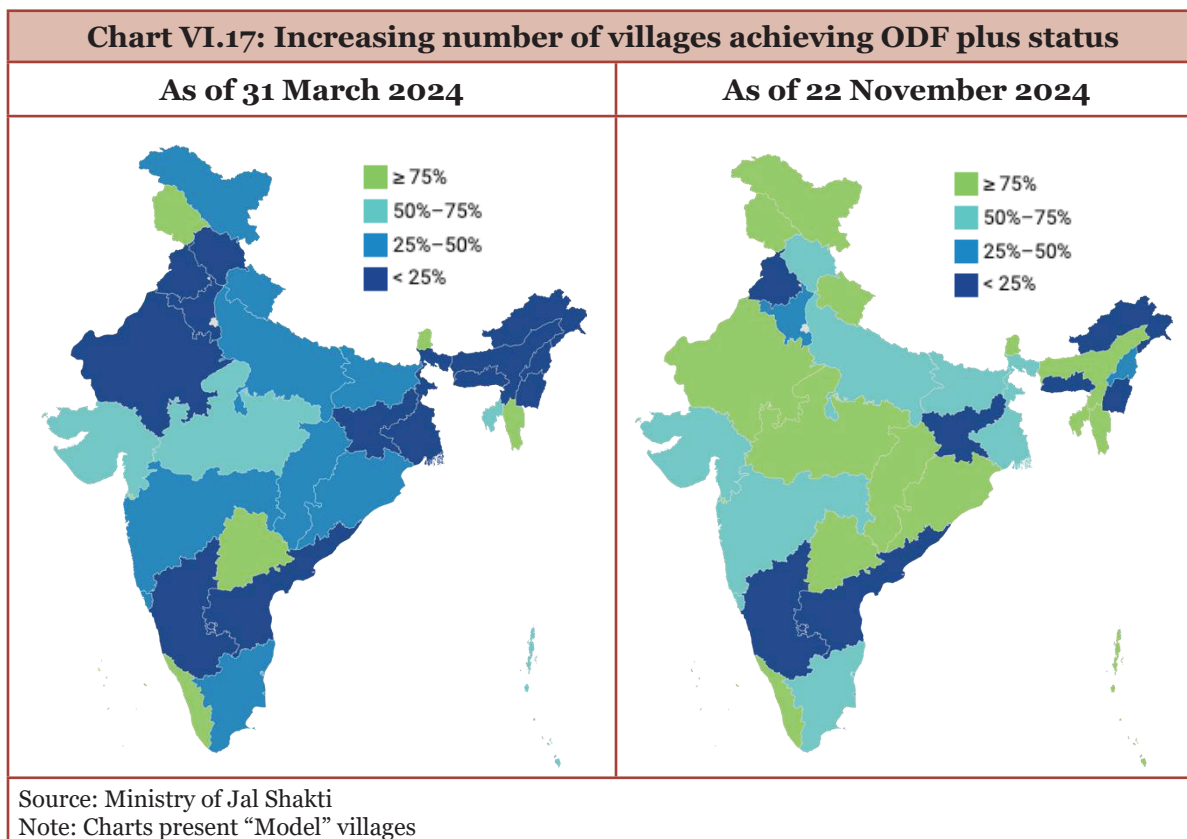
¹³ Cushman & Wakefield (2024, July). Potential for 5x capacity expansion to fuel digital transformation. <https://tinyurl.com/4w4x34a4>.

6.29 Swachh Bharat Mission– Grameen (SBM-G) achieved open defecation-free (ODF) status in the first phase. Phase II of SBM-G is implemented from 2020-21 to 2024-25, with a focus on converting the villages from ODF to ODF Plus. An ODF plus progress is captured in three categories¹⁴ namely aspiring, rising and model. The goal of SBM-G Phase-II is to make all the villages ODF Plus, i.e. “Model Category”. An ODF Plus village in the model category is one that is sustaining its ODF status, plus having arrangements for both solid and liquid waste management, observing visual cleanliness (minimal litter, minimal stagnant wastewater and no plastic waste dump in public places) and displaying ODF plus information, education and communication messages. During April to November 2024, 1.92 lakh villages were incrementally declared ODF Plus under the model category, taking the total number of ODF Plus villages to 3.64 lakh.



6.30 State-wise progress of villages achieving ODF plus status is presented in Chart VI.17. To highlight successful initiatives at the local level, two exemplary stories of waste management in Kerala and Madhya Pradesh are discussed in Box VI.12, demonstrating effective practices and impactful outcomes in these states.

14 Note: Aspiring: Sustaining ODF status + arrangements for Solid or Liquid Waste Management; Rising: Sustaining ODF status + arrangements for both Solid and Liquid Waste Management; Model: Rising category + observes visual cleanliness i.e. minimal litter, minimal stagnant wastewater and no plastic waste dump in public places. Displays ODF Plus Information, Education and Communication messages.



Box VI.12: Success stories of waste management initiatives

Model of sustainable development and community empowerment in Erattayar Gram Panchayat, Idukki, Kerala:



By focusing on waste management, the Panchayat preserves the environment and creates jobs, particularly for women. The strategy involves door-to-door collection, resource recovery, and recycling, reaching over 4,600 households and 500 institutions. Around 30 women are employed, earning an average of ₹10,000 monthly.

Despite initial challenges like fee collection and infrastructure issues, the Panchayat's resilience has driven progress. With enhanced training and partnerships, waste management practices have improved. The Haritha Karma Sena, with 28 dedicated members, plays a crucial role in this effort, collecting user fees from about 85 per cent of households and 90 per cent of institutions, generating approximately ₹2.5 lakh per month. Materials are meticulously segregated and sent to private agencies for further processing.

The Panchayat collects four tonnes of plastic and other non-biodegradable items monthly, adhering to a set schedule. This initiative not only fosters cleanliness but also empowers women, promoting inclusivity and gender equality. Erattayar Gram Panchayat's approach, emphasising collaboration, innovation, and empowerment, sets an example for other communities striving for a greener, more equitable future.

Transforming Waste into Wealth: NADEP Composting, Chhindwara, Madhya Pradesh

The Chhindwara district of Madhya Pradesh has prioritised biodegradable waste management as part of SBM-G Phase 2, establishing waste management infrastructure in 784 Gram Panchayats and 1,898 villages, including 8,507 NADEP (a method of organic composting that produces fertiliser from organic materials) compost pits. However, due to improper usage of these pits as community dustbins, the district initiated a comprehensive Swachhata Drive from May 1 to June 30. This initiative focused on enhancing awareness and promoting sustainable practices among rural communities.

Community engagement and capacity-building programmes were instrumental in the initiative's success. Extensive outreach efforts educated community members about the benefits of composting, while targeted training programmes equipped farmers and stakeholders with the knowledge to manage organic waste effectively. These efforts ensured the appropriate utilisation of cow dung and organic waste in NADEP pits, facilitating the production of high-quality compost.

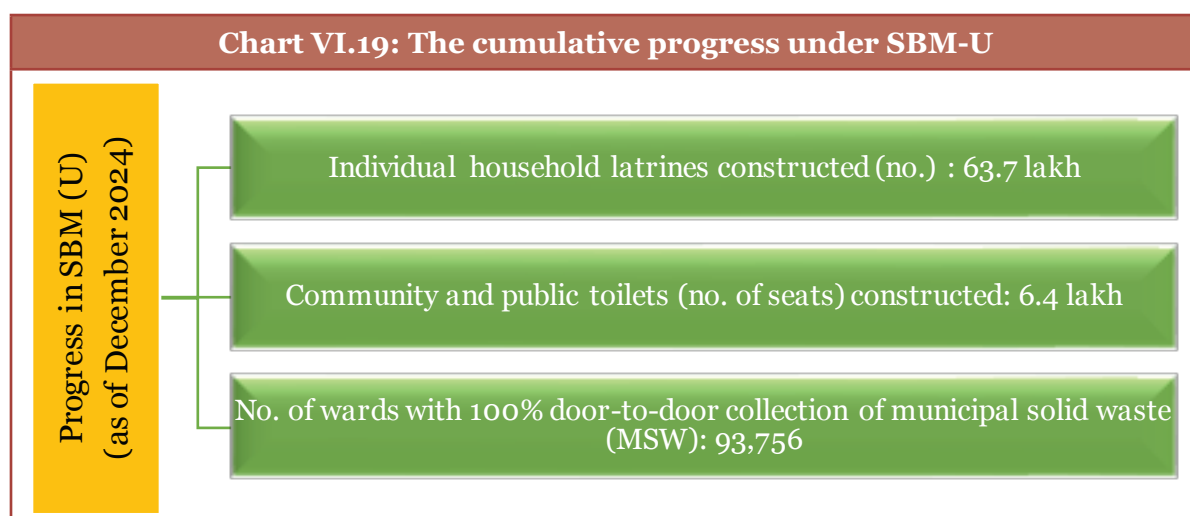
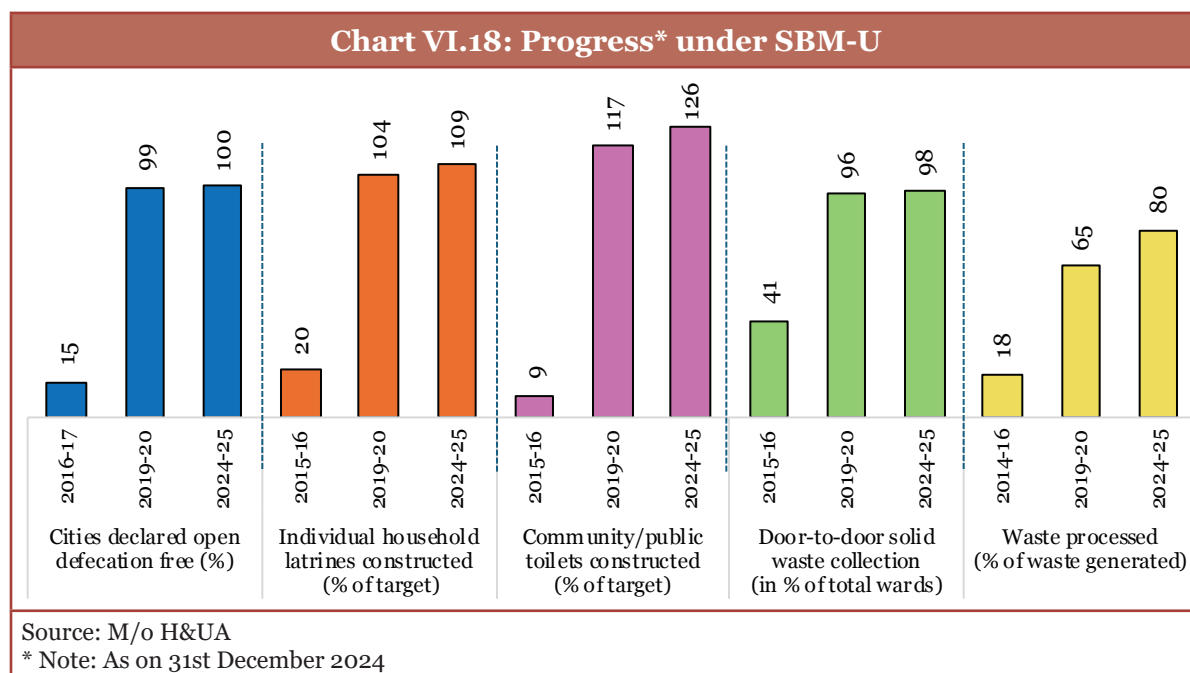
The initiative witnessed active participation of approximately 68,050 stakeholders, including farmers, PRI members, Swachhagrahis, SHGs, and community members, fostering significant improvements in waste segregation and management across villages. Each NADEP pit is projected to yield 500 kg of compost per cycle, generating an estimated income of ₹30,000 annually for farmers through three composting cycles. This shift is expected to reduce dependency on chemical fertilisers, decrease costs, and enhance soil health, supporting sustainable agricultural practices. Future plans include expanding the deployment of NADEP pits, ensuring their optimal use, and establishing market linkages for compost.

URBAN INFRASTRUCTURE

Swachh Bharat Mission-Urban

6.31 Building on the success of the Open Defecation Free (ODF) nation through the Swachh Bharat Mission (SBM-U), SBM-Urban 2.0 was launched in 2021. It envisions

creating ‘garbage-free cities’, integrating waste management and sanitation practices aligned with sustainability and circular economy principles. Progress and cumulative achievements under the SBM-U are given below:



6.32 The impact of the SBM-U was well-recognised. As per the 78th round report of NSS¹⁵, 97 per cent of households in urban areas report access to toilets. Niti Aayog Sector Report (2021)¹⁶ reported that SBM-U was well aligned with sustainable development goals and national priorities and was effectively implemented. Further, to encourage cities to improve urban sanitation, the government developed the ODF, ODF+,

¹⁵ Ministry of Statistics and Programme Implementation. (2023, March). Multiple indicator survey in India - NSS 78th Round Report (2020-21). Government of India. (<https://tinyurl.com/469rsmsj>)

¹⁶ Development Monitoring and Evaluation Office, NITI Aayog. (2021, July). Urban Transformation: Sector Report. Government of India. (<https://tinyurl.com/3t7evc72>)

ODF ++ and Water+ protocols to evaluate urban local bodies (ULBs) on standardised parameters of sustainable sanitation. Progress as of December 2024 is given below:

Table VI.1: Achievement under the standard uniform framework to evaluate cities

Protocol	Description	Progress
ODF certified	Complete access to toilets by citizens and ensuring that nobody goes out for open defecation at any time of day or night.	4,576 ULBs
ODF+	ODF and all community and public toilets are clean, hygienic and functional while following basic cleanliness criteria.	3,913 ULBs
ODF++	ODF+ and complete faecal sludge from toilets is safely contained, transported, and treated while ensuring that no untreated sludge is discharged in the open.	1,429 ULBs
Water+	ODF++ and ensuring that no untreated liquid waste (including wastewater) is discharged without proper treatment and ensuring maximum reuse of treated wastewater.	64 ULBs

6.33 Besides, leveraging ICT-enabled tools strengthened the mission governance. The Swachhata App effectively allows citizens to report grievances, directing them to the relevant municipal corporation for resolution. With 2.08 crore users, the app has handled 2.55 crore complaints, resolving 2.39 crore. The Google toilet locator allows users to upload information about community and public toilets in their cities as 'SBM Toilet' on Google Maps and provide feedback. To date, 67,407 toilets across 3,326 cities are mapped on Google Maps, including those in hospitals, malls, bus stands, railway stations, metro stations, markets, and more.

6.34 **Urban housing:** The Pradhan Mantri Awas Yojana – Urban (PMAY-U), launched in 2015, aims to provide permanent housing in urban areas. As of November 25, 2024, a total of 1.18 crore houses have been sanctioned, with 1.14 crore grounded and over 89 lakh completed. PMAY-U 2.0 was launched in September 2024 to assist an additional one crore households. Currently, 29 states and union territories have signed agreements to implement PMAY-U 2.0, with approval having been granted for 6 lakh houses in FY25.

6.35 **Urban transport:** Metro rail and rapid rail transit systems are operational or under construction in 29 cities across India, with 1010 kilometres currently operational in 23 cities and an additional 980 kilometres underway. As of January 5, 2025, 62.7 kms were operationalised in FY25, and the daily ridership reached 10.2 million. These systems have led to considerable savings in emissions, time, vehicle operating costs, accidents and infrastructure maintenance.

6.36 Atal Mission for Rejuvenation and Urban Transformation (AMRUT):

AMRUT scheme was launched in 2015 to focus on improving urban water management in 500 cities. As a result, tap water coverage has increased to 70 per cent, and sewerage coverage has risen to 62 per cent. The mission has created or augmented water treatment capacity of 4,649 million litres per day and developed 2,439 parks, adding 5,070 acres of green space. In 2021, AMRUT 2.0 was introduced to expand coverage to all statutory towns and cities, with an allocation of ₹2.77 lakh crore during FY22 to FY26. This phase so far has initiated 8,923 projects worth ₹1.89 lakh crore. AMRUT 2.0 actively involves self-help groups and promotes innovative technologies.

6.37 Smart Cities Mission: Launched in 2015, the mission aims to develop smart cities with essential infrastructure, good quality of life and a sustainable environment. As of 13 January 2025, 8,058 projects worth ₹1.64 lakh crore have been proposed, with 7,479 projects worth ₹1.50 lakh crore completed (Chart VI.20). Achievements under the mission are provided in Chart V1.21.

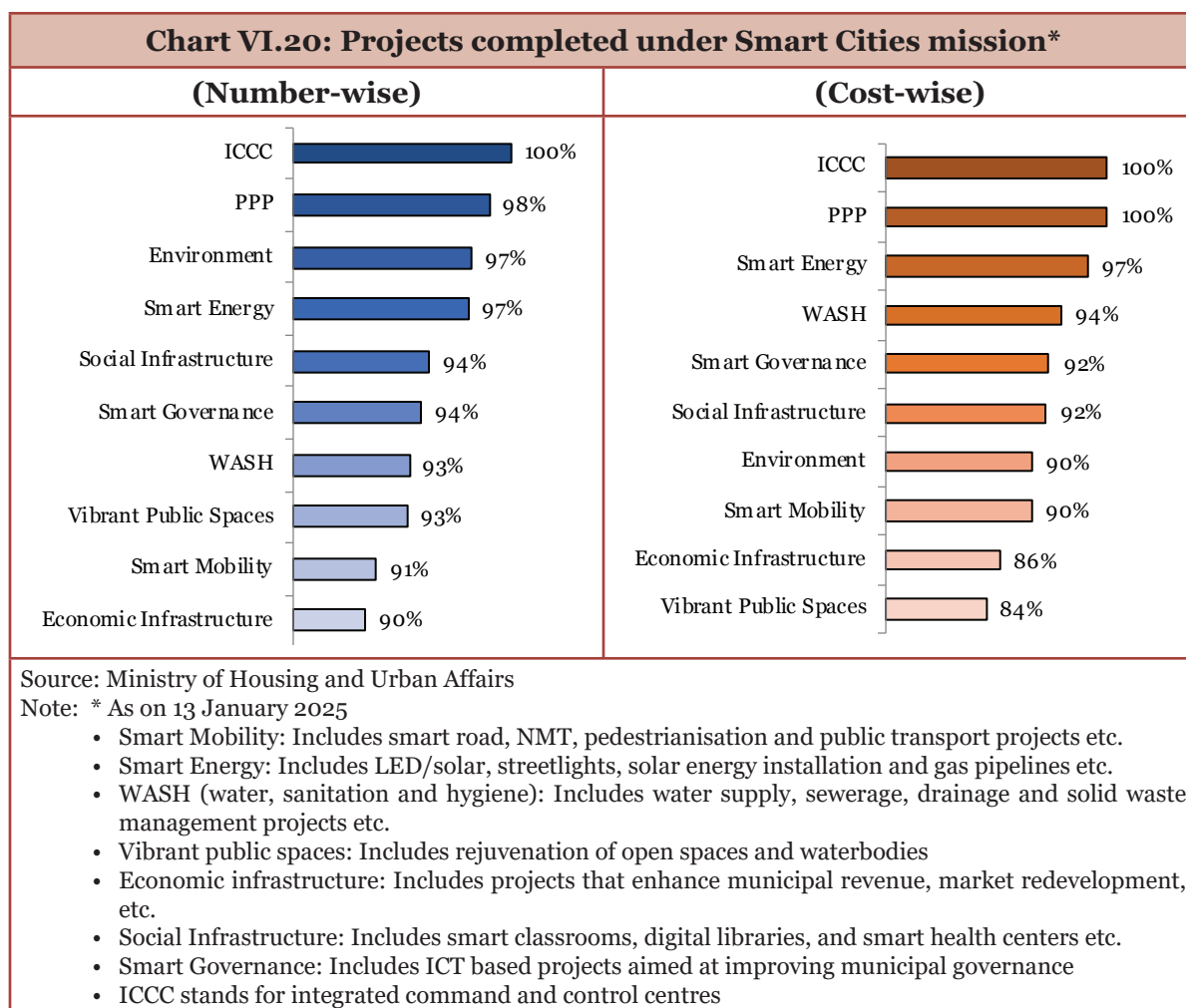


Chart VI.21: Achievements of the Smart Cities mission*

Integrated Command and Control Centres	• Operational in 100 cities. Used for urban management in crime tracking, safety, transport, disaster management, etc.
Public Safety	• 83,000+ CCTV cameras, 1,884 emergency call boxes, public address systems, and traffic enforcement tools installed
Public Safety	• 1,200+ projects completed, 318 km of waterfronts developed, 484 heritage sites conserved
Water Supply	• 17,000 km of water supply monitored via SCADA in 31 cities, reducing water loss and leaks.
Solid Waste Management	• ICCCs and 9,000 RFID-enabled vehicles in 48 cities optimized waste collection.
Streetlights	• 16 lakh solar/LED streetlights installed across 79 cities.
Mobility	• 1700 km of smart roads, shared bicycles (23,000), buses (1,500+), bus stops (2,000+), ITMS in 35 cities.
Affordable Housing	• 35,000+ affordable housing units built in 23 cities.
Smart Solutions	• 9,400 Wi-Fi hotspots and 83,000 CCTV cameras created.
Health	• 3,100+ hospital beds, 172 e-health centers, 155 health ATMs, and 300 sports facilities added.
Education	• 9,400 smart classrooms in 2,300 schools, digital libraries, and Anganwadis developed.
PPP Projects	• 199 projects worth ₹9,200 crores implemented in 50+ cities.
Economic Hubs	• Incubation projects and skill centers developed, supporting 1,400+ startups and 20,000+ vendors.

Source: Ministry of Housing and Urban Affairs
Note: * As of 18 Nov 2024

6.38 Central to urban transformation is leveraging technology and data to improve the efficiency and quality of urban services, including transportation, energy, healthcare, and education. Along these lines, the government has taken various initiatives, which are detailed in Box VI.13.

Box VI.13: Initiatives driving urban transformation

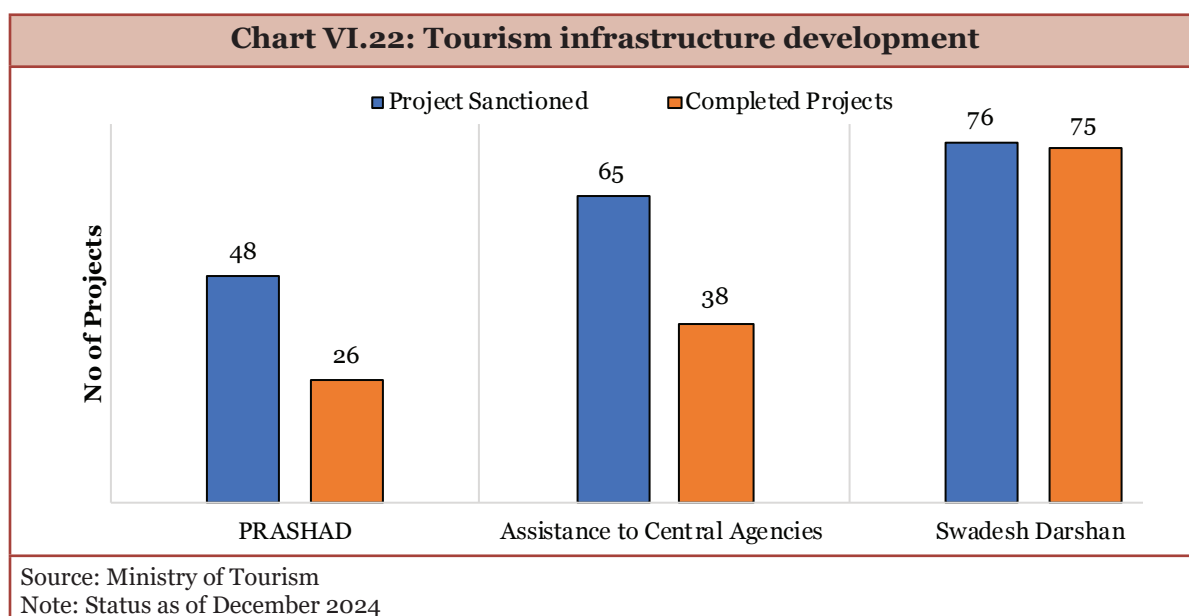
Several initiatives are being implemented to foster sustainable urban development and governance. These efforts focus on enhancing climate resilience, promoting data-driven decision-making, and improving infrastructure and citizen services across cities. These initiatives include:

- **Climate Smart Cities Assessment Framework (CSCAF):** Launched in 2019, this public assessment framework aims to enhance climate-sensitive development in cities. CSCAF 2.0 was introduced in 2020, evaluating 126 cities via 28 indicators across five thematic areas. The upcoming CSCAF 3.0 is currently being developed.
- **DataSmart cities strategy:** promotes data-driven governance with the data maturity assessment framework to assess cities' readiness to adopt data solutions, focusing on systemic and sectoral pillars.
- **National urban innovation stack:** facilitates collaboration within urban ecosystems by leveraging urban data, supporting data-driven governance.
- **National urban learning platform:** A scalable platform designed for capacity building among urban local bodies, offering a comprehensive approach to improve urban management capabilities.
- **City investments to innovate, integrate and sustain challenge:** supports innovative urban projects with significant funding, promoting circular economy practices. The second phase was approved in 2023 to fund climate-resilient infrastructure in a maximum of 18 cities.
- **Urban learning internship programme:** Launched in 2020, TULIP connects urban local bodies with youth, offering internship opportunities to enhance skills and experience in urban transformation. As of now, more than 49,000 internship opportunities have been posted across the nation, out of which over 14,500 internships are ongoing and completed.
- **National Urban Digital Mission:** seeks to establish shared digital infrastructure across cities, enhancing citizen-centric governance and service delivery by 2024.

6.39 Real Estate Development: Rules under the Real Estate (Regulation & Development) Act, 2016 (RERA) have been notified in all States and Union Territories except Nagaland, with various regulatory authorities established. About 1.38 lakh real estate projects and 95,987 real estate agents have been registered under the Real Estate Regulatory Authority as of January 6, 2025. 1.38 lakh complaints have been disposed of by the RERA across the country.

TOURISM INFRASTRUCTURE

6.40 The government has introduced several initiatives to promote domestic tourism. Pilgrimage Rejuvenation and Spiritual Augmentation Drive (PRASHAD) aims to develop tourism infrastructure at identified pilgrimage destinations and heritage cities (Chart VI.22).



6.41 Another major initiative of the Government to promote domestic tourism is Swadesh Darshan, which is aimed at the integrated development of tourism destinations, including theme-based tourist circuits. This programme was rechristened as the Swadesh Darshan Scheme 2.0 (SD 2.0) in 2022, with the vision to develop sustainable and responsible tourism destinations. Under this scheme, 34 projects have been approved, with a total funding of ₹793.2 crore.

6.42 Moreover, in line with the FY25 budget announcement, 40 projects across 23 states have been approved for interest-free loans for 50 years for an amount of ₹3,295.8 crore under the special assistance to states for capital investment. This initiative aims to create iconic tourist centres of global standards by supporting their development and marketing ¹⁷.

SPACE INFRASTRUCTURE

6.43 India currently operates 56 active space assets, including 19 communication satellites, nine navigation satellites, four scientific satellites, and 24 earth observation satellites. ISRO has enhanced its capabilities by adding a small satellite launch vehicle to its fleet. New Space India Limited (NSIL) successfully fulfilled its contract to launch 72 OneWeb satellites into low earth orbit. Recently it also launched the GSAT-20 satellite in collaboration with SpaceX. Various initiatives by the government in the domain of space-based infrastructure are given in Box VI.14.

¹⁷ Ministry of Tourism, (2024, December 25). Year End Review-2024: Ministry of Tourism. Government of India. [PIB Release]. <https://tinyurl.com/mja6ay3>.

Box VI.14: Space-based infrastructure monitoring platforms

ISRO's advanced geospatial platforms are playing a pivotal role in infrastructure monitoring and management. These initiatives support a range of projects, from rural development and electrical infrastructure to judicial and urban planning, enhancing efficiency and tracking progress.

- **ISRO's Bhuvan Platform:** supports infrastructure monitoring under schemes like MGNREGA and the watershed component of PMKSY at different stages of implementation.
- **Electrical infrastructure management:** Bhuvan facilitates the management of electrical infrastructure in Maharashtra and Telangana through Web-GIS portals.
- **NyayaVikas Portal for judicial infrastructure:** Developed in collaboration with the Department of Justice, this portal monitors 2,840 judicial projects using Web GIS and mobile geotagging, with over 7,900 geotags created to track progress.
- **Urban geospatial databases for AMRUT Cities:** ISRO has created large-scale 2D urban geospatial databases for 238 AMRUT cities, assisting in developing GIS-based master plans for urban planning.

6.44 As part of India's Space Vision 2047, the Union Cabinet has approved four key projects: the Gaganyaan follow-on mission, which will pave the way for the establishment of the first module of the Bhartiya Antariksh Station; the Chandrayaan-4 Lunar Sample Return Mission; the Venus Orbiter Mission; and the development of the Next Generation Launch Vehicle. These initiatives aim to enhance India's technological capabilities, foster industry collaboration, and strengthen the country's position in global space exploration.

CONCLUSIONS AND WAY FORWARD

6.45 The government has placed infrastructure development at the centre stage of its fiscal and public policy agenda. The capital expenditure of the union government for FY25 has been budgeted at about 3.3 times the capex for FY20. In Q1FY25, the constraints on new approvals and spending during the general elections, coupled with heavy monsoon in many regions, affected the progress of the infrastructure spending. Between July and November 2024, the pace of capex has picked up.

6.46 The review in the chapter shows that the progress of physical indicators in the current year mirrors the financial progress. The addition to the rolling stock of railways, port handling capacity and power and transformation capacity improved during FY25 so far on a Y-o-Y basis. The addition to the length of highways, roads and railway lines has been modestly lower. On the whole, seen against the background of the constraints that prevailed in Q1FY25, infrastructure build-up in the current year has stayed on course.

6.47 Apart from asset creation, our infrastructure programme also emphasises the use of sustainable materials and processes. These considerations are receiving particular attention in areas such as highway development, waterway projects, power capacity addition and waste management. Given the global imperative of promoting sustainable practices, model practices in this direction need to be replicated widely.

6.48 India needs a continued step-up of infrastructure investment over the next two decades to sustain a high rate of growth. Requirements are aplenty. Accelerating our efforts to build integrated multi-modal transport, coupled with the modernisation of existing physical assets, will improve efficiency and last-mile connectivity. Disaster-resilient urbanisation, public transport, preservation and upkeep of heritage sites, monuments and tourist destinations, as well as rural public infrastructure, including connectivity, call for greater attention. Our Net Zero commitments entail added stress on creating renewable energy capacities.

6.49 Quite clearly, public sector efforts cannot fully meet these requirements. There are binding budget constraints to the different tiers of government. Private participation should accelerate in many critical infrastructure sectors in many ways—programme and project planning, financing, construction, maintenance, monetisation and impact assessment.

6.50 Our infrastructure programme supports a variety of PPP models like build-operate-transfer (toll and annuity), design-build-finance-operate-transfer, hybrid annuity model and toll-operate-transfer. The government has instituted many de-bottlenecking and facilitatory mechanisms like the National Infrastructure Pipeline, National Monetisation Pipeline and PM-Gati Sakti that have made progress. Financial market regulators have introduced reforms to encourage private participation. Yet, the uptake of private enterprise is limited in many core sectors.

6.51 The strategy to step up private participation needs coordinated action of all stakeholders involved - governments at different tiers, financial market players, project management experts and planners, and the private sector. Capacities to conceptualise projects, develop sector-specific innovative strategies for execution, and, develop high-expertise areas such as risk and revenue sharing, contract management, conflict resolution and project closure need to improve substantially. The efforts of the Union Government would need to be supplemented with wholehearted acceptance of the need for public-private partnerships in infrastructure across the country.

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INDUSTRY: ALL ABOUT BUSINESS REFORMS

The global manufacturing landscape has undergone significant shifts over the past decade. India has been one of the dynamic economies that gained greater presence in the space gradually vacated by developed countries. A strategic emphasis on public capital formation and significant logistic improvements has underpinned this achievement. Lately, however, there have been serious challenges to global manufacturing in terms of persistent geopolitical tensions, aggressive industrial and trade policies, supply chain disruptions, and global trade slowdown. This has posed a challenge to export demand for India's manufactured products.

Industries such as steel, cement, chemicals, and petrochemicals have stabilised industrial growth, while consumer-focused sectors like automobiles, electronics, and pharmaceuticals have emerged as growth drivers. As we progress, fostering R&D investments, innovations, enhancing the growth and formalisation of smaller manufacturers will drive growth across various sectors.

State-level analysis indicates that business reforms in states are likely to foster industrial development. Achieving India's ambition of becoming a strong manufacturing power necessitates sustained and coordinated efforts from all tiers of government, the private sector, the skilling ecosystem, academia and R&D institutions.

GLOBAL BACKGROUND

7.1 In the global manufacturing space, high-income countries have lost a significant part of their share during the last decade¹. This was largely gained by the upper middle-income countries, mainly based on China's strength. The share of lower middle-income economies did not, in general, increase. Yet, India managed to improve its share in the pie and global presence.

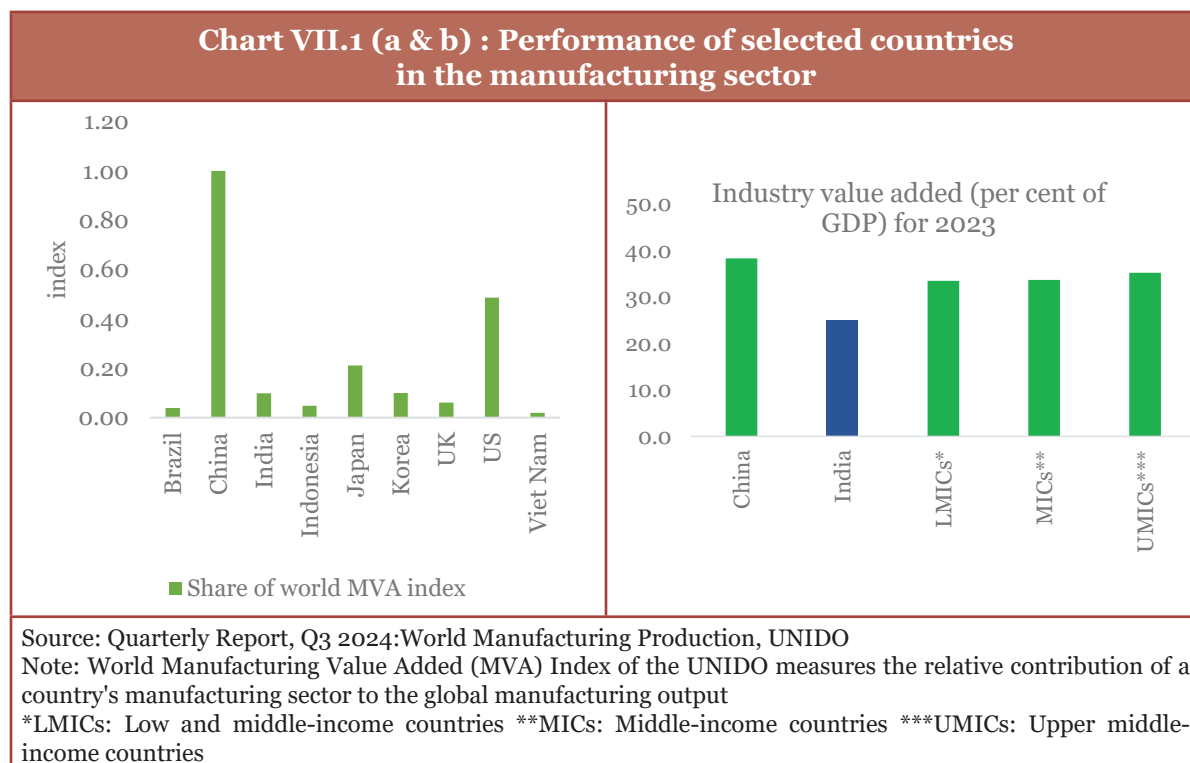
7.2 However, with 2.8 per cent of the global share in manufacturing, compared to China's 28.8 per cent, India has a large opportunity to climb up the ladder² (chart VII.1(a)). India also has a substantial scope to improve the contribution of the industrial sector in GDP in relation to its comparator countries (chart VII.2(b)). More so in the

1 World Development Indicators, World Bank.

2 United Nations Industrial Development Organisation (UNIDO).

light of the IMF's observation³ that manufacturing production is increasingly shifting towards emerging market economies, particularly China and India. India stands a good chance of benefitting from the trends in global industrial diversification⁴.

7.3 While this remains an upside of possibility, the downside stems partially from the increasing risks of industrial and trade policy measures by the countries faced with external competition and internal weaknesses. There are also early global indications that, given elevated commodity price trends, consumption is tilting away from manufactured items and more towards services.



7.4 Recently, the global manufacturing is facing a range of challenges, including persistent supply chain disruptions, political instability, pressure to reduce emissions and move towards renewables⁵, increased logistics costs and other effects of regional conflicts. As a result, the global manufacturing output rose modestly by 0.4 per cent only in the third quarter of 2024, compared to a stronger growth of nearly 1 per cent in the previous quarter⁶. Hence, in a rather unsupportive global environment, it calls for lasting, coordinated efforts from all tiers of government, the private sector, the skilling ecosystem, academia and R&D institutions, as well as financial stakeholders to enable India to realise its ambition as a manufacturing powerhouse.

³ World Economic Outlook, IMF, October 2024.

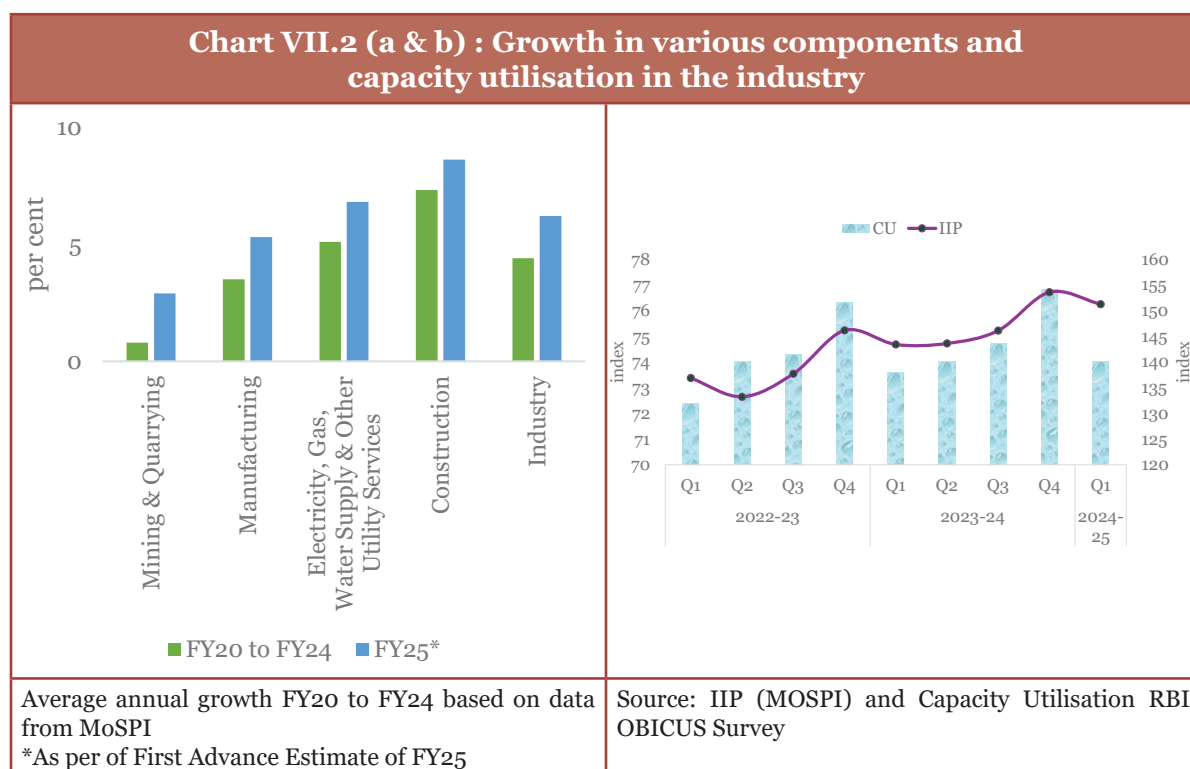
⁴ Ibid.

⁵ Bloomberg. (2024, October 21). Coal is powering the energy transition more than we'd like to admit. Bloomberg. <https://t.ly/R3s5A>.

⁶ Quarterly Report, Q3 2024: World Manufacturing Production, UNIDO.

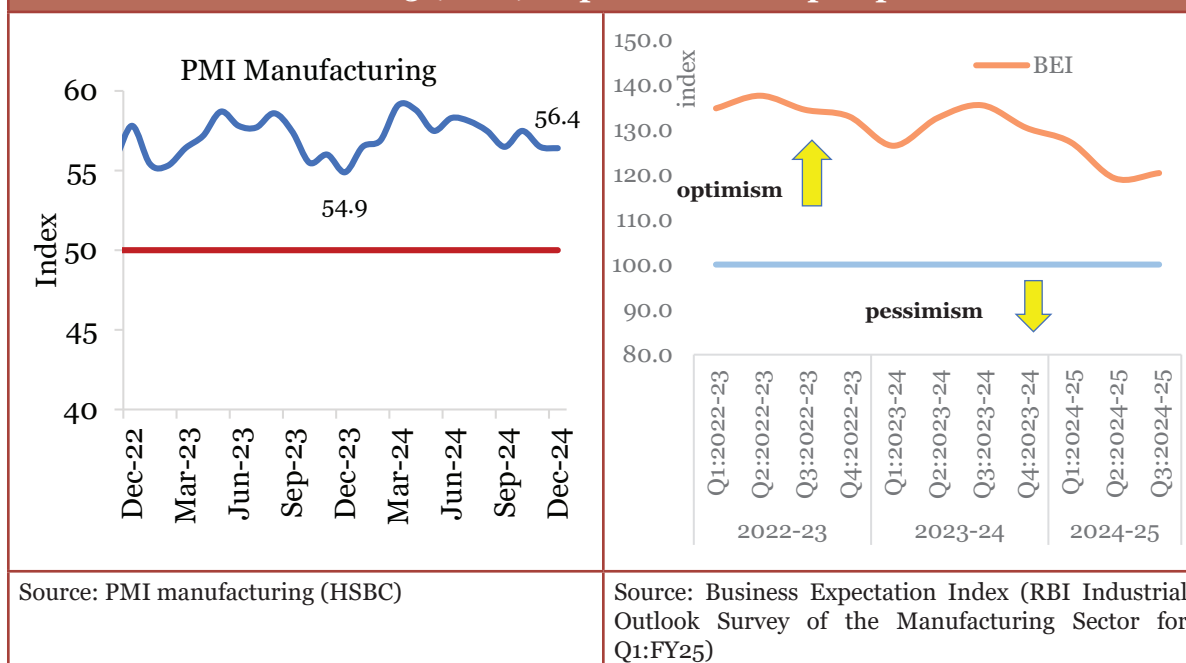
RECENT DOMESTIC DEVELOPMENTS

7.5 The industrial sector (including four sub-sectors, i.e., mining and quarrying; electricity, gas, water supply and utilities; manufacturing and construction) was affected significantly by the pandemic, leading to a contraction in FY21. This led to growth fluctuations in subsequent years. Hence, comparing FY25 with an average of the previous five years, including the pre-pandemic FY20, is appropriate. Chart VII.2(a) shows that the industrial growth in FY25 is expected higher than the previous five-year average. The industrial sector grew by 6.2 per cent in FY25, driven by robust growth in electricity and construction.



7.6 However, industrial growth has declined to 3.6 per cent in the second quarter (Q2) of FY25 on account of three major factors. Firstly, manufacturing exports experienced a sharp slowdown due to economic challenges in destination countries and intensified trade competition and industrial policies followed by many major trading nations. Secondly, the unprecedented levels of monsoon produced mixed impacts. While it helped replenish reservoirs and boost farming operations, it also slowed down activities like mining, construction and, to an extent, manufacturing. Thirdly, the variation in the timing of festivals between September and October in the previous and current years contributed to a slight statistical downward bias in the growth figures for Q2 as festivals drive higher consumer spending and economic activity. Festival sales of select consumer items, including automobiles, picked up in October.

Chart VII.3 (a & b) : Optimism about prospects



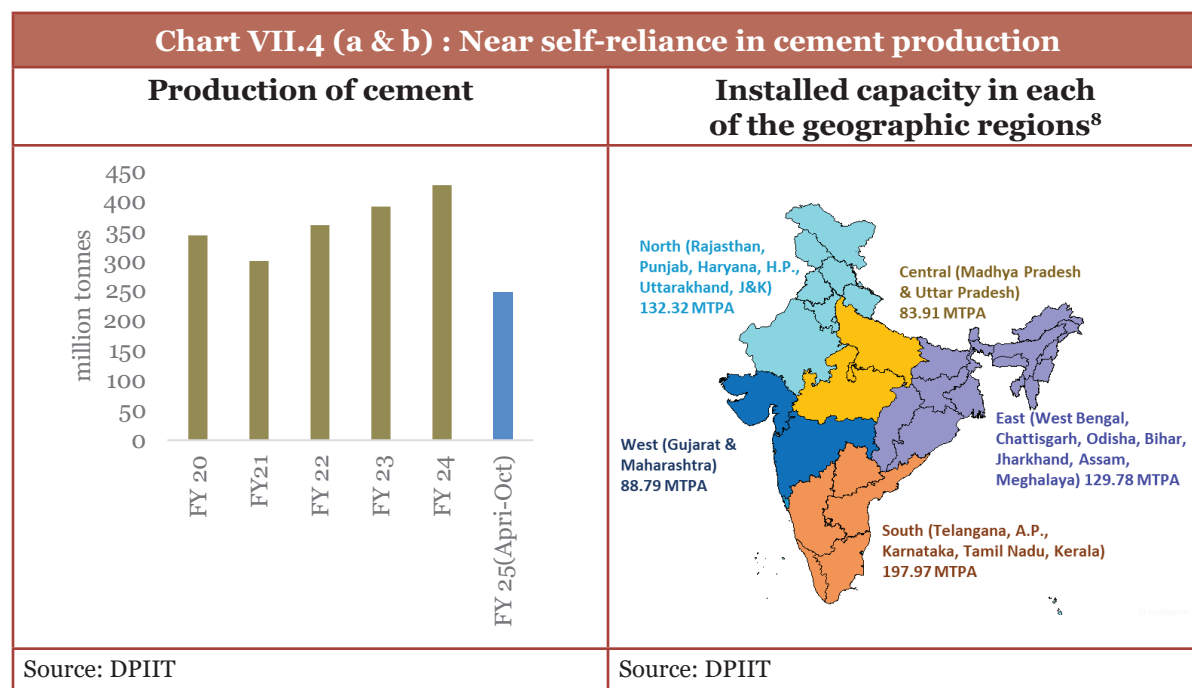
7.7 The remaining sections of the chapter are organised as follows. The next two sections review the progress, challenges, and policy measures across various industrial segments, including core industrial input industries and capital and consumer goods sectors. This is followed by a brief discussion on over-arching themes like research and development and micro, small and medium enterprises. The state-level variations in the degree of industrialisation and the scope for progress are examined in the following section. The last section concludes the discussions and presents a way ahead.

CORE INPUT INDUSTRIES

Cement

7.8 Currently, India is the second largest cement producer in the world after China⁷. The Indian cement industry comprises 159 integrated large cement plants, 128 grinding units, five clinkerization units and 62 mini cement plants. The current annual installed capacity of the cement industry is about 639 million tonnes, with cement production of around 427 million tonnes in FY24. Most of the cement plants in India are located in proximity to the raw material source. About 87 per cent of the cement industry is concentrated in the States of Rajasthan, Andhra Pradesh, Telangana, Karnataka, Madhya Pradesh, Gujarat, Tamil Nadu, Maharashtra, Uttar Pradesh, Chhattisgarh, Odisha, Meghalaya and West Bengal. The industry has adequate capacity to meet the domestic cement demand. Domestic cement consumption is around 290 kg per capita

against a global average of 540 kilograms per capita. The government's focus on mega projects like highways, railways, and housing schemes, coupled with rural development and industrial growth, is expected to fuel significant cement demand.



7.9 The cement industry carries an environmental footprint. The industry has been actively working to reduce its carbon emissions of cement by 2070.

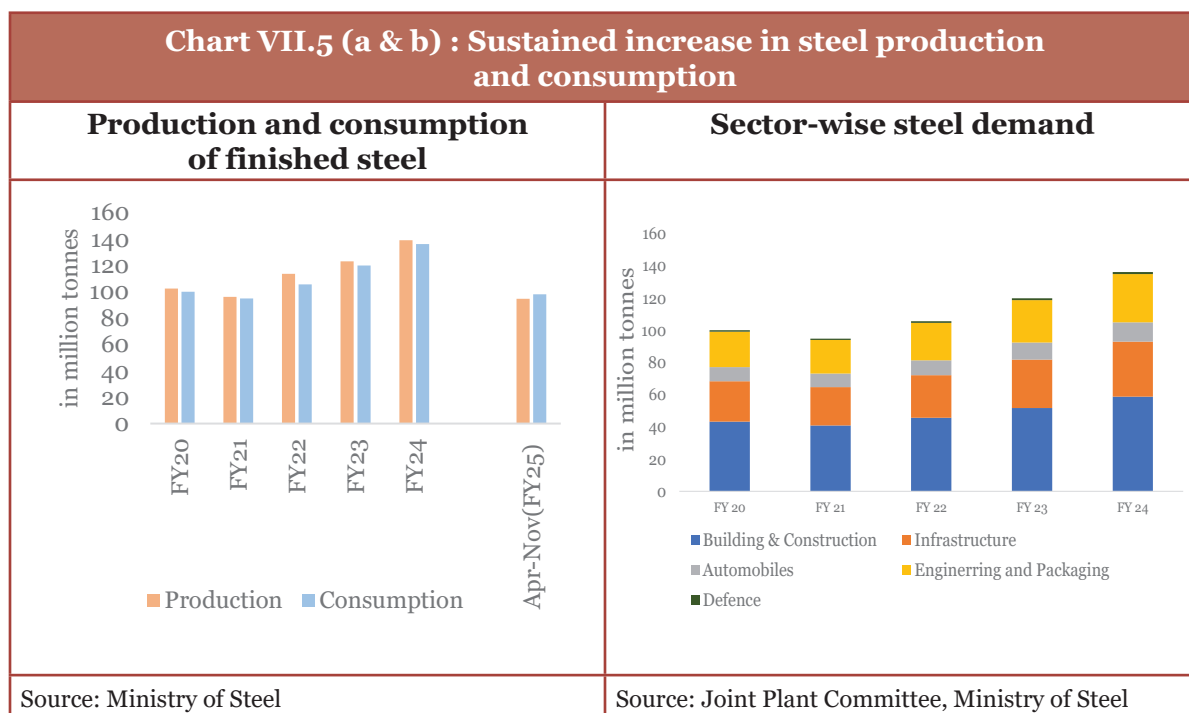
Steel Industry

7.10 In April-November of FY25, the country's crude steel and finished steel production registered a growth of 3.3 per cent and 4.6 per cent. There has been an overall upward trend in steel production and consumption during April-November FY25 despite some month-on-month fluctuations.

7.11 The sustained growth in steel sector was fuelled by ongoing development projects and increased public infrastructure spending. The primary drivers of steel demand included expansion in end-user sectors and the implementation of policies like the National Steel Policy and Production-Linked Incentive schemes. Government initiatives on housing, urban and rural infrastructure also contributed to the rising demand⁹.

⁸ MTPA (Million Tonnes Per Annum).

⁹ <https://t.ly/RoLzj>.

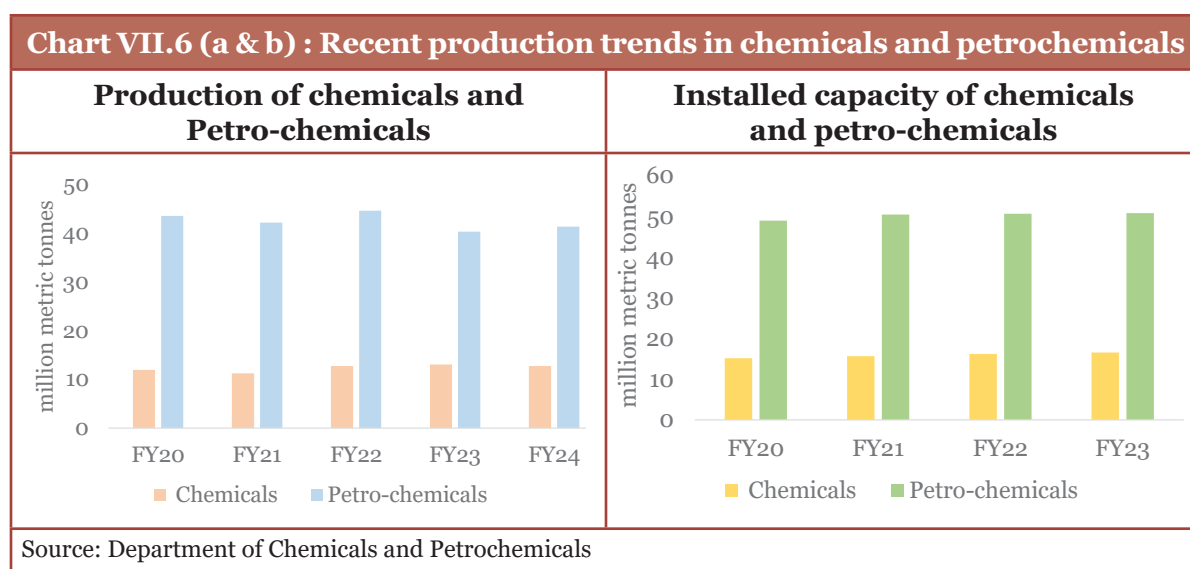


7.12 Driven by an infrastructure-focused growth strategy, steel demand in India is expanding at a strong pace. This growth is further bolstered by significant advancements in key user industries, particularly building & construction, and infrastructure. In FY24, construction, and infrastructure accounted for an estimated 68 per cent of total steel consumption, followed by engineering and packaging at 22 per cent and automobiles at nine per cent. India has been a net importer of steel from April to November FY25. The decline in India's export of finished steel during FY25 was mainly driven by gaps between international and domestic prices. The low price in the international market during this period resulted in a low margin on exports and cheaper imports.

7.13 The government's Steel's Scrap Recycling Policy encourages efficient recycling of scrap. The total domestic consumption of steel scrap in India is approximately 30 Million Tonnes (MT), of which around 5 MT is imported. Ensuring the availability of high-quality scrap in sufficient quantities is crucial for transitioning to green steel and supporting the future growth of the steel industry. In addition, the use of scrap significantly reduces specific energy consumption. It also reduces the water consumption by 40 per cent, and greenhouse gas emissions by 58 per cent¹⁰.

Chemical and Petrochemical Sector

7.14 The share of chemicals and chemical products sector in the GVA of manufacturing sector (at 2011-12 prices) was 9.5 per cent during FY23. The country is a net importer of these products, with a dependence on imports of around 45 per cent of petrochemical intermediates¹¹. Reducing the gap between domestic demand and supply is a high priority.

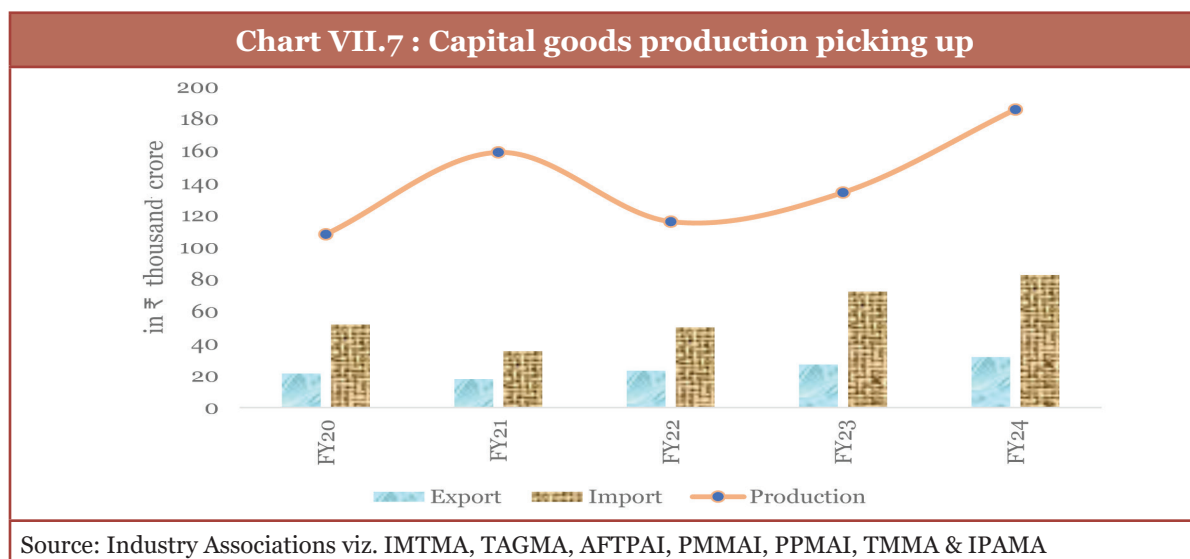


PERFORMANCE OF CAPITAL GOODS AND CONSUMER GOODS INDUSTRIES

Capital goods

7.15 The production of capital goods fluctuated between FY20 and FY23, before recording a robust growth in FY24. Yet, the growing reliance on the import of such goods poses a challenge. Due to technology gaps, this sector imports the high-end machines required for manufacturing. There is an urgent need to address the technology, skill and infrastructure gaps. The government has notified phase II of the Scheme for Enhancement of Competitiveness of the Capital Goods Sector. The objective of Phase II of the Scheme is to expand and enlarge the impact created by its Phase I. Phase II of the scheme promotes identification of technologies through technology innovation portals, setting up of new advanced centres of excellence and common engineering facility centres among others for enhancing the global competitiveness of capital goods sector.

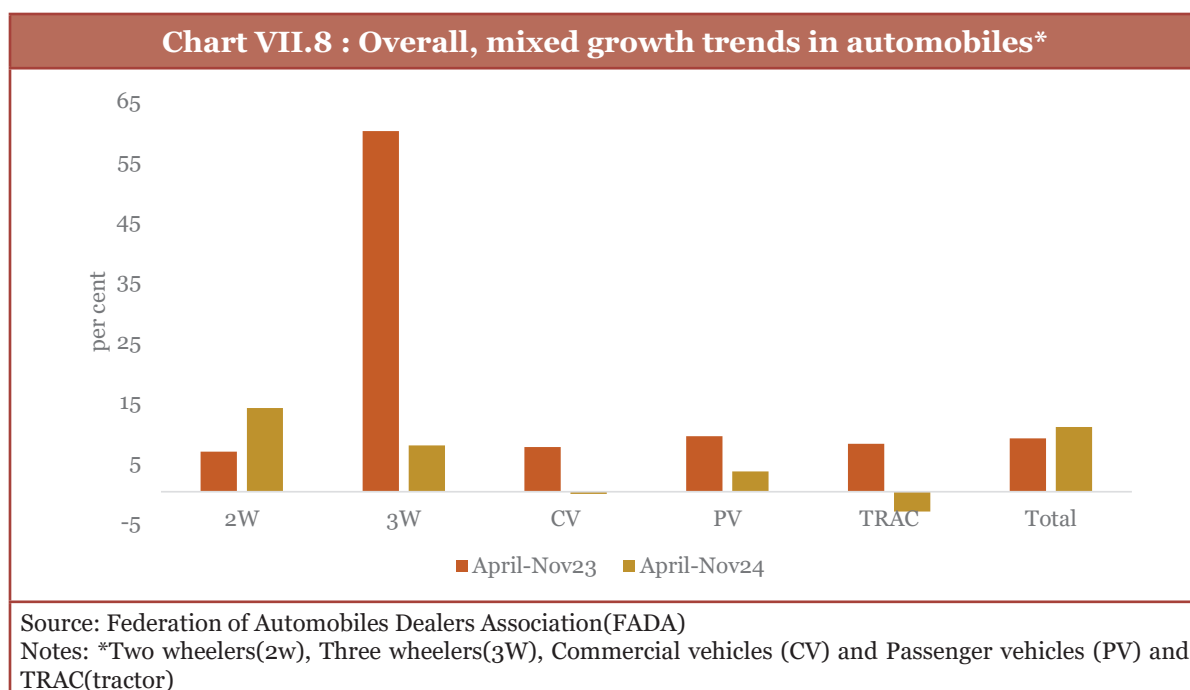
11 <https://pib.gov.in/PressReleasePage.aspx?PRID=2066478>.



7.16 The government has been actively promoting Smart Manufacturing and Industry 4.0, supporting the establishment of Smart Advanced Manufacturing and Rapid Transformation Hub (SAMARTH) Udyog centres at various institutions. These centres aim to foster an ecosystem where manufacturing industries, especially SMEs, can learn about and adopt new technologies.

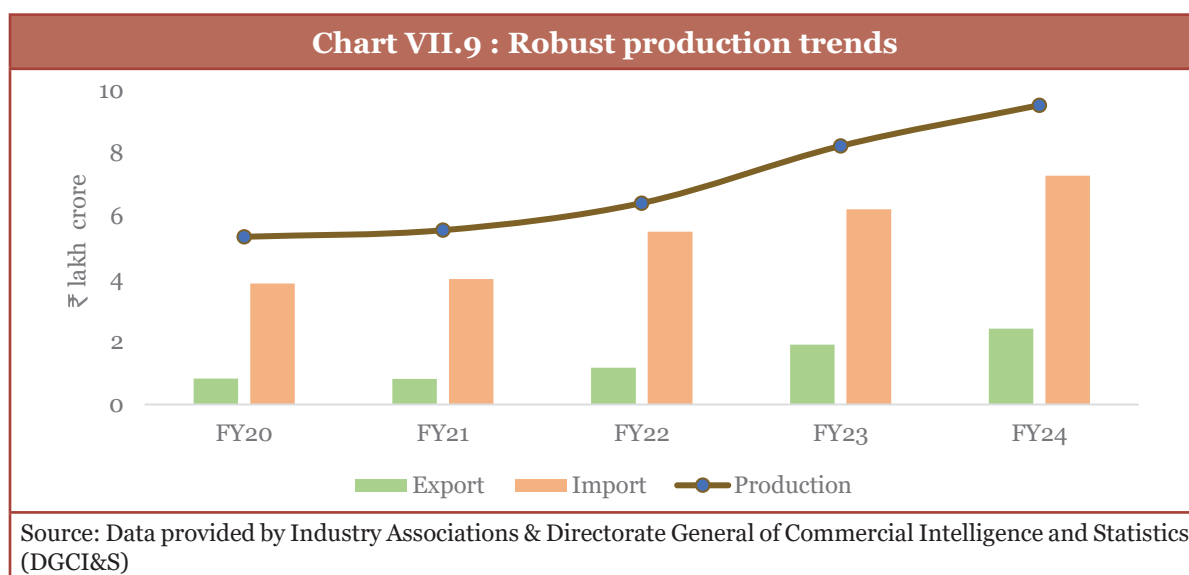
Automobile Industry

7.17 The Indian automobile industry is a significant driver of economic growth, offering a diverse range of domestically produced vehicles. In FY24, the industry recorded automobile domestic sales growth of 12.5 per cent. Recognising the sector's potential, the government has extended the PLI Scheme by one year.



Electronics Industry

7.18 India's electronics sector has been dynamic regarding domestic production, exports and imports in the last decade. The domestic production of electronic goods has increased substantially from ₹1.90 lakh crore in FY15 to ₹9.52 lakh crore in FY24, growing at a CAGR of 17.5 per cent. The country has also drastically reduced its dependence on smartphone imports, with 99 per cent now manufactured domestically. In FY24, the country produced approximately 33 crore mobile phone units, with over 75 per cent of the models being 5G enabled. The key drivers of growth have been the large domestic market, the availability of skilled talent, and low-cost labour.



7.19 Programmes such as Make in India and Digital India, along with improved infrastructure, ease of doing business, and various incentives, have boosted domestic manufacturing and drawn foreign investments. However, India's electronics market represents 4 per cent of the global market. The industry has largely focused on assembly, with limited progress in design and component manufacturing.

BOX-VII.1: Empowering India's Domestic Manufacturing in Electronics Sector Through Production-linked Incentives

The PLI scheme has been introduced in 14 key sectors including electronics. The PLI scheme adopts a sector-specific approach, avoiding a "one size fits all" methodology. In the electronics sector, PLI aims to scale up assembly processes to encourage the existing domestic manufacturing ecosystem. The results are evident: in FY15, mobile phone imports accounted for 78 per cent of the market in value terms, whereas, by FY23 this figure had dropped to just 4 per cent. In terms of volume, only 0.8 per cent of mobile phones were imported in FY23. Exports tell a similar story. Mobile phone exports, valued at zero in FY16, soared to ₹88,726 crore in FY23. Similarly, in the white goods sector, the scheme seeks to boost domestic value addition, targeting an increase from 15-20 per cent to 75-80 per cent¹².

12 Inputs for the paragraph are sourced from NITI Aayog.

The 3rd Round of on-line application window for PLI Scheme for White Goods (Air Conditioners and LED lights) attracted 38 responses. 43 per cent of the new applicants are in the MSME sector which shows the confidence among MSMEs to become part of the value chain of manufacturing of components of ACs and LED Lights.¹³

According to FICCI, the support of the PLI scheme, encouraging local production of the key components like compressor, heat exchangers, motors, controllers etc., triggered the development of a complete value chain for key AC components. As the annual size of room AC market has grown considerably in recent years, the import dependency for compressors has reduced. Local capacities for heat exchangers, cross flow fans and controller PCBAs also improved. The PLI scheme has fostered collaboration across various industry layers. Suppliers of raw materials, component manufacturers, and producers of finished goods, including multinational corporations and local brands, as well as MSMEs, have aligned their requirements.

Textiles

7.20 The textile industry is a major employment generator and it accounts for about 11 per cent of India’s manufacturing GVA. India is a leading producer of jute and ranks second globally in cotton, silk, and man-made fibre production. India is the sixth largest exporter of textiles and apparel and has a share of about 4 per cent of the global trade in this segment. The share of textiles and apparel, including handicrafts, in India’s total merchandise exports stood at about 8 per cent in FY24.



7.21 After having recorded a high of USD 44.44 billion in FY22, India’s export of textiles and apparel, including handicrafts, stood at USD 35.87 billion in the FY24, compared to export of USD 36.69 billion in FY23. India is looking to diversify its export market to other regions. India has traditionally focused on cotton textiles. Globally, manmade fibre (MMF) consumption is dominant. Hence, in order to move towards a higher global MMF share, it is essential to simultaneously focus on MMF along with cotton textiles.

¹³ <https://pib.gov.in/PressReleasePage.aspx?PRID=2064740>.

7.22 Technical textiles are another area of potential growth¹⁴. India's technical textile industry is rapidly growing, ranking fifth globally. Indian technical textiles market stands at US\$26.8 billion in FY24¹⁵. India is a net exporter of technical textiles, with exports valuing US\$2.58 billion in FY24. To assist the technical textiles manufacturing ecosystem, the government has introduced several initiatives, including the Production Linked Incentive (PLI) scheme. To ensure quality and standardisation of the technical textiles, 68 items have been brought under regulation through quality control order in various segments.

7.23 Despite possessing a complete value chain, textiles face several challenges. The dominance of MSMEs limits scale and efficiency, while its fragmented nature increases logistical costs. India's reliance on cotton, unlike the global shift towards MMF, limits its competitiveness in the worldwide market. The sector has attracted limited foreign direct investment, hindering technological advancements and reliance on imported textile machinery. A significant skill gap persists, hindering productivity and innovation. Addressing these challenges is crucial for India to realise its full potential as a global textile powerhouse.

Pharmaceuticals

7.24 The Indian pharmaceutical industry is the world's third-largest by volume. The industry boasts of a diverse product portfolio encompassing generic drugs, bulk drugs, over-the-counter medications, vaccines, biosimilars, and biologics, establishing a strong global presence. The total output of the pharmaceuticals, medicinal and botanical products industry in FY23, at constant prices, reached ₹4.56 lakh crore, with a value-added of ₹1.76 lakh crore¹⁶. The total annual turnover of pharmaceuticals in FY24 was ₹4.17 lakh crore, growing at an average rate of 10.1 per cent in the last five years. Exports account for 50 per cent of the total turnover, with its value at ₹2.19 lakh crore in FY24. The total import of pharmaceuticals was worth about ₹58,440.4 crore. The government has taken various measures to support the sector like PLI scheme and Strengthening of Pharmaceuticals Industry (SPI) among others. PLI scheme aims to attain self-reliance and reduce import dependence in critical Key Starting Materials (KSMs)/Drug Intermediates and Active Pharmaceutical Ingredients (APIs). SPI addresses the demand to support the existing pharma clusters and MSMEs across the country to improve their productivity, quality and sustainability.

7.25 The medical devices industry in India is experiencing rapid growth, with a CAGR of approximately 15 per cent. Currently, India holds an estimated 1.5 per cent share of the global medical devices market. Within Asia, India ranks fourth in terms of market size, following Japan, China, and South Korea. On a global scale, India is recognised as one of the top twenty medical device markets.

14 Technical textiles are specialized textile materials designed for specific functions rather than appearance.

15 Ministry of Textiles.

16 <https://pib.gov.in/PressReleaseDetail.aspx?PRID=2085345®=3&lang=1>.

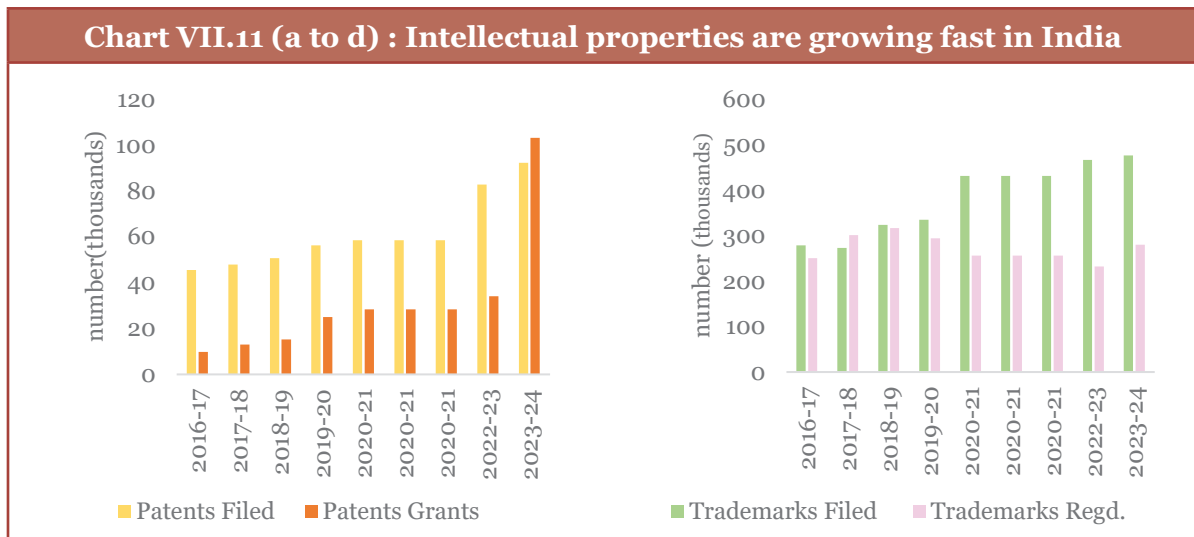
7.26 As noted by UNIDO, among the top 5 pharmaceutical producers, the United States led the way with a robust 4.7 per cent quarter-over-quarter growth in Q3 2024. Following the US were Japan at 1.4 per cent and China at 0.9 per cent. In contrast, Switzerland experienced a decline of -2.1 per cent, and India saw a slight decrease of -1.2 per cent.

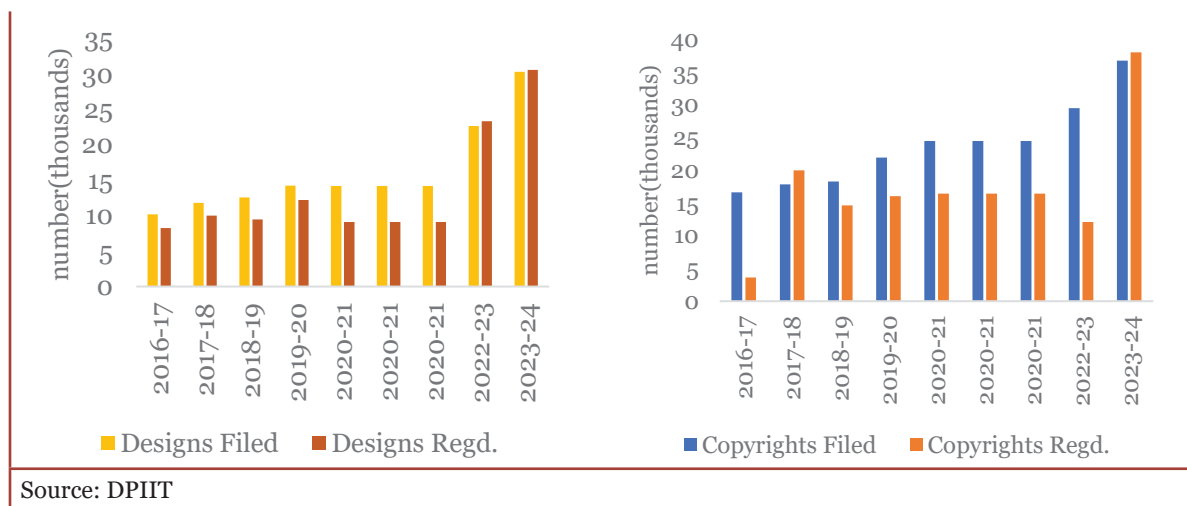
7.27 India is making significant strides in the area of cell and gene therapy. In October 2023, the Central Drugs Standard Control Organisation approved India’s first indigenously developed CAR-T cell therapy. To expedite the availability of newer drugs, such as gene therapy products, orphan drugs, drugs representing significant therapeutic advantage, in the country, the Central Drugs Standard Control Organisation under the rule 101 of the New Drugs and Clinical Trials Rules, 2019, has notified the United States of America, United Kingdom, Japan, Australia, Canada and the European Union, enabling waiver of local clinical trial for new drugs that are already approved and marketed in the notified countries. The overall pharma landscape of India points towards a need to focus on innovation, new drug development and biopharmaceuticals, as R&D spending still lags behind global leaders.

FLOURISHING INNOVATIONS AMIDST ASPIRATIONS OF ENHANCED R&D

7.28 India has a robust intellectual property ecosystem. As per the WIPO Report 2022, India ranks sixth among the top 10 patent filing offices globally. Patent applications are largely in computer & electronics, mechanical & biomedical, and communication fields. Since the National IPR Policy 2016, amendments to rules governing patents, designs, copyrights, and trademarks have streamlined application processes and reduced compliance. The Patent (Amendment) Rules 2024 has further simplified patent processing, filing and maintenance.

Chart VII.11 (a to d) : Intellectual properties are growing fast in India





7.29 The government has also implemented several other initiatives to encourage IP protection. Some of them include:

- Expedited patent examination for start-ups, SMEs, women inventors, government departments, and academic institutions.
- Simplified patent procedures: The government has simplified the disclosure requirements for patent working and foreign filings, reduced the timeline for examination from 48 months to 31 months, introduced certificates of inventorship, and provided a grace period for prior disclosed inventions.
- Simplified trademark procedures: The number of trademark forms has been reduced from 74 to 8, streamlining the trademark registration.
- Fee reduction: Significant fee reductions have been implemented for start-ups, MSMEs, and educational institutions for patent, design, and trademark filings.
- Digitalization: The adoption of virtual hearings, AI/ML-based search systems, and secure VPN connections have improved efficiency, accuracy, and decision-making in IP processes.
- Start-Up Intellectual Property Protection Scheme: It provides financial and technical assistance to start-ups in filing and processing patent, design, and trademark applications, which has been extended till March 2026.
- IP Saarthi Chatbot: offers instant support and guidance to users regarding IP registration and grant processes.
- Technology Transfer Organizations for promoting R&D and IP commercialisation by providing services to innovators and entrepreneurs. The government has established 34 Technology and Innovation Support Centres across the country to facilitate these efforts.

7.30 These measures have made the IP eco-system more efficient and prolific, helping India emerge as a global IP leader (Box-VII.2), ranking in the top 10 for patents, trademarks, and industrial designs.

BOX-VII.2: India's Innovation Landscape: Major Milestones...

- There is a more than 2-fold increase in patent filing since 2014-15, and patent grants have increased by more than 17-fold from 2014-15.
- There is a marked growth in resident filings which increased to more than 50 per cent of the total filings in FY24 from 28 per cent in FY15.
- The patent filings by domestic educational institutes have tripled from 7405 in 2021-22 to 23306 in FY24.
- Patent filings by women applicants increased from 15 in FY15 to 5183 in FY24.
- India's rank in the Global Innovation Index has improved to 39th in 2024 among 133 economies from 81st position in 2015. It ranks 1st among the 38 lower middle-income group economies and 1st among the 10 economies in Central and Southern Asia¹⁷.
- India holds the 7th position in intangible asset intensity, surpassing the growth rates of many high-income economies and matching the intangible investment intensity of Germany and Japan (as a share of GDP).¹⁸
- India holds 4th position in Science and Technology Cluster Ranking 2024 by WIPO with 4 cities among the world's top 100 science and technology clusters¹⁹.

Nonetheless, the Global Innovation Report 2024 notes that India needs to enhance human capital, improve access to finance and, reduce regulatory burdens further and improve infrastructure for innovation ecosystem.

Innovation over performers, relative to their economic development



Source: Global Innovation Index Report (2024)

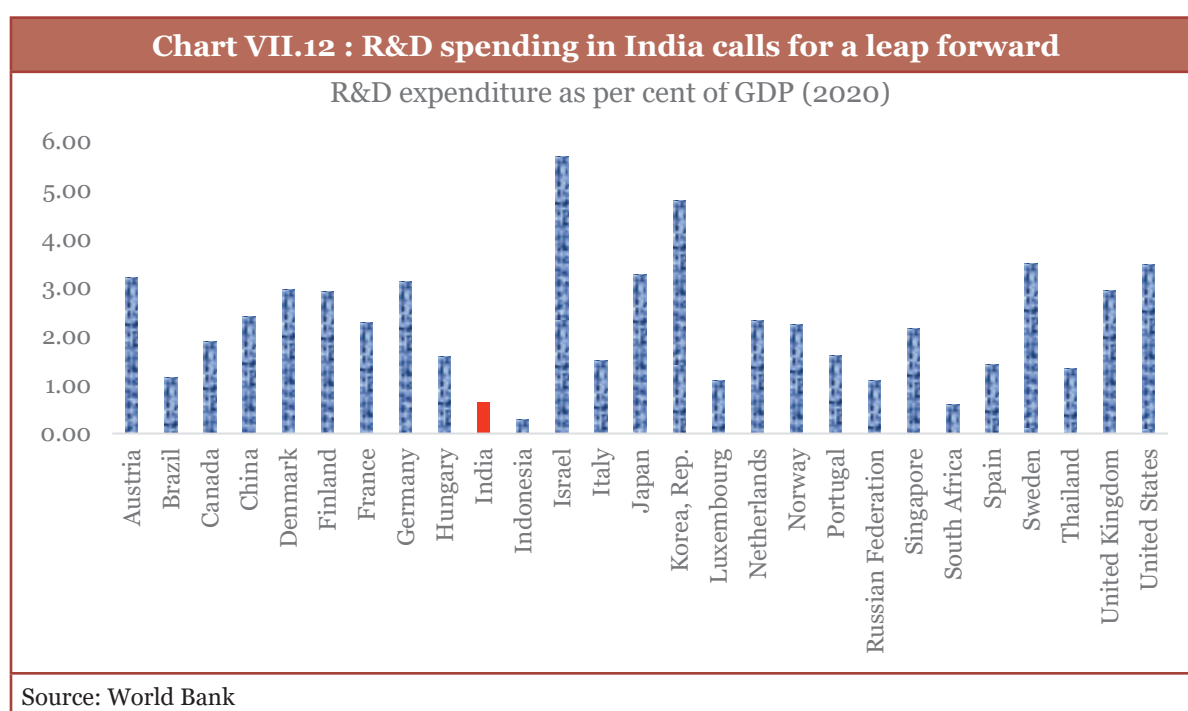
17 Source: Global Innovation Index 2024 published by WIPO.

18 Office of Controller General of Patents, Designs & Trade Marks.

19 Source: WIPO GII Report 2024.

7.31 While the focus on frugal innovations, abundance of scientific manpower, strength of IT, pharma industry, vibrant start-up eco-system, and policy support have fostered innovations, India lags in R&D, with a significant gap across major sectors. The gross expenditure on research & development (GERD) in India has increased from approximately ₹60,196 crore in FY11 to about ₹127,381 crore in FY21²⁰. However, this is 0.64 per cent of the GDP, which is insufficient and remains low compared to many countries that have forged ahead in R&D.

7.32 While government R&D policies and interventions have been making sustained efforts, there is a need for more contribution from the private sector. The funding for R&D in India is predominantly sourced from government entities.



7.33 In contrast, in most developed and emerging economies, business enterprises contribute over 50 per cent to the GERD. In countries like China, Japan, South Korea, and the USA, this share exceeds 70 per cent²¹. In the USA, the private sector leads, with companies like Google and Amazon accounting for about 70 per cent of R&D spending²². China, on the other hand, has a combination of major government funding with rising private sector involvement, leading to R&D spending of about 2.1 per cent of its GDP²³.

20 Research and development Statistics at a glance 2022-23.

21 Ibid.

22 National Science Board, 2020.

23 Ibid.

BOX-VII.3: R&D Incentives: A Global Comparison

R&D-related incentive systems vary across countries, yet there are common threads. China's strategy is characterised by significant government intervention. Key incentives include substantial tax breaks, such as super deductions and reduced corporate income tax rates. Preferential treatment is given for innovative products and services and various financial incentives and subsidies, especially in designated economic zones. South Korea focuses on targeted R&D investment with tax credits for investments in strategic technologies and new growth sectors and emphasising investment in tangible assets. The US approach relies more on market-based mechanisms and tax incentives. Key incentives include non-refundable tax credits and research credits with tax incentives for R&D investments in designated zones. In addition, there are no specific geographic requirements for IP location or designated innovation zones²⁴.

In India, incentives like grants, loans, tax exemptions, patent-related incentives etc. are given for R&D. In addition to these incentives, initiatives like Start-Up India, Digital India, and the Atal Innovation Mission have been introduced to foster entrepreneurship, research, and technological advancement. To provide financial support to industries, the government has also created the Technology Development Board. Many state governments provide stamp duty waivers and concessions, and soft loans²⁵.

R&D incentives* ²⁶	India	China	South Korea	United States	Japan
Grants	✓				
Loans	✓				
Patent related incentives	✓				
Tax credits			✓	✓	✓
Tax deductions		✓			
Tax exemption	✓	✓			
Tax holiday		✓			

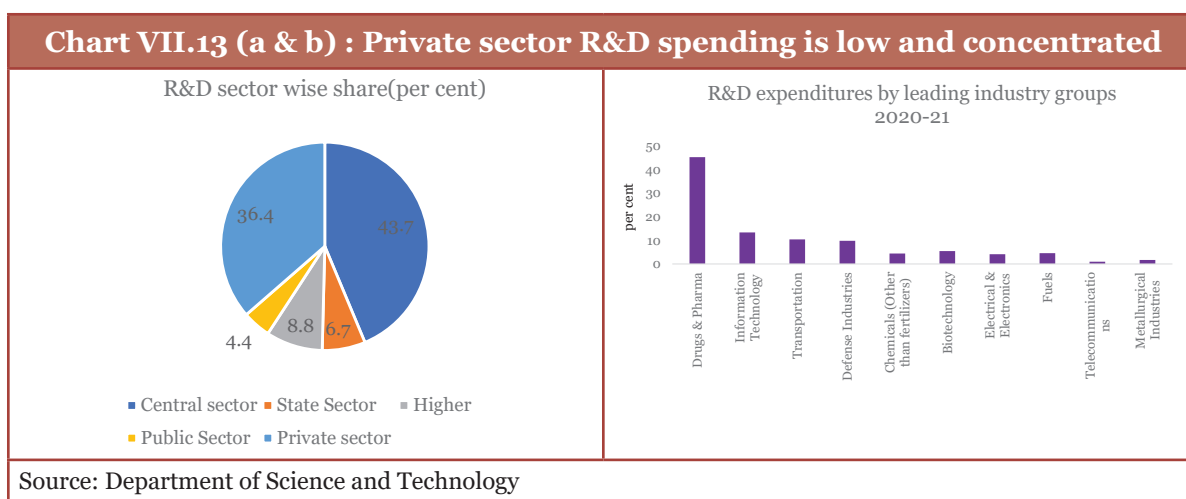
²⁴ EY Worldwide Research and Development Incentives Reference Guide 2024.

²⁵ Reforming R&D incentives: Ushering in a New Era for Indian Innovation, Deloitte, June 2024.

²⁶ EY Worldwide Research and Development Incentives Reference Guide 2024 (*note: Not the exhaustive list of R&D incentives).

7.34 In India, not only is the industrial R&D low, but it is also sectorally concentrated. Drugs and pharmaceuticals led the way, followed by information technology, transportation, defence, and biotechnology. Public sector R&D is primarily driven by the defence industry, followed by the fuels and metallurgical sectors.

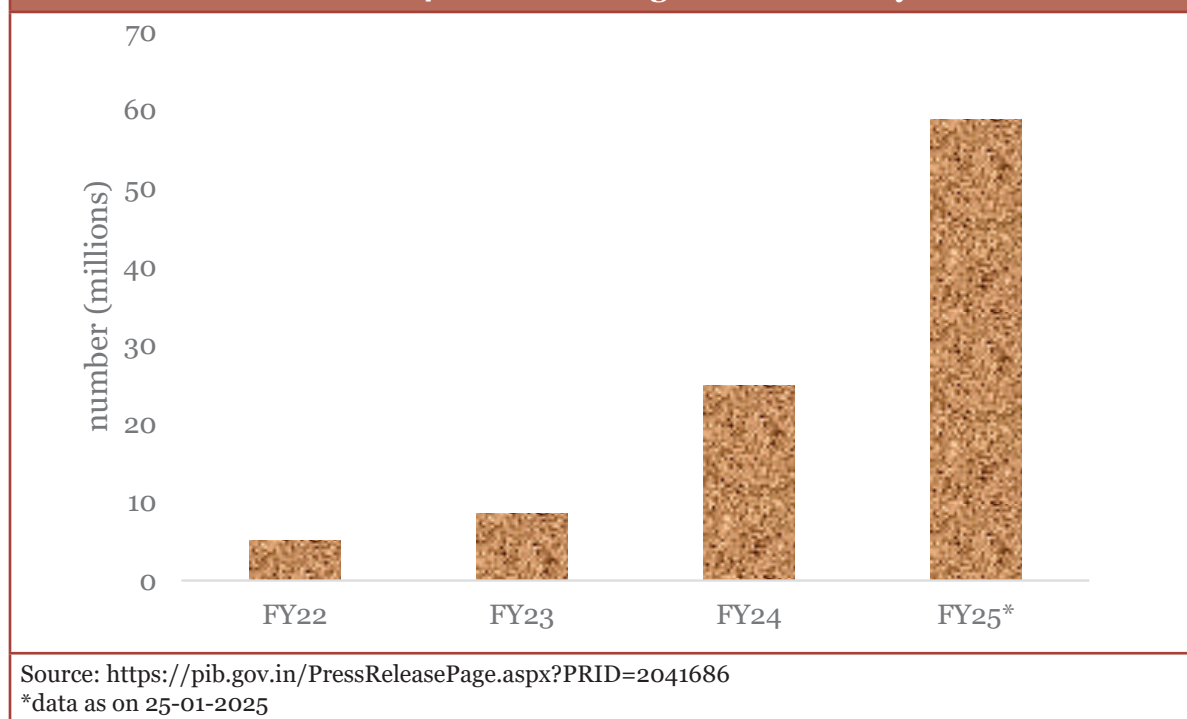
7.35 Historically, India's R&D focus has been on basic research rather than applied research. This often lacks the practical applications needed to attract private investment (DST, 2020). This gap needs to be bridged to streamline and drive innovations and investment across multiple sectors. To bridge this gap, we need to foster industry-academia collaboration, enhance private-sector participation, and prioritise applied research. And the private sector needs to respond to the R&D challenge wholeheartedly.



MICRO SMALL AND MEDIUM ENTERPRISES (MSME)

7.36 The MSME sector is important to India's progress. By fostering entrepreneurship and creating a large number of jobs at relatively low capital costs, the sector plays a crucial role, second only to agriculture. As of November 26, 2024, MSMEs have reported employing 23.24 crore individuals.

7.37 In order to simplify the process of registering MSMEs and to enable ease of doing business the government launched the Udyam Registration Portal in July 2020. This online, self-declaration-based system requires a PAN card for registration. To formalize Informal Micro Enterprises (IMEs), the government in collaboration with SIDBI, introduced the Udyam Assist Platform (UAP) in January 2023. Over 2.39 crore informal micro enterprises have been formalized through the platform, making them eligible for priority sector lending benefits.

Chart VII.14: Increased Registration on Udyam

7.38 To facilitate credit to MSMEs, a revamp of the Credit Guarantee Scheme for Micro and Small Enterprises (CGTMSE) was undertaken with ₹9,000 crore in the corpus of the Credit Guarantee Fund Trust for MSEs. This aimed to facilitate an additional ₹2 lakh crore credit for MSEs at reduced interest rates. Consequent to this, the credit limit for guarantee coverage under the scheme was enhanced from ₹2 crore to ₹5 crore, and the annual guarantee fees across all segments were reduced by 50 per cent. In FY23, 11.65 lakh guarantees amounting to ₹1 lakh crore were given. The government also made special provisions for IMEs under the existing credit guarantee to avail credit easily.

BOX VII.4: TReDS: Transforming MSME Financing Through Timely Payments

The launch of TReDS has been an important step taken by Government of India for benefitting the MSMEs and helping them realize their receivables in a time-bound manner at a relatively lower financing cost. TReDS, regulated by the RBI, is a marketplace that enables buyers such as government departments, public sector undertakings, corporates etc. to honour timely payments to their MSME suppliers as per MSMED Act 2006.

TReDS²⁷ offers several notable benefits for MSMEs, including post-shipment financing without recourse, which is based on the buyer's creditworthiness. The platform employs an auction-based mechanism that ensures competitive rates from financiers. Further, the seamless digital financing and settlement process, enabled through the National Payments Corporation of India, enhances efficiency and transparency in transactions. The Governments of Goa and Tamil Nadu have set an example by adopting the TReDS platform to ensure timely

payments to their MSME suppliers. Goa, heavily reliant on tourism, leveraged TReDS during the COVID-19 disruption to enhance supplier liquidity, facilitating payments for over 250 MSMEs since October 2020, with invoice discounts. Tamil Nadu joined TReDS in 2022 under the Raising and Accelerating MSME Performance (RAMP) program, supporting MSMEs in significant numbers. Their proactive adoption has inspired other states to follow suit.

Several central public sector enterprises and government entities have been using the TReDS platform since its inception to facilitate timely payments to MSME suppliers. Active participants like BHEL, NTPC, ONGC, BPCL, HPCL, IOCL and others help MSMEs maintain their working capital cycles while enabling them to benefit from lower interest rates.

In addition to CPSEs, corporates with a turnover exceeding ₹500 crore have been utilising TReDS for prompt payments to their suppliers. With the Government of India's mandate for companies with a turnover above ₹250 crore to join the platform, more corporates are expected to onboard. TReDS also fosters strong relationships between corporates and their suppliers by ensuring swift payments, eliminating the need for MSMEs to chase their buyers for payments. If more government bodies, ministries, state governments, and corporates adopt receivables discounting on platforms like TReDS, it could significantly transform the MSME financing landscape.

7.39 To provide equity funding to MSMEs with the potential to scale up, the government launched the Self-Reliant India (SRI) Fund with a corpus of ₹50,000 crore. The fund has a provision of ₹10,000 crore from the government and ₹40,000 crore through private equity/venture capital funds. In addition to providing easy credit, the government is committed to addressing MSMEs' issues through measures like MSME Samadhan and the CHAMPIONS (Creation and Harmonious Application of Modern Processes for Increasing the Output and National Strength) portal.

7.40 To deal with the issues of delayed payments, MSE suppliers may approach the Micro and Small Enterprises Facilitation Council (MSEFC). The government also launched a portal that gives information about individual CPSEs, central ministries, state governments, and other buyers regarding the payments pending with them in respect of the MSEs. The portal also facilitates MSEs to file their delayed payment-related complaints online. From the date of launch of the MSME SAMADHAAN portal 2,20,704 applications have been filed by MSEs, out of which 20652 have been mutually settled, 53493 are yet to be viewed by MSEFC, 60714 have been rejected, 45952 cases have been disposed off and 39893 cases are under consideration.²⁸ As of date, the CHAMPIONS portal disseminates information in eleven regional languages.

7.41 The government is implementing the Micro and Small Enterprises-Cluster Development Programme (MSE-CDP) to develop clusters across the country. Under this, Common Facility Centres (CFCs) are channels to address common issues, such as improvement of technology, skills, quality, etc., for MSEs. As per the report of the evaluation study of MSE-CDP conducted by the National Productivity Council, the

²⁸ https://samadhaan.msme.gov.in/MyMsme/MSEFC/MSEFC_Welcome.aspx. Accessed on 27.01.2025.

scheme has been able to improve the efficiency of the value chain of the units in the cluster, resulting in overall productivity growth of around 10-15 per cent and growth in turnover in the range of 20-30 per cent²⁹.

APPROPRIATE POLICIES LIKELY TO BRING IN GREATER EQUITY IN STATE-WISE PATTERNS IN INDUSTRIAL PRODUCTION

7.42 Developmental disparities across States have always been a matter of keen attention, bringing convergence of per capita incomes and living standards to policy focus. However, convergence does not mean convergence in every sector, because different states will have comparative advantages in different sectors—be it dairying & farming, manufacturing, conventional or medical tourism, software, financial sector or any other activity. Coastal states can do better in industrialisation and exports.

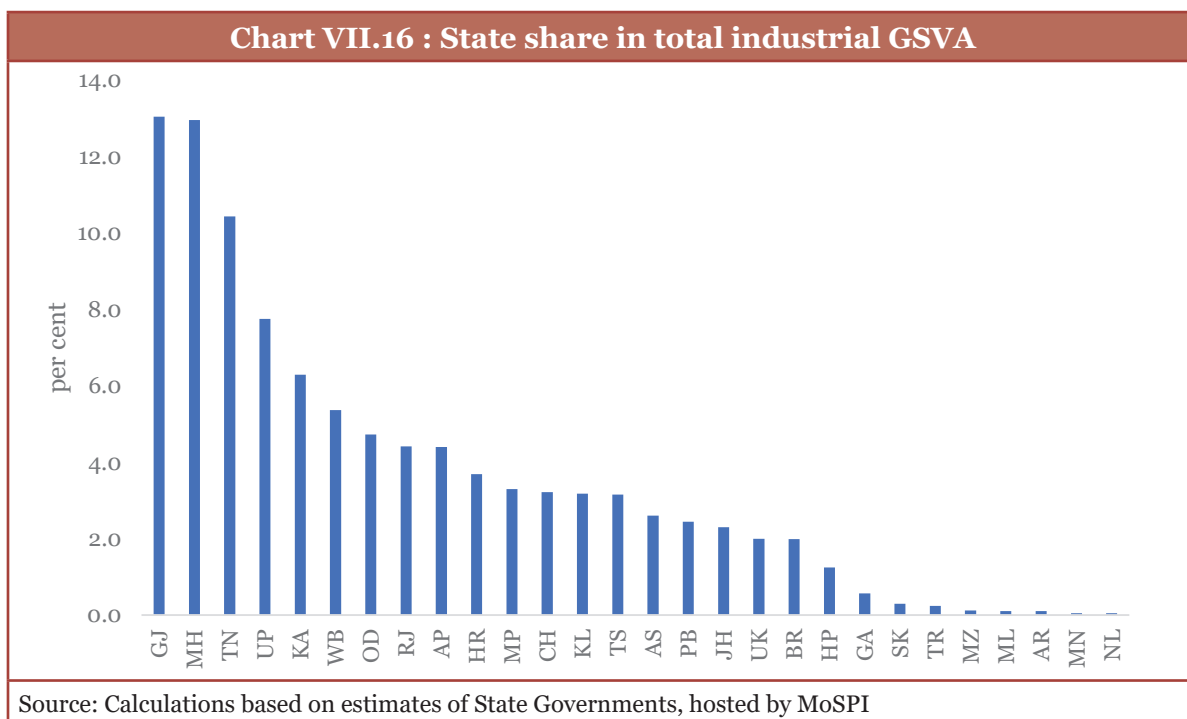
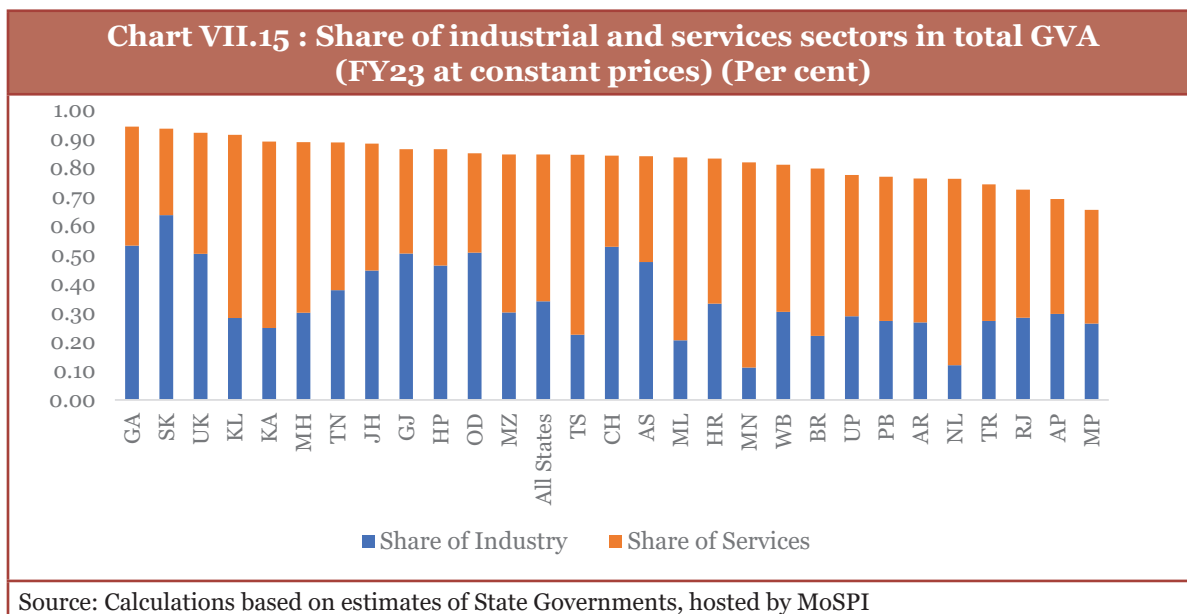
7.43 Even while recognising this, the Survey presents inter-state differences in industrialisation in this Chapter. Disparities in service sector developments are presented in Chapter 8. As shown by the national account statistics, in FY23 about 84.7 per cent of GVA (at constant prices 2011-12) in the country is generated by industrial and service activities together, with an inter-state³⁰ variation (chart VII.16)³¹. And hence, sustained improvements in productivity and growth in one or more service or industrial sectors is inescapable for overall development of states. This is true of even states that have an advantage in agricultural activities. This is because, dynamic industrial and service sectors can help to move and productively employ the surplus manpower in agriculture, apart from generating additional intermediate and final demand for farm output.

7.44 Four states—the western states of Gujarat and Maharashtra and the southern states of Karnataka and Tamil Nadu— account for about 43 per cent of the total industrial GSVA. (In this section, industrial GSVA refers to the year FY23 at constant 2011-12 prices; population refers to figures used by the respective State Directorates of Economics & Statistics for their GSDP calculations). In contrast, six states of the Northeast (excluding Sikkim and Assam), account for only 0.7 per cent of the industrial GVA. There is a need for focus on industrial strategies appropriate to unique geographies like the North East.

29 <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2038539>.

30 Andhra Pradesh (AP), Arunachal Pradesh (AR), Assam (AS), Bihar (BR), Chhattisgarh (CH), Goa (GA), Gujarat (GJ), Haryana (HR), Himachal Pradesh (HP), Jharkhand (JH), Karnataka (KA), Kerala (KL), Madhya Pradesh (MP), Maharashtra (MH), Manipur (MN), Meghalaya (ML), Mizoram (MZ), Nagaland (NL), Odisha (OD), Punjab (PB), Rajasthan (RJ), Sikkim (SK), Tamil Nadu (TN), Telangana (TS), Tripura (TR), Uttar Pradesh (UP), Uttarakhand (UK) and West Bengal (WB).

31 The values reflected in the state analysis in these section are based on the calculations of the respective Directorates of Economics and Statistics (hosted by MoSPI). The sum of all States may not match with the national GVA numbers published by the MoSPI.



7.45 In chart VII.17, states are placed and colour-coded in three categories based on their position relative to the overall average in the share of industrial and its component GVA (FY23 at constant prices). States with industrial share higher/lower by 25 per cent of the national average are ‘Green’ and ‘Red’ respectively. States around the overall average are yellow. The intent is to only understand whether there is a fairly balanced pattern in the share of industry and its components in the overall GSVA of each State. However, as observed in para 7.43, the observed patterns reflect, to a great extent, the

comparative advantages of States.³² There is no strong conspicuous regional pattern visible in terms of industrial dependence, except to an extent in the Eastern region.

Chart VII.17 : Share of industrial GSVA and its components in total GSVA of FY23 at constant prices (*)

Region	State code	Industry	Mining	Manufacturing	Electricity	Construction
Northern	HR	Yellow	Red	Yellow	Red	Yellow
	HP	Green	Red	Green	Green	Yellow
	MP	Yellow	Red	Red	Green	Yellow
	PB	Yellow	Red	Yellow	Green	Yellow
	UK	Green	Red	Green	Green	Yellow
	UP	Yellow	Red	Red	Red	Green
Eastern	BR	Red	Red	Red	Yellow	Yellow
	CH	Green	Green	Yellow	Green	Green
	JH	Green	Green	Green	Red	Yellow
	OD	Green	Green	Green	Green	Yellow
	WB	Yellow	Red	Yellow	Yellow	Yellow
Western	GA	Green	Red	Green	Green	Red
	GJ	Green	Yellow	Green	Green	Yellow
	MH	Yellow	Green	Yellow	Yellow	Yellow
	RJ	Yellow	Yellow	Yellow	Yellow	Yellow
North Eastern	AR	Yellow	Yellow	Red	Green	Yellow
	AS	Green	Green	Yellow	Green	Green
	MN	Red	Red	Red	Yellow	Yellow
	ML	Red	Red	Red	Yellow	Red
	MZ	Yellow	Red	Red	Green	Yellow
	NL	Red	Red	Red	Yellow	Yellow
	SK	Green	Red	Green	Green	Red
	TR	Yellow	Green	Red	Green	Red
Southern	AP	Yellow	Yellow	Yellow	Yellow	Yellow
	KA	Red	Red	Yellow	Red	Red
	KL	Yellow	Red	Red	Red	Green
	TN	Yellow	Red	Green	Red	Green
	TS	Red	Yellow	Red	Red	Red

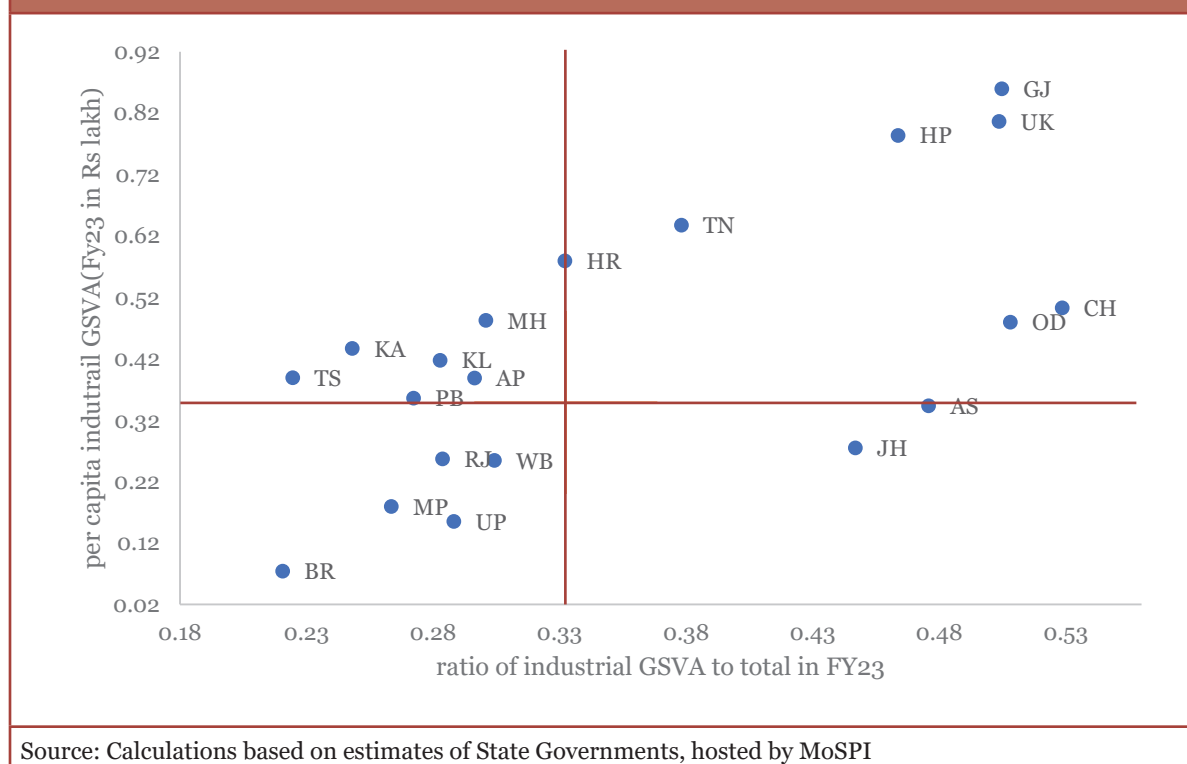
(*) Note: All State average of the share of industrial GVA is 33.2 per cent; mining: 2.8 per cent; manufacturing: 19 per cent; electricity: 2.5 per cent; and, construction: 8.9 per cent. The shares are in constant prices. The all-State average may not match with the national average.
Source: Calculations based on estimates of State Governments, hosted by MoSPI.

7.46 High level of dependence on industrial sectors does not necessarily reflect high level of industrial development. Thus, concealed within the state shares are the variations in per capita industrial GSVA. The chart VII.18 presents four quadrants demarcated by the all-state average in the share of industrial sector in State’s total GVA and their

³² Total real GSVA refers to the total given by the 28 states presented in the chart.

per capita industrial GSVA. There are clear patterns in the degree of industrialisation emerging from chart VII.18. Only a few States like Gujarat, Uttarakhand and Himachal Pradesh are able to cash on their high level of dependence on industrial sector to generate reasonable levels of incomes for their people. Chart VII.18 also shows that few states have high levels of dependence on industrial sector with low income generation while states in eastern and northern region are least industrialised.

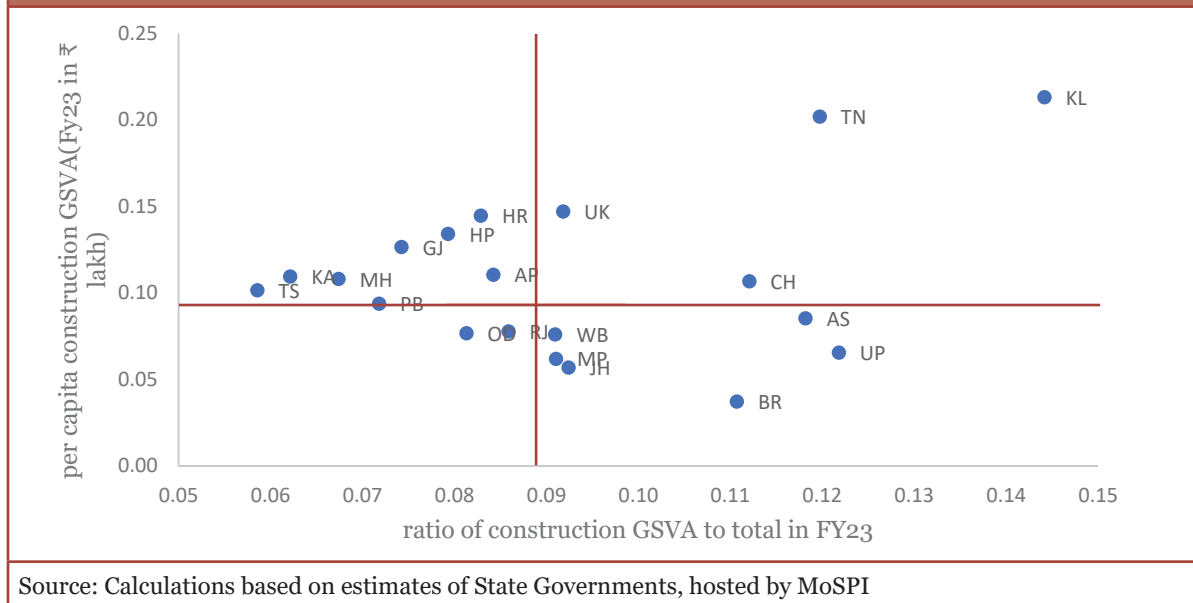
Chart VII.18 : Vast inter-State differences in the levels of industrialisation



7.47 Construction activity, closely linked with infrastructure development, urbanization and real estate trends, also shows inter-state differences. At one extreme, Kerala is comparatively less industrial than many other States (chart VII.18), but it is a positive outlier in construction activity (chart VII.19), with construction contributing about half of its industrial GVA.

7.48 The industrial patterns shown by many States reflect their comparative advantages. However, as shown by charts VII.18 & VII.19, in the case of many States, it signifies dependence on relatively low income generating industrial activities, hampering movement of surplus labour in agriculture and structural transformation.

Chart VII.19: Pattern of construction activity variant from general pattern of industrial activity



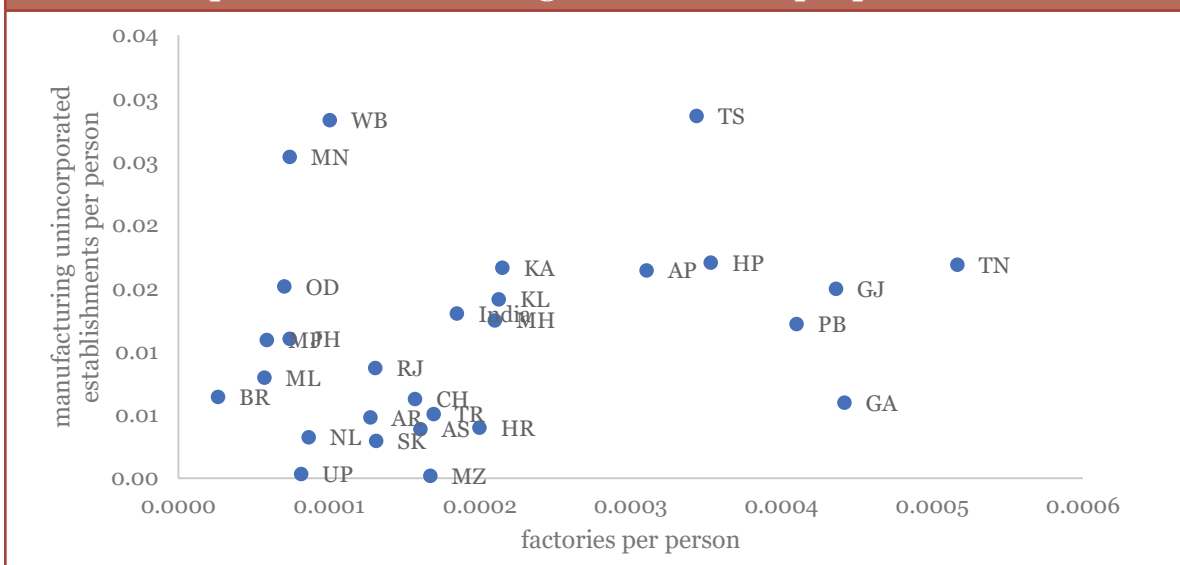
7.49 The mining sector contributes about 8 per cent to the total industrial output. On expected lines, the mining activity is highly concentrated with top five states that is Assam, Chhattisgarh, Gujarat, Maharashtra and Odisha, accounting for about 60 per cent of the all-State mining GSVA.

7.50 Ramaswamy (2019)³³, in his study on concentration of manufacturing units and workers across states, suggested that among States, there was no decline in concentration in the registered sector but there was a decline in concentration in the unregistered sector. Data from Annual Survey of Industries for FY23 for the factory sector and the data on unincorporated manufacturing enterprises (from ASUSE Survey for FY23) show vast inter-State disparities in the number of factories/enterprises per person in different states (chart VII.20). Among the bigger states, Tamil Nadu leads the pack with the highest concentration of factories per person, followed by Gujarat. Bihar hardly has any factories, while Uttar Pradesh hardly has any smaller enterprises.

7.51 The very weak relation between the state-wise patterns in factories per person and unincorporated manufacturing establishments per person indicates that some States low in the factory sector activity have considerable presence of unincorporated enterprises. It is an opportunity for those States to recognise, nurture and increase the durability and scales of their smaller enterprises, with appropriate policy facilitation and deregulation.

³³ Ramaswamy, Krishna. (2019). Where Have All the Factories Gone? Growth and Concentration of Sub-National Manufacturing Activity in India. SSRN Electronic Journal. 10.2139/ssrn.3403936.

Chart VII.20: Weak correlation between factories per person (horizontal axis) and Unincorporated manufacturing establishments per person (Vertical Axis)



Source: Survey calculation based on data from ASUSE

7.52 Research papers that examine the factors affecting industrial progress in States, highlighted that state-level policies play a crucial role in shaping the economic growth patterns across Indian states (IMF, 2006)³⁴. Another early study (Debnarayan et al., 2011)³⁵ suggested that Indian states that implemented significant economic and administrative reforms during the reform period reaped the benefits of industrial expansion. Factors like regulatory environment, infrastructure development, and state-level reforms are shown to significantly influence industrial growth patterns. Shiladitya Chatterjee (2022)³⁶ shows that the state level industrial growth drivers are infrastructure, human development and policy and institutional environment for industrial development.

7.53 The Business Reform Action Plan (BRAP) formulated by the Department for Promotion of Industry and Internal Trade aims to assess and enhance the ease of doing business across states. As per the BRAP 2020, states are categorised into four groups in terms of ease of doing business, i.e., top achievers, achievers, aspirers and emerging business eco-systems. Chart VII.21 shows a positive correspondence between business reforms and the level of industrial activity, suggesting the need for deregulation and enterprise-friendly reforms in aspiring and emerging states³⁷.

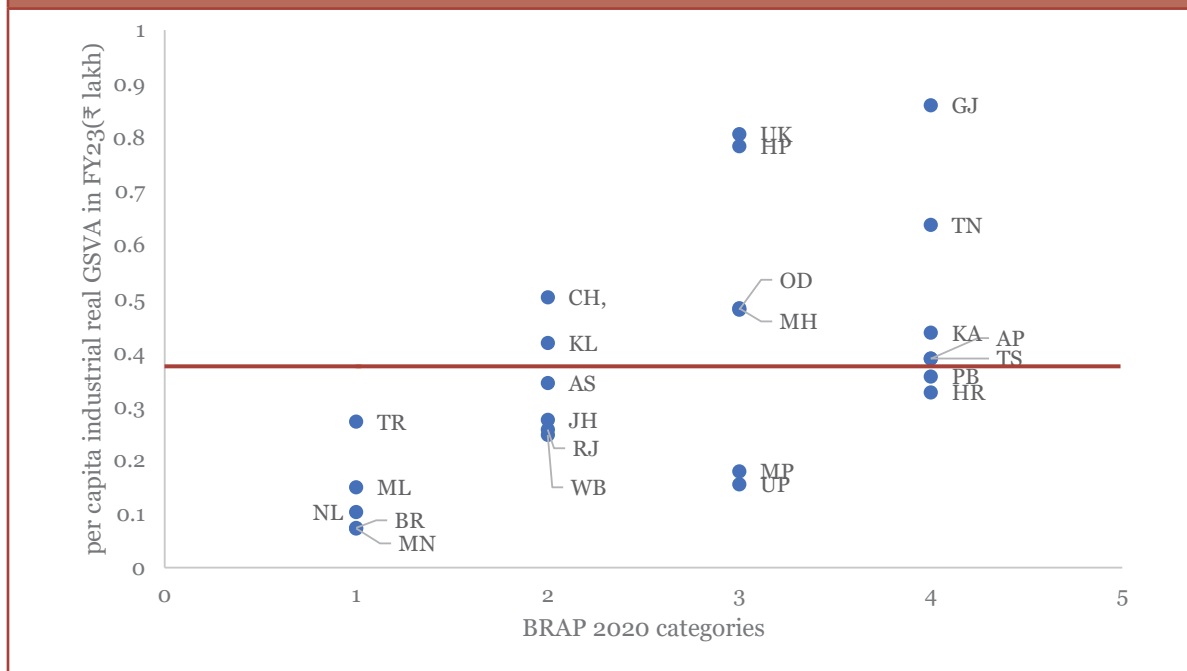
34 Is Economic Growth Leaving Some States Behind? Catriona Purfield and Jerald A Schiff, IMF, 2006.

35 Sarker, Debnarayan & Das, Debraj, 2011. "Performance of manufacturing industry in Indian states: who loose and why?" MPRA Paper 33645, University Library of Munich, Germany.

36 India's Unbalanced Industrial Development: Possible Explanations for Inter-State Variations Shiladitya Chatterjee 2022.

37 Chapter 5 on the Medium-Term Outlook makes a strong case for deregulation as a driver of industrial and economic growth and presents several illustrative areas for action.

Chart VII.21: Ease of doing business has positively contributed to industrial activity



Note: In horizontal axis, States are denoted as top achievers (4), achievers (3), aspirers (2) and emerging business eco-systems (1).

Source: Calculations based on estimates of State Governments, hosted by MoSPI and BRAR 2020 hosted by DPIIT.

BOX-VII.5: Tamil Nadu's Strategic Initiatives to Foster Footwear Manufacturing Growth

Tamil Nadu is a leader in the traditional leather sector and now championing the growth of non-leather footwear. The state contributes to 38 per cent share in India’s footwear and leather products output, contributing to about 47 per cent share in India’s total leather export. This sector generates more than 2 lakh employment. Tamil Nadu (TN) also houses technical and academic institutions like Central Leather Research Institute, Council for Leather Exports, Footwear Design and Development Institute.

Some of the major initiatives taken by Tamil Nadu Government to attract large footwear manufacturers in the recent years are listed below:

- The State has focused on developing industrial estates in rural areas to ensure access to a ready workforce, particularly women. These efforts have attracted foreign investors, such as Feng Tey from Taiwan, who set up contract manufacturing for Nike.
- It has identified land in districts like Madurai and Sivagangai for future footwear investments, ensuring land availability for potential manufacturers.
- TN’s investment promotion agency, namely, Guidance, has made concerted investment promotion activities. Guidance actively liaised with Taiwanese agencies to strengthen ties with potential investors in footwear sector. Guidance established contacts with major contract manufacturers of Nike like Pou Chen, Hong Fu, Taekwang and Changshin, positioning Tamil Nadu as an attractive destination for manufacturing.

- The External Engagement Cell in Guidance prepares publicity material in foreign languages like Mandarin, Japanese and Korean; it is now being prepared in German and French as well for smooth communication.
- A dedicated investment facilitator is assigned to each investor. The entire clearance process and operational issues after commencement of production are managed through this single point of contact. This has enhanced the reputation of TN as an investment friendly state.
- The agency has a division called WorkLabs which is a dedicated industry-academia coordination cell to actively engage industry in curriculum reform and familiarise new companies entering Tamil Nadu with the talent ecosystem of the State.
- It has also appointed regional officers for various parts of the State, who are based in Tier II towns like Madurai, Coimbatore and Tirunelveli.
- The incentive package system offered in Tamil Nadu is flexible and can be tailored to the needs of each investor. Tamil Nadu offers a range of incentives such as capital subsidies, payroll subsidies, and land cost subsidies. The state has launched a dedicated Footwear and Leather Products Policy 2022, which aims to develop a comprehensive ecosystem that supports both large manufacturers and smaller enterprises.

Source: Prepared based on inputs from Government of Tamil Nadu.

7.54 There is a close connection between industrial and service sectors, as indicated by the increasing ‘servicification’ of industrial output and exports.³⁸ Goldar et al. (2017) also indicated that services inputs contribute significantly to export intensity of Indian manufacturing firms. Hence, it is important that States focus on business reforms on a priority basis so as to achieve buoyancies in some industrial or service sectors where it has natural advantages. States should make it easier for businesses to commence operations, to grow and even be closed, if deemed inevitable by the entrepreneur. Allowing economic activity as far as possible and getting out of the way will foster faster convergence of living standards and per capita incomes. The route taken by different states will be different and will necessarily have to be so.

CONCLUSION AND OUTLOOK

7.55 Economic Survey 2023-24, released in July 2024, reported that:

- i. Over the last decade, output shares were realigned among industrial segments in favour of sectors like chemicals, wood products and furniture, pharmaceuticals, automobiles, steel and machinery and equipment.
- ii. Import dependency in key sectors like coal, capital goods and chemicals continues. Global uncertainties may constrain export demand and affect the domestic cost of production by influencing the prices of import-intensive raw materials.

³⁸ Is Service Orientation Benefiting Manufacturing Exports from Low-Middle Income Countries? Firm-level Empirical Evidence from WBES Data Sonia Pant and Debashis Chakraborty, 2024.

- iii. The path to further industrialisation is paved with deregulation, R&D and, innovation and improving the skill levels of the workforce. Commitment to R&D must be in the DNA of the industry, independent of any fiscal incentive since it is about global competitiveness and profitability.
- iv. Sectors with widely scattered production units, like textiles, and the MSME sector in general, seek support systems to develop projects and ensure finance, easier compliance, and grassroots-level facilitation to ensure market access.

7.56 The foregoing analysis supports and reinforces these conclusions and suggestions, particularly strongly in the following respects.

- i. The first is the connection between the uncertain and unsupportive global environment and the Indian industry. There was a manufacturing growth deceleration in H1 FY25. A part of it was due to seasonal causes like the alignment of festivities and monsoon-related disturbances. Slackening global trade and aggressive trade and industrial policies of many major economies have affected manufacturing and investment by the private sector. However, business surveys and purchasing managers' index point to improving optimism. The way ahead lies in vigorous focus on deregulation, R&D, appropriate skilling and employment strategies, and targeted support for smaller enterprises. This will improve the competitiveness of the Indian industry and prepare it to weather global challenges.
- ii. The brief State-wise analysis presented in this Chapter reveals that they are vastly different in their industrial strengths, weaknesses and accomplishments. It also highlighted that the state of business regulations and reforms varied across States, and these differences are closely related to their industrial progress or the lack of it. This reiterates the need for appropriate business reforms at the grassroots level.

7.57 Hence, as noted in the Chapter, in a rather unsupportive global environment, it calls for lasting, synchronised efforts of all tiers of governments, the private sector, the skilling eco-system, academia and R&D institutions, as well, and financial stakeholders to enable India realise its ambition as a manufacturing powerhouse.

SERVICES: NEW CHALLENGES FOR THE OLD WAR HORSE

The service sector has been fuelling growth both domestically and globally. In FY25 so far, services propped up GDP growth when manufacturing has been affected by dampening global merchandise trade. The critical role of services exports in strengthening India's external balance and the increasing 'servicification' of the industrial sector adds to its importance to the Indian economy. Logistics services have regained their pre-pandemic momentum and are enhancing the user experience through digitisation. India continues to be an important partner in the changing global technology landscape through the adoption of digital technologies in business processes. Initiatives such as Open Network for Digital Commerce (ONDC) are making these transformations more inclusive. Equipping the labour force with requisite skills and creating an enabling environment through simple and transparent processes of grassroots level governance will go a long way in realising the full potential of commercial services and building resilience to global headwinds.

INTRODUCTION

8.1 Services value added accounts for about 62 per cent of the global GDP¹. Services have been the growth engine for middle-income countries like China, Thailand, and India in the last decade. Presently, the Euro area is reeling under a slowdown but is expected to improve in 2025 on the back of improving services activity. However, higher nominal wage growth compared to pre-pandemic wage growth has kept service inflation high. This has caused the current cycle of global disinflation to slow down².

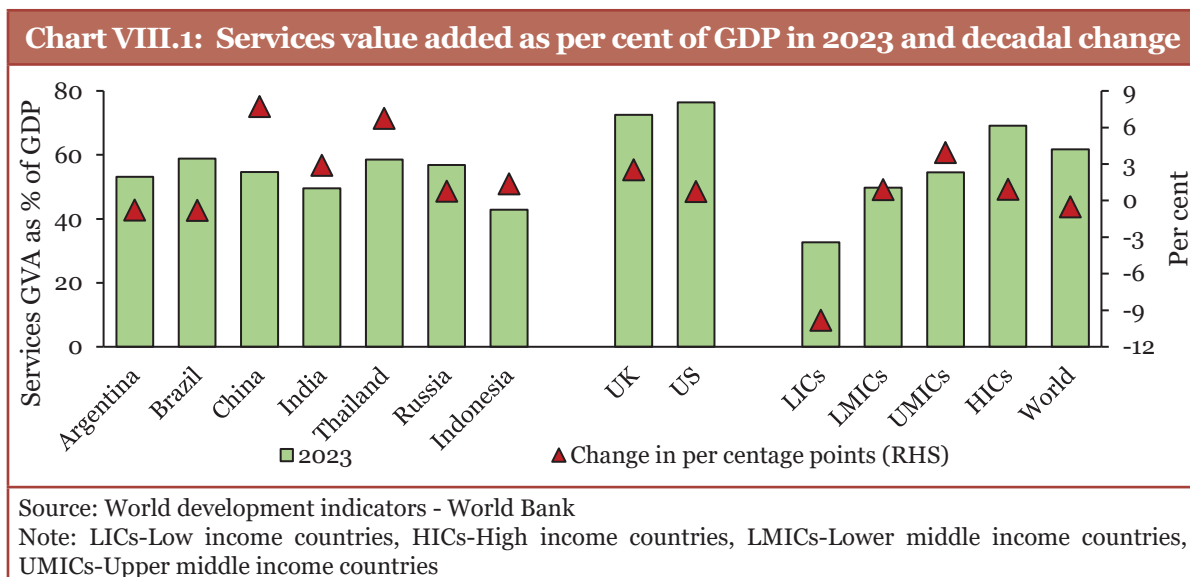
8.2 The Global Services PMI Business Activity Index rose to a four month high of 53.8 in December 2024. This signals expansion for the twenty-third consecutive month. Growth of new order intakes and employment also strengthened, while business sentiment edged higher³. However, global supply chains continue to face significant disruptions due to geo-political uncertainty, i.e., the rise of protectionism, wars, and

1 World development indicators - World Bank

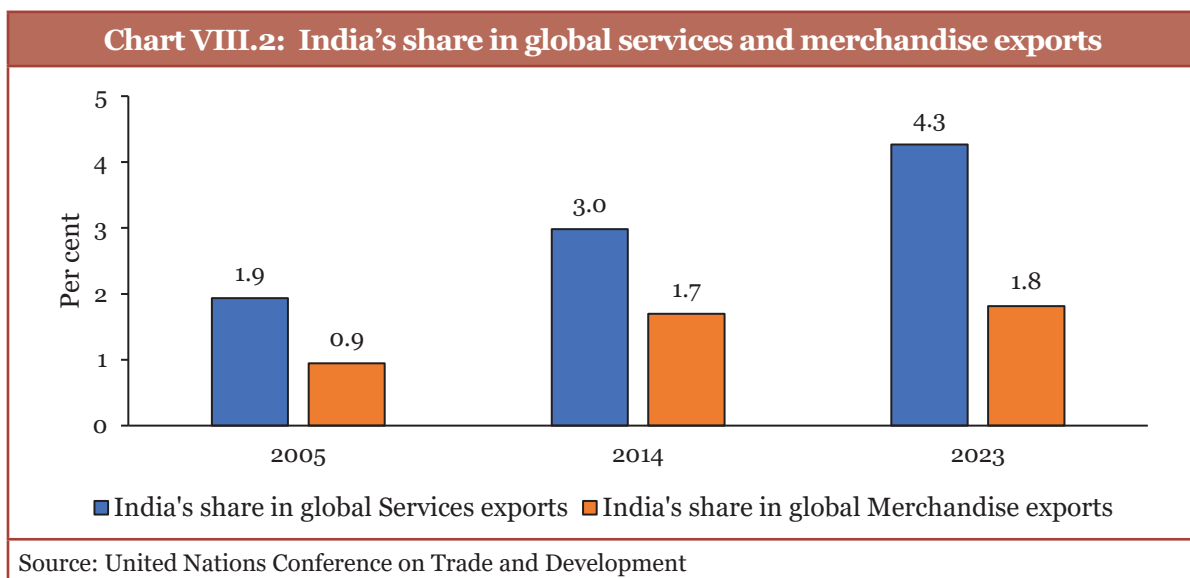
2 The IMF World Economic Outlook, October 2024

3 S&P Global. (2025, January 6). JP Morgan Global Composite PMI. Retrieved from <https://www.pmi.spglobal.com/Public/Home/PressRelease/f94e193ddf214de5bdfa79062611f26c>

climate-related challenges. These disruptions in supply chains pose a risk to the global services landscape.

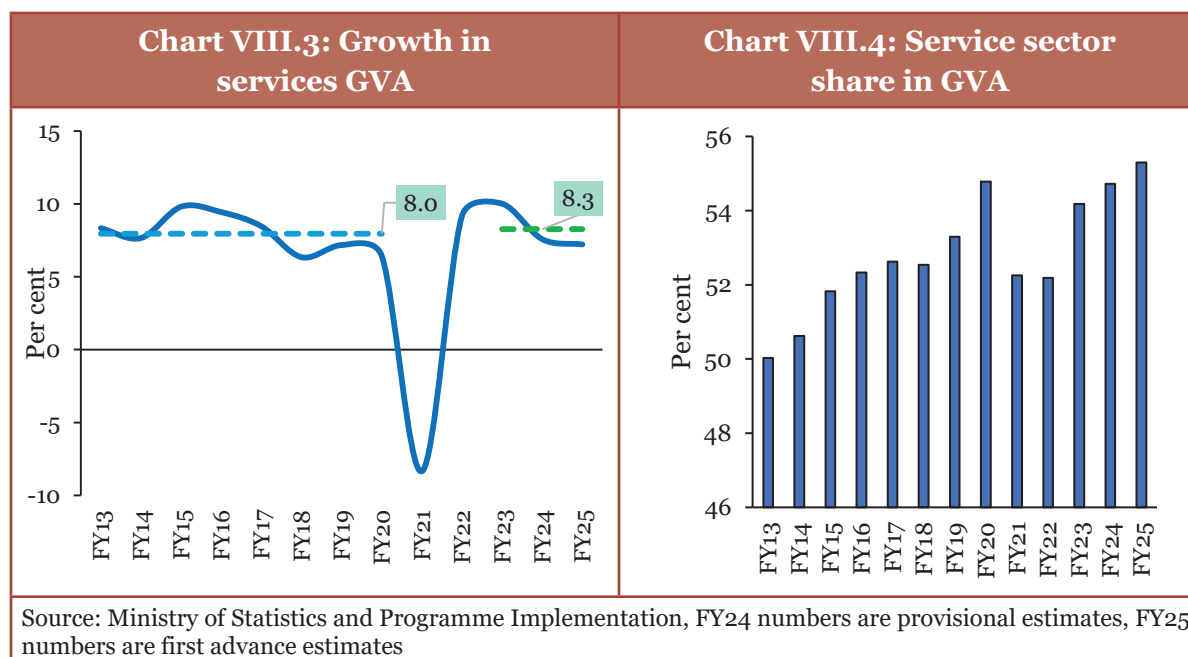


8.3 India’s share in global services exports has been steadily rising for the last two decades. This has helped compensate the impact of oscillation in the share of merchandise exports in global merchandise exports to some extent. In 2023, the United States led global services exports with a dominant 13 per cent share, followed by the United Kingdom with 7.4 per cent, Germany with 5.5 per cent and Ireland, China, and France, each accounting for approximately 5 per cent. India ranks seventh globally, representing a 4.3 per cent share in the global services export.



SERVICES SECTOR PERFORMANCE IN INDIA

8.4 India's services sector has been the steadiest contributor to the gross value added (GVA) in the economy. Its contribution to the total GVA at current prices has increased from 50.6 per cent in FY14 to about 55 per cent in FY25. It also provides employment to approximately 30 per cent of the workforce. Services also contribute indirectly to the GDP through the servicification of manufacturing, i.e., increasing utilization of services in manufacturing production and post-production value addition⁴.



8.5 The growth in the service sector, as measured by YoY change in the real GVA by services, has been above six per cent in each year in the last decade, except for the Covid-19 pandemic that affected FY21. The average services growth rate before the pre-pandemic year was eight per cent. The average services growth in the post-pandemic year i.e. FY23 to FY25 has risen to 8.3 per cent.

8.6 The service sector is divided into the following sub-sectors: (i) trade, repair, hotels and restaurants, (ii) transport, storage, communication & services related to broadcasting, (iii) financial services, (iv) real estate, ownership of dwelling & professional services, (v) public administration and (v) other services.

8.7 Within the service sector, public administration services have accounted for a share in the range of 11-12 per cent of the total services GVA during FY13 to FY23. Information and computer related services had the maximum buoyancy among the

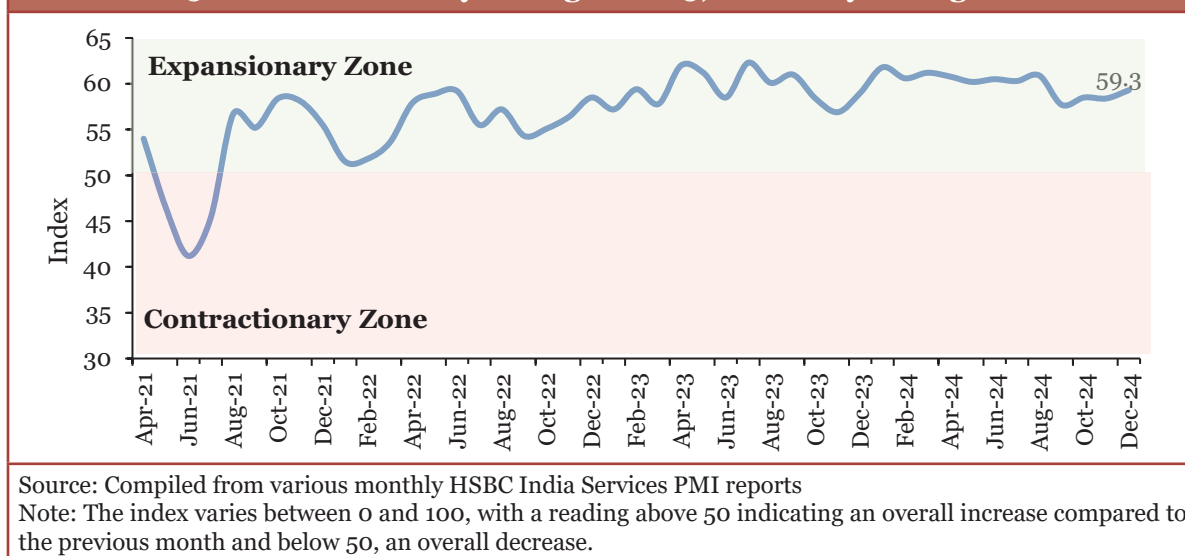
⁴ Pant, S., & Chakraborty, D. (2024). Is service orientation benefitting manufacturing exports from low-middle income countries? Firm-level empirical evidence from WBES data [Working Paper]. Indian Institute of Foreign Trade (IIFT)

services during the last decade (FY13 to FY23) which grew at a trend rate of 12.8 per cent during the last decade and stepped up its share in overall GVA from 6.3 per cent in FY13 to 10.9 per cent in FY23. This service has shown outstanding resilience both during and after the pandemic.

Purchasing manager's index (PMI)- services

8.8 HSBC's India services PMI shows that the service sector remained in the expansionary zone for continuous 41 months since August 2021. The index remained above the 60 mark for the first five months of FY25. However, in September, the index witnessed a ten-month low, but it quickly rebounded in October. The recent data⁵ indicates demand buoyancy continued to drive new business inflows higher, which in turn supported output growth and prompted firms to recruit additional workers. Finance & insurance registered strongest increases in both new orders and business activity at the sub-sector level.

Chart VIII.5: PMI services stay strong in FY25, backed by strong fundamentals



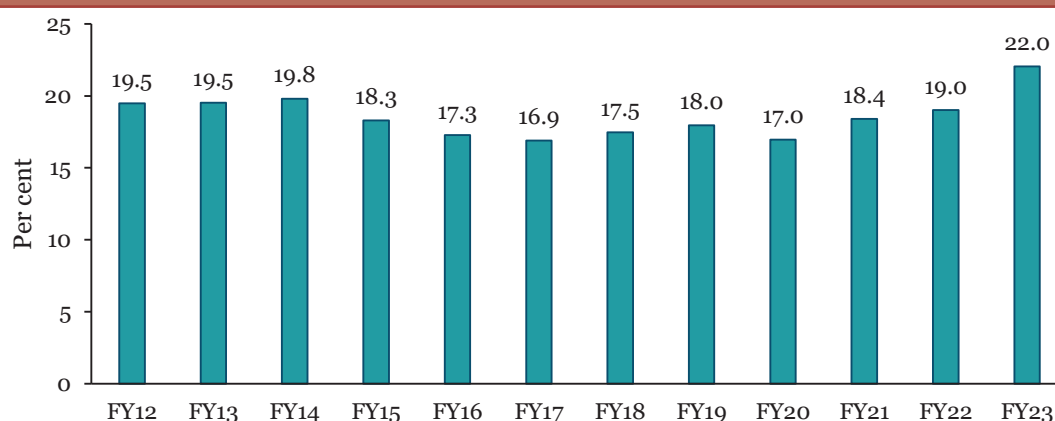
Trade in the services

8.9 The export of services grew at a trend rate of 11 per cent during FY14 to FY23, at constant prices. Computer services and business services exports account for around 70 per cent of India's services exports. India remained amongst the top five major countries in terms of growth in services exports in FY25 (April-September)⁶. India's services export growth accelerated to 12.8 per cent in April-November FY25 from 5.7 per cent in FY24. In April-November FY25, services imports grew by 13.9 per cent, in contrast to a decline of 2.9 per cent during the same period in FY24.

⁵ HSBC PMI Services report for December 2024

⁶ WTO Stats

Chart VIII.6: Services exports as per cent of services GVA (net of public administration)

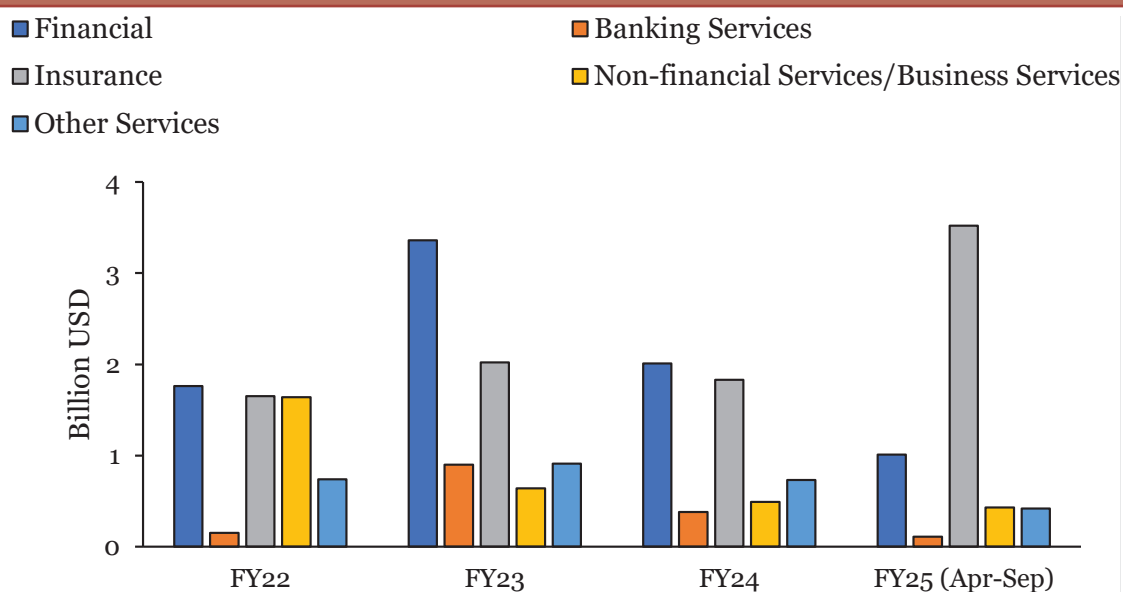


Source: Ministry of Statistics and Programme Implementation

SOURCES OF FINANCING: BANK CREDIT AND FDI

8.10 Total outstanding bank credit⁷ to services sector stands at 48.5 lakh crore as of November 2024. The YoY growth in the credit to the services sector was recorded at 13 per cent. Within the service sector, computer software and professional services recorded the highest YoY credit growth at 22.5 and 19.4 per cent respectively.

Chart VIII.7: FDI inflow within the service sector



Source: DPIIT, FY25 numbers are provisional

8.11 FDI equity inflows⁸ stood at USD 29.8 billion in FY25 (April- September), while the services sector witnessed USD 5.7 billion inflow in the same period. In FY25 (April-

⁷ RBI's Sectoral Deployment of Bank Credit – November 2024, https://rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=59430.

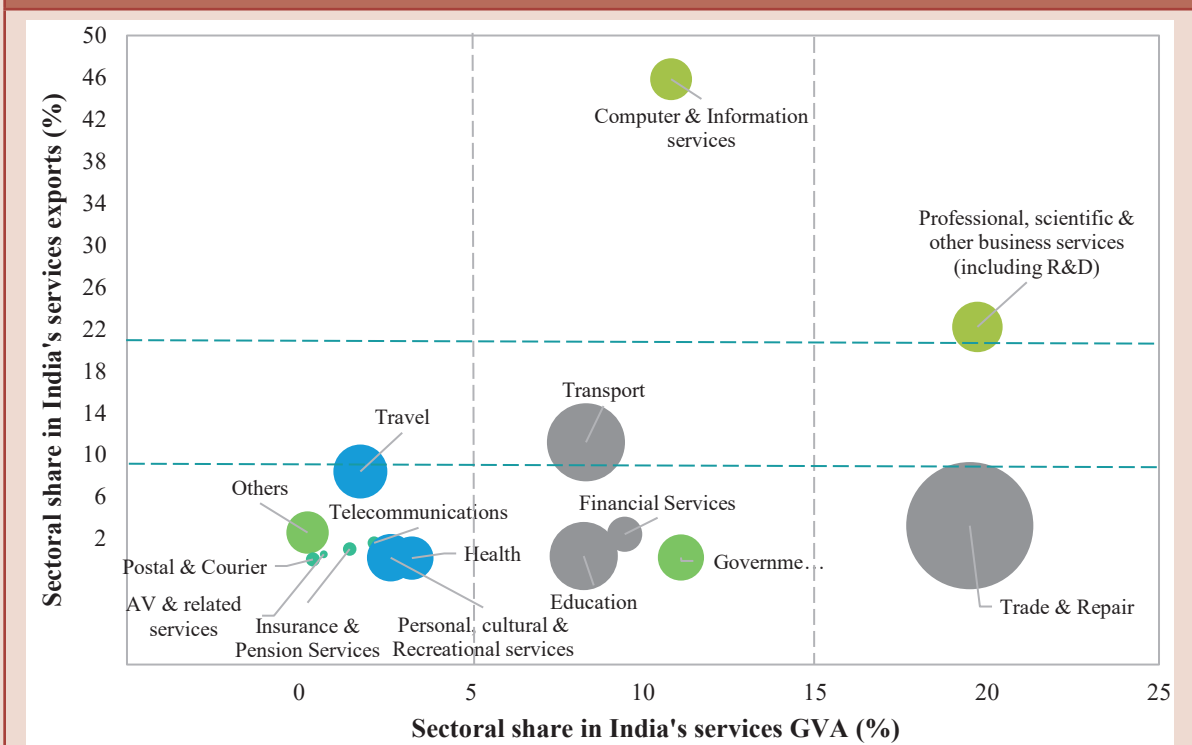
⁸ Quarterly Fact Sheet on FDI Inflow, <https://dpiit.gov.in/sites/default/files/FDI%20Factsheet%20September%202024.pdf>

September)⁹, insurance services received the highest FDI inflows of over 62 per cent, followed by the financial sector, which received over 18 per cent of the total FDI equity inflows to the services sector.

Box: VIII.1: Strategy for services – multi-dimensional analysis

NITI Aayog working paper on “Identifying Potential Service Sub-Sectors: Insights from GVA, Exports, and Employment Data” studies the potential of services in transforming the Indian economy from various dimensions such as the contribution to output /value added, employment and exports. Based on the analysis of the performance of the various service sub-sectors on these key dimensions, services are classified into four categories each with its own set of policy recommendations: defend, accelerate, transform, and untapped.

Chart VIII.8: Sectoral share of services sector in terms of GVA, exports and employment



Note: *Bubble size represents sectoral share in India's services sector employment. Construction services have been excluded from services exports, while real estate services (employment and GVA) are included under 'Other Business Services'. This sector is not considered due to challenges in mapping it within the GVA and employment dimensions
Based on data from RBI (exports), PLFS (employment) and MoSPI (GVA)

- Sectors to defend
- Sectors to accelerate
- ◆ Sectors to transform
- Untapped sectors
- Other sectors

⁹ Sub-sector wise FDI equity inflow in services sector, DPIIT, FY25 numbers are provisional

Sectors to defend

sectors with high export & GVA, low employment share	computer & information services, professional, scientific & other business services
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Sectors to accelerate

sectors with low-moderate export, moderate-high GVA & employment share	trade & repair, transport, education, financial services
--	--

Sectors to transform

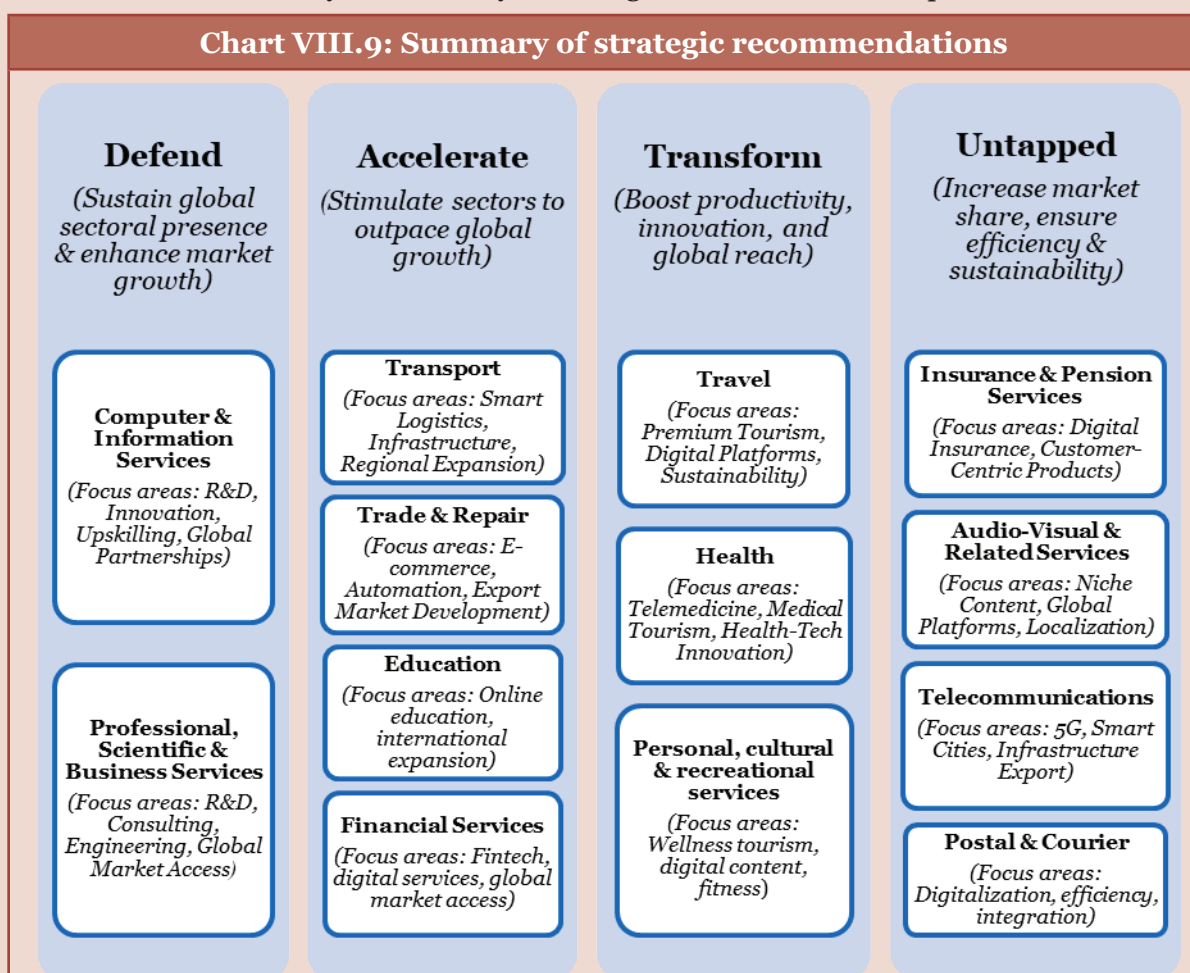
sectors with low export, GVA & employment share	travel, health, personal, cultural & recreational services
---	--

Untapped sectors

sectors with negligible export, GVA & employment share	telecommunications, insurance & pension services, AV & related services, postal & courier
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Based on the above analysis, summary of strategic recommendation is presented as below:

Chart VIII.9: Summary of strategic recommendations

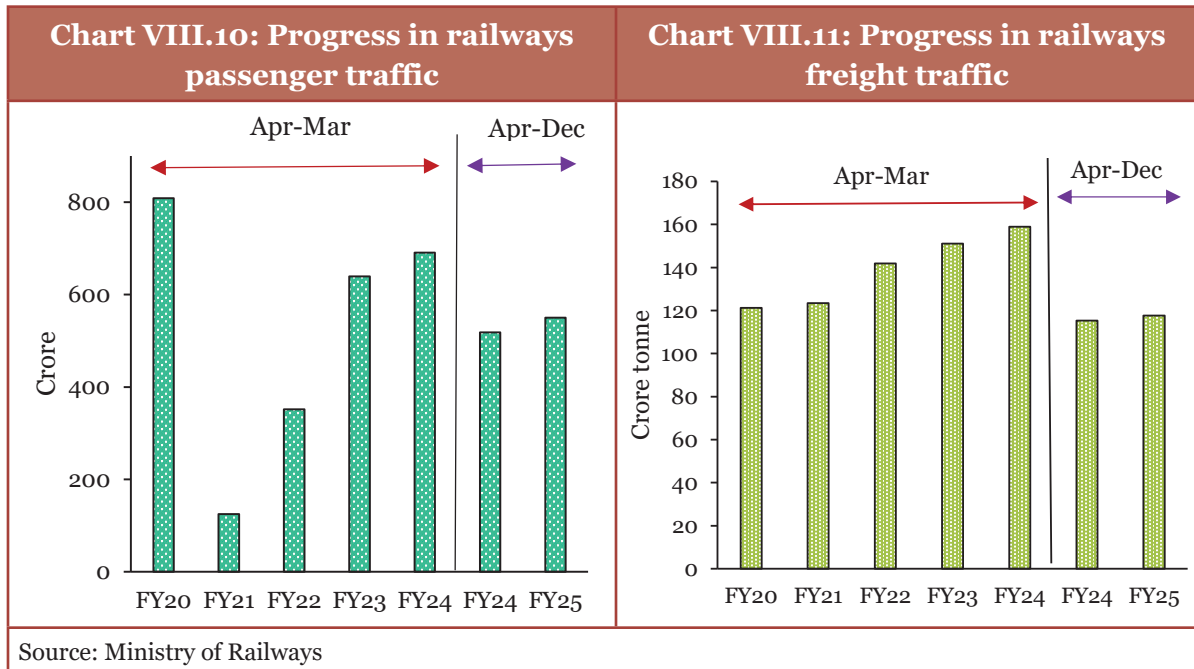


Source: Pant.S, Sharma. P, Gupta. A & Agrawal, P.(2024, December). Identifying Potential Service Sub-Sectors: Insights from GVA, Exports, and Employment Data. [Working paper]. NITI Aayog. <https://tinyurl.com/vxbbs5j>

PROGRESS IN LOGISTICS AND PHYSICAL CONNECTIVITY-BASED SERVICES

Indian Railways: keeping the development on track

8.12 Indian Railways (IR) is the fourth largest network in the world. Passenger traffic originating in IR achieved a growth of 8 per cent over the previous year. Revenue-earning freight in FY24, achieved a growth of 5.2 per cent.



8.13 In view of the rising passenger traffic, the government is taking various steps to upgrade passenger amenities. Out of a total of 7,325 railway stations across the nation, train indication boards have been provided at 1351 stations, coach guidance systems at 866 stations, digital clocks at 5605 stations, and public address systems at 6071 stations as of November 2024. Wi-Fi facility has been provided at 6112 stations to date. A new policy for the management of mobile catering services was introduced in 2023. As of date, 557 base kitchens have been commissioned catering to 468 pairs of trains.

8.14 As a result of the push toward digitalization in IR, E-ticketing has touched 86 per cent in the reserved sector as of October 2024. Ticketing through digital means in the unreserved sector has increased from 28 per cent at the beginning of the current financial year to around 33 per cent in October 2024. IR has also transformed the refund process enabling refunds in eligible cases within 24 hours in around 98 per cent of cases. Dynamic QR code-based payment has been enabled across all the counters. The passenger reservation system is being redeveloped using cloud-native technologies.

The new application will have features like high scalability, high performance, high availability, high level of security, ease of operations, and high agility.

8.15 To encourage tourism, Bharat gaurav trains have been introduced as theme-based tourist circuit trains that showcase India's rich cultural heritage and magnificent historical places. Under this scheme, the service provider is to provide comprehensive tour services comprising meals, accommodation, transport, sightseeing, tour guide, etc. As of date, a total of 325 trips of Bharat gaurav trains carrying 1,91,033 tourists have been operated covering various tourist destinations.

Road transport

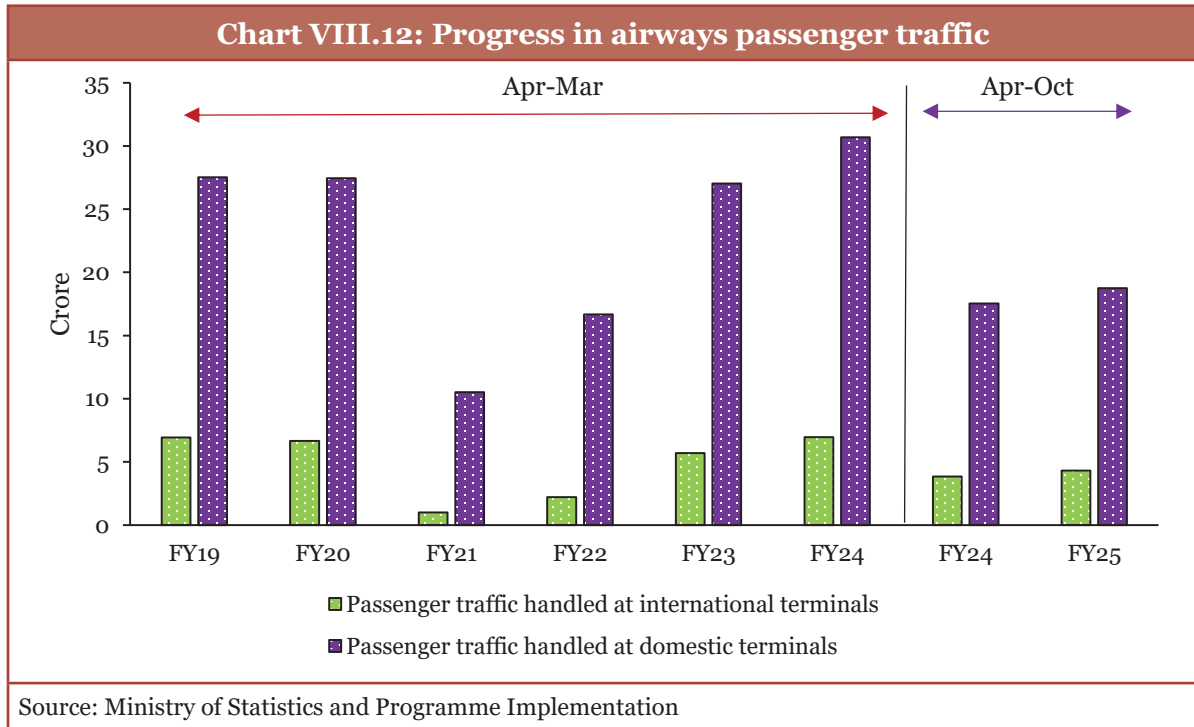
8.16 Road transport generates the highest GVA within transport services. During FY23, road transport accounted for 78 per cent of the total GVA of transport services. Enhancing user convenience on national highways is central to the growth of road transport. In this direction, the government has moved from traditional ways of tolling to digitised tolling by adopting electronic toll collection through FASTag. This has reduced the average waiting time at toll plazas from 734 seconds to 47 seconds¹⁰. The government has targeted the rollout of barrier-free tolling on all four lane plus NHs and high-speed corridors by FY29. The government has planned to establish more than one thousand wayside amenities in the next five years to provide world-class facilities and amenities to highway users in line with global standards along the NHs at every 40-60 kms on both sides.

8.17 In a major step towards road safety, the government has formulated a comprehensive strategy to improve road safety standards on NHs. A cashless treatment scheme for road accident victims has been initiated. Institute of driving training and research, regional driving training centres, and driving training centres at the state/district level have been set up. The government is also working towards road safety through initiatives like supporting truck driver health with the Abhay project, and providing eye tests and health checks for drivers.

Aviation: flying high

8.18 India is the fastest-growing aviation market globally. To accommodate the substantial growth in air traffic, Indian airlines have placed amongst the largest orders for aircraft globally.

¹⁰ <https://sansad.in/getFile/loksabhaquestions/annex/1712/AS302.pdf?source=pqals>

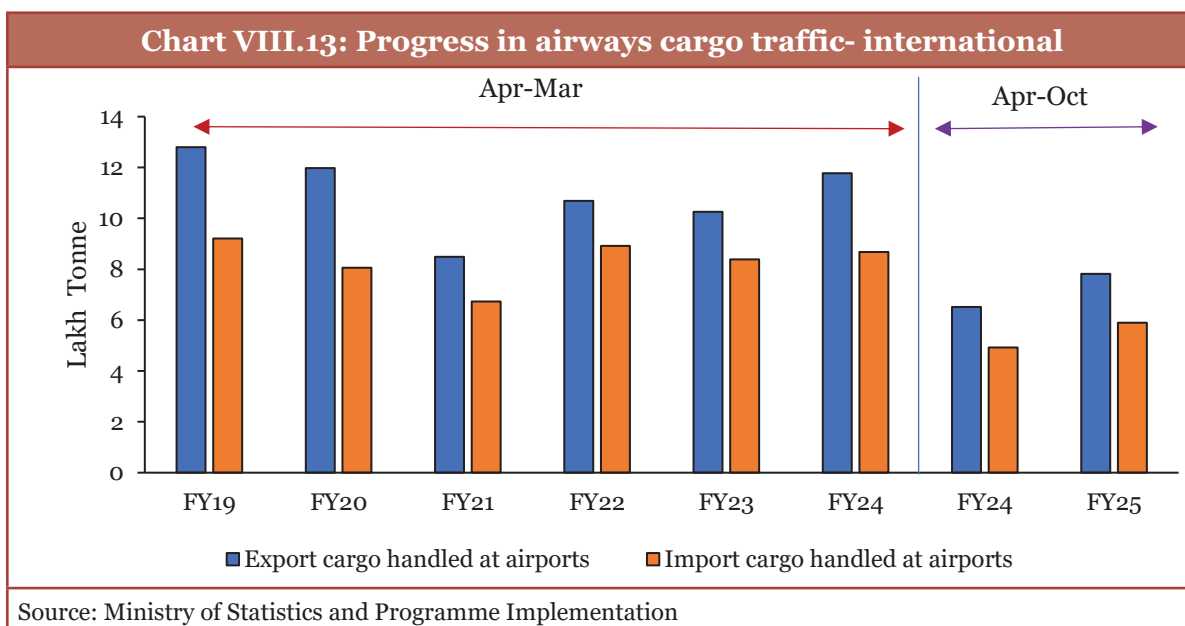


8.19 In the sphere of the maintenance, repair, and overhaul (MRO) industry, the government is encouraging original equipment manufacturers to establish facilities in India and has introduced policies to align the sector with global standards.

Box VIII.2: New segments – drones, leasing and MRO

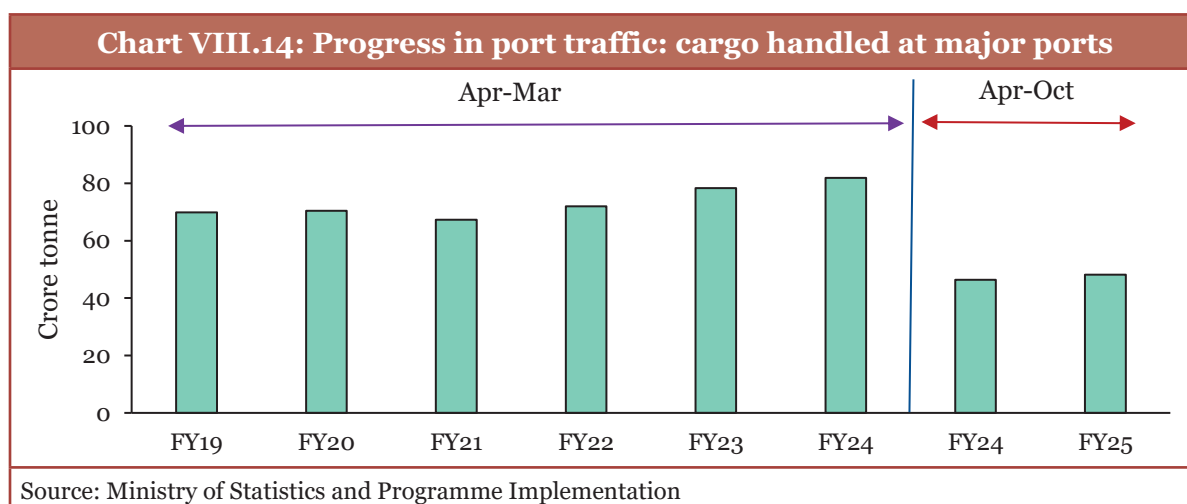
- As of October 31, 2024, India has seen a notable rise in drone activities, with 140 remote pilot training organisations, 18,862 remote pilot certificates issued, 26,659 registered drones, and 82 approved drone models (DGCA type certificates). About ₹ 60.6 crore have been disbursed under the PLI scheme to support drone manufacturing.
- As of November 30, 2024, 32 aircraft leasing entities (including provisional) have registered in the GIFT-IFSC, leasing 105 aviation assets, including 53 aircraft and 52 engines.
- On July 12, 2024, the government announced a uniform 5 per cent integrated goods and services tax on imported aircraft parts and tools, applicable regardless of HSN classification.

8.20 The PM Gati Shakti initiative aims to create a seamless multimodal connectivity network across the country. Under this initiative, the aviation sector is being integrated with other modes of transport, such as railways, roads, and waterways.



Port, Waterways and Shipping: Sea of opportunities

8.21 Major ports of India are enhancing their capacity to accommodate increased trade demand. The cargo movement in FY24 was 819 MT. In FY25, in line with the annual target of 870 MT, around 622 MT has been handled upto December 2024.

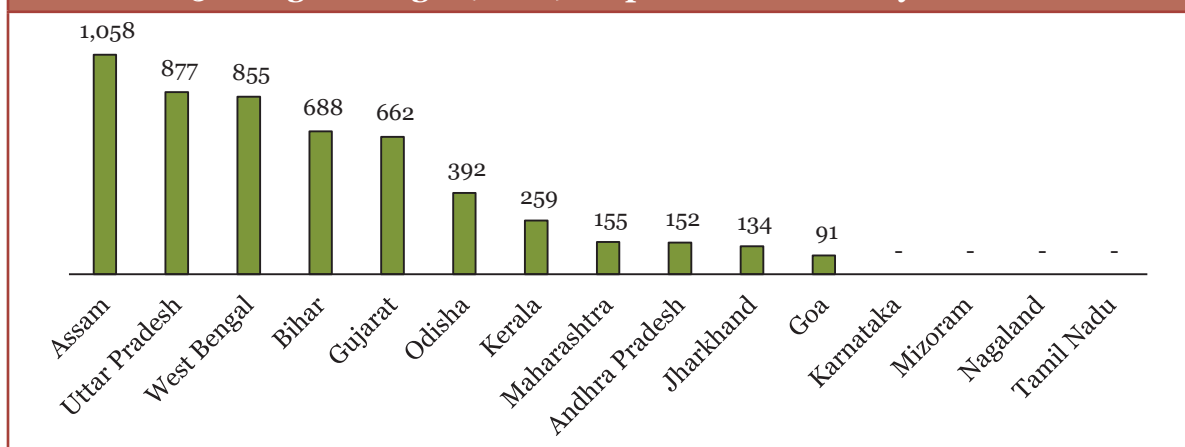


8.22 The government of India has launched the Maritime India Vision 2030 and Maritime Amritkaal Vision 2047 with the aim of positioning Indian shipbuilding and ship repair among the top five globally by 2047.

8.23 Inland water transport holds great untapped potential as a means for the transport of goods and passengers. India has a large endowment of rivers, canals, and other waterways. The total navigable length of waterways in India is around 14,850 km. As of October 2024, the country has 26 operational waterways of more than 4,800 km. The government is also putting efforts into promoting river cruise tourism on national

waterways. Passenger movement on national waterways in Q2 of FY25 was more than 3.36 crore, increasing from approximately 67 lakh passengers in Q2 of FY24.

Chart VIII.15: Navigable length (in km) of operational waterways in different states



Source: Ministry of Ports, Waterways and Shipping

OTHER SERVICES

Tourism and hospitality

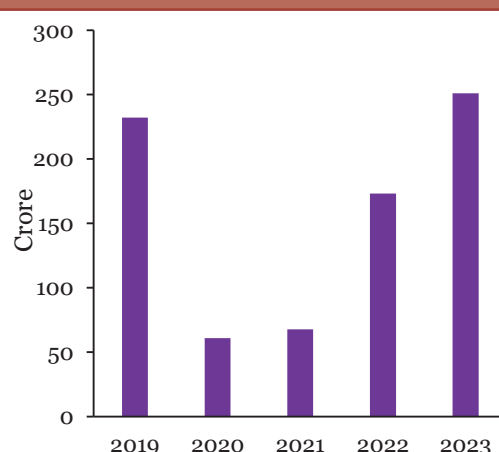
8.24 The tourism sector’s contribution to GDP regained the pre-pandemic level of 5 per cent in FY23. The tourism sector created 7.6 crore jobs in FY23.

8.25 International tourist arrivals (ITAs) in India have rebounded to pre-pandemic level in 2023. The share of India’s ITAs in World ITAs stands at 1.45 per cent in 2023. Foreign exchange earnings through tourism were 28 billion USD. India received 1.8 per cent of world tourism receipts and attained a rank of 14th worldwide in world tourism receipts during 2023.

Chart VIII.16: International tourist arrivals and foreign exchange earnings through tourism



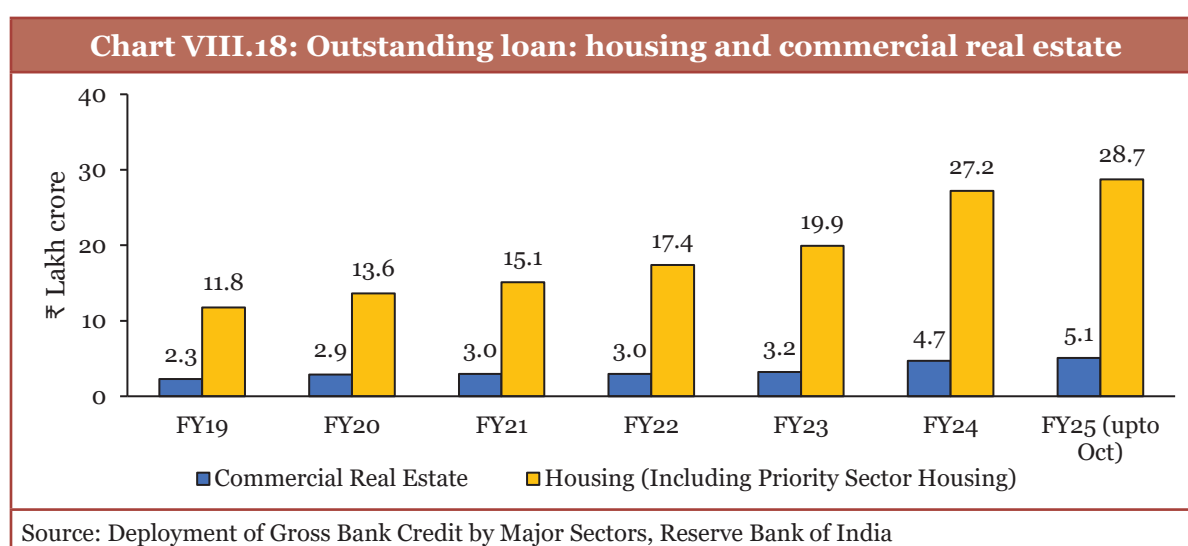
Chart VIII.17: Domestic tourist visits rebounding to pre-pandemic level



Source: Ministry of Tourism

Real Estate: Building the economy

8.26 India's real estate market witnessed robust performance under office demand as well as residential sales driven by economic stability and positive market sentiment. After the enactment of the Real Estate Regulatory Authority, India ranked 31st out of 89 countries in the Global Real Estate Transparency Index in 2024¹¹. The demand for real estate is emerging not only in tier 1 and tier 2 cities but across the country due to the expansion of metro networks, enhancement to road networks, and improvements in connectivity. Housing demand in India is expected to touch 93 million units by 2036¹². The rise of real estate investment trusts (REITs) further amplifies the positive trajectory of the commercial sector. The residential real estate market scaled an 11-year high in sales volume in the first six months of 2024. During this period, total sale across top eight cities recorded 11 per cent YoY growth¹³.



8.27 The Real Estate (Regulation and Development) Act has brought numerous improvements in the real estate sector, including protection against fraud, increased transparency, timely project deliveries, and measures to prevent misuse of funds, among other benefits. GST has helped to simplify the taxation structure in real estate transactions by applying a single unified tax system across states. It has encouraged proper invoicing and documentation, thus reducing the scope for tax evasion. The government introduced REITs as an investment vehicle in commercial real estate, allowing investors to pool funds and invest in income-generating real estate. This helps increase commercial real estate market liquidity and attracts institutional investors. Implementation of online platforms for the submission and approval of building plans has led to a reduction in delays and brought more transparency to the process. The

11 <https://www.jll.co.in/en/trends-and-insights/research/global-real-estate-transparency-index>

12 Confederation of Real Estate Developers Associations of India

13 Monthly Industry Update Reports, Hotels & Hospitality Overview, HVS ANAROCK

digital India land records modernization programme aims to create a comprehensive, accessible, and transparent land record management system.

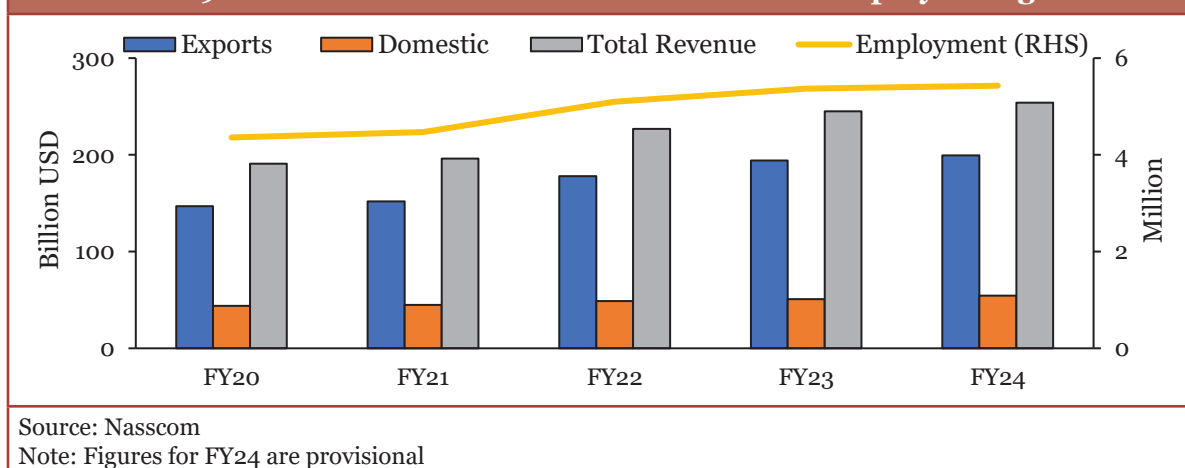
BUSINESS SERVICES

Information Technology (IT) Services

8.28 The Indian IT/ ITes industry has a leading position globally and has been a significant contributor to the growth of exports. According to NASSCOM Strategic Review Report 2024, India's tech industry¹⁴ demonstrated extraordinary resilience in FY24, amidst macroeconomic pressures and geopolitical tensions. The industry has estimated revenues of USD 254 billion, marking a 3.8 per cent YoY growth in FY24 (excluding e-commerce). Tech exports reached nearly USD 200 billion, reflecting a growth of 3.3 per cent, while the domestic market is expected to expand by 5.9 per cent, crossing USD 54 billion in FY24. The sector maintained its position as a net hirer, adding 60,000 employees to reach a workforce of 5.43 million in FY24.

8.29 The abolition of the angel tax (on investments made by investors in startups) is expected to boost the country's global innovation and entrepreneurial competitiveness. Expanding the scope of safe harbour rules and streamlining transfer pricing assessment procedures are expected to make the country's transfer pricing regime more attractive and competitive, boost IT exports, and ease business for Global Capability Centres and the IT services industry. Other reforms include the abolition of the 2 per cent equalisation levy, reduction in tax deduction at source on payment made by e-commerce operators to e-commerce participants, relief from GST on data centre exports, reduction of rate of tax collection at source to be collected by e-commerce operators etc.

Chart VIII.19: Performance of IT services: revenue and employment generation



¹⁴ Tech industry revenues include information technology services, business process management, engineering research and development, software products, and hardware.

Global Capability Centers

8.30 India's Global Capability Centres (GCCs) are emerging as strategic hubs reshaping the Indian corporate landscape while influencing global business dynamics. The number of GCCs in India has grown from approximately 1430 in FY19 to over 1700 in FY24. As of FY24, GCCs in India employ nearly 1.9 million professionals. Over the past five years, India has remained at the forefront of the global GCC expansion strategy, with more than 400 new GCCs and around 1100 new units established.

8.31 GCCs are fundamentally altering the technology landscape. Leading organisations are centralising their tech ecosystems in India. This is particularly evident in sectors like aerospace, defence, and semiconductors, where companies are advancing their engineering efforts to focus on next-generation platforms, products, and technologies. Over the last five years, the setup rate of engineering research & development GCCs has grown 1.3 times faster than the overall GCC setup, highlighting a continued shift towards high-value-added work.

8.32 India has established itself as a prominent player in leveraging its vast talent pool, which accounts for 28 per cent of the global (science, technology, engineering, mathematics) STEM workforce and 23 per cent of the global software engineering talent. Over the past decade, the GCC ecosystem in India has matured significantly, advancing into high-end engineering roles such as product managers and architects, with 35 per cent of transformation hubs exhibiting a strong presence of architects¹⁵. Furthermore, global roles within GCCs are expanding rapidly, expected to grow from currently 6,500 to over 30,000 by 2030, supported by robust training programs to develop leadership. The adoption of Artificial Intelligence (AI) and Machine Learning (ML) and the establishment of AI centres of excellence further enhance the GCC landscape by tapping into India's strong middle-management talent.

Box VIII.3: AI adoption in the services sector in India

The services sector, including banking, financial services, and insurance (BFSI), healthcare, telecom, retail, and transport and logistics, stands out for its rapid AI adoption, supported by various national initiatives and technologies.

Finance: Several financial institutions and banks in India are using AI to enhance their operations, improve customer experiences, and streamline their services. For example, SBI Intelligent Assistant (SIA) by SBI is a chatbot used to provide support to customers. Banks are also using AI for fraud detection and risk management. ML algorithms are used to identify suspicious transactions by analysing customer data.

Telecom: AI improves customer support, network optimisation, and predictive maintenance. Several telecom companies in India are leveraging AI to improve their services, optimize operations, and enhance customer experience. For example, AI-driven platforms

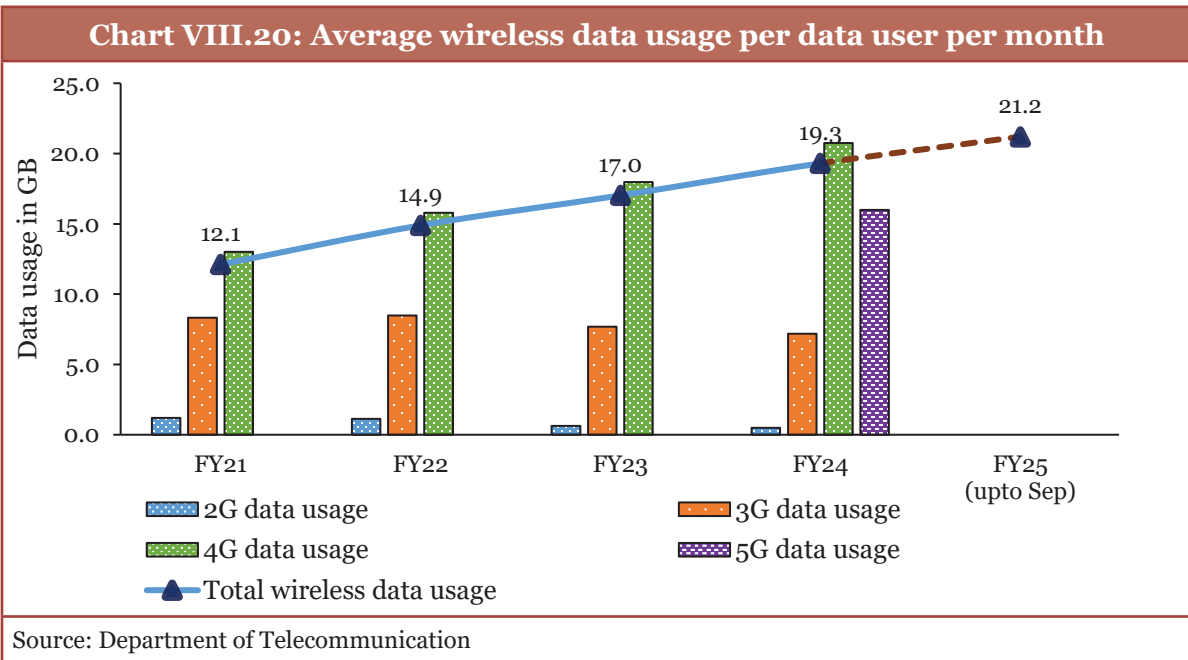
for end-to-end telecom network management. Built on top of state-of-the-art big data architecture touching upon every aspect of the network – from the core and radio to the business functions of a telecom service provider are being used. Cloud-native data lake platform tailored for carriers to enable smarter operations through ML as a service are also being used. They leverage ML to detect anomalous network patterns and create reports and alert based on these patterns for proactive root cause analysis and resolution before the network symptoms start affecting operations.

Retail and e-commerce: AI enables personalised marketing, inventory management, and customer experience enhancement. The fashion e-commerce giants are using advanced features to enable customers to have an enhanced and discovery-led shopping experience.

Transport and logistics: AI applications streamline operations and improve delivery accuracy, helping companies cut costs and enhance customer satisfaction. AI is used for route planning and optimization to ensure timely delivery of packages. AI-based robotic systems are being used in their fulfilment centres to streamline the sorting, packaging, and inventory management processes, reducing human intervention and increasing efficiency.

Telecommunication

8.33 India's telecom sector is expanding with the smartphone boom, surging data consumption, and the advent of technologies like 5G. India stands as the second-largest telecommunications market, with over 1.18 billion telephone subscribers, an overall teledensity of 84 per cent, and 941 million broadband users¹⁶ as of 31st October, 2024. The country also leads in mobile data consumption per subscriber and offers the world's most affordable data rates. India's achievement of the fastest 5G rollout globally highlights its technological prowess in the telecom sector.



16 https://www.trai.gov.in/sites/default/files/2024-12/PR_No.94of2024_o.pdf

8.34 There has been a paradigm shift in India's telecom technology space that underscores an ongoing effective transition from a technology importer to a technology developer and exporter.

Box VIII.4: C-DOT- the catalyst of India's telecom revolution

The Centre for Development of Telematics (C-DOT) has been committed to research and development of indigenous solutions and reducing dependency on foreign technologies.

C-DOT has consistently spearheaded next-generation telecom technologies:

4G and 5G core networks: C-DOT has been instrumental in developing indigenous 4G and 5G core solutions, reducing reliance on global vendors and helping in reduction of telecom imports. Its innovations support the deployment of secure, scalable networks tailored to India's needs.

Quantum communication systems: Recognising the rising importance of cybersecurity, C-DOT has developed quantum encryption solutions, ensuring secure communication for government and strategic sectors.

Disaster management solutions: Technologies like geo-targeted and automated multi-hazard, multi-media early warning alerts to citizens have reinforced India's resilience against natural disasters.

Cybersecurity and resilience: As telecom infrastructure evolves, so do the threats. C-DOT has developed indigenous cybersecurity tools that monitor and protect critical infrastructure. These tools are pivotal in mitigating risks associated with cyber warfare and ensuring national security. C-DoT has developed the SAMVAD app to provide secure call and chat for sharing text, image, audio, and video files and deployed in strategic organizations.

Uplifting domestic telecom ecosystem: Through its CCRP (C-DOT Collaborative Research Program), C-DOT fosters indigenous telecom innovation by partnering with industry players. This initiative strengthens India's telecom research ecosystem, with C-DOT offering funding and expertise to help companies develop advanced technologies. C-DOT also supports startups incubated under the CCRP framework. The national initiative for developing and harnessing innovations (NIDHI) and Avishkar programme have been launched by the government to nurture innovations and ideas into startups.

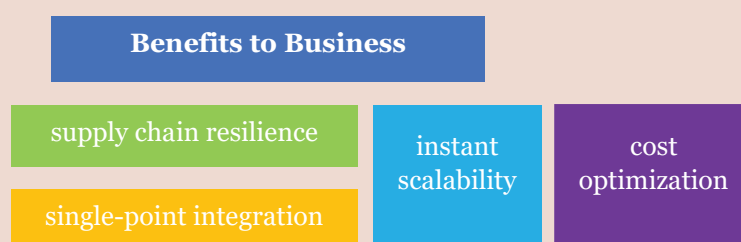
C-DOT's journey can exemplify India's transition from a telecom consumer to a technology innovator, propelling the nation towards a future of digital sovereignty and inclusive connectivity.

Box VIII.5: Open Network for Digital Commerce: thinking beyond platforms

The pandemic underscored the critical role of digital commerce in enabling business continuity and consumer access to essentials. Digital commerce played role in enabling resilience in the economy. The prevailing platform-centric model of digital commerce globally, and increasingly in India, calls for attention. A few large e-commerce players dominate the market, which affects participation and flexibility of smaller sellers, such as local retailers, artisans, and MSMEs. Sellers often have to conform to terms and conditions, from customer data access to product visibility, reducing their market leverage and fostering dependence on these platforms.

The Open Network for Digital Commerce (ONDC) represents a paradigm shift, promoting a democratic and interoperable digital commerce ecosystem thus fostering inclusivity and equity. ONDC enables buyers and sellers to transact seamlessly across different platforms. It helps by reducing customer acquisition costs, enhancing business efficiencies, and expanding choices for merchants and consumers.

ONDC recorded more than 14 million transactions in the month of November 2024 across 1100+ cities. 7 lakh+ sellers and service providers are active on the ONDC network spread across 600+ cities and towns across India. 190+ network participants are live on the network. Presently, over 7000 farmer producer organisations (FPOs) have registered to be a part of the ONDC network through various seller network participants. Around 400 self-help groups (SHGs), micro-entrepreneurs, and social sector enterprises have been onboarded on the network. Mobility through the ONDC network is live in 15+ cities with around 5.45 lakh taxi and auto drivers onboarded.



Scaling new frontiers: thinking beyond traditional e-commerce

Logistics as a service: ONDC is integrating hyperlocal and inter-city logistics service providers to ensure a seamless supply chain with unified first-mile, middle mile, and last-mile connectivity across 1200+ cities.

Financial services: ONDC's financial services category was launched in August 2024. It integrated with 9 lending service providers applications and 3 lenders, to enhance accessibility and efficiency in credit services. It integrates account aggregator for data, digilocker / Aadhaar for KYC, eNACH / eMandate for repayment and Aadhaar eSign for agreement signing. It facilitates low-cost distribution and innovation in financial products, enabling personal loans, health insurance, and mutual funds.

Expanding coverage: enhancing inclusion

The platform today has 10 active domains, 110 network participants, and close to 6.5 lakh sellers/service providers. It has attracted an increasing number of transactions since its launch. In the retail category, the platform has seen over 4.4 crore orders transacted, across 814 districts and with 2.83 lakh sellers involved.¹⁷

ONDC in collaboration with Bhashini, an AI-driven language translation tool, launched Saarthi, a reference application to assist businesses in creating their buyer-side apps. In October 2024¹⁸, the platform joined hands with the National Cooperative Consumers' Federation of India, and Otopy to make onions available at affordable prices across the NCR region, in order to help reduce the prices.

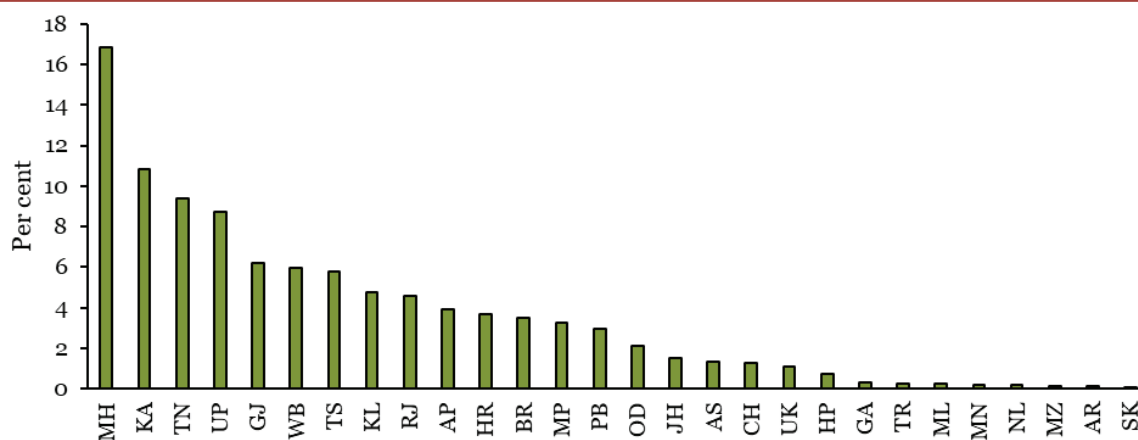
¹⁷ <https://opendata.ondc.org/>

¹⁸ ONDC Press Release, 16 October, 2024 <https://ondc.org/press-releases-details/?id=30>

STATE WISE ANALYSIS OF SERVICE SECTOR PERFORMANCE

8.35 The context for presenting the state-specific patterns in industrial and service gross state value added (GSVA)¹⁹ has been mentioned in Chapter 7 of this Survey. The service sector accounts for about 55 per cent of the national GVA in FY25. However, the distribution of service sector activity across Indian states reveals a pronounced geographic dispersion. For FY23, Karnataka and Maharashtra account for more than one fourth of the total service sector GSVA of all the states. These states along with Tamil Nadu, Uttar Pradesh, and Gujarat together share more than 50 per cent of the total service sector GSVA. These states also have more than 50 per cent of the total industrial GSVA, suggesting that both feed into each other. On the other hand, another set of 19 states collectively account for only one fourth of the service sector GSVA of all the states (Chart VIII.21).

Chart VIII.21: State-wise share in services GSVA at constant prices for FY23



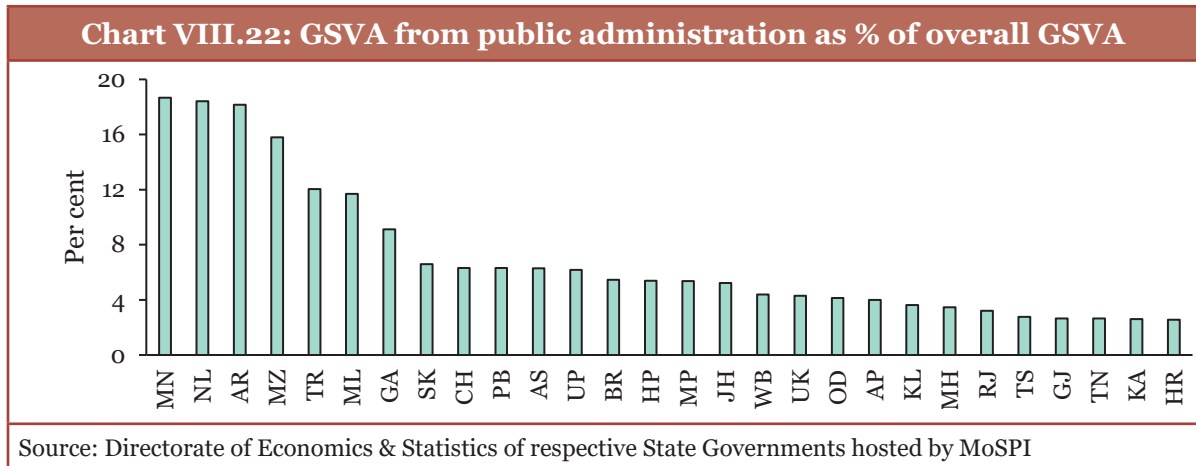
Source: Directorate of Economics & Statistics of respective State Governments hosted by MoSPI
Note: State codes used in this section;

State	Code	State	Code	State	Code	State	Code
Andhra Pradesh	AP	Haryana	HR	Manipur	MN	Sikkim	SK
Arunachal Pradesh	AR	Himachal Pradesh	HP	Meghalaya	ML	Tamil Nadu	TN
Assam	AS	Jharkhand	JH	Mizoram	MZ	Telangana	TS
Bihar	BR	Karnataka	KA	Nagaland	NL	Tripura	TR
Chhattisgarh	CH	Kerala	KL	Odisha	OD	Uttarakhand	UK
Goa	GA	Madhya Pradesh	MP	Punjab	PB	Uttar Pradesh	UP
Gujarat	GJ	Maharashtra	MH	Rajasthan	RJ	West Bengal	WB

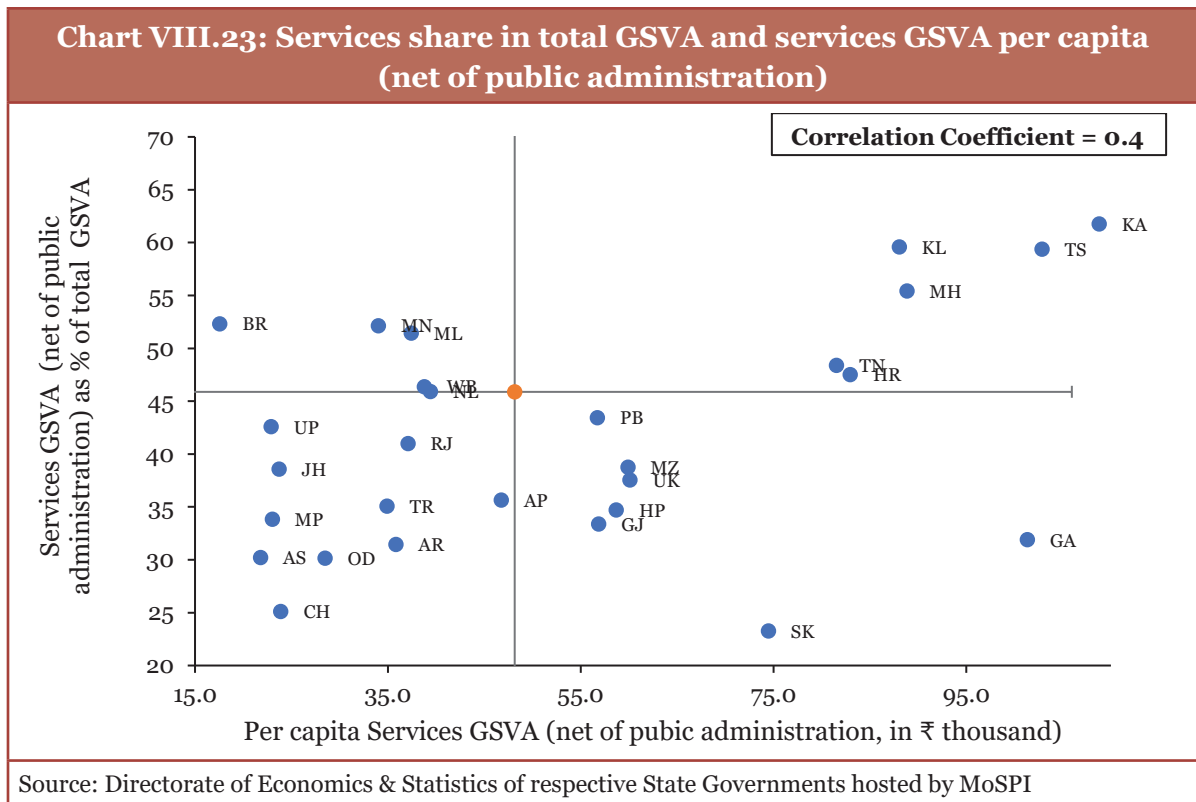
8.36 Among the different service activities, public administration is a unique category that reflects the strength of the state machinery in the state. This is majorly determined by the strength of state's own revenues, central transfers including tax devolution and

¹⁹ In this chapter, service sector gross state value added (GSVA) refers to FY23 and it is taken at constant prices (2011-12). These GSVA numbers are estimated by the respective State Directorates of Economics & Statistics and hosted by MoSPI. The aggregate of state GSVA may differ from the national GVA estimated by MoSPI. State population, wherever used, refers to figures of the respective state governments for their GSDP calculations.

borrowing of the state, which together define the spending capacity of the state. This is independent of other services which are largely commercially driven.



8.37 The economies of many north eastern states have considerable dependence on the resources of the state and central government because there are natural disadvantages to those regions to pursue large-scale industrialisation and commercial services. (Chart VIII.22)



8.38 There are four different scenarios in the relationship between services share in total GSVA (defined as service intensity of the state economy), and, services GSVA per capita.

- i. low service intensity, low per capita service GSVA;
- ii. low service intensity, high per capita service GSVA;
- iii. high service intensity, low per capita service GSVA; and,
- iv. high service intensity, high per capita service GSVA.

8.39 Category (ii) above indicates that the productivity of commercial services is high. In contrast, category (iii) represents high dependence on commercial service activities without their being productive enough to generate high levels of income. Firm conclusions cannot be drawn from states falling in the other two categories without analysing supplementary information. However, in category (iv), some state patterns are very clear—Karnataka's, and to an extent, Telangana's positions are majorly explained by the large presence of IT services, Maharashtra's position is largely due to its strength of financial intermediation activities, and, Kerala's position mainly because of the strong presence of trade, financial and real estate services. The following three charts present service activities that constitute more than two-thirds of the total services GSVA net of public administration. These three charts provide some explanation for the patterns seen in Chart VIII.23.

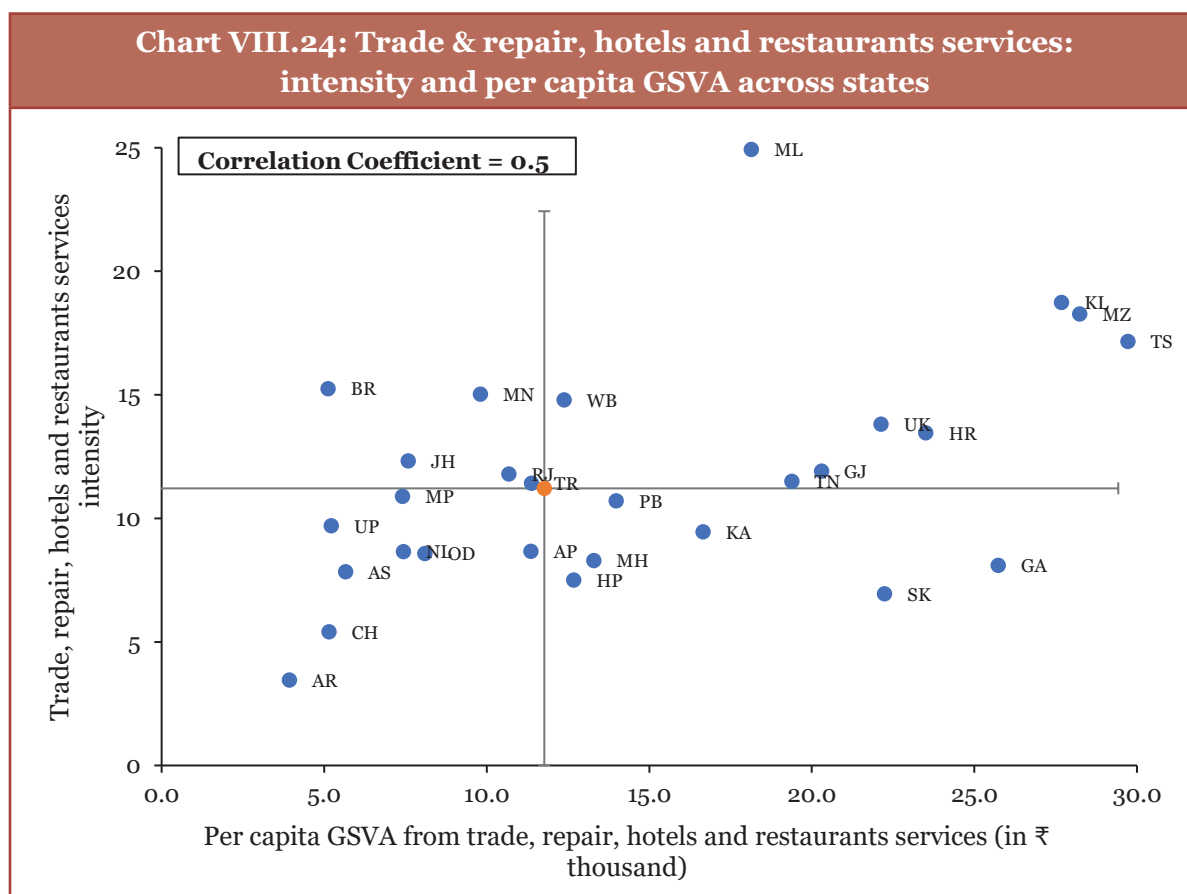


Chart VIII.25: Financial services: intensity and per capita GSVA across states

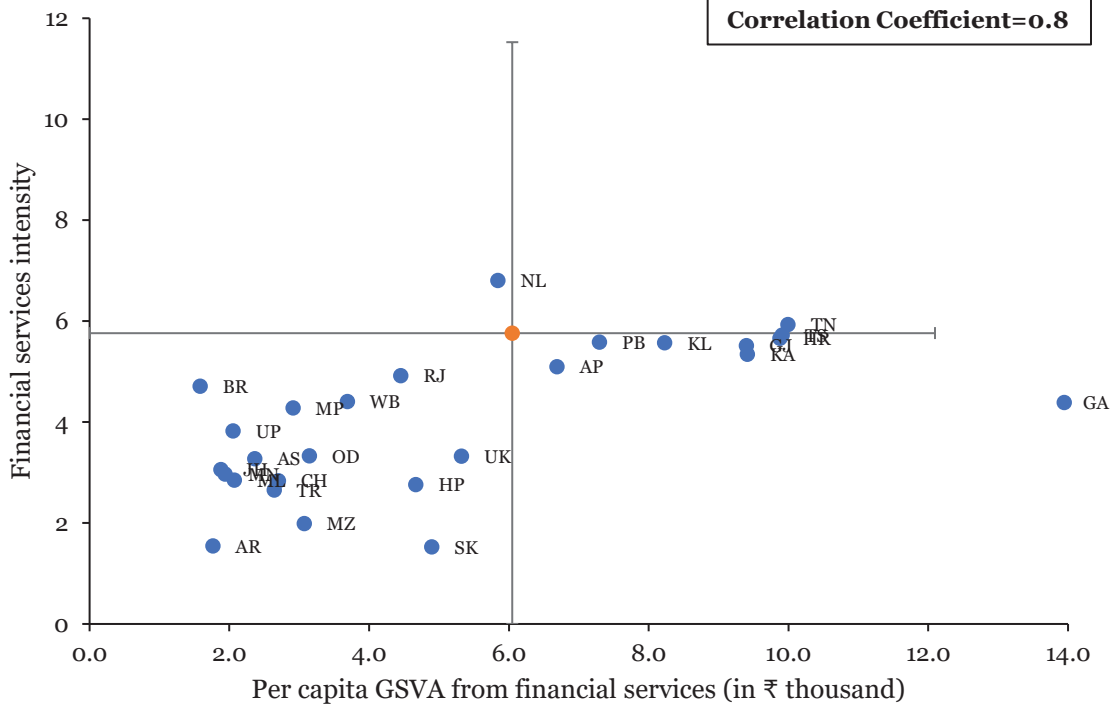
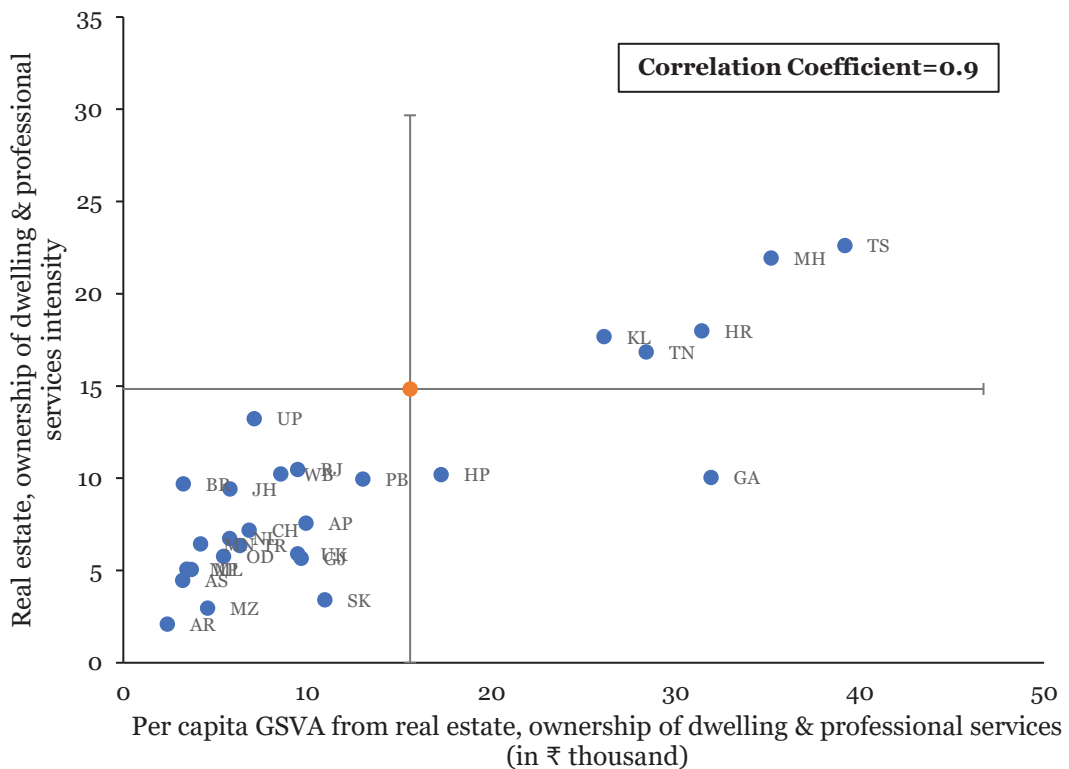


Chart VIII.26: Real estate, ownership of dwelling & professional services: intensity and per capita GSVA across states

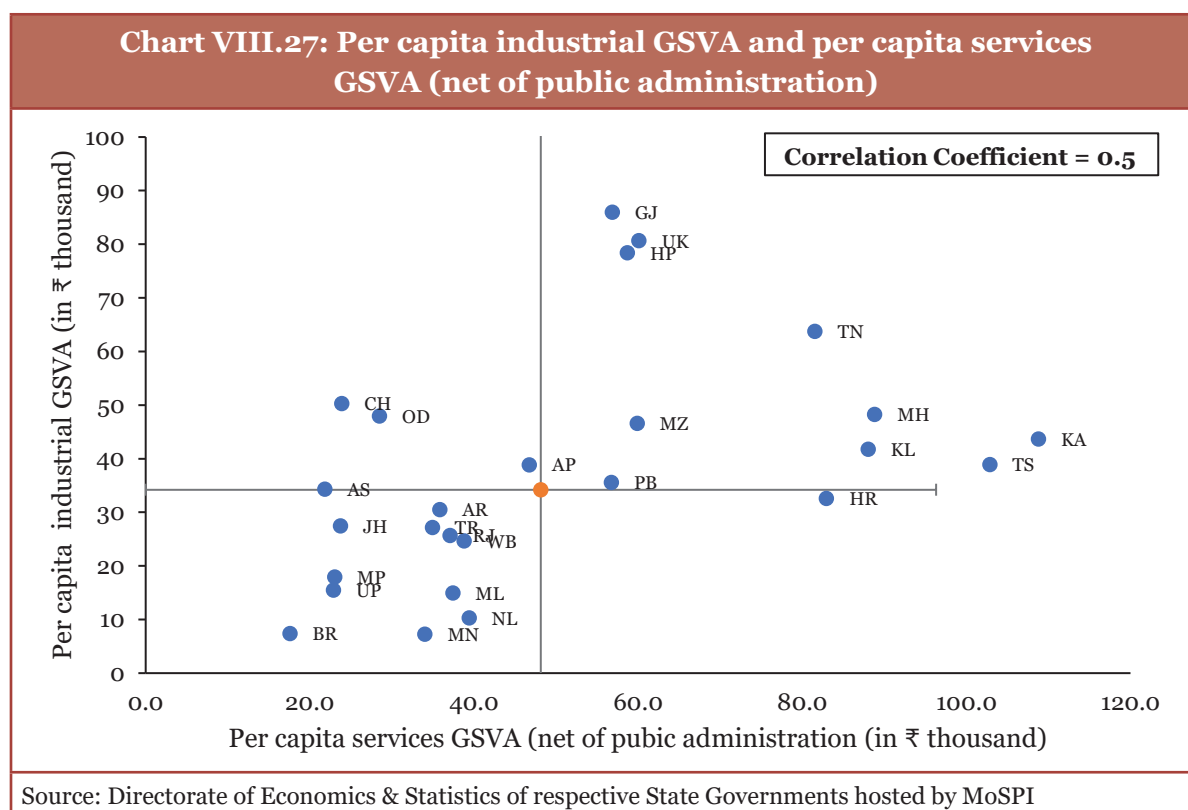


Source: Directorate of Economics & Statistics of respective State Governments hosted by MoSPI

8.40 The states like Meghalaya, Uttarakhand, and Mizoram have more than a third of their services GSVA coming from trade, repair, hotels, and restaurants, partly because of tourism. Many bigger states have trade and repair intensity of close to or higher than the national average indicating a large presence of low value adding trade in these states. Many of these states are relatively less industrialised also (Refer Chapter 7).

8.41 Financial, real estate and professional services have very high levels of concentration in a few states. Within the service sector, financial services are highly concentrated with Maharashtra (Mumbai), Tamil Nadu, Gujarat (GIFT City) and Karnataka accounting for more than 50 per cent of total financial services GSVA. (Maharashtra is not presented in the chart because it is a big positive outlier).

8.42 Karnataka, Maharashtra, Telangana, Haryana, Tamil Nadu have more than one third of their services GSVA coming from real estate, ownership of dwelling & professional services. (Karnataka is not presented in the chart because it is a positive outlier). Karnataka (Bengaluru), Telangana (Hyderabad) and Maharashtra (Mumbai), Haryana (Gurugram) and Tamil Nadu (Chennai) have concentration of IT and fintech services leading to high demand for office and residential space.



8.43 Chart VIII.27 combines the state patterns flowing from this chapter and chapter 7. (Sikkim and Goa are not presented here because they are outliers). It largely indicates the comparative advantages of different states.

8.44 On the basis of the above analysis, states can be classified into four distinct categories based on their service and industrial performance in terms of per capita GSVA.

- i. States with high per capita industrial GSVA: These are states like Gujarat, Uttarakhand, and Himachal Pradesh. States like Chhattisgarh and Odisha perform reasonably well in the industrial sector while they have low service sector presence. This indicates that these states will stand to gain largely by accelerating their industrialisation and industrial productivity which will strengthen their service sectors through the ongoing trends in greater ‘servicification’ of industries.²⁰
- ii. Strong service sector performers: States such as Karnataka, Telangana and Kerala excel in services, with high per-capita service GSVA and service shares in GSVA but exhibit only around average industrial per capita GSVA. These regions largely depend on urbanised service-driven economies.
- iii. Dual strengths—industrial and service: Maharashtra and Tamil Nadu typically represent states with reasonably strong industrial and service sectors. Their diversified economies integrate manufacturing with trade, financial services, real estate & professional services.
- iv. States with reform potential: While the need for business reforms cuts across states in general, the fourth category specifically includes states that have significant potential for reform led development. These states are Arunachal Pradesh, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Manipur, Meghalaya, Nagaland, Rajasthan, Tripura, Uttar Pradesh and West Bengal.

8.45 As per DPIIT’s Business Reforms Action Plan (BRAP)²¹, which ranks states based on their performance in introducing business reforms, the states with service intensity backed by industry are the states which have introduced larger numbers of reforms in comparison to their peer states and fall in top achiever and achiever’s category. Thus, introducing business reforms is essential to industrial as well as service development in the state.

8.46 As per annual survey of unincorporated sector enterprises 2022-23, the number of estimated enterprises belonging to the unincorporated sector stands at 6.5 crore. 72.6 per cent of these enterprises operate in the service sector. Many states like Uttar Pradesh and West Bengal have a substantial presence of these enterprises. These enterprises, though contributing to the overall development of the economy in terms of employment and income, are losing out on benefits normally offered by incorporation such as tax benefits, and credibility which could help them build better client relationships, access

20 Pant, S., & Chakraborty, D. (2024). Is service orientation benefitting manufacturing exports from low-middle income countries? Firm-level empirical evidence from WBES data [Working Paper]. Indian Institute of Foreign Trade (IIFT)

21 https://eod.dpit.gov.in/Home?year=wM54HFmV7pBOTrogIzA97w_eee_eee_

to credit and durability which would help them provide continuity to their business operations etc. States, through policy nudges reducing compliance difficulties, can accelerate the incorporation of these enterprises.

CONCLUSION AND WAY FORWARD

8.47 In the Economic Survey 2023-24, we reported that two significant transformations are reshaping India's services landscape: the rapid technology-driven transformation of domestic service delivery and the diversification of India's services exports. At the helm of this change are financial and professional services. In the first half of FY25, about 45 per cent of the total service sector GVA growth in India was due to financial, real estate, rental and professional services; almost as much as they did during the last decade. Globally, services are presently shoring up growth even in countries where there is a manufacturing slowdown inflicted by moderation in merchandise trade buoyancy. This presents an upside of possibilities to services exports and hence domestic services output.

8.48 At the same time, new risks have surfaced in the growth of IT and professional services in view of the recent changes in global policies following key electoral outcomes. Regulators, have expressed concerns about the potential impact of offshore work on the quality of audits. The general concerns expressed seem to stem from the breakdown of traditional apprenticeship model, inadequate direct supervision, language barriers and inability to communicate instructions effectively in complex cases, information gaps of the remote auditors, risks of loss of confidentiality and differences in regulatory provisions in the countries involved, resulting in compliance gaps. These perceived risks present a downside risk to export-led services growth.

8.49 Domestically, the embedded service content of the non-service economic activities has increased significantly, as evidenced by the National Accounts Statistics. There is also growing literature emphasising the 'servicification' of manufacturing, i.e., increasing utilization of services in manufacturing production and post-production value addition²². This means that growth in manufacturing has a significant bearing on service sector growth, and vice versa. At the same time, the increasing penetration of digital technologies and artificial intelligence in manufacturing and service sector activities like finance, retail and commerce, telecom, and, transport and logistics is changing the very composition of demand for embedded services.

8.50 This picture of the emerging services landscape auto-generates two conclusions. First, it is widely believed that the manpower (and sectors) with suitable digital

²² Pant, S., & Chakraborty, D. (2024). Is service orientation benefitting manufacturing exports from low-middle income countries? Firm-level empirical evidence from WBES data [Working Paper]. Indian Institute of Foreign Trade (IIFT)

and technical skills stand to benefit from AI penetration. Hence, one of the primary conditions for manufacturing and service sector progress is the focus on appropriate skilling of the labour force. The significant initiatives taken in the Budget 2024-25 need to be carried forward into action by the synergic efforts of all tiers of the government, private sector and skilling institutions. Second, there is an urgent need to review and amend complicated procedures at the grassroots level, regulations and rules that hinder both manufacturing and services. Chapter 5 offers several suggestions in this regard. These will help build resilience against the likely persistent global headwinds.

AGRICULTURE AND FOOD MANAGEMENT: SECTOR OF THE FUTURE

India's agricultural sector has demonstrated remarkable resilience in recent years, marked by consistent growth rates. This stability can be largely attributed to various government initiatives to enhance productivity, promote crop diversification, and increase farmers' income. A crucial factor influencing agricultural performance is the impact of weather conditions. Climate variability can present significant challenges; however, farmers with diverse income streams are better positioned to navigate these uncertainties. Allied activities such as animal husbandry, fisheries or agroforestry, can enable the farmers to mitigate the risks effectively. Various government initiatives are specifically designed to address these challenges.

INTRODUCTION

9.1 The 'Agriculture and Allied Activities' sector has long been the backbone of the Indian economy, playing a vital role in national income and employment. This sector contributes approximately 16 per cent of the country's GDP for FY24¹ (PE) at current prices and supports about 46.1 per cent of the population. Not only does its performance directly impact food security, but it also influences other sectors, sustaining livelihoods and supporting economic growth.

9.2 In recent years, the agriculture sector in India has shown robust growth, averaging 5 per cent² annually from FY17 to FY23, demonstrating resilience despite challenges.

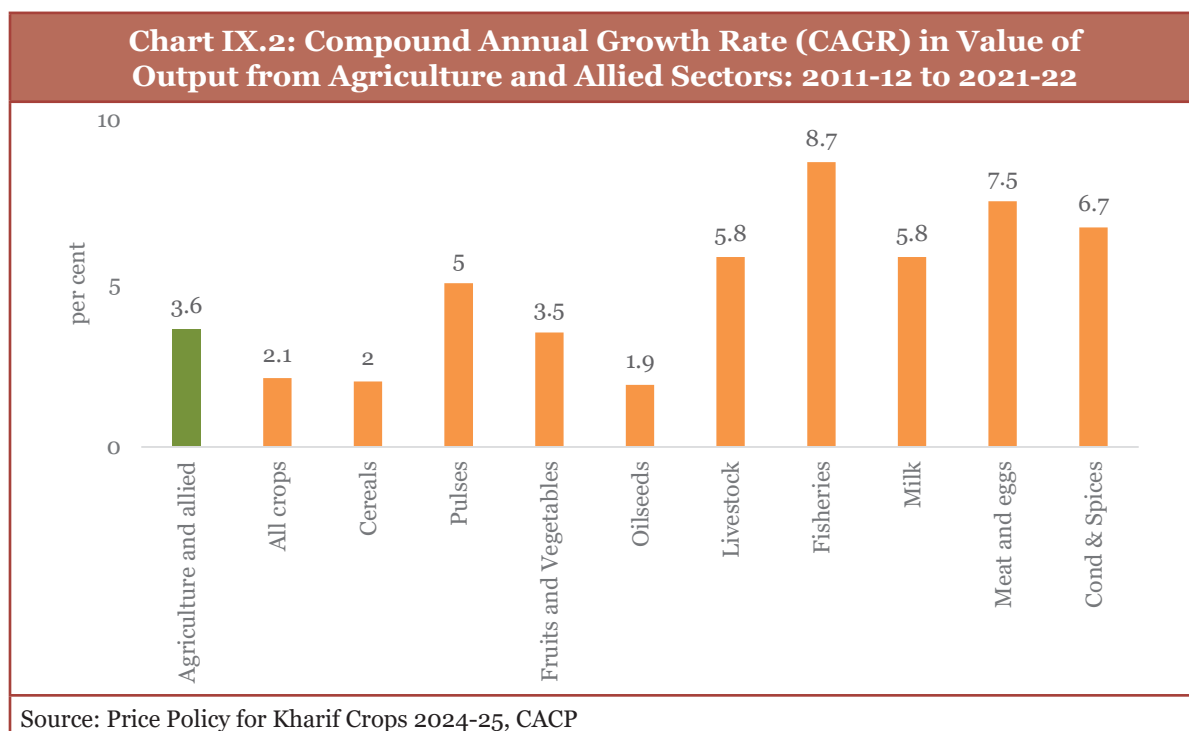
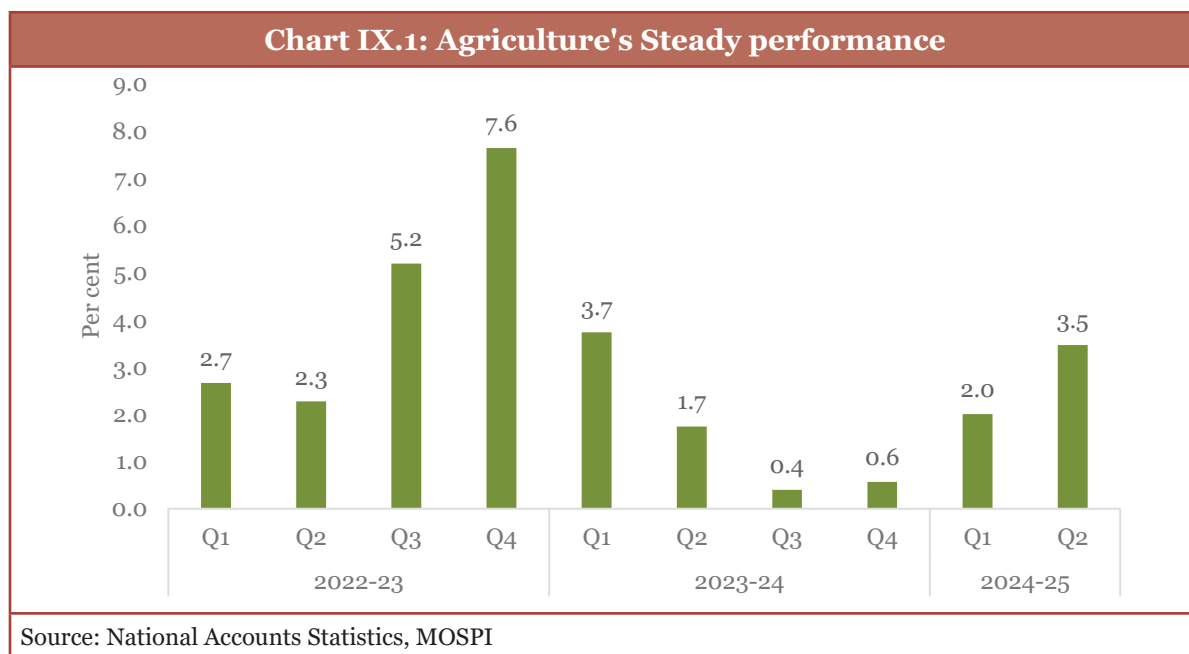
9.3 In the second quarter of the FY25 year, the agriculture sector recorded a growth rate of 3.5 per cent³. This performance represents a recovery compared to the previous four quarters, during which growth rates varied from a modest 0.4 per cent to 2.0 per cent. The recent rise in growth rate can be attributed to improved conditions, potentially driven by favourable weather patterns, advancements in agricultural practices, and government initiatives to enhance productivity and sustainability within the sector.

1 Ministry of Statistics and Program Implementation (MOSPI). <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2079024>

2 Ramesh Chand and Jaspal Rana, "Performance of Agriculture Sector 2014-24: Implications for Short-and Medium-term Strategy", *Economic and Political Weekly*, September 2024, 59(39):70-73

3 <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2079024>.

9.4 Assured remunerative prices, improved access to institutional credit, crop diversification, support for sustainable practices, and enhancement in productivity have played a crucial role in the sustained growth observed. Riding on good monsoon, kharif foodgrain production in 2024 is projected at 1647.05 Lakh Metric Tonnes (LMT), suggesting an increase of 89.37 LMT compared to the previous year and 124.59 LMT above the average kharif foodgrain output⁴ bodes well for food security. Agricultural income has increased at 5.23 per cent annually over the past decade, compared to 6.24 per cent for non-agricultural income and 5.80 per cent for the overall economy.



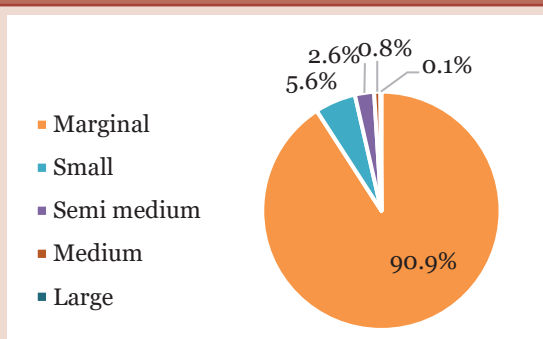
⁴ First Advance Estimates for 2024-25, Ministry of Agriculture and Farmers Welfare

9.5 India's agriculture is characterised by diversity, with performance varying significantly across different segments and states. As a major global cereal producer, India accounts for 11.6 per cent of the world's total output. However, crop yields in the country are considerably lower compared to those of other leading producers, underscoring the need for productivity improvements. The crop sector has experienced a modest compound annual growth rate (CAGR) of 2.1 per cent, from FY13 to FY22. This increase is also largely driven by notable increases in the production of fruits, vegetables, and pulses.

Box IX. 1 : India's Floriculture: A Sunrise Industry

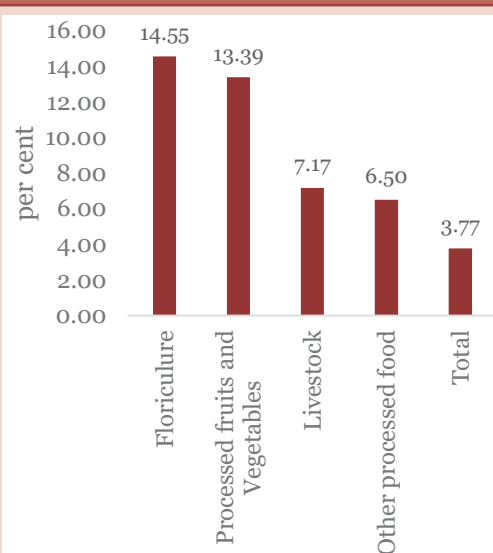
India's floriculture industry has grown into a high-performing sector, earning its status as a "sunrise industry" with a 100 per cent export orientation⁵. Driven by a growing global demand for flowers, floriculture has evolved into a key commercial venture within agriculture. Commercial floriculture is particularly lucrative, offering higher returns per unit area than many traditional field crops. Profitable avenues in commercial floriculture include cut-flower production, loose-flower production, dry flowers, cut greens, pot plants, flower seeds, perfumes and essential oils. Ramachandra et al. (2007)⁶ found that including flowers in rice-based crop sequences gave higher net returns than other sequences, viz. rice-soybean, rice-bell pepper, rice-fodder maize, rice-cowpea and rice-radish. Further, intercropping flowers are more profitable compared to the options of cereals, pulses, vegetables and oilseeds. With subsidy support and crop loan financing, it is a promising venture for marginal and small landholdings, which constitute more than 96 per cent of the total landholdings and 63 per cent of the area of cultivation under floriculture.

Chart: IX.3 Distribution of operational landholdings under floriculture



Source: Agriculture census, 2015-16

Chart: IX.4 Exports of agri-and processed foods (April-Oct FY25 over April-Oct FY25)



Source: APEDA

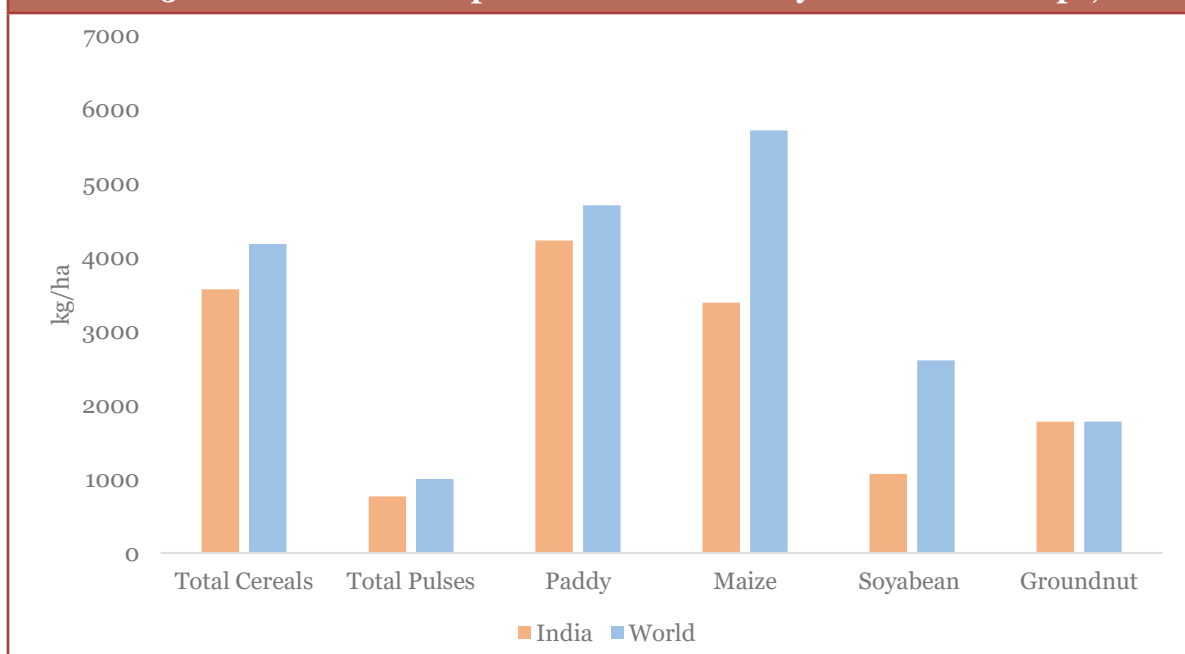
5 https://apeda.gov.in/apedawebsite/SubHead_Products/Floriculture.htm.

6 Ramachandra C., Anwarulla M. S, Janardhan G. and Murthy P. (2007) Production potential and economics of rice-based cropping systems in hill zone of Karnataka, India. International Journal of Agriculture Sciences. 3(2), 127-9.

The shift from cultivating traditional flowers to export-focused cut flowers highlights the industry's transformation. Entrepreneurs across states like Tamil Nadu, Karnataka, Madhya Pradesh, West Bengal, Uttar Pradesh and Maharashtra have capitalized on this opportunity, establishing sophisticated export-oriented floriculture units. In FY24, approximately 297 thousand hectares were dedicated to floriculture, yielding an estimated 2,284 thousand tonnes of loose flowers and 947 thousand tonnes of cut flowers. During the same period, India exported 19,678 metric tonnes of floriculture products, earning ₹717.83 crore (USD 86.63 million). Key export destinations included the USA, Netherlands, UAE, UK, Canada, and Malaysia. With its high growth trajectory and promising export potential, India's floriculture industry is blooming as a vital player in the global flower trade⁷.

9.6 The slower growth rate of oilseeds at 1.9 per cent raises concerns, especially considering India's heavy reliance on imports to satisfy domestic edible oil demands. High-value sectors such as horticulture, livestock, and fisheries have emerged as the primary contributors to the overall growth of agriculture. Among these, the fishery sector has demonstrated the highest compound annual growth rate (CAGR) at 13.67 per cent, followed by livestock with a CAGR of 12.99 per cent⁸ during FY15 to FY23(at current prices).

Chart IX.5: International Comparison of Productivity for Selected Crops, 2022



Source: Price Policy for Kharif Crops 2024-25, CACP

9.7 Diversity is also seen in inter-state variations in growth observed from 2011-12 to 2020-21. Andhra Pradesh was the leading performer with a CAGR of 8.8 per cent in agriculture and allied sectors, excluding forestry and logging. Madhya Pradesh followed with 6.3 per cent, and Tamil Nadu came in third with 4.8 per cent among major states.⁹

⁷ https://apeda.gov.in/apedawebsite/SubHead_Products/Floriculture.htm.

⁸ Department of animal Husbandry and Dairying.

⁹ Price Policy, Report Kharif 2024-25, Commission for Agriculture Costs and Prices.

These states have diversified towards crops where yield is high. For example, Andhra Pradesh diversified towards jowar, Madhya Pradesh towards moong and Tamil Nadu towards maize. Even so, there is significant potential to enhance productivity and reduce the yield gap compared to the global average.

9.8 As we look to the future, it's important to consider how changing dietary preferences, driven by rising incomes, will influence the agricultural sector's growth trajectory. The increasing consumption of non-food grains, particularly horticultural products, livestock, and fisheries, will be significant. Given the perishable nature of these high-value commodities, effective post-harvest management and robust marketing infrastructure are essential. This endeavour should be supported by the active involvement of Farmer Producer Organizations (FPOs), cooperatives, and Self-Help Groups (SHGs). Furthermore, substantial investment from the private sector would also be vital to aid small-scale farmers.

BOX IX.2 : Transforming Rural Economies: The Rise of Horticulture

India's horticulture sector is more productive and profitable than traditional agriculture, emerging as a fast-growing industry. This can be seen from the fact that India is also a leading exporter, shipping 343,982.34 MT of fresh grapes worth ₹3,460.70 crore (USD 417.07 million) globally in 2023-24¹⁰. Key grape-growing states are Maharashtra, Karnataka, Tamil Nadu, and Mizoram. Maharashtra leads in production, contributing over 67 per cent of total output with the highest productivity in 2023-24¹¹. Grape cultivation has significantly improved the livelihoods of Nashik farmers where export-quality grapes fetch higher prices (₹65-70/kg) than domestic markets. This economic upliftment has attracted rural youth to grape farming. Farmers have adopted advanced technologies like real-time monitoring systems to ensure optimal grape quality. The Nashik grape story shows how export-oriented agriculture, technology, and collective efforts can transform a region's socio-economic conditions.

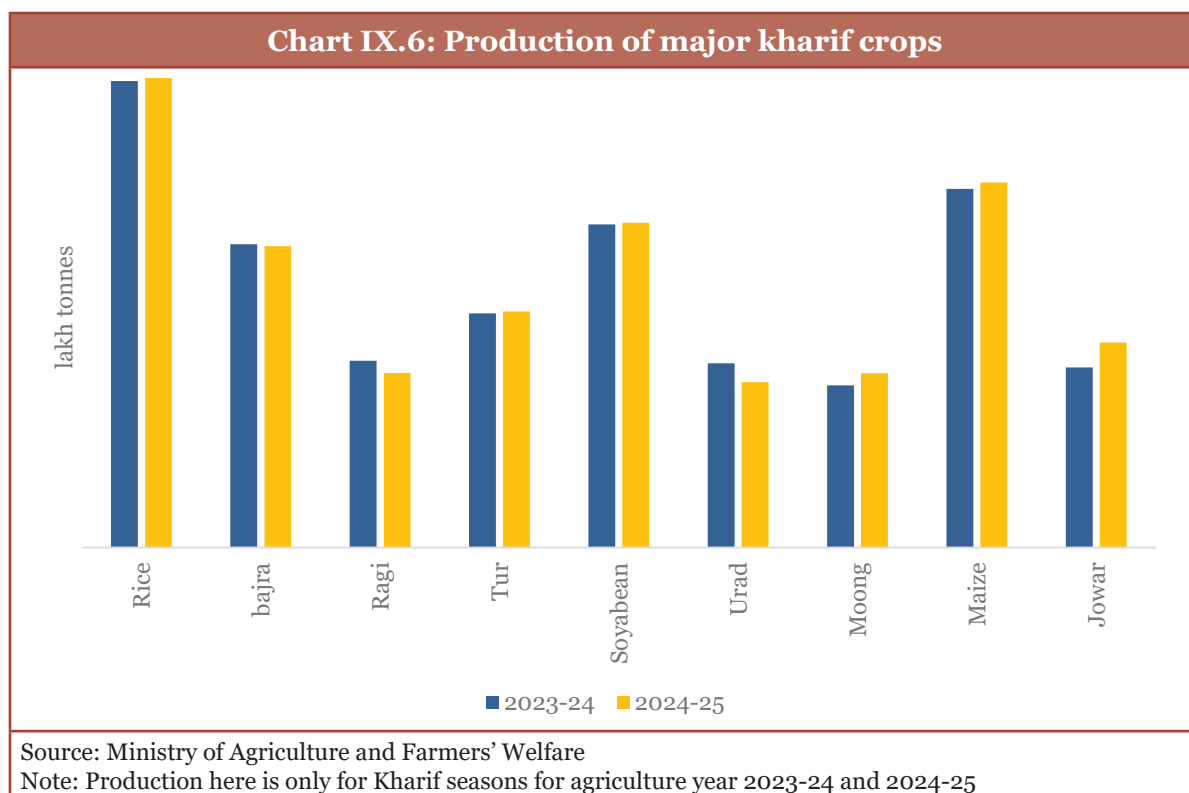
9.9 The government is implementing a range of initiatives aimed at enhancing agricultural productivity and increasing farmers' incomes, in alignment with the recommendations put forth in the Doubling Farmers' Income (DFI) Report 2016. This report highlighted essential strategies for improving crop and livestock productivity, boosting cropping intensity, and diversifying into high-value crops. Committed to promoting greater input efficiency and adopting sustainable production practices, the government is pursuing initiatives such as Per Drop More Crop (PDMC) and various actions under the National Mission on Sustainable Agriculture (NMSA). These measures include using alternative and organic fertilisers to enhance productivity and sustainability. Furthermore, digital initiatives like the Digital Agriculture Mission and the e-National Agriculture Market (e-NAM) have been launched to encourage the adoption of innovative agricultural technologies and improve price discovery mechanisms. Additionally, the government provides income support to farmers through assured remunerative prices for their produce, alongside programs such as the Pradhan Mantri Kisan Samman Nidhi (PM-KISAN).

¹⁰ https://apeda.gov.in/apedawebsite/six_head_product/Fresh_Fruits_Vegetables.htm

¹¹ Ibid.

CROP PRODUCTION: Incentivising productivity increase, crop diversification and efficiency in the use of inputs

9.10 Despite the increase in crop production, further enhancements in productivity across various crops and regions are vital for boosting performance and positively influencing farmers' incomes. Productivity is closely linked to on-farm and post-harvest inputs such as improved access to quality seeds, better irrigation facilities, efficient water management practices, effective extension services, soil health improvements, modern post-harvest infrastructure, and accessible markets. Additionally, agricultural price policies play a crucial role in facilitating informed decision-making by protecting farmers from market price volatility and encouraging them to diversify their crops, promoting sustainable agricultural practices.



9.11 The Minimum Support Price (MSP) for essential crops such as wheat, rice, pulses, oilseeds, and nutri-cereals acts as a safety net for farmers, reassuring them of a guaranteed minimum price for their crops from the government. This mechanism also serves as a guiding signal for farmers in planning their future crop compositions. In the Union Budget of 2018-19, the government decided the principle of fixing MSP at a level of at least 1.5 times the weighted average cost of production for these crops. The support provides the necessary returns to promote sustainable farming practices and encourage farmers to focus on cultivating key crops. The government has raised the MSP for nutri cereals (Shree Anna), pulses, and oilseeds as part of these initiatives. For the fiscal year FY25, the MSP for arhar and bajra has been increased by 59 per cent and 77 per cent over the weighted average cost of production, respectively. Moreover, the MSP for Masur has risen by 89 per cent, while rapeseed has seen an impressive increase of 98 per cent.

SEEDS-QUALITY AND USE OF FERTILISERS: The Critical Differentiator

9.12 The adage “As you sow, so shall you reap” effectively reflects the significance of seed quality and the accessibility of seeds in sufficient quantities by farmers in promoting healthy crop growth. In the 2023-24 season, ICAR produced 1.06 lakh quintals of breeder seeds encompassing 1,798 varieties across 81 crops for further multiplication. Given the impact of weather on agricultural output, research into climate-resistant seeds has become a priority, with 2,177 of the 2,593 new varieties released since 2014 specifically addressing this challenge. To ensure that these varieties are readily available, seed banks have been established. In regions such as north-western India, heat-tolerant wheat varieties have seen widespread adoption to alleviate the effects of heat stress. In FY24, demonstrations of climate-resilient technology packages were conducted in 121 vulnerable districts under the National Innovations in Climate Resilient Agriculture initiative.

9.13 Soil degradation, particularly the decline in organic carbon content, poses a significant challenge to Indian agriculture. Many soils in India are deficient in organic carbon, macronutrients, and essential micronutrients such as boron, iron, and sulphur. This deterioration of soil health adversely affects fertility, productivity, and overall agricultural sustainability. To achieve optimal crop yields while ensuring environmental sustainability, it is imperative to use fertilisers judiciously. Recently introduced, ‘Urea Gold’ combines urea with sulphur, minimizing wastage and enhancing plant nutrient uptake. Additionally, the use of drones and fertigation¹² techniques are being implemented to optimize fertiliser applications. The Programme for Restoration, Awareness Generation, Nourishment, and Amelioration of Mother Earth (PM-PRANAM) initiative incentivises states to adopt alternative fertilisers such as Nano Urea, Nano Diammonium phosphate (DAP), and organic fertilisers. By promoting these sustainable options, the government aims to improve soil health, reduce environmental pollution, and boost agricultural productivity.

RAINFALL AND IRRIGATION SYSTEM: Building Efficiency and Extending Coverage

9.14 Precipitation is crucial in the global water cycle, serving as a primary source for freshwater replenishment, vital for various ecosystems and human activities. The repercussions of climate change on rainfall patterns are profound, particularly concerning agricultural practices that rely heavily on consistent and predictable weather conditions (Porter et al., 2014)¹³.

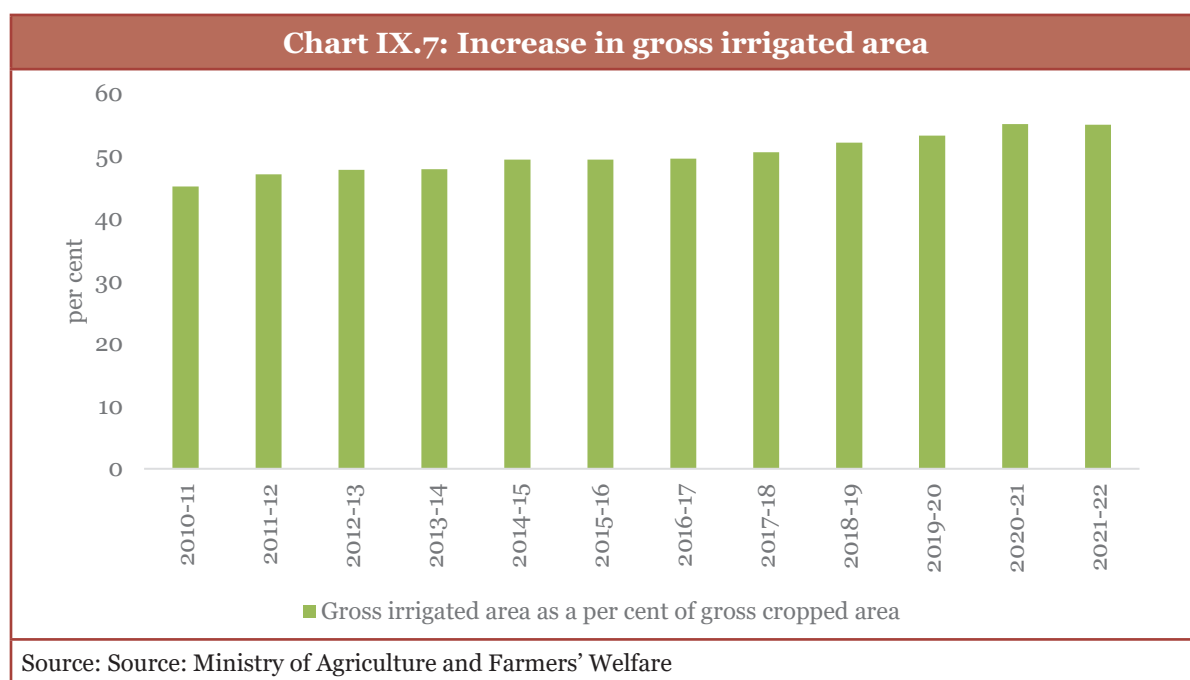
9.15 In India, while the volatility in agricultural growth has notably diminished over time due to targeted interventions, the sector remains highly vulnerable to weather

¹² Fertigation is a method of fertiliser application in which fertiliser is incorporated within the irrigation water by the drip system.

¹³ Porter, J. R., Xie, L., Challinor, A. J., Cochrane, K., Howden, S. M., Iqbal, M. M., Lobell, D. B., and Travasso, M. I. (2014). Food security and food production systems. In Field, C. B., Barros, V. R., Dokken, D. J., Mach, K. J., Mastrandrea, M. D., Bilir, T. E., Chatterjee, M., et al., eds., *Climate change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK: Cambridge University Press.

variability, with only about 55 per cent of the net sown area receiving irrigation¹⁴. A substantial portion of the agricultural land relies on rain-fed systems, making it especially susceptible to fluctuations in precipitation. Moreover, more than two-thirds of India's agricultural land faces the threat of drought, with national estimates indicating a 35 per cent probability of drought occurrences¹⁵. This risk is not uniform across the country; it varies considerably based on geographies. For instance, in dry-humid regions, the likelihood of drought is relatively lower at about 20 per cent, while in arid zones, it can exceed 40 per cent. Such disparities emphasise the urgent need for region-specific strategies to mitigate drought risk¹⁶.

9.16 The implications of erratic monsoon patterns are particularly pronounced for marginal and small-scale farmers, representing approximately 85 per cent of India's agricultural holdings. These farmers typically cultivate on plots less than 2 hectares in size, making them highly vulnerable to the impacts of climate variability.¹⁷



9.17 Climate change is a problem because it accentuates weather variability. There has been an increase in the frequency of dry spells during the summer monsoon season, which are 27 per cent more common from 1981 to 2011 compared to 1951 to 1980¹⁸.

14 Agriculture statistics at a glance 2022-23, Ministry of Agriculture.

15 NABARD Climate Change and Risk Management in Indian Agriculture, 2022.

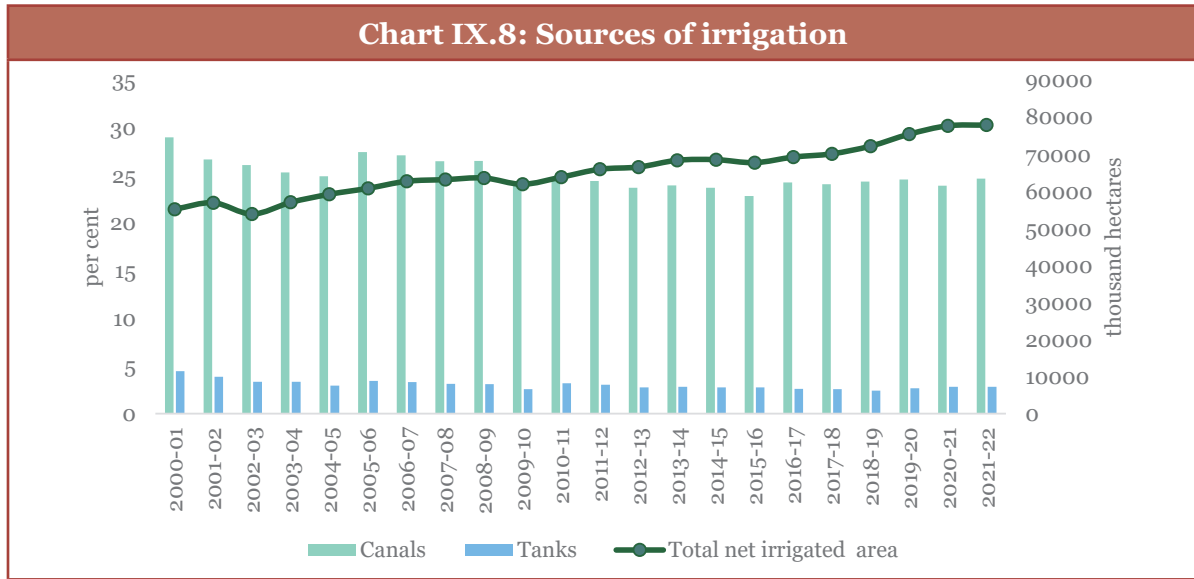
16 Krishnan, R., Sanjay, J., Gnanaseelan, C., Mujumdar, M., Kulkarni, A., & Chakraborty, S. (2020). Assessment of climate change over the Indian region: a report of the ministry of earth sciences (MOES), government of India (p. 226). Springer Nature

17 Kumar, S., Mishra, A. K., Pramanik, S., Mamidanna, S., & Whitbread, A. (2020). Climate risk, vulnerability and resilience: Supporting livelihood of smallholders in semiarid India. *Land use policy*, 97, 104729.

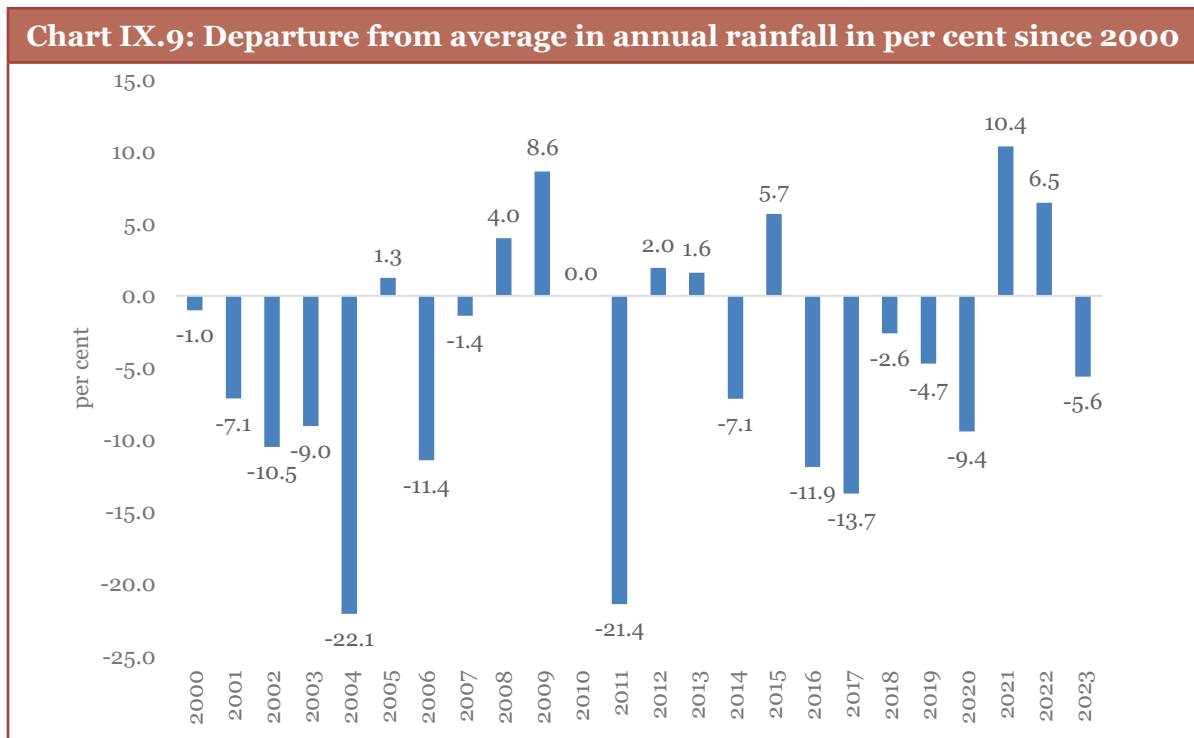
Birthal, P S, P K Joshi, D S Negi and S Agarwal (2014): Changing Sources of Growth in Indian Agriculture: Implications for Regional Priorities for Accelerating Agricultural Growth, IFPRI Discussion Paper 1325, International Food Policy Research Institute (IFPRI), Washington D.C.

18 Assessment of Climate Change over the Indian Region: A Report of the Ministry of Earth Sciences (MoES), Government of India, 2020

Not only has there been an increase in the number of years with deficient rainfall at an all-India level, but more subdivisions¹⁹ have experienced rainfall deficits- reflecting an increase in the frequency and the geographic spread of droughts. At the same time, there are also more intense short wet spells. In central India, the frequency of extreme daily rainfall events exceeding 150 mm has increased by about 75 per cent from 1950 to 2015²⁰.



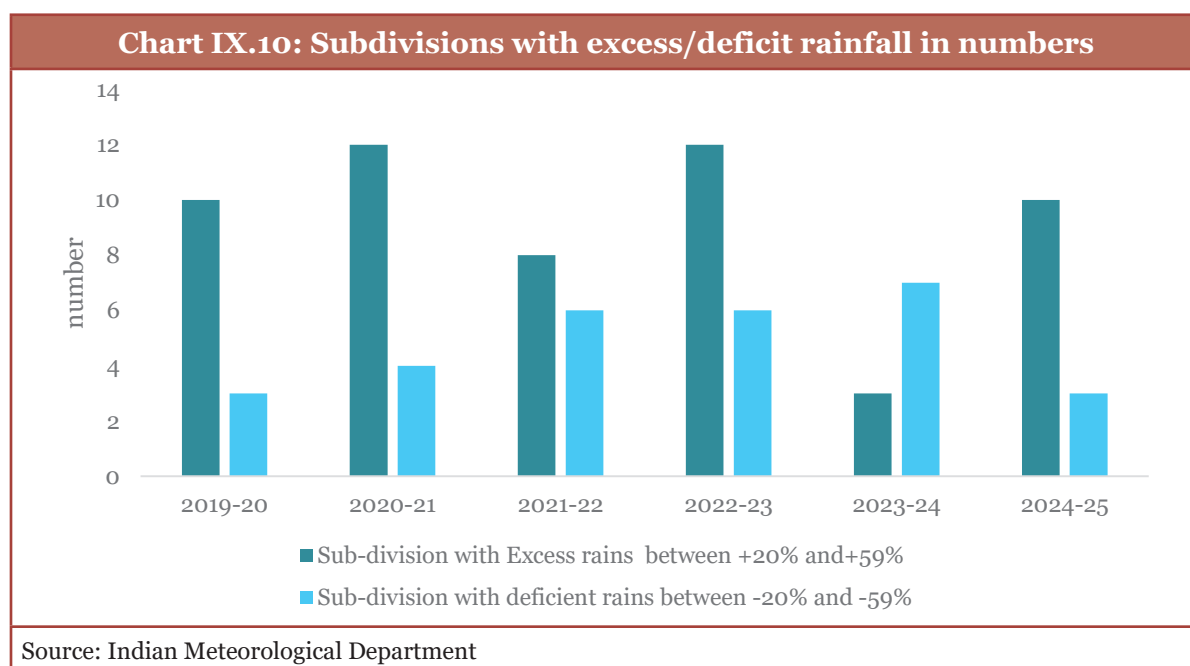
Source: Source: Ministry of Agriculture and Farmers' Welfare



Source: Indian Meteorological Department

19 Subdivisions by Indian Meteorological Department are based on rainfall.

20 Ibid



9.18 Several studies have also assessed the overall effect of climate change on agricultural production. Negi and Ramaswami (2024)²¹ examined the relationship between crop yields and rainfall across India at the district level for nine key crops during the kharif season. They found a strong link between significant rainfall shortfalls and substantial crop yield losses. This statistical phenomenon is known as lower tail dependence, indicating that the correlation between yield losses and rainfall deficits is stronger for extreme rainfall deficiencies than for minor variations. Other studies have indicated that a potential 2°C rise in annual temperature and a 7 per cent increase in annual rainfall by 2099 could lead to an 8-12 per cent decline in Indian agricultural productivity²². Birthal et.al (2021)²³ found that heat stress harmed crop yield, which worsened over time. Most studies have suggested that droughts and heat waves negatively impact agricultural productivity compared to floods and cold waves in India. It is, therefore, pertinent to increase the area under irrigation and diversify towards heat and water-resistant crops.

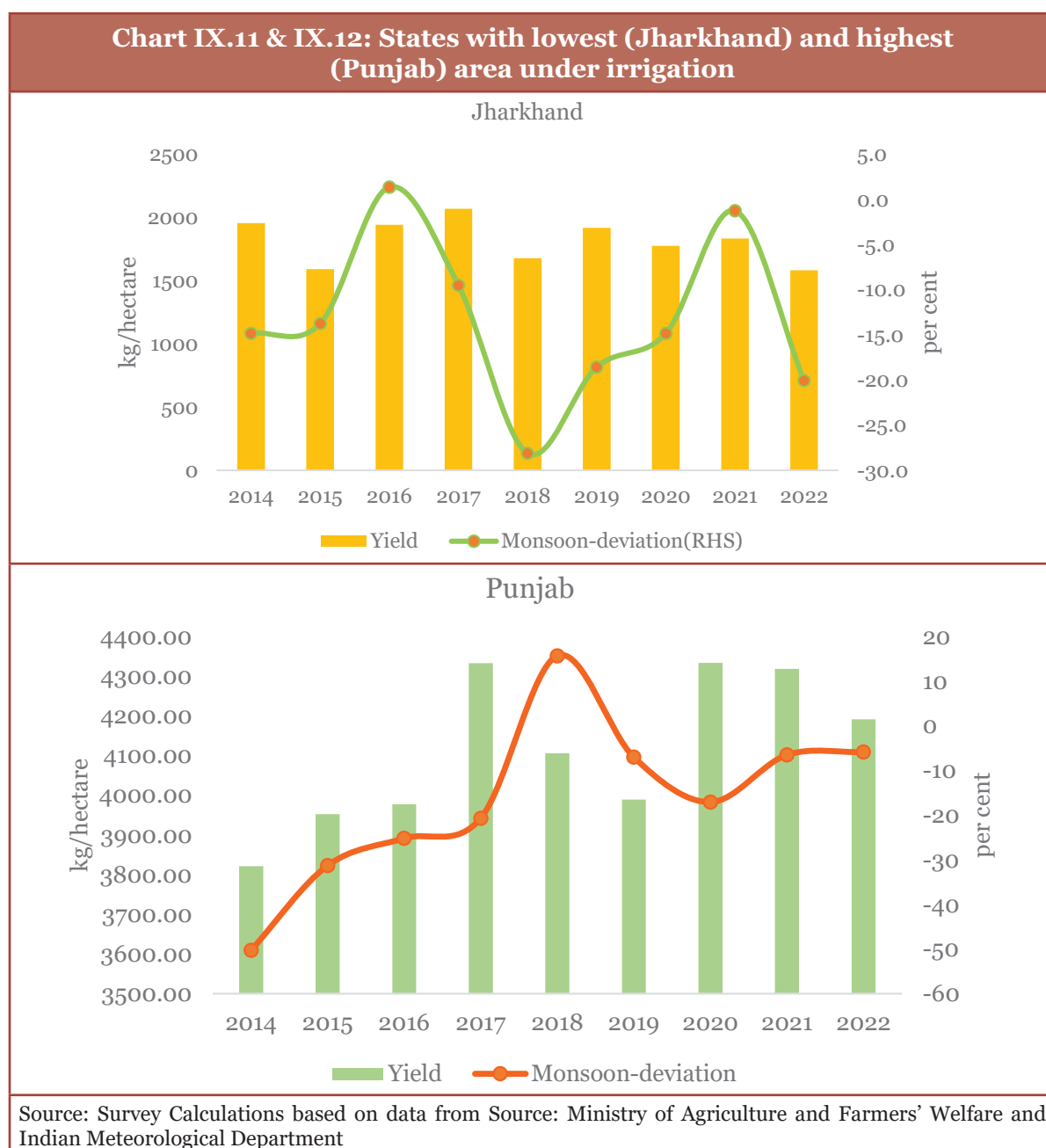
9.19 Between FY16 and FY21, India experienced a significant increase in irrigation area coverage and intensity. The coverage of irrigation area has increased between FY16 and FY21 from 49.3 per cent to 55 per cent of the gross cropped area (GCA), while irrigation intensity has risen from 144.2 per cent to 154.5 per cent. States such as Punjab, Haryana, Uttar Pradesh, and Telangana exhibit high irrigation coverage of their gross cropped area, with figures around 98 per cent, 94 per cent, 84 per cent, and 86 per cent, respectively. In contrast, states like Jharkhand and Assam lag significantly, with irrigation coverage below 20 per cent, underscoring the necessity to improve irrigation

21 Negi, D. S., & Ramaswami, B. (2024). Basis risk and the demand for catastrophic rainfall insurance. *QOpen*, 4(1), q0ae009.

22 NABARD Climate Change and Risk Management in Indian Agriculture, 2022.

23 BIRTHAL, P S, J Hazrana, D S Negi and G Pandey (2021b): "Benefits of Irrigation against Heat Stress in Agriculture: Evidence from Wheat Crop in India", *Agricultural Water Management*, Vol. 255 , No. C.

and water management practices in regions with lower irrigation levels.



9.20 The government has prioritised irrigation development and water conservation practices to enhance access to irrigation facilities. Since the FY16 fiscal year, the government has been implementing the Per Drop More Crop (PDMC) initiative, a component of the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), to promote water efficiency. Financial assistance is provided at 55 per cent of the total project cost for small and marginal farmers, and 45 per cent for other farmers for installation of micro irrigation under PDMC. From FY16 to FY25 (end of Dec. 2024), ₹ 21968.75 crore was released to states for implementation of PDMC Scheme and an area of 95.58 lakh ha has been covered under which is about 104.67 per cent higher as compared to the Pre-PDMC period. Further, in addition to PDMC the micro irrigation Fund (MIF)

supports innovative projects through 2 per cent interest subvention to states on loans availed under MIF. Loans amounting to ₹4709 crore has been approved of which ₹3640 crore has been disbursed so far.

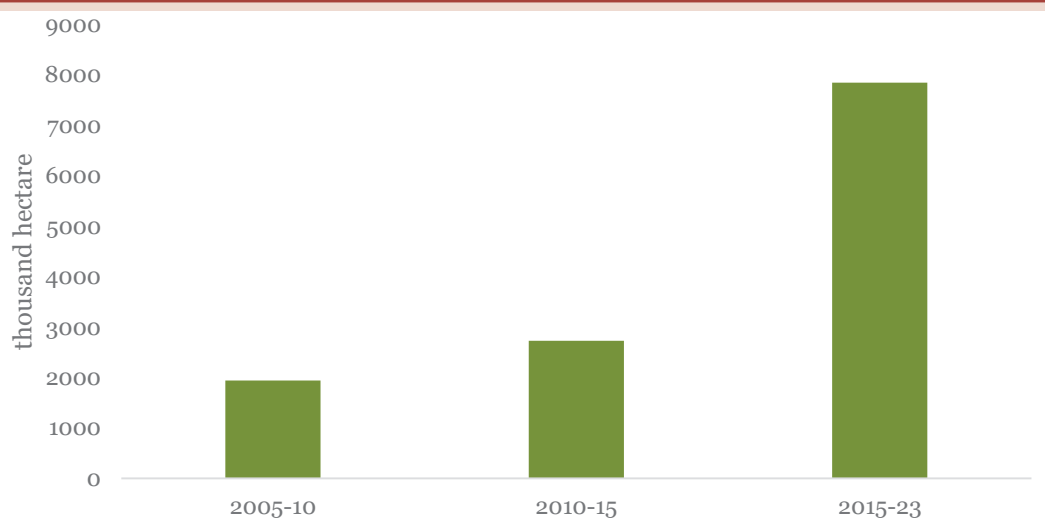
9.21 The Rain-fed Area Development (RAD) program has been implemented to develop and conserve natural resources alongside farming systems as part of the National Mission for Sustainable Agriculture (NMSA) since FY15. From FY22 onwards, the RAD scheme has been integrated into the Rashtriya Krishi Vikas Yojana (RKVY). So far, ₹1,858.41 crore have been allocated, covering an area of 8.00 lakh hectares under the RAD program since its inception.

9.22 According to a study by the A.T.E Chandra Foundation, a community-led, technology-enabled model for rejuvenating water bodies (RWB) across India can be an important intervention to enhance rural water security. The Composite Land-use Restoration and Assessment Tool (CLART GIS) and the AVNI Gramin app can identify water bodies with potential for groundwater recharge and enable monitoring of such interventions to restore water bodies through geo-tagged images and verification at the farmer level. RWB could, therefore, be a cost-effective solution to India's water challenges, offering environmental, economic, and social benefits.

BOX IX.3 : Micro-Irrigation: Unlocking the potential

Water scarcity is a challenge for Indian agriculture, and promoting micro-irrigation is extremely important in reducing the water footprint. Micro-irrigation holds significant potential for India's 140 million hectares of arable land . Even though there is an increase in area under micro-irrigation in India (8 per cent of irrigated area), the pace is still slow as compared to the USA (68.6 per cent) and China (13.7 per cent).²⁴

Chart IX.13: Area Under Micro-irrigation

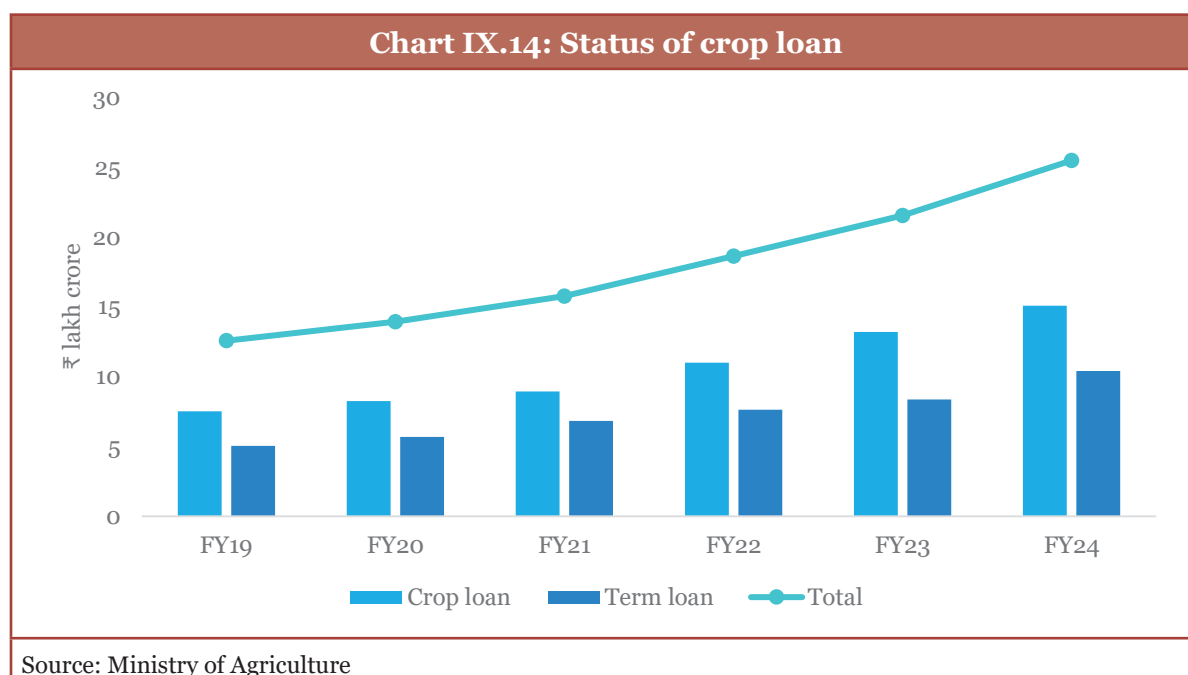


Source: Ministry of Agriculture and Farmers Welfare
Note: Area under PDMC and other central sponsored schemes

A study by (Narayanamoorthy et al,2024)²⁵ examined the impact of drip irrigation on five horticultural crops—brinjal, tomato, banana, watermelon, and mango—in Tamil Nadu, India. The study suggested that drip irrigation enhances agricultural outcomes. Compared to flood irrigation, it reduces water consumption by 39-55 per cent and boosts crop yields by 33-41 per cent due to targeted water delivery. This efficiency translates to substantial economic benefits for farmers, with profit margins increasing by 52.92-114.50 per cent depending on the crop (e.g., brinjal, mango). In a similar vein, another study (D. Suresh Kumar et al, 2010) suggested that the drip irrigation method has demonstrated a substantial impact on resource conservation, reduction in cultivation costs, improved crop yields, and enhanced farm profitability²⁶.

AGRICULTURE CREDIT: A critical input

9.23 Providing adequate credit support to all farmers, especially small and marginal farmers and vulnerable sections of society, is crucial to improving agricultural productivity and income.



9.24 The Government of India introduced the Kisan Credit Card (KCC) to enable farmers to meet their short-term working capital requirements promptly and hassle-free. This has helped enhance the working capital flow to agriculture and allied sectors. As of March 2024, the country has 7.75 crore operational KCC accounts with a loan outstanding of ₹9.81 lakh crore. KCC was further extended to meet the working capital needs of fisheries and animal husbandry in 2018-19, along with the enhancement

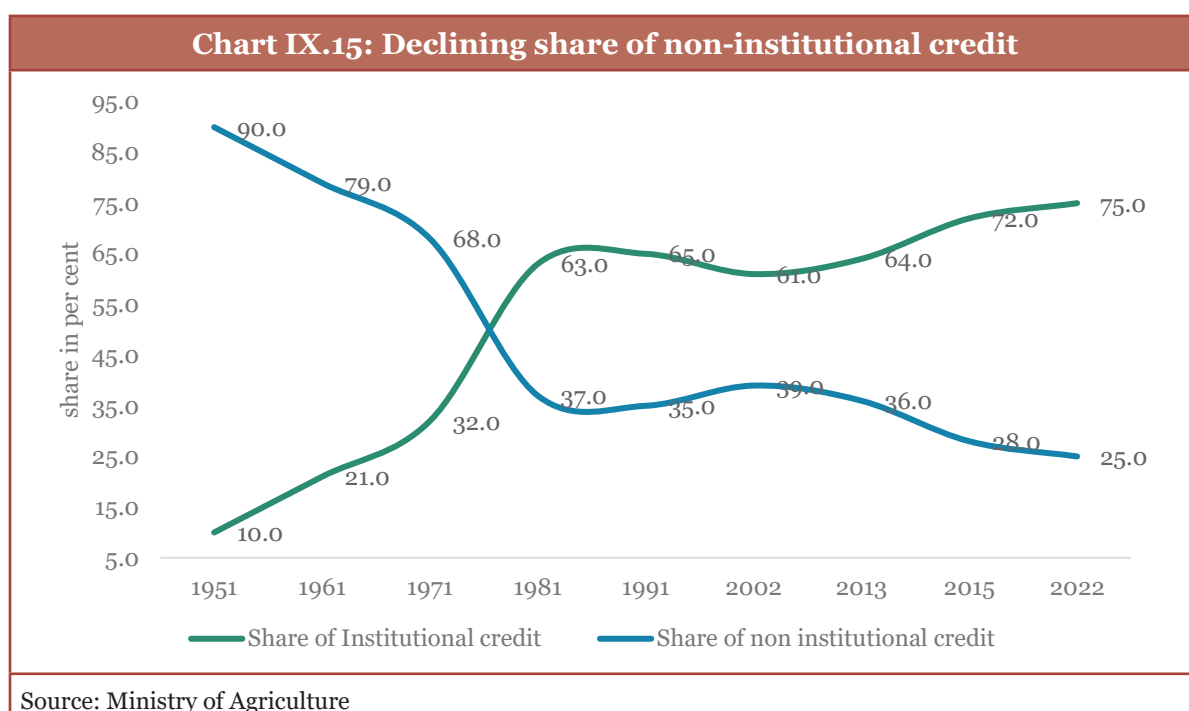
25 Narayanamoorthy, A., Jothi, P., Suresh, R., & Sujith, K. S. (2024). Can Drip Method of Irrigation Transform Yield and Income of Horticultural Crops? Evidence of Five Crops from Tamil Nadu. *Indian Journal of Agricultural Economics*, 79(3), 455-468.

26 Kumar, D. S., & Palanisami, K. (2010). Impact of drip irrigation on farming system: evidence from southern India. *Agricultural Economics Research Review*, 23(2), 265-272.

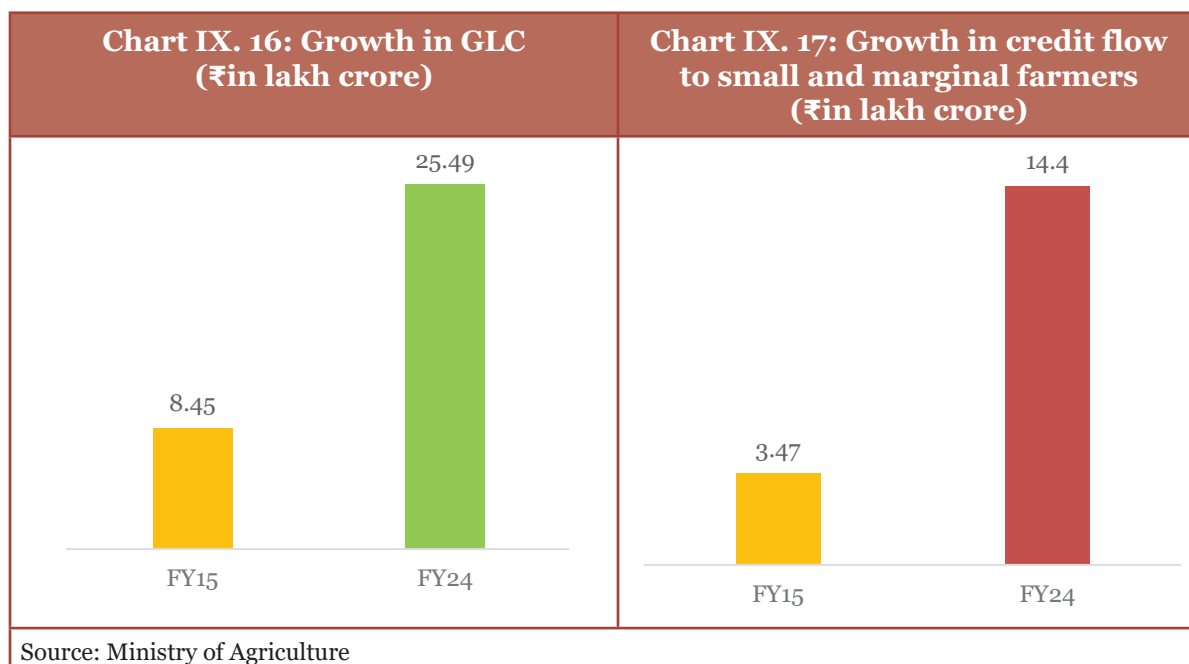
of the limit for collateral-free loans to ₹1.6 Lakh. As of 31 March 2024, 1.24 lakh KCC and 44.40 lakh KCC were issued to fisheries and animal husbandry activities, respectively.

9.25 In addition to interventions such as the Modified Interest Subvention Scheme (MISS), which provides short-term agri-loans through KCC for working capital requirements at the concessional interest rate of 7 per cent, the Prompt Repayment Incentive (PRI) provides a 3 per cent incentive to farmers who repay on time. Starting from FY25, the claim processing has been digitised through the Kisan Rin Portal for faster and more efficient capturing and settlement of MISS claims.

9.26 To further support small and marginal farmers, banks must allocate 40 per cent of their Adjusted Net Bank Credit (ANBC) or Credit Equivalent Amount of Off-Balance Sheet Exposure (CEOBE), whichever is higher, to priority sectors, including agriculture. All the above measures have significantly reduced the reliance on non-institutional credit sources from 90 per cent in 1950 to around 25.0 per cent in FY22²⁷.



9.27 Ground-level credit (GLC) to agriculture has also shown impressive growth with a CAGR of 12.98 per cent from 2014-15 to 2024-25. The GLC has risen from ₹8.45 lakh crore in 2014-15 to ₹25.48 lakh crore in 2023-24. Within this, the share of small and marginal farmers has significantly increased from ₹3.46 lakh crore (41 per cent) to ₹14.39 lakh crore (57 per cent) from 2014-15 to 2023-24.



BOX IX.4 : Kisan Rin Portal: Streamlining Agri Credit for Farmers' Prosperity



The Kisan Rin Portal (KRP) launched in September 2023 addresses key challenges in the Modified Interest Subvention- Kisan Credit Card (MISS-KCC) scheme. Previously, banks had to submit claims for Interest Subvention (IS) and Prompt Repayment Incentive (PRI) manually to the Reserve Bank of India (RBI) and NABARD, leading to significant delays and inefficiencies. The Kisan Rin Portal digitises this process, ensuring farmers and lending institutions benefit from quicker, seamless transactions, improving access to credit for agricultural needs.

- **Empowering Farmers with Seamless Access to Credit:** The portal simplifies the process, enabling access to low-cost credit not only for traditional cropping activities but also for dairy, poultry, fisheries, and beekeeping.
- **Benefiting Financial Institutions: Banks and Cooperatives:** With the portal, banks can submit automated digital claims, streamlining the entire process. This not only improves efficiency but also helps banks track and manage claims more effectively, facilitating prompt disbursement of benefits.
- **Reaching the Grassroots: Training and Support:** The KRP's impact extends to over 453 banks nationwide, with 1.89 lakh branches and 4.65 lakh users actively involved in processing claims.
- **Current Success and Achievements:** By 31 December 2024, it had processed claims worth ₹108336.78 crore including Interest Subvention (IS) and PRI. About 5.9 crore farmers that are currently getting benefitted under the MISS-KCC scheme, have been mapped through KRP.

9.28 The government also provides insurance for farmers through the Pradhan Mantri Fasal Bima Yojana (PMFBY). This scheme acts as a safety net for farmers against crop losses due to natural calamities, pests, and diseases. As the largest crop insurance program in the world in terms of farmer enrolment and the third-largest by premiums, PMFBY offers comprehensive risk coverage from the pre-sowing to post-harvest stages. By ensuring financial stability, the scheme encourages farmers to adopt modern agricultural practices and technologies, ultimately enhancing agricultural productivity and food security. In response to recommendations from various committees, the scheme has recently launched several technological interventions, such as YES-TECH, WINDS, and CROPIC²⁸. These advancements have increased transparency within the scheme ecosystem by minimizing human intervention and fostering greater trust among stakeholders, including implementing States/UTs and insurance companies. The participation of State governments and insurers has increased to 24 and 15, respectively, in FY25, up from 20 and 11 in the 2020-21. Additionally, these interventions have contributed to a 32 per cent reduction in premium rates compared to previous years. As a result, in the FY24 period, the number of enrolled farmers reached 4 crore, a 26 per cent increase from 3.17 crore in the FY23 period. The insured area also expanded to 600 lakh hectares in FY24, reflecting a 19 per cent rise from 500 lakh hectares in FY23. Both the acreage and farmer enrolment figures under the scheme are at an all-time high.

AGRICULTURE MECHANISATION: Facilitating access

9.29 The high machinery cost presents a significant barrier to promoting farm mechanisation among small and marginal farmers. Custom hiring arrangements can enhance these farmers' adoption of farm mechanisation, particularly in regions where mechanisation is currently limited. The Sub-Mission on Agricultural Mechanisation (SMAM) supports state governments with training and demonstrations related to agricultural machinery, in establishing Custom Hiring Centres (CHCs), and assisting farmers in acquiring various farming equipment. Further, farm machinery banks enable the renting of machinery at affordable rates, thereby promoting access to high-tech machinery for small and marginal farm holdings in areas with low levels of mechanisation. As of 31 December, 26,662 CHCs were established under this initiative, with 138 CHCs set up in the year FY25 alone.

9.30 Furthermore, the government has promoted a recently approved scheme aimed at providing drones to Women SHGs. This initiative targets 15000 selected Women SHGs to offer rental services to farmers for agricultural purposes, including for the application of fertilisers and pesticides. Central financial assistance of 80 per cent of the drone's cost and related ancillary charges, up to a maximum of ₹8 lakh, will be granted to the women SHGs for drone purchases. This scheme will also deliver sustainable business and livelihood support to the SHGs, enabling them to generate an additional income of at least ₹1 lakh per annum.

²⁸ Weather Information and Network Data Systems (WINDS), Yield Estimation System based on Technology (YES-Tech), Collection of Real Time Observations and Photographs of Crops (CROPIC) provide real time data on weather, yield and uploading full size photos of crops.

AGRICULTURE EXTENSION: The Enabler

9.31 Agricultural extension is vital in disseminating knowledge, enhancing productivity, and promoting sustainable agricultural practices. The government is implementing the Sub-Mission on Agricultural Extension (SMAE) to bolster agricultural extension services, enhance entrepreneurship and improve productivity in the agricultural sector throughout India. A key component of the SMAE is the support provided by the Agricultural Technology Management Agency (ATMA), which focuses on sharing the latest agricultural technologies to boost production. The initiatives include farmer training, demonstrations, exposure visits, kisan melas, mobilisation of farmer groups, and the establishment of farm schools. During the FY24 period, over 3.66 million farmers benefitted from these extension activities, with an additional 4.49 million having availed themselves of these benefits by November 2024. Furthermore, the government has launched the short duration skill training of rural youth scheme to offer short-term skill training to rural youth and farmers in agriculture and related fields. So far, 20940 candidates were trained as of November 2024 of which 5504 were trained in FY25. To address the training needs of middle-level field extension workers, the government has established four regional extension education institutes located in Haryana, Telangana, Gujarat, and Assam. During FY24, 8,175 extension workers underwent training, with an additional 2,195 trained by November 2024. In addition to training programs, the government operates the Kisan Call Centre to address farmers' queries regarding agriculture and allied sectors. Responses to these queries are provided in 22 official languages from 17 locations nationwide.

IMPROVEMENT IN AGRICULTURE MARKETING INFRASTRUCTURE

9.32 The government has started several programs to encourage private investment in agricultural marketing infrastructure. One such initiative is the Agriculture Marketing Infrastructure (AMI) sub-scheme, introduced in 2014. It provides capital subsidies to individuals, farmers, and cooperatives to develop storage infrastructure. The AMI is a capital investment program that is open-ended, demand-driven, credit-linked, and features a back-ended subsidy mechanism.

9.33 Under this sub-scheme, a subsidy of 25 per cent is granted for projects in the plains, while projects in the North-Eastern, hilly, and other specified regions, as well as those led by women, SC/ST promoters, and FPOs, can receive a subsidy of 33.33 per cent. The subsidies support the establishment of a range of agricultural marketing infrastructure projects, including storage facilities, rural haats, common facilitation centres for FPOs, market yard infrastructure, direct marketing facilities, mobile post-harvest²⁹ operations, cold storage facilities, and integrated value chain projects up to the primary processing stage.

²⁹ Mobile post-harvest systems are portable solutions for processing, storing, and handling agricultural produce near harvest sites to reduce losses and maintain quality.

9.34 As of October 31, 2024, 48611 storage infrastructure projects have been sanctioned, with ₹4,795.47 crore disbursed in subsidies. In addition, 21004 projects related to other types of infrastructure assisted under the AMI scheme have been sanctioned, amounting to a subsidy of ₹2,125.76 crore.

BOX IX.5 : Empowering Farmers: The Success Story of MAHAFPC

Maha Farmers Producer Company Limited (MAHAFPC), a state-level producer company in Maharashtra, has empowered 646 FPOs to procure and sell agricultural products, including pulses and perishable items. It has helped farmers by providing multiple procurement centres, reducing transportation costs, and ensuring timely payment at MSP. In 2022, MAHAFPC became Maharashtra's largest procurement channel, benefiting over 1.7 lakh farmers. The company has also assisted FPOs in developing infrastructure like storage facilities and processing units. By connecting FPOs with private players and using digital technology, MAHAFPC has created employment opportunities and strengthened the agricultural value chain³⁰.

9.35 Another scheme is the Agriculture Infrastructure Fund (AIF) launched in 2020 to boost farm-gate infrastructure further and improve private sector involvement. This fund provides medium-term debt financing for post-harvest management and community farming projects, offering interest subvention and credit guarantees and supporting various projects such as custom hiring centres, processing units, warehouses, and cold storage facilities.

BOX IX.6 : Innovative Ways of Land Leasing – Case of Kerala

The Model Agricultural Land Leasing Act, 2016, introduced by NITI Aayog, is a model law aimed at legalising and facilitating the leasing of agricultural land in India. The objective is to improve land access for landless and marginal farmers and provide them with various benefits and protections while safeguarding the rights and interests of landowners. The states of Andhra Pradesh and Odisha have attempted to introduce some forms of land leasing. However, the state government of Kerala has created an innovative arrangement for land leasing. Under this, women or men's SHG groups lease land for more than 3 years for horticulture cultivation. This agreement is made under the Indian Contract Act, 1872, in which the lessee offers agriculture as a service to the landlord and shares profits or pays fixed compensation. The Gram Panchayat (GP) becomes a party to the transaction, and the agreement is notarised in the GP. This helps the lessee group become eligible for benefits like credit and insurance. Since the agreement lasts 3 to 5 years, it is well-suited for cultivating horticulture crops. It also encourages the lessee to maintain and nurture the quality of the land, with findings indicating an increase in farm efficiency in terms of input-output ratio in the case of group leased land compared to owned and self-cultivated land and individually leased land in Kerala possibly due to better convergence achieved with central and state government support for group farming activities. The initiative has also improved land access for the poor, as more than 85 per cent of the members are under the low-income category.

9.36 To enhance efficiency in agricultural marketing and improve price discovery, the government has introduced the e-NAM Scheme. This initiative provides free software and financial assistance of ₹75 lakh per Agricultural Produce Market Committee (APMC) Mandi for essential hardware, which includes quality assaying equipment and the development of infrastructure for cleaning, grading, sorting, and packaging. Additionally, to support FPOs and empower farmers, the government launched a scheme in 2020 with a budget of ₹6,860 crore. As of October 31, 2024, over 1.78 crore farmers and 2.62 lakh traders have registered on the e-NAM portal. As of the same date, 9,204 FPOs have been registered, and 4,490 of these organisations have received equity grants amounting to ₹237 crore.

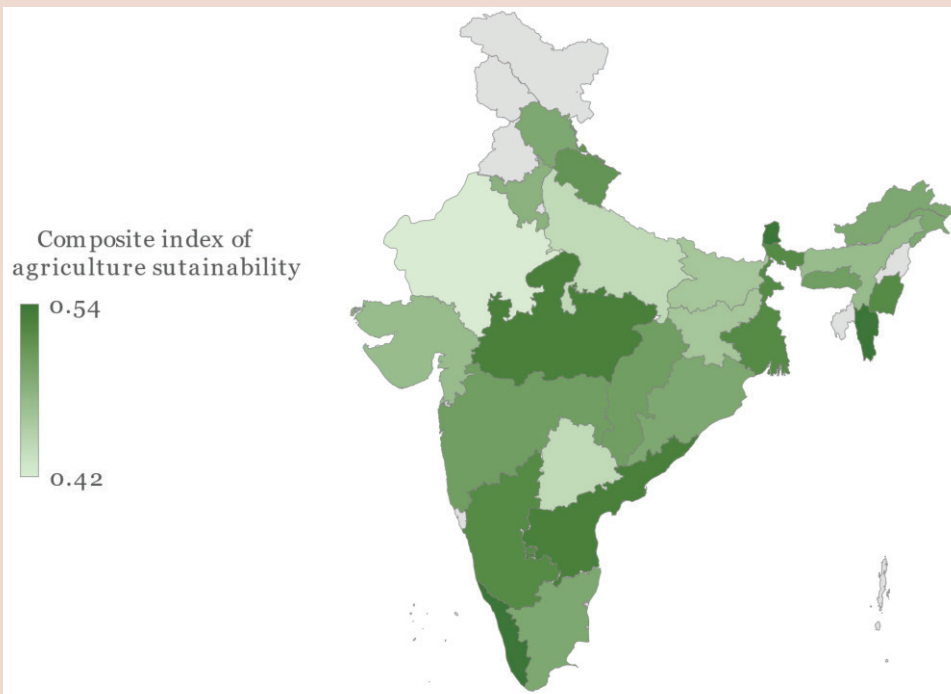
CLIMATE ACTION IN AGRICULTURE

9.37 The NMSA is recognised as one of the nine missions within the National Action Plan on Climate Change (NAPCC). The NMSA has identified key climate adaptation strategies, including enhancing water efficiency, managing soil health and nutrients, providing crop insurance, offering credit support, strengthening value chains, delivering agro-advisories, promoting farm mechanisation, managing agricultural waste, developing integrated farming systems, and supporting organic and natural farming practices. It also emphasises climate-resilient varieties, livestock, and fish culture, promoting these initiatives through various government schemes.

9.38 To support organic farming, the government has implemented two dedicated schemes since 2015: the Paramparagat Krishi Vikas Yojana (PKVY) and the Mission Organic Value Chain Development for North Eastern Region (MOVCDNER). Under PKVY, 52,289 clusters covering 14.99 lakh hectares and 25.30 lakh farmers have been mobilised. Similarly, under MOVCDNER, 434 Farmer Producer Companies have been created, covering a total area of 1.73 lakh hectares and benefiting 2.19 lakh farmers.

BOX IX.7 : Spatial mapping of agricultural sustainability

A Composite Index of Agricultural Sustainability was calculated by ICAR using 51 indicators related to environmental health, soil and water quality, and socioeconomic development. The average estimated value of the Index is 0.49, suggesting that Indian agriculture is moderately sustainable. States like Mizoram, Kerala, Madhya Pradesh, Andhra Pradesh, Manipur, West Bengal, and Uttarakhand perform better than the national average.

Chart IX. 18: Composite index of agriculture sustainability-State wise

Source: A Spatial Assessment of Sustainability in Indian Agriculture, Policy paper 42, 2024, ICAR

In contrast, arid Rajasthan has the least sustainable agricultural practices. According to the report, the states with higher sustainability scores have experienced sizable crop diversification, improvement in agriculture infrastructure, farm credit and sustainable input usage. States in the Indo-Gangetic Plains, including Uttar Pradesh, Punjab, Bihar, and Haryana, as well as rice-dominant states like Jharkhand and Assam, are at a higher risk of climate change impacts.

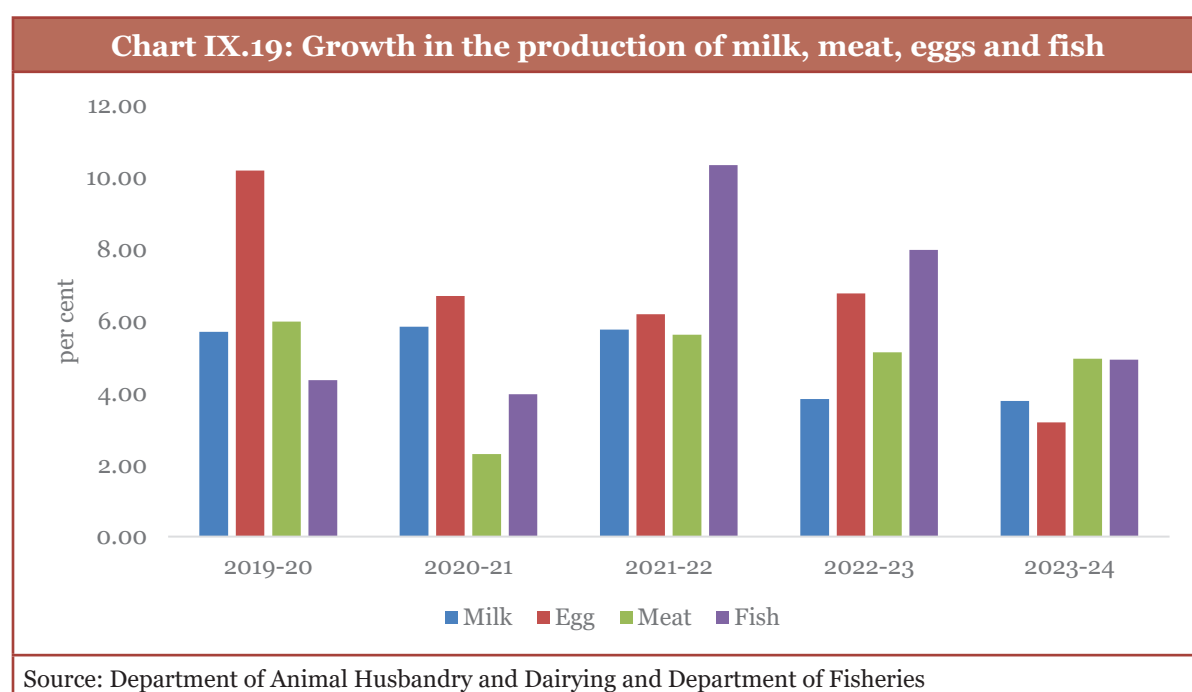
ALLIED SECTORS: Potential to Build Resilience

9.39 The livestock sector has emerged as a significant engine of growth in agriculture, playing a vital role in the overall agricultural landscape. This importance is underscored by a remarkable increase in its contribution to the Gross Value Added (GVA) of agriculture and related sectors, which surged from 24.38 per cent in the fiscal year FY15 to an impressive 30.23 per cent by FY23. In the latter year, the livestock sector alone represented 5.5 per cent of the total GVA, reflecting its dynamic growth trajectory, with a robust CAGR of 12.99 per cent.

9.40 The economic significance of this sector is clearly illustrated by its escalating output value, which reached an astounding 17.25 lakh crore rupees (equivalent to US\$205.81 billion) in FY23. Among the various branches of livestock production, the milk industry stands out, generating over ₹11.16 lakh crore (US\$133.16 billion) in revenue. This figure highlights the sector's vitality and reveals its dominance, eclipsing the aggregate production value of staple crops like paddy and wheat. The livestock

sector is thus not just a contributor to the economy; it is a cornerstone of agricultural prosperity and food security, propelling the rural economy and livelihoods along the way.

9.41 The government has supported the sector through various initiatives by recognising the growing importance of the livestock sector and its potential to boost farm incomes. The interventions include the Rashtriya Gokul Mission for the development and conservation of indigenous bovine breeds, the Livestock Health and Disease Control Program to enhance the well-being of livestock, the promotion of IVF technology and sex-sorted semen production to increase the productivity of female cows and initiatives to encourage the formation and growth of FPOs and SHGs to strengthen the sector. Further, the mechanism of Multipurpose AI Technicians in Rural India (MAITRIs) has been established to deliver breeding inputs to farmers' doorstep. In the last 4 years, 38736 MAITRIs have been inducted under Rashtriya Gokul Mission.



9.42 The government has implemented several initiatives to enhance the fisheries sector's production and productivity over the past decade. The Pradhan Mantri Matsya Sampada Yojana (PMMSY) was established to boost aquaculture productivity and improve fisheries management. Additionally, the Fisheries and Aquaculture Infrastructure Development Fund (FIDF) was introduced to provide financial support for developing infrastructure in both marine and inland fisheries. Other supportive measures include the establishment of fishing harbours and fish landing centres, the adoption of innovative production technologies such as cages³¹, Recirculating

31 Cages are netted enclosures in water bodies like lakes or rivers, allowing water flow while containing fish.

Aquaculture Systems (RAS)³², bio flocs³³, pens³⁴, and raceways³⁵, as well as initiatives focused on transforming waste into wealth through the expansion of saline water aquaculture, and the growth of freshwater fisheries, cold water fisheries, ornamental fisheries, and pearl cultivation. Significant investment has also been made in marketing and transportation infrastructure, along with the development of cold storage facilities.

9.43 Due to these initiatives, total fish production (both inland and marine) has surged to 184.02 lakh tonnes in FY 23, up from 95.79 lakh tonnes in FY14. Furthermore, India's seafood exports have risen from ₹46,662.85 crore in FY-20 to ₹60,523.89 crore in 2023-24, reflecting a growth of 29.70 per cent.

9.44 Under the Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY), the National Fisheries Digital Platform (NFDP) was launched, successfully mobilising and registering 16.35 lakh fish producers, workers, vendors, and processors within a short timeframe of just four months.

COOPERATIVE SOCIETIES: Strengthening the Institution to serve better

9.45 Cooperative societies in India serve a vital function across many sectors, including agriculture, credit and banking, housing, and women's welfare. These societies are essential in promoting financial inclusion, particularly by extending credit to farmers and small entrepreneurs who frequently encounter barriers when accessing conventional banking services.

9.46 To strengthen the cooperative sector, the Indian government has implemented various strategic initiatives. These include the introduction of Model Bye-Laws specifically for Primary Agricultural Credit Societies (PACS), designed to provide a structured framework for their operations. Additionally, the government has prioritised the computerisation of PACS to enhance efficiency and transparency. There is also an ongoing effort to establish new multipurpose PACS and dedicated dairy and fishery cooperatives, which serve diverse community needs. Another key focus is the transformation of PACS into Common Service Centres (CSCs), which are intended to provide services beyond financial assistance.

9.47 Other noteworthy measures aimed at enriching the cooperative landscape include the establishment of retail petrol and diesel outlets and the setting up of micro-ATMs within cooperative societies to facilitate easier access to banking services. Moreover, the issuance of RuPay Kisan Credit Cards specifically for dairy cooperatives aims to improve the financial capabilities of these entities and their members.

9.48 The achievements of these initiatives are significant. Over 9,000 new PACS, dairy, and fishery cooperatives in underserved panchayats have been established,

32 RAS uses tanks to grow fish while continuously filtering and reusing water.

33 Biofloc systems use microorganisms (bacteria, algae) to convert organic waste, uneaten feed, and excreta into protein-rich feed directly in the water.

34 Pens are netted enclosures in natural water bodies, restricting fish to a specific area while allowing water exchange.

35 Raceways are narrow channels with continuous one-way water flow, supplying oxygen and removing waste efficiently.

receiving support from various federations. As part of the government's push for greater accessibility, 240 PACS have applied for retail petrol and diesel outlets, with 39 currently selected to operate, thus expanding their service offerings. Furthermore, a substantial number—35,293 PACS—are now functioning as Pradhan Mantri Kisan Samridhhi Kendras (PMKSK), which are dedicated to providing essential fertilisers and related services to farmers, directly impacting agricultural productivity. Further, 1,723 micro-ATMs have been distributed, facilitating doorstep financial services and enhancing accessibility for rural populations.

FOOD PROCESSING INDUSTRIES: Critical for the Economy

9.49 The food processing industry in India is one of the largest employers within organised manufacturing, accounting for 12.41 per cent of total employment in the organised sector. In the fiscal year FY24, the value of agri-food exports, which includes processed food exports, reached USD 46.44 billion, constituting roughly 11.7 per cent of India's total exports. Notably, the share of processed food exports within agri-food exports has risen from 14.9 per cent in FY18 to 23.4 per cent in FY24.

9.50 To foster growth in the food processing sector, the Indian government has initiated several key programs, including the Pradhan Mantri Kisan Sampada Yojana (PMKSY). This scheme focuses on developing modern infrastructure and optimising supply chains from farm to retail. By minimising post-harvest losses, increasing processing capabilities, and enhancing export levels, PMKSY aims to promote the overall advancement of the food processing industry. As of 31 October 2024, 1,079 PMKSY projects have been completed.

9.51 The Production Linked Incentive Scheme for Food Processing (PLISFPI), launched in 2021, seeks to cultivate globally competitive food processing leaders by facilitating branding and marketing initiatives in international markets. By 31 October 2024, 171 applications had been approved under this scheme, with beneficiaries investing ₹8,910 crore and receiving ₹1,084.01 crore in incentives.

9.52 Furthermore, to provide comprehensive support—including technical, financial, and business assistance for establishing or upgrading micro food processing enterprises—the Pradhan Mantri Formalisation of Micro Food Processing Enterprises (PMFME) scheme was launched in 2020. As of 31 October 2024, the scheme has received 407,819 applications, with loans totalling ₹8.63 thousand crore sanctioned to 108,580 applicants. Additionally, the programme has successfully trained 672 Master Trainers, 1,120 District Level Trainers, and 87,477 beneficiaries across 36 states and union territories.

FOOD MANAGEMENT: Enabling Food Security

9.53 The basic concept of food security is to ensure that there is access to basic food for their active and healthy lives. It is characterised by the availability, access, utilisation, and stability of food supply. While the government has long tackled household food

security through the Public Distribution System (PDS) and Targeted PDS (TPDS), the National Food Security Act (NFSA) 2013 and the Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY) marked a fundamental shift in the approach to food security. That is transitioning from a welfare-based to a rights-based approach. NFSA act legally entitles up to 75 per cent of the rural population and up to 50 per cent of the urban population to receive foodgrain, free of cost, under the Targeted Public Distribution System, which, as per Census 2011, comes to 81.35 crore persons. Therefore, about two-thirds of the population is covered under the Act to receive highly subsidised food grains. In addition, PMGKAY was introduced to alleviate the suffering of the poor and vulnerable caused by the COVID-19 pandemic. The allocation of free food grain under PMGKAY is in addition to the regular allocation for around 80 crore beneficiaries. The provision of free food grains under PMGKAY for another five years, with effect from 1st January 2024, reflects the long-term commitment and vision of the Government for addressing National food and nutrition security.

9.54 To enhance the efficiency of the Public Distribution System (PDS), the government is fully committed to achieving 100 per cent e-KYC compliance nationwide. This aligns with the One Nation, One Ration Card (ONORC) scheme, allowing beneficiaries to complete electronic know your customer e-KYC anywhere, regardless of their home state. Beneficiaries can authenticate their Aadhaar biometrics at any Fair Price Shop (FPS), making it especially convenient for migrant workers to access their entitlements. To facilitate post-harvest lending for farmers, especially small and marginal farmers, the government has approved the Credit Guarantee Scheme for electronic-negotiable warehouse receipt (e-NWR)-based Pledge Financing (CGS-NPF). Under this scheme, farmers can obtain loans against e-NWRs issued for agricultural and horticultural commodities stored in accredited warehouses. The scheme covers the loss incurred by the bank due to credit and warehouseman risk. The scheme will help in increasing post-harvest lending against e-NWRs and thereby play a role in improving farmers' income.

BOX IX.8 : Measures to support foodgrain storage infrastructure in the country

- To support and upgrade the storage infrastructure for foodgrains and to ramp up the storage capacity in India, steel silos are being created in PPP.
- The government is creating capacity under Hub and Spoke Model Silos, where “Hub” silos have a dedicated railway siding and container depot facility. While the transportation from “Spoke” Silos to “Hub” Silos is undertaken by road, transportation from Hub to Hub is via rail.
- To improve food grain storage, especially in hilly and remote areas, the government is exploring the use of Flospan, a type of Mobile Storage Unit (MSU), in collaboration with the World Food Programme (WFP). These units can be quickly erected and have a storage capacity of 400 metric tonnes. As a pilot project, WFP has installed Flospan in six states: Jammu & Kashmir, Himachal Pradesh, Rajasthan, Mizoram, Uttarakhand, and Chhattisgarh.
- To modernise government grain warehouses, the government partnered with WFP and IGMRI to pilot a 'Smart Warehouse'. This warehouse uses sensors to monitor temperature, humidity, airflow, and rodent activity, providing real-time data to improve storage and reduce losses.

CONCLUSION

9.55 India's agricultural sector, despite encountering various challenges, remains a crucial pillar for economic growth and ensuring food security for the nation. This sector has consistently demonstrated remarkable resilience, evidenced by stable growth rates supported by a range of government initiatives to enhance productivity, diversify crop portfolios, and provide essential social security support for farmers.

9.56 The increasing significance of allied sectors, such as animal husbandry, dairying, and fisheries, underscores the importance of diversification in activities and sources of income for boosting their income levels and building resilience. By tapping into these complementary sectors, farmers can create additional streams of revenue that can buffer them against the inherent volatility of traditional crop production.

9.57 However, the sector is not without its challenges. Issues like climate change and water scarcity present significant obstacles that require focused and targeted interventions. Promoting agricultural production patterns and practices that align with the specific agro-climatic conditions and natural resource availabilities of different regions across the country is vital. Investment in research and development, especially on climate-resistant varieties, improved agriculture practices, diversification to high-yield and climate-resilient crops, and micro-irrigation, can yield sustainable long-term benefits. The widespread adoption of digital technologies in agriculture will unlock further possibilities for enhancing productivity.

9.58 Improving price discovery and market efficiency is another critical aspect that necessitates attention. Strengthening market infrastructure is essential to facilitate this improvement. This can be achieved by effectively utilising the e-NAM, a platform for farmers to access broader markets. Furthermore, supporting the establishment and operational capabilities of FPOs and enabling cooperatives to play a more active and influential role in agricultural markets is paramount to fostering an inclusive market environment.

9.59 Government initiatives like PM-KISAN, which provides direct income support to farmers, and Pradhan Mantri Kisan Maandhan Yojna (PMKMY), which offers pension schemes for farmers, have successfully contributed to bolstering farmers' incomes and enhancing their social security safety nets. More than 11 crore farmers have been benefitted under PM-KISAN and 23.61 lakh farmers had enrolled under PMKMY as of 31st October 2024. In addition to these efforts, reforms such as e-KYC compliance under the ONORC initiative and credit guarantee schemes for e-NWR financing address systemic inefficiencies that have historically plagued the agricultural sector.

9.60 Moreover, there is a concerted focus on modernising food grain storage systems, particularly in remote and hilly areas, which reflects a strong commitment to improving the overall supply chain infrastructure.

9.61 While various initiatives have helped India's agriculture and allied services to grow under challenging circumstances, the good news is that there is still significant

untapped growth potential. The right set of policies across all levels of government can reduce the overproduction of cereals and address the underproduction of pulses and edible oil. For instance, India's farmers must be allowed to receive price signals from the market unimpeded, with separate mechanisms designed to take care of the cost-of-living impact on deserving households for specified durations. Two, they need to have market mechanisms to hedge their price risks. Three, they need the right policies that nudge them away from impairing their soil fertility with an unbalanced application of fertilisers and from producing already overproduced crops, which deplete India's water resources and use up electricity excessively. These policy shifts will help lift agricultural productivity in the economy by boosting land and labour productivity in the sector. Consistent and stable growth of agriculture at around 5 per cent, with a 20 per cent share of overall GVA in the economy, will contribute 1 per cent growth to GVA. Agriculture will then absorb surplus labour even as output per worker and output per hectare rise. Agro-based entrepreneurship will flourish even more than it already does. In the process, India will not only achieve food security for itself but will also enable it for other nations too. The possibilities are both exciting and limitless.

CLIMATE AND ENVIRONMENT: ADAPTATION MATTERS

India needs to achieve robust economic growth to attain developed nation status by 2047, with a focus on inclusive and sustainable development. While the country has low per capita carbon emissions, it is committed to pursuing low-carbon growth. However, it faces challenges in deploying renewable energy, particularly due to a lack of storage technology and access to minerals. Given India's vulnerability to climate change, a strong adaptation strategy is essential; the increase in adaptation expenditures from 3.7 per cent to 5.6 per cent of GDP between FY16 and FY22 indicates the prominence adaptation and building resilience play in the development strategy. The Lifestyle for Environment (LiFE) initiative, designed to encourage sustainable practices and circular economy, will play a transformative role in the development process. The flow of international finance has remained grossly inadequate, with much of the action being financed from domestic resources. The outcomes from the recent CoP29 hold little promise on that account.

INTRODUCTION

10.1 India's ambition to achieve developed nation status by 2047 is fundamentally anchored in the vision of inclusive and sustainable development. Notably, India's per capita carbon emissions are one-third of the global average, even as it stands among the world's fastest-growing economies. The country is dedicated to identifying and exploring pathways for low-carbon development that simultaneously ensure affordable energy security, job creation, economic growth, and environmental sustainability. However, India's aspiration for low-carbon economic growth presents significant trade-offs. While the nation has made remarkable progress in building renewable energy capacity, effectively harnessing and scaling these resources remains challenging due to the lack of viable storage technologies and limited access to essential minerals.

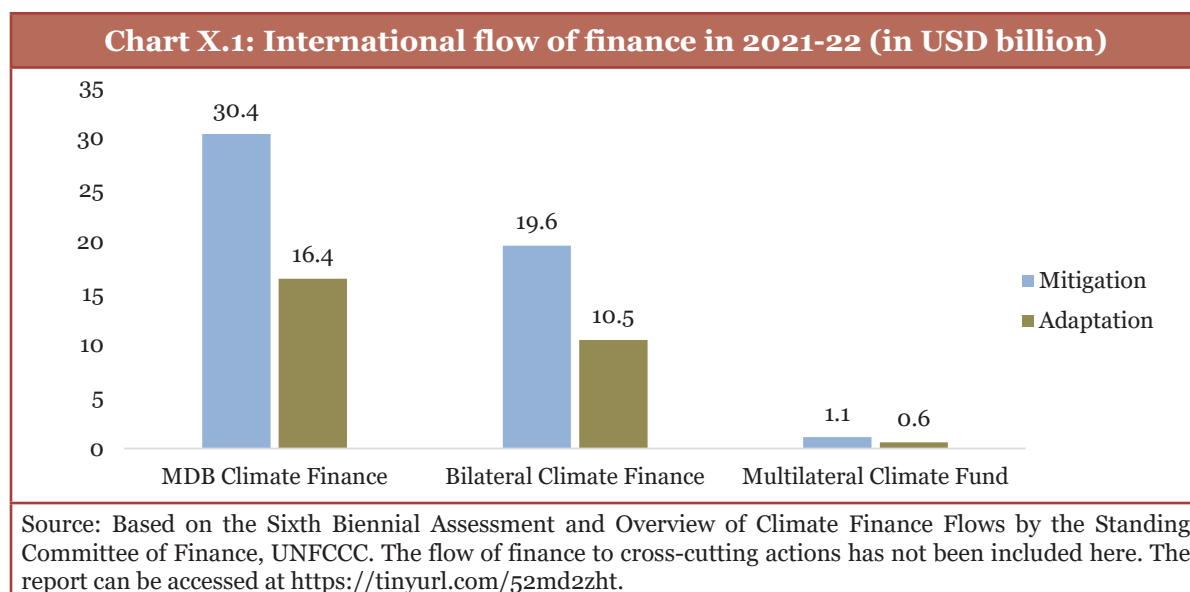
10.2 A strong adaptation strategy is a priority for the country, given its significant vulnerability to climate change, stemming from its geographic and agro-climatic diversity.¹ India's Initial Adaptation Communication, submitted to the United Nations

¹ Khanna, P. (2024, December 29). India is overlooking the climate drag on its economic growth. Financial Times. Retrieved January 4, 2025, from <https://tinyurl.com/cbkc3hix>.

Framework Convention on Climate Change (UNFCCC) in December 2023, reveals that the total expenditure related to adaptation in FY22 was 5.6 per cent of the Gross Domestic Product (GDP), an increase from 3.7 per cent in FY16. Climate action, so far, has been financed through domestic resources, with the public sector playing a central role. On the other hand, the international flow of funds for climate actions is highly inadequate and has a mitigation bias (Chart 1).

10.3 Following a low-carbon development pathway and achieving the net zero carbon emissions goal necessitates a fundamental shift in mindset and behaviour towards mindful consumption and production. The India-led global movement, Lifestyle for Environment (LiFE), aims to enhance the country's sustainability efforts. The LiFE initiatives are being executed in India in mission mode through various regulatory measures and policies that encourage environmentally friendly practices such as waste management, resource conservation, and recycling. Promoting a circular economy is also envisioned as a central component under the Mission LiFE.

10.4 The recent outcome of the New Collective Quantified Goal at CoP29 (29th session of the annual climate conference under the UNFCCC) held in Baku in November 2024 on finance presents little optimism about the possibility of support to developing countries. With the developed countries also falling short of their Nationally Determined Contributions (NDCs) by about 38 per cent,² their actions do not reflect the historical responsibility or the leadership in meeting their obligations. The lack of commitment and insufficient delivery of the means of implementation,³ as mandated in the Paris Agreement, will make the low-carbon transition in developing countries more challenging.



² CEEW (October 26, 2023). Trust and Transparency in Climate Action. Retrieved December 23, 2024, from <https://www.ceew.in/publications/trust-and-transparency-climate-action-research>.

³ Finance, Technology and Capacity Building are regarded as the means of implementation.

10.5 The 29th session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 29) and the 6th Session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA 6), held in Baku, Azerbaijan, were designated as the 'Finance COP'. The focus was to establish the New Collective Quantified Goal (NCQG) on climate finance.⁴ The meetings of COP29 and CMA6 presented a significant opportunity to serve as a benchmark for international climate cooperation and multilateralism, with the potential to influence the efficacy of climate policies on a global scale and strengthen collaborative efforts by enhancing the financial commitments to support climate action in developing countries.

10.6 Establishing a small mobilisation target of USD 300 billion annually by 2035 is a fraction of the estimated requirement of USD 5.1 - 6.8 trillion by 2030.⁵ It is out of sync with the needs of the critical decade when action is required to keep the temperature goals of the Paris Agreement within reach.⁶ The decision demonstrates a significant misalignment with the Paris Agreement's mandate to demonstrate a 'progression beyond previous efforts' by developed countries. It underscores the unwillingness of affluent developed nations to assume their equitable share of the responsibility to address emission reduction and mitigate climate change impacts on vulnerable populations in developing regions. The goal contravenes equity and the principle of common but differentiated responsibility in the global climate response by disproportionately placing the burdens of climate change on those nations that have not historically contributed to the crisis.

10.7 COP 30 in 2025 is the COP for Climate Action, before which the parties to the Paris Agreement are to submit their next version of Nationally Determined Contributions. The funding shortfall may lead to a reworking of the climate targets. Considering that domestic resources will be the key to action, resources for meeting development challenges may be affected, undermining progress toward sustainable development objectives and compromising the integrity of international climate partnerships.

10.8 This chapter is structured into three broad parts. It starts with discussing the importance of adaptation for India and the measures taken, focuses on energy transition and the lessons learnt from the experience of the developed countries and weighs options for India. It ends with an overview of the Lifestyle for Environment (LiFE) initiative and measures encouraging sustainable practices and circular economy.

4 Conference of the Parties serving as the meeting of the Parties to the Paris Agreement. (2024). New collective quantified goal on climate finance. In Decision -/CMA.6. Retrieved December 11, 2024, from <https://tinyurl.com/45x593ce>.

5 UNFCCC Standing Committee on Finance. (2024). Second report on the determination of the needs of developing country Parties related to implementing the Convention and the Paris Agreement. In UNFCCC. Retrieved December 23, 2024, from https://unfccc.int/sites/default/files/resource/UNFCCC_NDR2_ES_Web_Final.pdf.

6 United Nations. (2024). Outcome of the first global stocktake Decision 1/CMA.5 in the Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its fifth session. In Addendum (FCCC/PA/CMA/2023/16/Add.1). UNFCCC. Retrieved December 23, 2024, from https://unfccc.int/sites/default/files/resource/cma2023_16a01E.pdf.

BRINGING ADAPTATION TO THE FOREFRONT

10.9 India is the seventh most vulnerable country to climate change.⁷ It suffers from weather extremes and hazards, slow onset events such as sea-level rise, biodiversity loss, and water insecurity. While greenhouse gas (GHG) emissions are a global bad and the benefits of mitigation are diffused, vulnerable developing countries such as India have to bear a disproportionate burden of climate change and have no choice but to face the climate change consequence of historical emissions. The emissions remain with us. They impose huge costs on already resource-constrained countries. Hence, vulnerable developing countries such as India need to undertake climate adaptation on an urgent footing as this has a direct impact on lives, livelihoods and the economy.

10.10 The Ministry of Environment, Forest and Climate Change (MoEFCC) has initiated the process of developing the National Adaptation Plan (NAP). The NAP is a vital strategic document articulating India's adaptation priorities. The process aims to develop a comprehensive and inclusive NAP that aligns with sustainable development goals and ensures climate resilience for all regions and sectors. This is in addition to the Initial Adaptation Communication submitted to the UNFCCC on 9 December 2023, highlighting the country's adaptation priorities, strategies, policies, and programmes along with implementation support needs for adaptation action.

10.11 Implementing effective adaptation strategies will necessitate a multi-faceted approach that includes policy initiatives, sector-specific strategies, development of resilient infrastructure, research and development, and securing financial resources for adaptation efforts. Furthermore, these adaptation measures should be tailored to regional specificities, given India's significant diversity of geographic and agro-climatic conditions. The following subsections discuss the initiatives to build resilience across sectors.

Adaptation in agriculture

10.12 Heat and water stress can negatively impact yields, posing challenges for India's food security. Adaptation strategies in agriculture have included enhanced focus on research and development of climate-resilient seeds, measures to preserve and enhance groundwater resources, improve soil health, and modify cropping practices, among other measures. The chapter on Agriculture and Food Management discusses measures to improve adaptation in agriculture in detail.

Building resilience in urban areas

10.13 With increasing urbanisation and climate change impacts, comprehensive adaptation action to address heat stress, urban flooding, and depleting groundwater in

⁷ Global Climate Risk Index. (2021). The 10 most affected countries in 2019. Table 1. Page 8. Retrieved December 27, 2024, from <https://www.germanwatch.org/en/19777>.

cities has been gaining focus. The National Mission on Sustainable Habitat (NMSH), launched in 2010, one of the nine missions under the National Action Plan on Climate Change (NAPCC), seeks to promote low-carbon urban development and bolster resilience against climate change impacts through five key thematic areas: waste management, water management, energy and green building, mobility and air quality, and urban planning, green cover, and biodiversity. In 2015, sustainable development and climate actions became integral to urban investments through various missions and programs. The Ministry of Housing and Urban Affairs (MoHUA) has introduced a unique assessment framework for cities to evaluate climate-relevant parameters, helping them adopt and share best practices. This framework aligns with international standards for green, sustainable, and disaster-resilient urban habitats, enabling Indian cities to promote sustainable urban development.⁸

10.14 The Atal Mission for Rejuvenation and Urban Transformation (AMRUT) is benefiting citizens by improving water supply systems, augmenting localised water resources through the revitalisation of water bodies, enhancing groundwater recharge, increasing permeable green spaces, promoting the recycling and reuse of wastewater, and implementing energy efficiency reforms, thus, promoting key thematic areas under the NMSH. As of December 2024, 785 stormwater drainage projects have been completed, eliminating 3,631 waterlogging points and constructing 1,380 kilometres of drains to mitigate the effects of urban flooding. Work is currently underway to address an additional 285 waterlogging points. Additionally, 2,438 parks have been developed, contributing 5,070 acres of green space. Over 320 green mobility projects have been completed to encourage environmentally friendly modes of transport and infrastructure, creating 493 kilometres of walkways and cycle tracks.

10.15 AMRUT 2.0⁹ aims to enhance ease of living by creating water-secure cities through water conservation, augmentation and rejuvenation. As of December 2024, 3,078 water body rejuvenation projects have been approved with the planned rejuvenation of 475 square kilometres area with 4.65 crore million litres per day (MLD) capacity, of which nine water rejuvenation projects have been completed. These projects are focused on sewer diversion/ treatment before discharge into water bodies, sustainability and emphasis on nature-based solutions. AMRUT 2.0 also focuses on the reuse of water and greywater management. As of December 2024, 1,437 MLD capacity has been developed for recycling/reuse.

8 Ministry of Housing and Urban Affairs. (2021). National Mission on Sustainable Habitat 2021-2030. Retrieved December 17, 2024, from <https://tinyurl.com/bdd584zk>.

9 Ministry of Housing and Urban Affairs. (2021). Atal Mission for Rejuvenation and Urban Transformation 2.0. Retrieved December 17, 2024, from <https://tinyurl.com/24kkjvxn>.

BOX-X.1 Vertical Gardens and Environment Sustainability

Rapid urbanisation has intensified environmental challenges, including the urban heat island effect, increasing carbon emissions, and heightened air pollution. A promising solution gaining traction is the concept of vertical gardens, also called living walls or vertical greenery systems (VGS). These systems incorporate vegetation into vertical structures, effectively addressing these issues. By transforming urban facades into vibrant green landscapes, vertical gardens enhance the aesthetic appeal of buildings and contribute to environmental sustainability—improving thermal performance, sequestering carbon, and fostering biodiversity in densely populated cities. (Zaid et al., 2018¹⁰; Harbiankova & Manso, 2025)¹¹.

The practical application of this innovation is the Income Tax Department's initiative to create vertical gardens using over seven lakh waste plastic bottles. This project recycles waste and adorns urban structures across 17 states, showcasing the environmental and aesthetic enhancements vertical gardens can offer.¹²

Looking ahead, India's regulatory framework is continuously evolving, exemplified by the introduction of the Energy Conservation and Sustainable Building Code (ECSBC) 2024, which advocates energy-efficient and environmentally sustainable building practices. While this code facilitates the adoption of sustainable designs, there remains an opportunity for further enhancements, such as explicit guidelines for vertical gardens. These additions could significantly improve urban air quality and mitigate heat islands. Such policy advancements would align India with global best practices observed in Singapore, Japan, and the European Union, where vertical greening has become integral to urban development. (Bustami et al., 2018)¹³.

The future of urban planning in India stands to gain immensely from embedding these ecological considerations into building policies and approval processes, making vertical gardens a standard feature in the architectural landscape. This shift would ultimately contribute to healthier and more sustainable urban environments.

10.16 The Smart City Mission¹⁴ adopts a people-centric approach anchored around liveability, economic ability and sustainability. The Urban River Management Plan (URMP) aims to assist river cities in reviving and maintaining rivers sustainably. Launched in 2021, the River Cities Alliance (RCA), a partnership between the Ministry of Jal Shakti and MoHUA, focuses on sustainable river-centric development in more than 145 member cities.

10 Zaid, S. M., Perisamy, E., Hussein, H., Myeda, N. E., & Zainon, N. (2018). Vertical Greenery System in urban tropical climate and its carbon sequestration potential: A review. *Ecological Indicators*, 91, 57-70. <https://doi.org/10.1016/j.ecolind.2018.03.086>.

11 Harbiankova, A., & Manso, M. (2025). Integrating Green Roofs and Green Walls to Enhance Buildings Thermal performance: A literature review. *Building and Environment*, 112524. <https://doi.org/10.1016/j.buildenv.2025.112524>.

12 Press Information Bureau. (2022, October 31). Creation of vertical gardens by the Income Tax Department by using waste plastic bottles. Retrieved January 21, 2025, from <https://pib.gov.in/PressReleasePage.aspx?PRID=1872353>.

13 Bustami, R. A., Belusko, M., Ward, J., & Beecham, S. (2018). Vertical greenery systems: A systematic review of research trends. *Building and Environment*, 146, 226-237. <https://doi.org/10.1016/j.buildenv.2018.09.045>.

14 UN-Habitat. MoHUA, GoI. (2023). Smart Cities Mission, India: Localizing Sustainable Development Goals. Retrieved December 17, 2024, from https://smartcities.gov.in/sites/default/files/2023-09/SCM_UN_Report%20.pdf.

Adaptation in coastal regions

10.17 India's 7,600 km long coastline and many islands make adaptation in the coastal region particularly important. The coastal regions face extreme climate events (such as heavy rain, severe storms, high tide flooding, etc.), and slow onset events, such as sea-level rise, bring the risk of permanent inundation. Adaptation action in coastal regions can include planting and sustaining mangroves, building sea walls and artificial reefs, beach nourishment, dune planting, sand bypassing, etc.

BOX-X.2 Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI)

The 'Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI)' was introduced in the Union Budget for 2023-24. It aims to promote and conserve mangroves, which are unique natural ecosystems known for their high biological productivity and carbon sequestration capabilities. Additionally, mangroves serve as a protective barrier for coastlines against cyclones, typhoons, and tidal waves.

The objective is to restore mangrove forests through reforestation and afforestation measures along India's coast. This will be achieved by adopting the best practices established in India and worldwide, all within a realistic timeline. The aim is to enhance sustainable livelihood options for coastal communities and improve the support and services the mangrove ecosystem provides to the community and the economy.

The programme will cover approximately 540 square kilometres across nine coastal states and four UTs over five years (2023-2028). It will create approximately 22.8 million man-days of employment with an estimated carbon sink of 4.5 million tons of carbon, creating potential areas for nature tourism and livelihood potential for local communities.

The programme is being implemented in convergence mode, with funding from the State Compensatory Afforestation Fund Management and Planning Authority (CAMPA), National CAMPA, Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and other sources. State forest departments are the primary implementing agencies of the programme. Gap funding to support the core and support activities under MISHTI is through National-CAMPA.

As of 30 November 2024, six states and UTs: Andhra Pradesh, Gujarat, Odisha, West Bengal, Kerala, and Puducherry have been allocated funds under the program. This funding is intended to treat 3,836 hectares under the National CAMPA program, based on the annual plans submitted by these states for their first-year activities. Additionally, through collaboration with other initiatives, including State CAMPA, the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), and various state-specific programs, a total of 22,560.34 hectares of degraded mangrove areas have been brought under restoration across 13 states and UTs.

Source: Based on inputs from the Green India Mission Directorate, MoEFCC.

10.18 The government of India has undertaken several steps to protect and enhance mangrove forests in coastal states/union territories (UTs) through promotional and regulatory measures.¹⁵ Promotional measures are implemented through the ‘Conservation and Management of Mangroves and Coral Reefs’ scheme under the National Coastal Mission Programme. Regulatory measures are implemented through the Coastal Regulation Zone (CRZ) Notification (2019) under the Environment (Protection) Act, 1986; the Wild Life (Protection) Act, 1972; the Indian Forest Act, 1927; the Biological Diversity Act, 2002; and rules under these acts as amended from time to time.

BOX-X.3 Enhancing climate resilience of India’s coastal communities

The “Enhancing Climate Resilience of India’s Coastal Communities” project aims to enhance the resilience of the lives and livelihoods of the most vulnerable populations, particularly women, and to build resilience to climate change and extreme events, using an ecosystem-centred and community-based approach. The project is being implemented across India’s coastal states and UTs.

As of 31 December 2024, approximately 4955.01 hectares of ecosystem has been restored which includes 3259.11 hectares of mangroves and 1695.9 hectares of degraded watershed. It is estimated that approximately 40,617.8 tonnes CO₂ eq. have been sequestered under this project. An assessment of the coastal zone's cumulative vulnerability is proposed to facilitate appropriate adaptive measures. Other proposed activities under the project include promoting/demonstrating alternative climate-resilient livelihood options such as establishing mud crab hatcheries, promoting climate-resilient agriculture practices - and systematic rice intensification (SRI) technology for paddy cultivation.

Source: Based on inputs received from MoEFCC.

Adaptation action for water management

10.19 The Jal Shakti Abhiyan was initiated in 2019 to address the acute water stress in various parts of the country. The recent Jal Shakti Abhiyan: Catch the Rain – 2024, themed “Nari Shakti se Jal Shakti” (9 March to 30 November 2024), was focused on women’s role in water conservation through five interventions like rainwater harvesting, water body mapping, intensive afforestation, and awareness generation. The National Aquifer Mapping Project (NAQUIM) has been completed across 25 lakh square kilometres, offering water conservation plans and recharge structures to state agencies for implementation.

¹⁵ Press Information Bureau. (2024, February 5). Schemes for Restoration of Mangrove Forests. Retrieved December 16, 2024, from <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2002625>.

10.20 The Bhu-Neer portal, launched in September 2024, is a Central Ground Water Authority portal for managing and regulating groundwater resources, promoting transparency, efficiency and sustainability in groundwater usage. The FloodWatch India app (Version 2.0) launched by the Central Water Commission provides real-time flood forecasts and detailed data from 592 flood monitoring stations, along with reservoir storage insights to assist flood management.

10.21 Several states have undertaken other initiatives to manage water resources. The ‘Jal Sanchay Jan Bhagidari’ initiative, launched in Gujarat in September 2024, focuses on constructing 24,800 rainwater harvesting structures across the state to enhance rainwater harvesting and ensure long-term water sustainability. The Smart Laboratory on Clean Rivers (SLCR), established under the India-Denmark Green Strategic Partnership in Varanasi, aims to rejuvenate the Varuna River through sustainable practices and collaboration among government bodies, institutions, and communities. The Mawrah Multipurpose Reservoir Project of Meghalaya in East Khasi Hills district aims to conserve rainwater, recharge groundwater, rejuvenate springs, restore the catchment area and rehabilitate mine-spoilt land. The project serves as a model for integrated water resource management and community-driven environmental conservation efforts. The Dhamtari district of Chhattisgarh launched the Jal Jagar campaign focused on rainwater harvesting, rooftop water collection and wastewater management by engaging the community, especially women. It aims to transfer technology to field functionaries and empower communities to make decisions based on scientific data, and financial prudence. Jal Jagar activities were undertaken across 370 gram panchayats of Chhattisgarh, involving the participation of 80,389 women and 61,580 men.

ENERGY TRANSITION - LEARNING FROM THE EXPERIENCE OF DEVELOPED COUNTRIES AND WEIGHING THE OPTIONS

10.22 The first major energy transition from wood to coal began in the early eighteenth century, coinciding with the advent of the first industrial revolution. Two centuries later, coal was overtaken by oil and gas around 1946 (O’Connor, 2010),¹⁶ and fossil fuels became the primary energy source (Solomon & Krishna, 2011).¹⁷ The energy transition from wood to coal was motivated by several factors, of which industrialisation in Britain and concerns over the loss of forests due to enhanced logging were pre-dominant (Smil, 2019).¹⁸ A more recent transition from oil to nuclear energy in France that began in the

16 O’Connor, P. A. (2010). Energy Transitions. In *The Pardee Papers*. The Frederick S. Pardee Center for the Study of the Longer-Range Future Boston University. <https://tinyurl.com/bddn4b7r>.

17 Solomon, B. D., & Krishna, K. (2011). The coming sustainable energy transition: History, strategies, and outlook. *Energy Policy*, 39(11), 7422–7431. <https://doi.org/10.1016/j.enpol.2011.09.009>.

18 Smil, V. (2019). *Energy in World History*. In Routledge eBooks. <https://doi.org/10.4324/9780429038785>.

1970s was driven by the oil embargo by oil-producing countries in 1973 (Solomon & Krishna, 2011)¹⁹ and the intent to reduce dependence on imported oil.

10.23 The energy transitions witnessed till the last century were driven by commercial interests rather than the will to limit the emissions from advanced economies. Commercial interests and energy security remain the most significant factors in the transition pathway even today. In 2022, the European Union introduced the REPowerEU plan,²⁰ which aims to reduce dependence on Russian gas supplies. The plan includes a budget of € 10 billion allocated for investment in liquefied natural gas infrastructure and an additional € 1.5 to 2 billion designated for securing oil supplies. The European Union further amended its sustainable taxonomy²¹ to include generating power and heat from fossil gaseous fuels as a transitional activity. In 2023, the US administration also approved the onset of the country's largest oil drilling project in the Alaska region, with an estimated total oil and non-gas liquids production of 628.9 million barrels and 260.79 million metric tons of associated indirect carbon dioxide equivalent of emissions.²² Actions speak louder than words, with the biggest beneficiaries of carbon-intensive growth over several centuries holding on to fossil fuels even as they would want the developing countries to take up the less efficient, costlier and riskier options.

10.24 Recent data about the G7 countries (Charts 2 and 3) for almost the last six decades (1992 to 2023) shows that these countries continue to rely heavily on fossil fuels in their per capita primary energy consumption, shifting from coal and oil-based energy to gas-based energy.

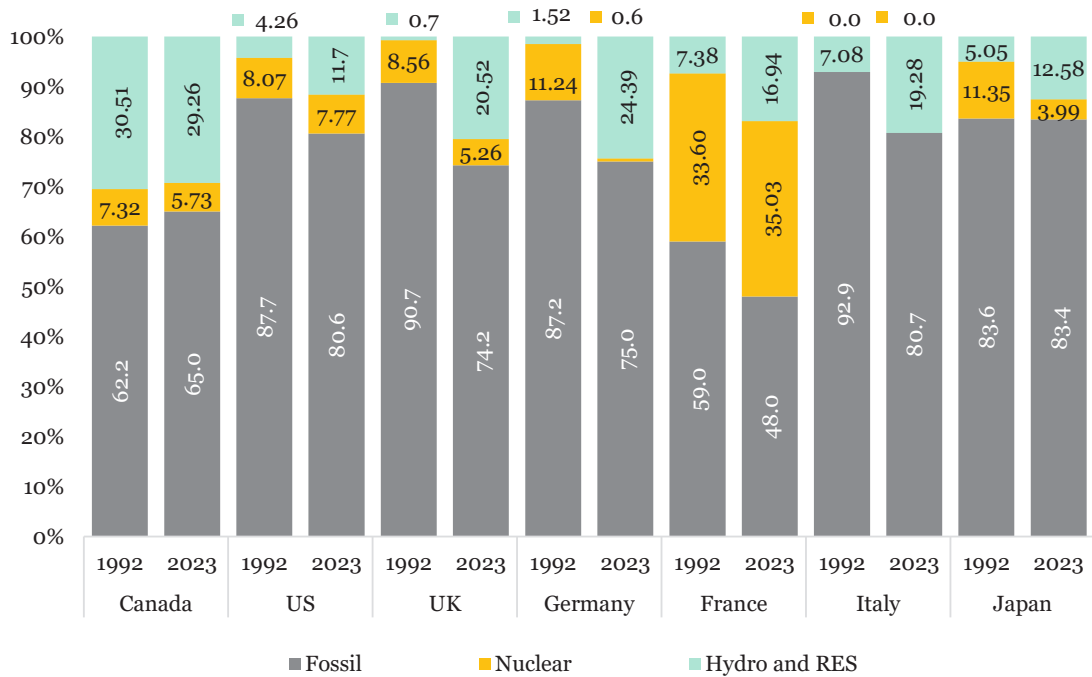
19 Solomon, B. D., & Krishna, K. (2011). The coming sustainable energy transition: History, strategies, and outlook. *Energy Policy*, 39(11), 7422–7431. <https://doi.org/10.1016/j.enpol.2011.09.009>.

20 Communication from the commission to the European Parliament, The European Council, Council, The European Economic and Social Committee and the Committee of the region REPowerEU Plan of 18 May 2022. Retrieved December 20, 2024, from <https://tinyurl.com/3nw57rmp>.

21 Commission Delegated Regulation (EU) 2022/1214 of 9 March 2022 amending Delegated Regulation (EU) 2021/2139 as regards economic activities in certain energy sectors and Delegated Regulation (EU) 2021/2178 as regards specific public disclosures for those economic activities. Retrieved December 20, 2024, from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R1214>.

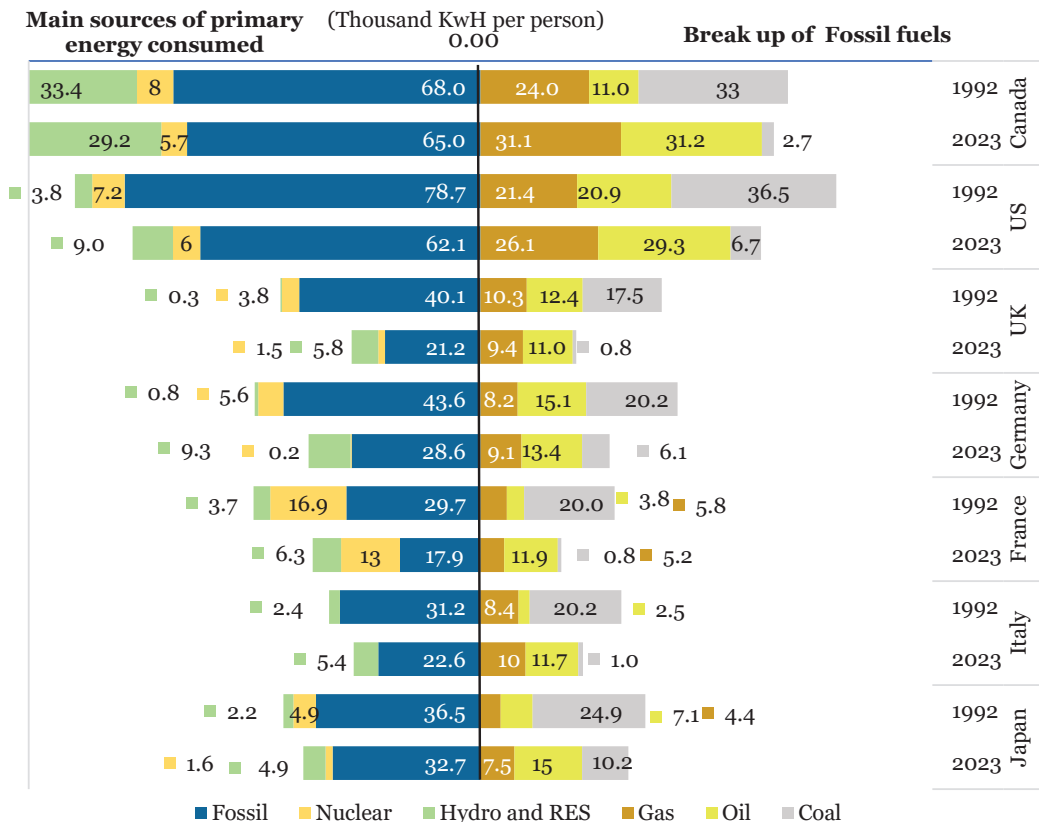
22 Record of Decision under the National Environmental Policy Act (NEPA) for approval of the Willow Master Development Plan Project. (2023). In U.S. Department of The Interior's (DOI). Retrieved December 20, 2024, from <https://tinyurl.com/y45fwk2p>.

Chart X.2: Contribution of fossil fuels in per capita primary energy consumption in G7 in 1992 and 2023



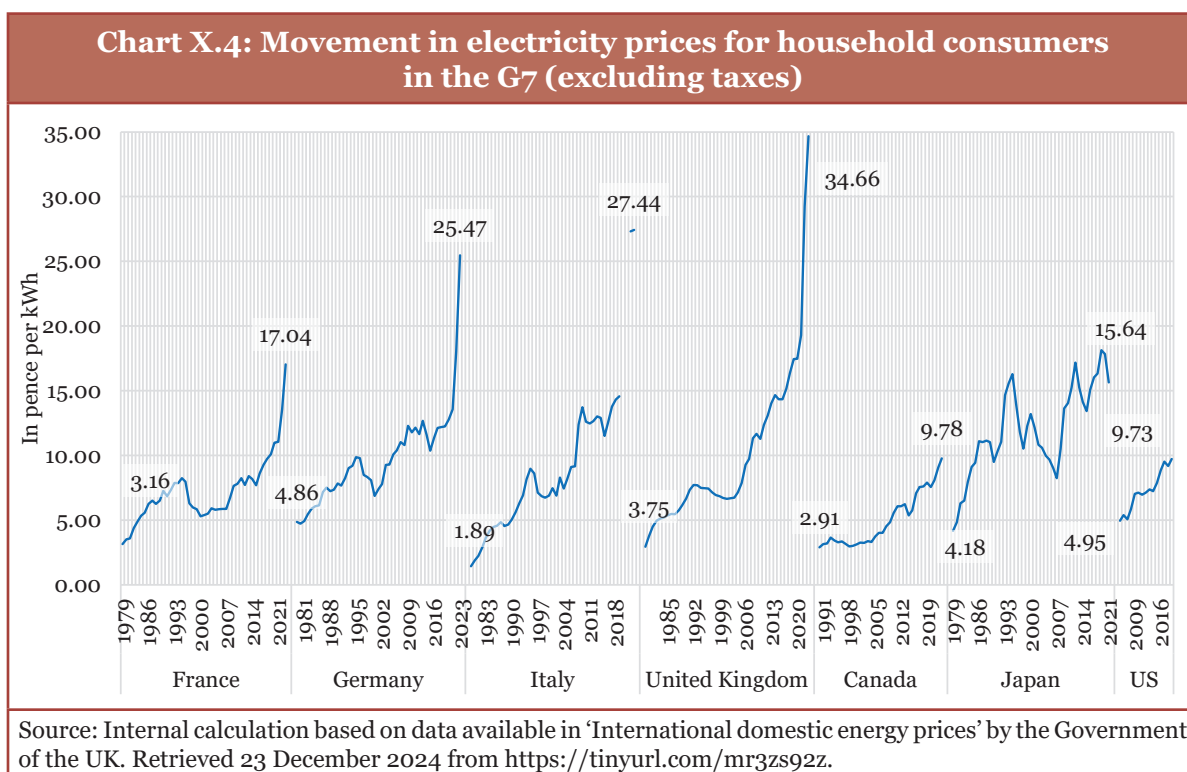
Source: Internal calculations based on data accessed from 'Our World in Data'.

Chart X.3: Per capita energy consumption by sources in G7 in 1992 and 2023



Source: Internal calculations based on data accessed from 'Our World in Data'.

10.25 The friction between energy transition and energy security is clearly evident in the actions of developed countries, revealing the limitations of transitioning to renewable energy sources such as wind and solar. First is the significant ‘congestion cost’ of managing a complex energy system incorporating fossil fuels and renewables. With the shift to renewable energy, there has also been an increasing trend in electricity prices (Chart 4). The congestion and higher cost have led to instances of wind turbines being curtailed due to grid limitations, necessitating the activation of gas plants to meet peak demand (Will Mathis, 2024)²³, (Oliver, 2024)²⁴. The shift from coal to natural gas as the base load has been the policy choice for ensuring grid stability in the UK and other developed countries. Developed countries have utilised their most abundant fuel in their transition. The transition to renewable energy has been tardy, forcing a return to fossil fuels to ensure stable supply and address rising electricity prices.



10.26 India has growing energy needs. The 2030 Agenda for Sustainable Development also includes a dedicated and stand-alone goal on energy, SDG 7, which calls for countries to "ensure access to affordable, reliable, sustainable and modern energy for all". India’s Human Development Index currently stands at 0.644.²⁵ Based on various forms of

²³ Will Mathis. (2024, December 2). UK is paying £1 billion to waste a record amount of wind power. Bloomberg. Retrieved December 12, 2024, from <https://www.bloomberg.com/news/articles/2024-12-02/uk-is-paying-1-billion-to-waste-a-record-amount-of-wind-power>.

²⁴ Oliver, M. (2024, August 7). London and South East warned of net zero blackouts. The Telegraph. Retrieved December 12, 2024, from <https://www.telegraph.co.uk/business/2024/08/07/power-chiefs-fear-net-zero-blackouts-in-london/>.

²⁵ United Nations Development Programme. Accessed from <https://tinyurl.com/2haphvns>.

energy mixes and energy efficiency scenarios, Bhattacharyya et al. 2022²⁶ estimated that the minimum level of per capita final energy requirement for India to become a developed country with an HDI of 0.9 must be in the range of 45.7 to 75 gigajoules per year. As per the Energy Statistics of India 2024, provisional estimates indicate that the total final consumption of energy per capita for FY23 was 16,699 megajoules or 16.7 gigajoules (~approx.),²⁷ indicating that the gap between actual and required future energy consumption to fuel growth to achieve Viksit Bharat status is quite huge.

10.27 One of the key pillars of SDG7 is the expansion of renewable energy; however, it is clear that even in the most advanced economies, the technologies for renewable energy and their implementation are not yet at a maturity level that allows them to fully replace fossil fuel-based power plants. Several challenges hinder renewable energy's cost-effective and efficient integration into the energy mix. These include significant investments required for grid integration, the development of battery infrastructure to manage intermittency, scaling up production of the components of renewable energy systems, access to critical minerals that are needed for storage technology, the limited availability of land in densely populated areas and the competing and rapidly increasing energy demands from agriculture, infrastructure, and industry.

10.28 Coal has an important role to play in India's sustainable development.²⁸ Around 88 per cent of the US's coal-fired capacity was built between 1950 and 1990.²⁹ On the other hand, the United Kingdom, driven by their industrialisation, started very early and their coal-run power plants dominating the energy supply till the late 1970s when natural gas was identified as a reliable substitute.³⁰ In India's case, most capacity additions to the coal-fired power plants were made only in the 2010s.³¹ There is no valid economic rationale for shutting down coal plants in India, leaving huge investments underutilised and stranded and without a dependable alternative in place. The US and European countries may transition from coal to natural gas because they have access to

26 Bhattacharyya, R., B., Singh, K. K., Grover, R. B., Bhanja, K., Applied Systems Analysis, Homi Bhabha National Institute, & Chemical Engineering Group, Bhabha Atomic Research Centre. (2022). Estimating minimum energy requirement for transitioning to a net-zero, developed India in 2070. In CURRENT SCIENCE (Vol. 122, Issue 5, pp. 517–518). <https://tinyurl.com/36mmzfc6>.

27 Table 8.4 in the Energy Statistics India 2024 by MOSPI. Retrieved 25 December 2024 from <https://tinyurl.com/mrxz4bc7>.

28 Srikanth, R., & Bhatt, J. R. (2023). Why India needs Coal to achieve its Sustainable Development Goals. *ideas.repec.org*. <https://ideas.repec.org/p/osf/osfxxx/f6dhe.html>.

29 Most coal plants in the United States were built before 1990. (2017, April). U.S. Energy Information Administration. Retrieved 26 December 2024, from <https://tinyurl.com/fd8e7ha3>.

30 McGarry, T. (2023). UK Electricity capacity and generation by fuel between 1920 and 2020. Department for Energy Security and Net Zero, Government of UK. Retrieved 26 December 2024, from <https://tinyurl.com/2cj4v6wk>.

31 Srikanth, R., & Nathan, H. S. K. (2017). Towards sustainable development: planning surface coal mine closures in India. *Contemporary Social Science*, 13(1), 30–43. <https://doi.org/10.1080/21582041.2017.1394484> and Chart 7.A in Growth of electricity sector in India from 1947-2024 July, 2024 by Central Electricity Authority, M/o Power, from https://cea.nic.in/wp-content/uploads/pdm/2024/08/Growth_Book_2024.pdf.

that resource, and their older conventional coal-based thermal plants are nearing the end of their life cycle. Unlike many developed countries, India's only reliable energy source is coal,³² as it possesses around 10 per cent of the world's coal reserves but only 0.7 per cent of the world's natural gas reserves.³³

10.29 Presently, given the resource endowments, coal cannot be neglected as a reliable and affordable source of energy for India's development. India has, however, taken a leading role in climate action, with the government implementing measures to reduce emissions in the economy. One key strategy has been to promote the efficient use of coal by utilising super-critical (SC), ultra-super-critical (USC) and the recent Advanced Ultra Super Critical (AUSC) technologies in coal-based power plants. Back in 2010, India commissioned its first power unit based on supercritical technology, and by the middle of 2024, a total capacity of 65,290 megawatts (94 Units) and 4,240 megawatts (06 units) in supercritical and ultra-supercritical technology-based power units have been commissioned respectively.³⁴ Further, more recently, the National Thermal Power Corporation Limited (NTPC) and Bharat Heavy Electricals Limited (BHEL) have developed an Indigenous Advance Ultra Super Critical (AUSC) technology and are setting up an 800-megawatt AUSC technology-based Thermal Power Plant. This AUSC power plant will reduce emissions by about 11 per cent compared to super-critical plants.³⁵

10.30 Among the other cleaner sources of energy, nuclear, being an efficient source of energy, has increasingly emerged as a reliable alternative to fossil fuel. However, there are challenges. The expansion of the use of nuclear power has to contend with public concerns about safety and the uncertainty that the latest technologies are controlled by a few countries (Jayanti, 2023).³⁶ Geographical concentration (Economic Survey, 2022-2023; 2023-2024)³⁷ of uranium and other essential minerals also poses a challenge. Besides, nuclear energy relies heavily on the stability of fossil fuel supply chains to

32 ICRIER. (2024, May 2). Decommissioning of coal-based plants in India and its ramifications - ICRIER. Retrieved January 6, 2025, from <https://tinyurl.com/4xkfw4k>.

33 Tables XI.4: World Proven Gas Reserves (Country-wise) and XI.6: World Natural Gas Production (Country-wise) in Indian Petroleum & Natural Gas Statistics 2022-23 by Ministry of Petroleum and Natural Gas, from <https://tinyurl.com/mtnm393>.

34 Coal-fired electricity output and emissions. (2024, July). Press Information Bureau. Retrieved 26 December 2024, from <https://tinyurl.com/fk5c4mem>.

35 Ministry of Heavy Industries, from <https://tinyurl.com/bd9munhn>.

36 Jayanti, S. (2023, December 4). Nuclear Power Is the Only Solution. TIME. Retrieved 12 December 2024, from <https://tinyurl.com/4vtsav9r>.

37 The geopolitics of critical minerals and rare earth minerals supply chains were discussed in detail in box VI.4 of Chapter 6, in Economic Survey 2023-24 and Box VII.2 of Chapter 7 in Economic Survey 2022-23. References: Government of India. (2024, July). Economic Survey 2023-24. Retrieved 18 December 2024, from <https://tinyurl.com/53f7wfm7>; Government of India. (2023, January). Economic Survey 2022-23. Retrieved 18 December 2024, from <https://tinyurl.com/scwc88hw>.

produce sulfuric acid for uranium extraction (Maslin et al., 2022).³⁸ By 2040, estimates suggest that a shortfall of sulfuric acid supply could range from 100 million to 320 million tonnes,³⁹ depending on the extent of efforts to reduce carbon emissions. Furthermore, even in the short run, actions by key players can pose a risk to the growth of the nuclear power sector (Dempsey, 2024).⁴⁰ The significance of nuclear energy, given its higher efficiency and low greenhouse gas emissions, requires a forward-looking perspective to address potential challenges in advance, facilitating a smoother transition.

10.31 Further, the challenge of disposing of renewable energy technologies, especially solar panels, reveals how environmental policies can create complex issues. The state of California, a leader in promoting rooftop solar for two decades, did not develop a comprehensive plan for managing the end-of-life of these systems (Kisela, 2022).⁴¹ Disassembling and recycling solar panels is complex and demands highly specialised equipment and skilled workers. Implementing proper waste management strategies for renewable energy systems is imperative, as neglecting to address this issue could lead to significant environmental contamination. Effective disposal methods must be developed to manage by-products and materials associated with renewable energy technologies to mitigate potential negative impacts on ecosystems and public health.

BOX-X.4 New Emission Sources: Are they being accounted for?

The demand for electricity in the United States is projected to increase significantly⁴² and in an unprecedented manner.⁴³ This surge is primarily attributed to the growing requirements associated with the expansion of artificial intelligence operations (Will Wade, 2024).⁴⁴

Globally, electricity consumption by data centres in 2022 was estimated at 460 terawatt hours - around two per cent of final electricity demand and is estimated to reach 1000 terawatt-hours by 2026 (International Energy Agency, 2024).⁴⁵ These data centres alone will consume six per cent of the US's total electricity demand in 2026, estimated to be around

38 Maslin, M., Van Heerde, L., & Day, S. (2022). Sulfur: A potential resource crisis that could stifle green technology and threaten food security as the world decarbonises. *Geographical Journal*, 188(4), 498–505. <https://doi.org/10.1111/geoj.12475>.

39 *ibid.*

40 Kazatomprom, the top uranium producer, plans to limit its output for 2025 as per Dempsey, H. (2024, August 23). World's largest uranium producer slashes production target. *Financial Times*. Retrieved December 12, 2024, from <https://tinyurl.com/54evz5a5>.

41 Kisela, R. (2022, July 16). California landfills are filling up with toxic solar panels - *Los Angeles Times*. *Los Angeles Times*. Retrieved December 12, 2024, from <https://tinyurl.com/muuv5p5>.

42 North American Electric Reliability Corporation (NERC)'s 2024 Long-Term Reliability Assessment (LTRA). Retrieved December 12, 2024, from <https://tinyurl.com/2kkevmvr>.

43 AI Is Already Wreaking Havoc on Global Power Systems. (2024, June 21). *Bloomberg*. Retrieved January 4, 2025, from <https://tinyurl.com/3mufa39m>.

44 Will Wade. (2024, December 25). US Electricity Demand Forecast to Surge 16% Over Next Five Years. *Bloomberg*. Retrieved December 12, 2024, from <https://tinyurl.com/yexrs3ju>.

45 InternationalEnergyAgency. (2024). Electricity 2024. Retrieved December 13, 2024, from <https://tinyurl.com/4v8mcf5m>.

200 terawatt-hours or roughly four per cent of the country's national demand in 2022 (IEA, 2024).⁴⁶ Besides, the concerns about 'bad harmonics'⁴⁷ of the AI-led surge in power demand from data centres, adversely affecting households, are getting attention as well.

Until recently, the major technology firms have offset their substantial carbon emissions by purchasing 'unbundled'⁴⁸ renewable energy certificates (RECs). This practice has allowed them to present a façade of sustainability, as it enables them to claim that the electricity they consume—potentially sourced from fossil fuel facilities like coal plants—originates from renewable sources such as solar farms (Rathi & White, 2024)⁴⁹ and pay much less for the purchase of the unbundled REC than the actual cost of abatement of that one unit of GHG emission by them. Instead, the growing power demand from data centres is likely to cause further expansion in natural gas-based electricity, which will only increase the emissions of developed countries.⁵⁰

The engagement of advanced economies in harmonising their technological goals with the imperatives of the energy transition will become more apparent over time, but it is apparent that increases in emissions are not being factored in.

PROGRESS MADE ON INDIA'S ENERGY TRANSITION

10.32 India's efforts in mitigation have been ambitious. India has successfully established an installed electricity generation capacity of 213,701 megawatts from non-fossil fuel sources, which accounts for 46.8 per cent of the total capacity as of 30 November 2024 (see Chart 5).⁵¹ The goal is to reach 50 per cent by 2030.

46 *ibid.*

47 Bad Harmonics means the distortions in power supply to households on account of increased power consumption by data centres. This distortion can erode the quality of the power supply, which can damage electrical appliances and increase risk of electrical fires. Based on the research by Nicoletti, L., Malik, N., & Tartar, A. (2024, December 27). AI Needs So Much Power, It's Making Yours Worse. Bloomberg. Retrieved January 4, 2025, from <https://tinyurl.com/trehmcpa>.

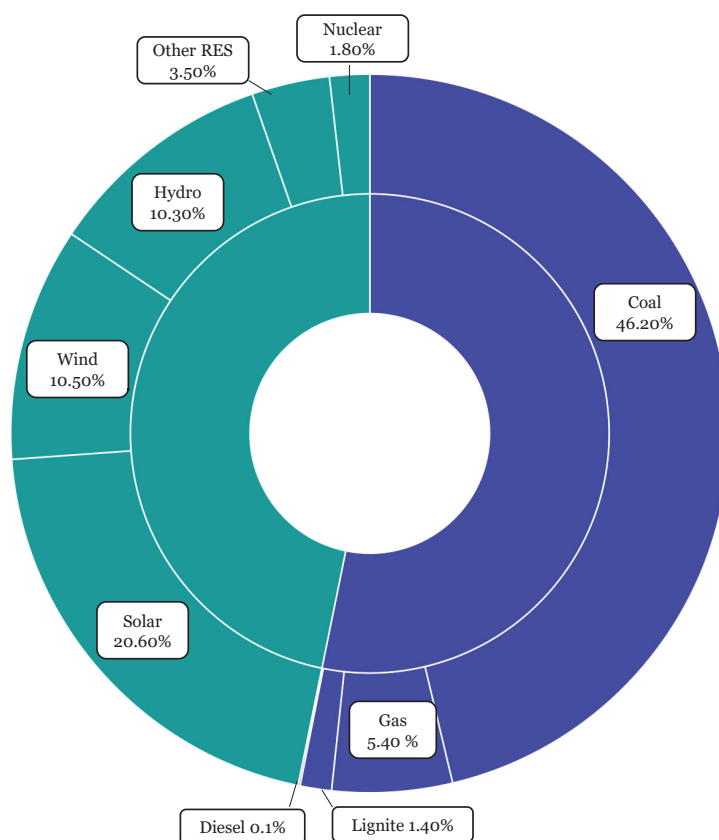
48 Unbundled REC are sold, purchased, or delivered separately from electricity. The REC provides no physical delivery of electricity to customers, and the latter purchases electricity from another producer and the REC from another. Source: Unbundled Renewable Energy Certificates (RECs) | US EPA. (2020, June 11). US EPA. Retrieved January 2, 2025, from <https://tinyurl.com/5eujv97a>.

49 Rathi, A., & White, N. (2024, August 21). How Tech Companies Are Obscuring AI's Real Carbon Footprint. Bloomberg. Retrieved December 12, 2024, from <https://tinyurl.com/3e2sapee>.

50 Saul, J., Malik, N. S., & Chediak, M. (2024, September 16). AI Boom Is Driving a Surprise Resurgence of US Gas-Fired Power. Bloomberg. Retrieved on January 4, 2025, from <https://tinyurl.com/2ubfaha9>.

51 Ministry of Power (November 2024). Power sector at a glance "All India". Retrieved on December 20, 2024 from https://powermin.gov.in/sites/default/files/uploads/power_sector_at_glance_Nov_2024.pdf.

Chart X.5: India's Installed Generation Capacity (fuel-wise) (30 November 2024)

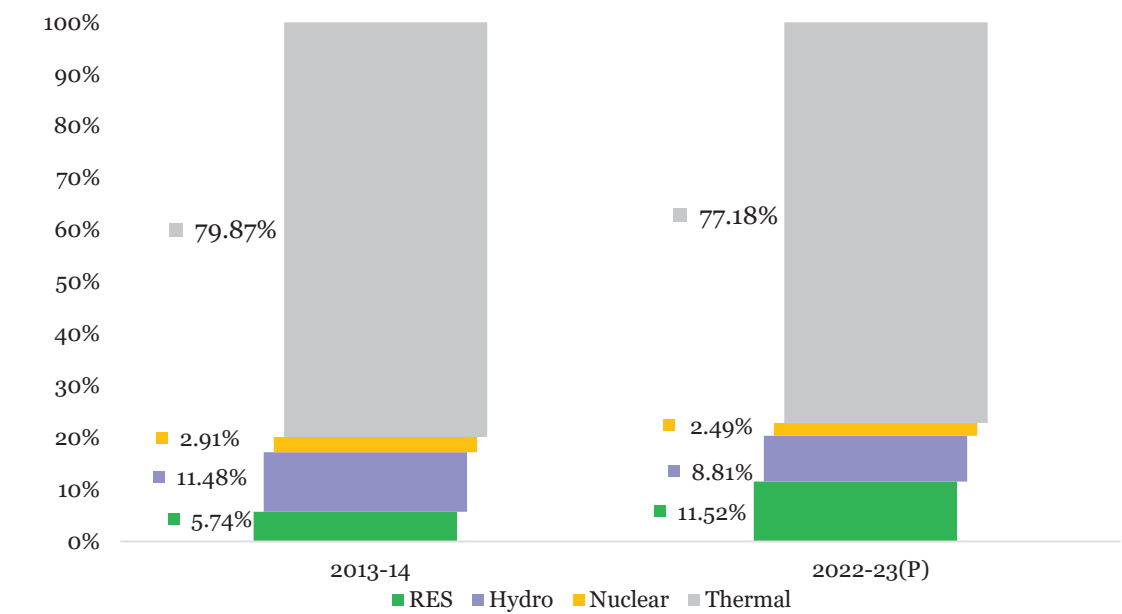


Source: Internal calculation based on data from Ministry of Power https://powermin.gov.in/sites/default/files/uploads/power_sector_at_glance_Nov_2024.pdf.

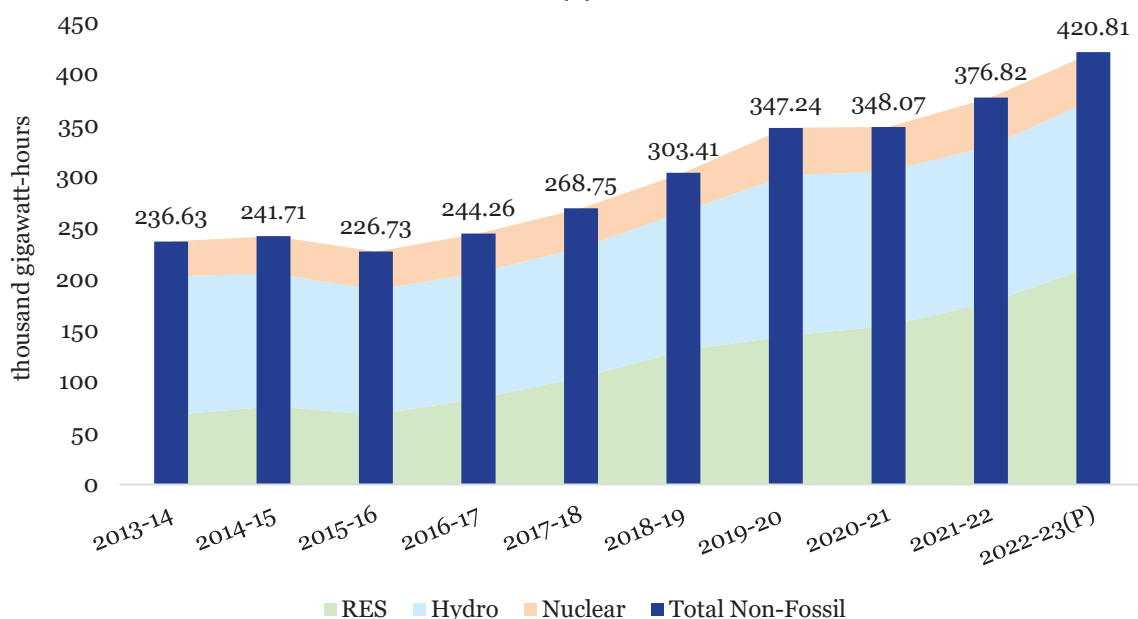
10.33 There has been notable progress in energy generation from non-fossil fuels, including nuclear, hydro, and renewable sources. This segment reached 420.8 thousand gigawatt hours in the 2022-23 provisional data, making up 22.8 per cent of the total gross energy generation. Within this, large hydro represents 8.81 per cent, nuclear contributes 2.49 per cent, and renewables account for 11.52 per cent (refer to Chart 6(a)).⁵²

⁵² Based on Tables 3.6 (a) and (b) in Energy Statistics of India 2024, M/o Statistics, Planning and Implementation. Accessed from <https://www.mospi.gov.in/publication/energy-statistics-india-2024-1>.

Chart X.6: Growing energy generation from non-fossil fuels in India (Utilities and Non-Utilities)



(a)



(b)

Source: Based on Tables 3.6 (a) and (b) in Energy Statistics of India 2024, M/o Statistics, Planning and Implementation. Accessed from <https://www.mospi.gov.in/publication/energy-statistics-india-2024-1>.

New initiatives and updates on existing policies/schemes to boost energy transition

10.34 The Ministry of New and Renewable Energy (MNRE) initially launched New Solar Power Scheme (for Particularly Vulnerable Tribal Group (PVTG) Habitations/

Villages) under Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan (PM JANMAN) on 4 January 2024, which was later revised on 18 October 2024 to also include other tribal habitations/villages and renamed as New Solar Power Scheme (for Tribal and PVTG Habitations/Villages) under PM JANMAN and Dharti Aabha Janjatiya Gram Utkarsh Abhiyan (DA JGUA). The Scheme will cover electrification of one lakh un-electrified households (HHs) in Tribal and PVTG areas of over 63000 villages identified by the Ministry of Tribal Affairs (MoTA) by the provision of off-grid solar systems. The scheme also includes provision for off-grid solar lighting in 1500 Multi-Purpose Centres (MPCs) in PVTG areas and solarisation of 2000 public institutions through off-grid solar systems. The off-grid solar systems shall be provided only where electricity supply through grid is not techno-economically feasible.

10.35 Additionally, the PM - Surya Ghar: Muft Bijli Yojana aims to install rooftop solar plants in one crore households, which is expected to enable approximately 30 gigawatts of residential rooftop solar capacity and contribute to an overall rooftop solar capacity addition of 40-45 gigawatts by 2027. So far, rooftop solar systems for more than 7 lakh households (as on 9 January 2025) have already been installed.

10.36 In offshore wind energy, the Viability Gap Funding (VGF) scheme has been introduced, featuring a total budget of ₹7,453 crore. This includes VGF of ₹6,853 crore allocated for one gigawatt of projects (500 megawatts each off the coasts of Gujarat and Tamil Nadu), and ₹600 crore grant designated for upgrading two ports to enhance logistic infrastructure.

10.37 The projects under the Green Energy Corridor (GEC) aim to establish an intra-state transmission system that enhances grid capabilities for renewable energy. Currently, GEC-I is being implemented across eight states, successfully installing 9,136 circuit kilometres of transmission lines and 21,413 megavolt-amperes (MVA) substations. Meanwhile, GEC-II is progressing across seven additional states.

10.38 The National Bioenergy Programme is structured around three main pillars: the Waste to Energy Programme, the Biomass Programme, which supports the manufacturing of briquettes and pellets as well as promotes biomass (non-bagasse) based cogeneration in industries, and the Biogas Programme, which focuses on promoting family-type biogas plants. As of 31 December 2024, the installed capacity for biomass power and cogeneration projects stood at approximately 9.8 gigawatts (grid-connected) and 0.92-gigawatt equivalent (off-grid), while waste-to-energy projects reached a capacity of 249.74 megawatts (grid-connected) and 370.19-megawatt equivalent (as on 9 January 2025) (off-grid). Under the biogas programme, around 5.1 million small biogas plants and 361 medium-sized biogas plants (totalling 11.5 megawatts) have been installed.

10.39 Furthermore, the Scheme for the Development of Solar Parks and Ultra-mega Solar Power Projects sets a target for establishing 40,000 megawatts of capacity. This scheme focuses on developing essential infrastructure such as land, roads, power evacuation systems, and water facilities, ensuring all necessary statutory clearances and approvals are in place for the expedited development of utility-scale solar projects. As of 31 December 2024, 55 Solar Parks with a cumulative capacity of 39.9 gigawatts have been sanctioned across 13 states. Notably, solar projects with a capacity of 12.2 gigawatts have already been commissioned, while others are at various stages of implementation.

10.40 The Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) aims to add 34.8 gigawatts of solar capacity by promoting small grid-connected solar energy power plants, stand-alone solar-powered agricultural pumps, and the solarisation of existing grid-connected agricultural pumps. As of 31 December 2024, a decentralised solar capacity of 397 megawatts has been installed, along with the solarisation of 7.28 lakh agricultural pumps under this scheme.

10.41 To enhance the manufacturing capabilities in the solar sector, the Production Linked Incentive Scheme for the National Programme on High-Efficiency Solar Photo-voltaic Modules has been initiated. The goal is to achieve a gigawatt-scale manufacturing capacity of high-efficiency solar photo-voltaic modules. So far, Letters of Award have been issued to establish manufacturing units with a total capacity of 48,337 megawatts.

10.42 The National Green Hydrogen Mission aims to achieve a production capacity of about five million metric tonnes per annum of Green Hydrogen, along with an associated renewable energy capacity of around 125 gigawatts and the potential for 50 million metric tonnes of CO₂ annual emission abatement by 2030. The mission also focuses on bolstering research and development, as well as standards and testing within the green hydrogen ecosystem. Under the mission, the green hydrogen production capacity of 412,000 tonnes per annum and electrolyser manufacturing capacity of 3000 megawatts per annum have been successfully awarded.

10.43 Lastly, the Central Public Sector Undertaking Scheme Phase-II aims to establish grid-connected solar photo-voltaic power projects funded by CPSUs, state PSUs, and government organizations, utilising domestically manufactured solar PV cells and modules with VGF support. Out of approximately 8.2 gigawatts of sanctioned solar photo-voltaic capacity, 1.81 gigawatts have already been commissioned as of 31 December 2024.

Lessons Learned

10.44 Lessons learnt from the experiences of developed economies caution against shutting down thermal energy without adequate technological alternatives that allow a stable energy supply. India is uniquely positioned in terms of its growing energy requirements. India must decisively leverage its best resources, advanced technologies, and expertise to accelerate its journey toward becoming a developed nation by 2047 while ensuring a low-carbon pathway. Following this critical milestone, the nation must pursue its ambitious goal of achieving net zero emissions by 2070. This will demand innovative strategies and strong implementation plans to confront climate challenges while ensuring sustainable development takes centre stage. Innovation and investment in addressing the problems related to renewable energy - battery storage, grid infrastructure and critical minerals - must be the focus in the short to medium term.

Developments in financial regulation on green investments

10.45 Based on the 2019 National Guidelines on Responsible Business Conduct (NGRBC) by the government, SEBI introduced new reporting mandates on ESG parameters - the Business Responsibility and Sustainability Report (BRSR) - for the top 1000 listed companies, mandatory from FY23, replacing the previous Business Responsibility Report (BRR) of 2012. The BRSR norms were further expanded in 2023, with the Board introducing the BRSR core for assurance and ESG disclosures for value chains by the listed entities. The value chain for the purpose of BRSR core reports encompasses the top upstream and downstream partners, cumulatively comprising 75 per cent of the purchases/sales (by value), respectively. From FY26, the top 500 listed entities would be mandated to report under BRSR core, which will be expanded to the top 1000 listed entities from FY27 onwards. The BRSR Core consists of a set of Key Performance Indicators (KPIs)/metrics under nine ESG attributes, including GHG emission footprints, water footprints, energy footprint, embracing circularity, enhancing employee well-being and safety, enabling gender diversity in business, enabling inclusive development, fairness in engaging with customers and suppliers, and open-ness of business.

10.46 SEBI also introduced the regulatory framework for the issuance of green debt securities in 2017, which outlines an illustrative list of activities that can be financed through green debt securities. The framework was revamped in 2023 by introducing the concepts of transition bonds (funds raised for transitioning to a more sustainable form of operations, in line with India's Intended Nationally Determined Contributions), blue bonds (related to water management and marine sector), and yellow bonds (related to solar energy), and circular economy as sub-categories of the green debt securities. The

framework mandates the issuers of green debt securities to disclose details related to the perceived social and environmental risks and proposed mitigation plan associated with the project(s) proposed to be financed/refinanced through the proceeds from the issue of green debt securities, in the offer documents. By March 2024, green debt securities amounting to a total of ₹6,128 crore have been issued by various listed companies.⁵³

10.47 In addition to these measures, the Government of India has included Sovereign Green Bonds (SGrBs) in its overall market borrowings with the aim of mobilising resources for green infrastructure. Adhering to the framework for sovereign green bonds that sets forth the obligations of the Government of India as a green bond issuer, the government has issued various lots of SGrBs of varying maturities of 5, 10 and 30 years. On the whole, SGrBs worth ₹16,000 crore were issued in FY23 and ₹20,000 crore in FY24. As for FY25, so far, the Government of India has raised 10-year SGrBs worth ₹11,697.40 crores and plans to raise ₹10,000 crore in remaining period of H2 FY25, i.e., ₹5,000 crore each under 10-year and 30-year securities, respectively.

10.48 In order to foster and strengthen the country's green finance ecosystem, the RBI put in place the framework for accepting Green Deposits for Regulated Entities (REs), with effect from 1 June 2023, to encourage green deposits to augment the flow of credit to green activities/projects address greenwashing concerns. RBI has also classified bank loans of up to ₹30 crore for borrowers seeking funding for renewable energy projects under the priority sector lending category. This includes solar power generators, biomass-based power generators, windmills, micro-hydel plants, and renewable energy public utilities such as street lighting systems and remote village electrification.

BOX-X.5 Growing Carbon sink of forests in India

India's NDC aims to increase the carbon sinks by 2.5 to 3 billion tonnes of CO₂ equivalent through improvement and addition of tree cover by 2030. As per the latest Forest Survey of India 2024, India is estimated to have a total carbon sink of 30.43 billion tonnes of CO₂ equivalent in 2023, as compared to 2005, when the carbon sink was estimated to be 28.14 billion tonnes of CO₂ equivalent. The addition to the carbon sink between 2005 and 2023 is of 2.29 billion tonnes CO₂ equivalent, closer to the NDC target. Based on the trends, the FSI projects a carbon sink of 31.71 billion tonnes in 2030, which would even surpass the NDC target of 2.5 to 3 billion tonnes of CO₂ equivalent.

Source: India State of Forest Report 2023, Volume 1. Ministry of Environment, Forest & Climate Change. Retrieved on December 27, 2024, from <https://tinyurl.com/5n7f69zk>.

OPTIMISING LIFESTYLES FOR SUSTAINABLE DEVELOPMENT

10.49 The policy framework established by Multilateral Environment Agreements provides a foundational structure for advancing environmental sustainability. Effective implementation relies on countries' actions in achieving their national sustainability goals, ultimately determined by individual behaviours. Recognising the need for a movement mobilising collective will towards moderating consumption and production habits, India introduced the Lifestyle for Environment (LiFE) Mission at COP26 in Glasgow in 2021. The LiFE Mission encourages the adoption of lifestyles that are in harmony with nature and are environmentally friendly. This initiative aims to create a collective impact that is “greater than the sum of its parts,” significantly shaping the way environmental and climate challenges are addressed. With its endorsement by the United Nations Environment Assembly (UNEA) at its sixth session in 2024, the mission has evolved into a global mass movement committed to promoting sustainable lifestyles among all participating member states while aligning with the principle of equity and common but differentiated responsibilities and respective capabilities, in the Paris Agreement.

10.50 According to estimates, almost 17 per cent of all food available to consumers worldwide is wasted annually, amounting to more than 8 per cent of global greenhouse gas emissions. It is said that “*if food waste were a country, it would be the third-largest emitting country in the world*”.⁵⁴ This highlights the significant potential for change through initiatives like Mission LiFE, which aims to mobilise at least one billion Indians and other global citizens to take both individual and collective actions to protect and conserve the environment from 2022 to 2028. Again, as brought out in the Economic Survey 2023-24, dietary preferences also impact emissions. Behavioural changes take time, as do lifestyle modifications. Household consumption accounts for around two-thirds of global greenhouse gas (GHG) emissions⁵⁵. As per the UNFCCC, cutting dairy and meat from our diets can reduce our emissions by 66 per cent.⁵⁶ *Switching to a plant-based diet can reduce an individual's annual carbon footprint by up to 2.1 tons with a vegan diet or up to 1.5 tons for vegetarians.*⁵⁷ Nudging family, friends, and colleagues to a more sustainable dietary preference and moderation in lifestyles globally may be an idea whose time has come.

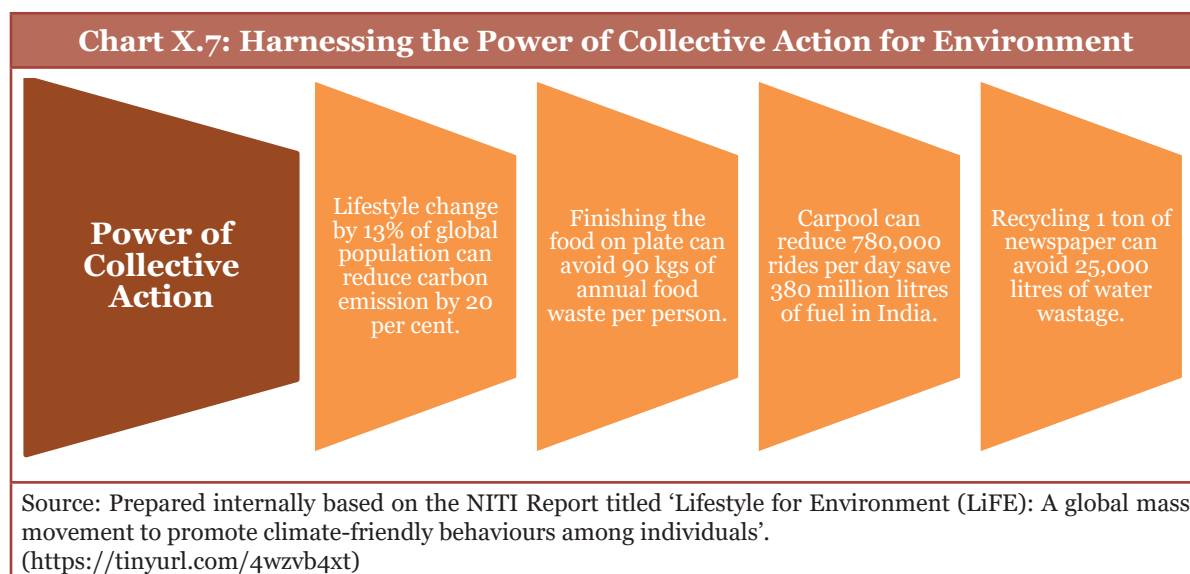
54 United Nations. (n.d.). Food and Climate Change: Healthy diets for a healthier planet | United Nations. Retrieved January 4, 2025, from <https://tinyurl.com/2s4jmjmp>.

55 UNEP Emissions gap report 2020. United Nations Environment Program (2020). Retrieved December 18, 2024, from <https://www.unep.org/emissions-gap-report-2020>.

56 <https://unfccc.int/news/5-ways-changing-your-diet-can-be-a-climate-action>.

57 <https://www.un.org/en/actnow/food>.

10.51 Within India, the goal is for at least 80 per cent of all villages and urban local bodies to become environmentally friendly by 2028 under this mission. The proactive implementation of LiFE measures can yield substantial co-benefits, including reducing inequalities in energy consumption, mitigating air pollution, achieving cost savings, and enhancing overall well-being and health. By 2030, it is estimated that these measures could save consumers around USD 440 billion globally through reduced consumption and lower prices.⁵⁸



10.52 There are several effective mechanisms to promote low-carbon lifestyles and advance sustainable development. The Emissions Gap Report 2020 from the United Nations Environment Programme (UNEP) outlines key strategies for fostering meaningful lifestyle changes. Financial incentives, such as tax breaks for electric vehicles and renewable energy use subsidies, can motivate individuals and organizations to adopt greener practices. Additionally, educating the public about the environmental impacts of their choices is essential. Campaigns that highlight the benefits of low-carbon alternatives and provide practical guidance can empower individuals to make sustainable decisions. Harnessing social influence is also important. By leveraging peer pressure and engaging community involvement through social media and local initiatives, we can inspire sustainable behaviours and help establish a culture where low-carbon lifestyles are the norm.

10.53 Furthermore, encouraging citizen participation in sustainability decision-making at local and national levels is crucial for effective policymaking. Platforms for public input can lead to community-driven solutions. Finally, challenging existing habits and creating new norms around sustainability—such as promoting cycling or local food initiatives—can drive significant behavioural change over time. A combination of these

⁵⁸ IEA (February 2023), "LiFE lessons from India: The benefits of advancing the LiFE initiative through the G20". IEA, Paris. Retrieved December 18, 2024 <https://tinyurl.com/mpfde99m>.

mechanisms is necessary to foster a transformative shift towards low-carbon lifestyles and a brighter, sustainable future.

10.54 The Indian government has introduced various measures to promote environmental sustainability and influence economic behaviour. Initiatives like the Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyaan (PM KUSUM) and PM Surya Ghar: Muft Bijli Yojana encourage solar power adoption. High excise duties on fossil fuels and incentives for electric vehicles push for greener alternatives. The Eco-mark scheme certifies eco-friendly household products, while the star-labelling scheme and 'Go Electric' campaign raise awareness about energy efficiency and electromobility. Market-based incentives, such as the Perform Achieve and Trade (PAT) scheme, enhance energy efficiency, and waste management regulations minimise environmental impact. Expanding city metro networks also promotes a shift from private to public transport for a more sustainable transportation option.

Green Credit Programme

10.55 Several key initiatives have been taken to enhance pro-environment outcomes by implementing measures consistent with LiFE. One notable example is the introduction of the Green Credit Rules, 2023, for implementation of the Green Credit Programme (GCP). These rules are designed to incentivise voluntary efforts toward environmental conservation, resulting in the issuance of green credits. To begin with, voluntary tree plantation is envisaged on degraded land under the control and management of Forest Departments. The Ministry published notification for 'methodology for calculation of green credit in respect of tree plantation' on 22 February 2024. GCP Portal has been developed and is accessible to public and participants. So far, Seventeen state forest departments are participating as implementing agencies with 48,074 hectares of degraded land registered.

Ek Ped Maa Ke Naam

10.56 The tree plantation campaign 'Ek Ped Maa Ke Naam' is another example of nudging individual behaviour to promote pro-environmental activities. Launched in June 2024 on World Environment Day, the campaign attempts to leverage the deep love and respect for mothers towards conserving mother nature. It successfully met its ambitious goal of planting 80 crore seedlings by September 2024. It achieved a remarkable feat by planting over 5 lakh saplings by the 128 Infantry Battalion and Ecological Task Force of the Territorial Army in just one hour on 22 September 2024.

Swachh Bharat Mission

10.57 The Swachh Bharat Mission (SBM) launched in 2014 signifies a fundamental transformation in India's pursuit of universal sanitation access and has revolutionised

the hygiene practices of a substantial portion of the Indian population. SBM 2.0 integrates comprehensive waste management and sanitation practices aligned with sustainability and circular economy principles. The chapter on “Investment and Infrastructure” discusses SBM in detail.

Circular Economy and Resource Efficiency

10.58 The key objective of promoting a circular economy is to minimise waste, recover valuable materials, and reduce reliance on virgin resources. According to an estimate, the circularity of resources could lead to cost savings of 11 per cent of current GDP in 2030 and 30 per cent in 2050.⁵⁹ India has followed a multi-pronged approach through regulatory measures, financial incentives, and awareness campaigns in support of the circular economy and the improvement of resource efficiency. Recycling e-waste is important to supplement India’s renewable energy drive by extracting useful resources from the wastes of solar and wind energy equipment. Therefore, the government provides incentives to promote circularity, including tax benefits, subsidies, and low-interest loans to the recycling industry.⁶⁰ India’s extended producer responsibility (EPR) framework is an innovative mechanism for waste management in which manufacturers and producers are made responsible for the waste generated by their products post-consumption. The EPR framework encourages producers to adopt sustainable product design practices, increases the use of recycled materials, and supports waste management and recycling initiatives.

10.59 Plastic pollution is a major driver of biodiversity loss and ecosystem degradation and contributes to climate change. It will account for 15 per cent of global greenhouse gas emissions by 2050.⁶¹ India is one of the lowest per capita plastic consumers and generators of plastic waste in the world, with per capita plastic consumption of only 14 kg compared to that of the developed economies, which is more than 100 kg, much above the global average of 35 kg.⁶² India’s Plastic Waste Management Rules, 2016 provides the statutory framework for environmentally sound plastic waste management in the country. The rules mandate urban local bodies and gram panchayats to undertake plastic waste management, including plastic waste collection, and impose restrictions on their open incineration. Measures such as the ban on identified single-use plastic

59 Circular economy in India: Rethinking growth for long-term prosperity. (2016, December 5). Retrieved January 4, 2025, from <https://tinyurl.com/yyussu2a>.

60 EAC-PM Working Paper Series EAC-PM/WP/17/2023. “India’s tryst with a circular economy”. Economic Advisory Council to the PM. (April, 2023). Retrieved December 18, 2024, from <https://tinyurl.com/53ryap2m>.

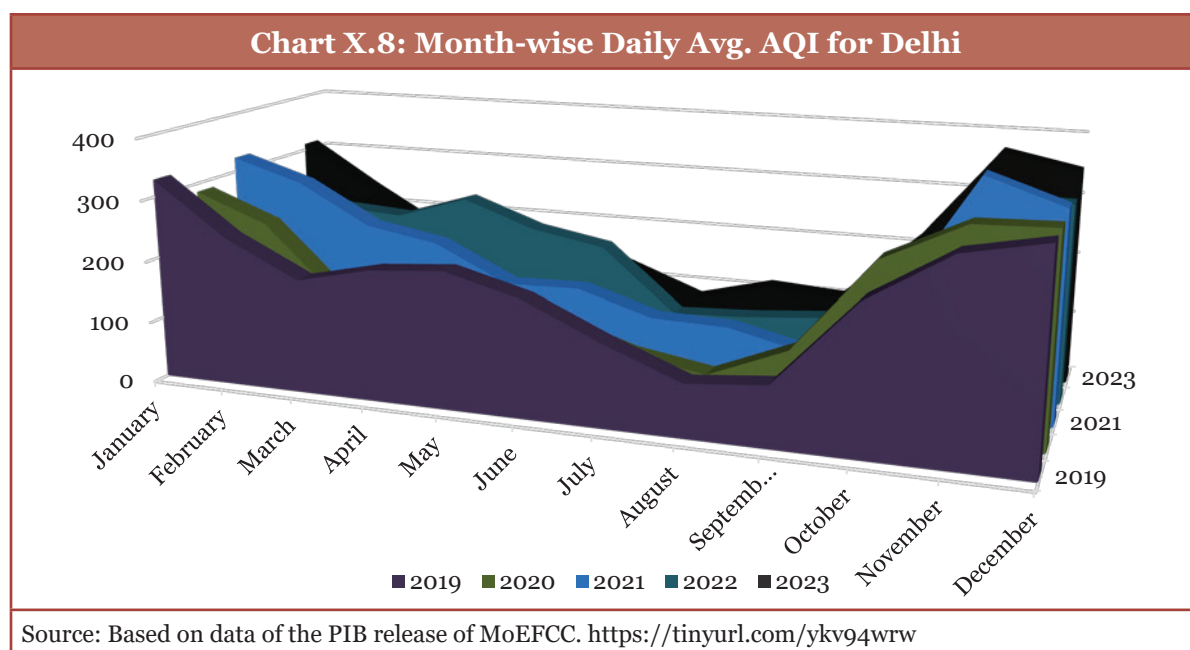
61 UNEP Finance Initiative. “The Finance Statement on Plastic Pollution”. United Nations Environment Program. Retrieved December 18, 2024, from <https://tinyurl.com/35kmdte9>.

62 Intervention of India, Contact Group I, Evening Session 14112023, Part II (1) Primary plastic polymers. Retrieved December 18, 2024, from <https://tinyurl.com/4hvsjm2x>.

items, which have high littering potential and low utility, with effect from 1 July 2022, coupled with the implementation of EPR, will further reduce pollution caused by littered and unmanaged plastic waste.

AIR POLLUTION

10.60 The World Health Organisation (WHO) data show that almost all of the global population (99 per cent) breathe air that exceeds WHO guideline limits and contains high levels of pollutants, with low- and middle-income countries suffering from the highest exposures.⁶³ Air pollution is a concern for the people of the northern part of India, especially Delhi and NCR, during the transition months from autumn to winter when pollutant levels frequently exceed the WHO guidelines (Chart 8). While there are anthropogenic reasons for the increase in particulate matter, such as vehicular traffic due to a distinct modal choice for private vehicles, agricultural practices, and use of coal and wood for cooking, geography and wind direction also play an important part in keeping the particulate matter from being dispersed.



10.61 The government launched the National Clean Air Programme (NCAP) in 2019 as a national-level strategy to reduce air pollution levels in 130 targeted non-attainment cities/million-plus cities across the country by implementing national, state and city-level action plans. The NCAP emphasises the implementation of City Action Plans (CAPs) through the convergence of resources from various central government schemes such as Swachh Bharat Mission (Urban), AMRUT, Smart City Mission, SATAT, and Nagar Van Yojana, as well as through resources from state governments/UT administration and agencies like municipal corporations and urban development authorities. Actions

⁶³ World Health Organization. Air Pollution. Retrieved December 18, 2024, from <https://tinyurl.com/4c6nmyzt>.

under the 'Graded Response Action Plan (GRAP)' are also imposed based on AQI. The GRAP calls for a set of emergent preventive/restrictive actions depending on air pollution levels, to be implemented by the identified agencies for combating the adverse air quality scenario. To address the issue of stubble burning, the government launched a scheme for 'Promotion of Agricultural Mechanization for In-Situ Management of Crop Residue in the States of Punjab, Haryana, Uttar Pradesh & NCT of Delhi' in 2018, under which financial assistance is provided for the establishment of custom hiring centres (CHCs) and to farmers for purchase of crop residue management machinery.

CONCLUSION

10.62 India's climate efforts are anchored in its ambitious commitment to achieve net-zero emissions by 2070. This long-term goal is entwined with the country's aspirations for high and stable economic growth, which envisions becoming a developed nation by 2047. Realising this vision necessitates a delicate balance, achieving low-carbon development while ensuring that critical imperatives such as affordable energy security, job creation, sustained economic expansion, and environmental sustainability are met.

10.63 To effectively navigate this dual challenge, India is adopting a holistic approach that embeds mitigation and adaptation in the growth strategy. Mitigation focuses on addressing the root causes of climate change by reducing greenhouse gas emissions, while adaptation seeks to minimize the adverse impacts of climate change through a robust framework for resilience. Given the backdrop of decreasing global financial commitments to support climate action in developing countries, India must increasingly prioritise building resilience to safeguard the benefits of its rapid economic growth against climate-induced setbacks.

10.64 Adaptation and building resilience demand explicit and targeted policy measures, sufficient financing options, and the seamless integration of adaptive strategies into existing policies and developmental programs. It requires a multidimensional approach that encompasses a variety of initiatives, including the creation of appropriate policy incentives, the development of resilient infrastructure, research and development (R&D) in climate-related technologies, and mobilising financial resources dedicated to adaptation initiatives. Additionally, it is essential that adaptation actions are tailored to be region-specific, considering India's vast and diverse geographic and agro-climatic landscape.

10.65 Despite being one of the world's lowest greenhouse gas emitters per capita, India has made notable strides in reducing the emissions intensity of its energy consumption.

This progress is largely due to the increased deployment of renewable energy sources alongside a suite of energy conservation measures. Nonetheless, the growth of renewable energy faces substantial hurdles, particularly in energy storage technologies and the sourcing of critical minerals necessary for this transition. While alternative solutions such as green hydrogen present a viable option for the medium term, affordability issues remain a significant barrier to widespread adoption. Furthermore, although nuclear energy could contribute to India's energy mix, its expansion is impeded by a lack of a supportive ecosystem and the monopolistic nature of nuclear fuel supply chains.

10.66 Lessons learned from the experiences of developed economies underscore the risks of prematurely shutting down thermal energy sources without viable technological alternatives that ensure a stable energy supply. The challenges mentioned above in harnessing renewable energy at scale indicate that India will need to continue the efforts to maximise the efficiency of its existing fossil fuel resources in the medium term. The advancement and deployment of low-emission thermal power technologies, including Advanced Ultra Super Critical (AUSC) power plants, will play a pivotal role in this transition.

10.67 Investments in research and development related to battery storage technologies, as well as the recycling and sustainable disposal of waste associated with renewable energy systems, are critical factors in ensuring a reliable supply of energy from renewable sources and its sustainability. The mission mode approach to developing carbon capture, utilization, and storage technology is essential for the continued use and enhancement of thermal power plants in the medium term. In the agricultural sector, developing climate-resilient seeds and improving agricultural practices, which may include the rejuvenation of water bodies, will be vital components in building resilience against climate impacts.

10.68 The promotion of pro-environment lifestyle changes, as envisaged under India's LiFE Mission, has significant potential to contribute to climate change mitigation by encouraging low-carbon lifestyles and energy conservation behaviours. To transform the LiFE mission into a widespread public movement, a comprehensive awareness campaign is crucial—this could include integrating the principles of the LiFE mission into school and college curricula to foster an environmental consciousness from a young age. The successful implementation of the LiFE initiative could provide India with compelling evidence of achieving more sustainable outcomes with fewer resources.

10.69 Accomplishing the goal of net zero emissions by 2070 will require innovative strategies and robust implementation plans designed to confront both the challenges

posed by climate change and the need for sustainable development to take centre stage. To strengthen its renewable energy initiatives, India must prioritise investment in extensive grid infrastructure improvements and the secure sourcing of critical minerals necessary for this transformative shift.

SOCIAL SECTOR: EXTENDING REACH AND DRIVING EMPOWERMENT

India's economic growth strategy emphasises inclusivity and welfare for all its citizens. The government's focus is on empowering citizens through education, healthcare, skill development, and social infrastructure development. All these aspects have seen significant progress. Further enhancements are still possible by improving delivery systems through innovation and technology.

For example, achieving improved educational outcomes and healthcare access can be accomplished with innovative solutions, such as integrating new teaching methods and preventive healthcare strategies. Peer learning, life skills, and social and emotional learning hold great potential for fostering lifelong learning. Additionally, prioritising mental health in the workplace not only matters for overall well-being and a harmonious society but can also enhance worker productivity. A strong focus on preventing non-communicable diseases combined with the use of technology can be economically effective, significantly reducing the cost burden on healthcare systems.

INTRODUCTION

11.1 The virtuous cycle of economic and social development starts with sustainable and inclusive economic growth. While growth expands the economic pie, development represents the process of sustained economic progress and is a medium to long-term outcome of growth. Such growth supports inclusion by providing better and more equal opportunities, enhancing incomes, and reducing extreme poverty. Inclusive growth also improves the overall living standards of citizens of the country in terms of healthcare, education, basic necessities of life and livelihood.

11.2 For growth to transition into meaningful development, sound, effective, holistic, and comprehensive policies are indispensable. Focus is required on education, health, social security, enhancing employment opportunities through skilling etc. These translate to improved quality of social and economic infrastructure in the country. In alignment with this vision for growth-led-development, the government has adopted interventions to ensure welfare for all. Inclusive economic growth is central to the vision of *Viksit Bharat 2047*.

11.3 Social sector policies need to consider the complex interplay of multiple factors which eventually determine their success. For example, a policy to improve school education may not be very effective without policies related to healthcare, food and nutritional security, access to transport facilities, and household income playing as the contributing factors to a child continuing school. Further, policies are required to aim towards empowering citizens and enhancing their capability to achieve their aspirations. This requires providing them with opportunities for self-growth and progress. In keeping with this understanding, the focus is on all-round development to ensure a better quality of life for all citizens through efficient delivery of welfare measures. Government programmes are being designed to reach citizens cost-effectively, leveraging user-friendly dashboards and management information systems for real-time monitoring, promoting transparency and accountability.

Trend in social services expenditure

11.4 The general government's social sector expenditure has been keeping pace with the sector's growing importance. The general government's social services¹ expenditure (SSE) has shown a rising trend since FY17. The SSE as a percentage of total expenditure (TE) has increased from 23.3 per cent in FY21 to 26.2 per cent in FY25 (BE). The social services expenditure witnessed an increase of 21 per cent in FY24 (RE) over FY23 and another 10 per cent increase in FY25 (BE) over FY24 (RE). During the five years from FY21 (pandemic year) to FY25 (BE), the SSE grew at a CAGR of 15 per cent. While the SSE outlay of the centre and state governments was ₹14.8 lakh crore in FY21, it has increased steadily to stand at ₹25.7 lakh crore in FY25 (BE). Expenditure on education has grown at a CAGR of 12 per cent from ₹ 5.8 lakh crore in FY21 to ₹ 9.2 lakh crore in FY25 (BE).² Expenditure on health grew at CAGR 18 per cent from ₹ 3.2 lakh crore in FY21 to ₹ 6.1 lakh crore in FY25 (BE).³

1 Social services include, education, sports, art and culture; medical and public health, family welfare; water supply and sanitation; housing; urban development; welfare of SCs, STs and OBCs, labour and labour welfare; social security and welfare, nutrition, relief on account of natural calamities etc.

2 Expenditure on 'Education' pertains to expenditure on education, sports, arts and culture.

3 Expenditure on 'Health' includes expenditure on 'Medical and Public Health', 'Family Welfare' and 'Water Supply and Sanitation'.

Chart XI.1: Trends in social service sector expenditure by government (combined Centre and States)

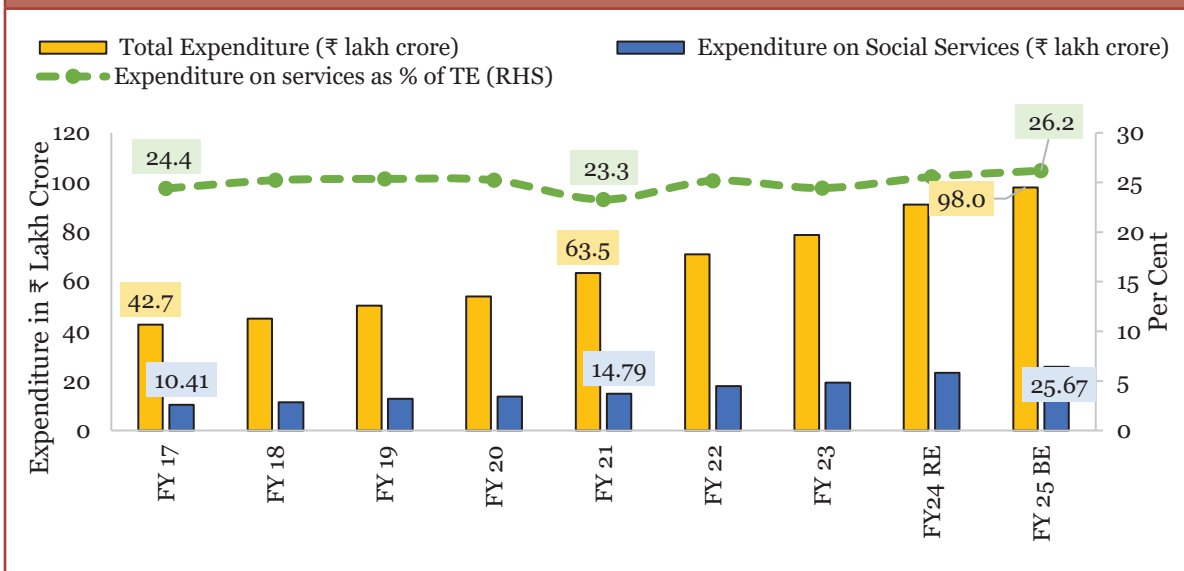
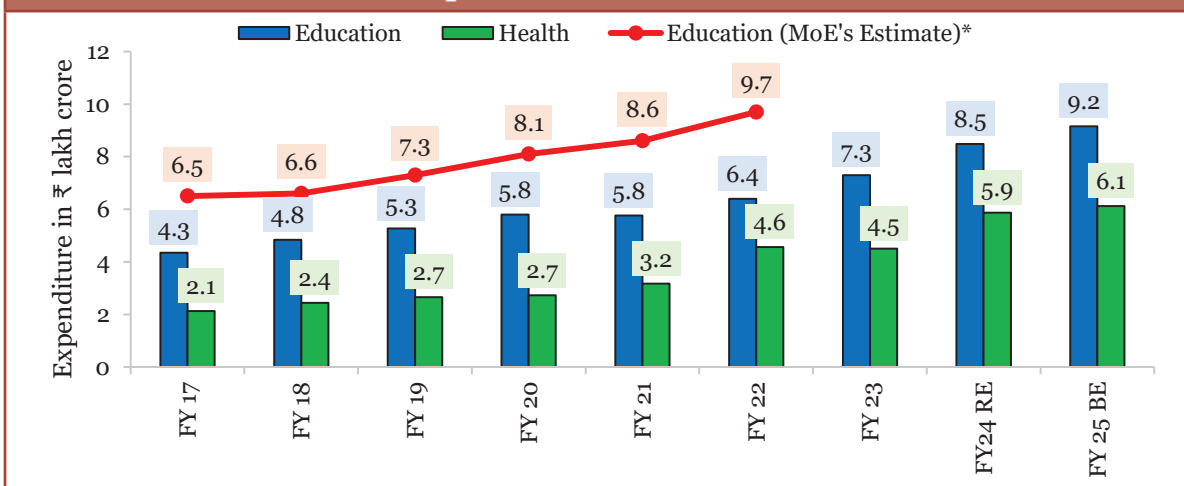


Chart XI.2. Expenditure on education and health



Sources: Budget Documents of Union and State Governments.

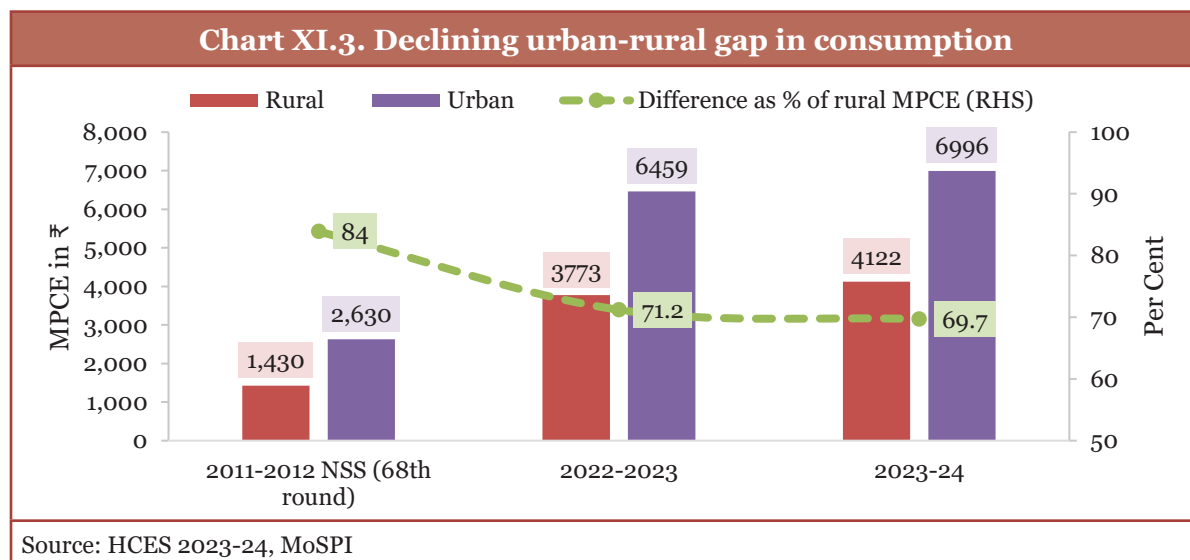
Note: *The Ministry of Education (MoE), Government of India, also calculates the General Government spending on education. While RBI's data on Education expenditure incorporates the spending incurred by Centre and States on Education, Sports, Arts, and culture, MoE's estimates also include expenditure incurred on medical and public health education, agriculture research and education, welfare of SC, ST, OBC & Minority's education, other scientific research & development, Education under social security, Nutritious food expenditure under mid-day meal, expenditure on imparting training to police, Labour employment and skill development expenditure, education/training expenditure under rural development Programmes etc. This leads to a higher estimate of expenditure on education. The latest available estimate is for the year 2021-22 (BE).

Household Consumption Expenditure Survey 2023-24

11.5 The results of the Household Consumption Expenditure Survey (HCES) 2023-24⁴ highlights the narrowing urban-rural gap in consumption expenditure. The average monthly per capita expenditure (MPCE) in rural and urban India in 2023-24 is

4 The survey period is August 2023 to July 2024. (<https://tinyurl.com/syyuey62>)

estimated at ₹4,122 and ₹6,996, respectively.⁵ Considering the imputed values of items received free of cost through various social welfare programmes, these estimates rise to ₹4,247 and ₹7,078, respectively, for rural and urban areas.⁶ The urban-rural gap in MPCE has declined to 71 per cent in 2022-23 from 84 per cent in 2011-12. It has further come down to 70 per cent in 2023-24, which confirms the sustained momentum of consumption growth in rural areas.



11.6 Social sector initiatives have reduced inequality and increased consumption spending, as reflected in the survey. The Gini coefficient improved for rural areas (declined to 0.237 in 2023-24 from 0.266 in 2022-23) and urban areas (declined to 0.284 in 2023-24 from 0.314 in 2022-23). The bottom 5 per cent of the rural population, ranked by MPCE, has an average MPCE of ₹1,677, compared to ₹2,376 in urban areas. The top 5 per cent have average MPCEs of ₹10,137 in rural and ₹20,310 in urban areas.

11.7 The largest growth in average MPCE between 2022-23 and 2023-24 occurred among the bottom 5–10 per cent of the population in both rural and urban areas. The bottom 5 per cent of the rural population saw a 22 per cent increase, while the corresponding urban segment experienced 19 per cent growth in the MPCE.

11.8 The Economic Survey 2023-24 (chapter 7) highlighted how the welfare policies of the government and the social sector initiatives have resulted in the reduction of inequality marked by rising consumption expenditure, as evident from the results of

⁵ The figures do not consider the values of items received free of cost by the households through various social welfare programmes.

⁶ (i) food items: Rice, Wheat/Atta, Jowar, Bajra, Maize, Ragi, Barley, Small Millets, Pulses, Gram, Salt, Sugar, Edible Oil and (ii) non-food items: Laptop/PC, Tablet, Mobile Handset, Bicycle, Motor Cycle/Scooty, Clothing (school uniform), Footwear (school shoe etc.) received free of cost by the households through government programmes, have been imputed. Accordingly, another set of estimates of MPCE considering imputed values of these items and of consumption out of home produce, free collection, gifts, loans etc. has also been compiled for HCES: 2023-24.

the HCES 2022-23. Fiscal policies of the government are playing a key role in reshaping income distribution, inter-alia, through the provision of subsidies, pensions, and other direct transfers, as well as public spending on social services such as education and health. Various government welfare schemes such as free foodgrain or subsidised availability of foodgrains, subsidised cooking fuel, insurance cover, etc, are lifting household incomes. These fiscal transfers help to provide additional resources to the financially deprived sections and, thus, favourably impact people's standard of living.⁷ As an example, building upon the learnings of the HCES, a study by the World Bank⁸ presents evidence of the re-distribution impact of the Public Distribution System (PDS). **Box XI.1** discusses this evidence.

Box XI.1: Evidence on the distribution of benefits from the PDS

Food subsidies constitute the largest fiscal outlay in the government's large set of social schemes. In 2022-23, Union government spent 6.5 per cent of its budget on the PM Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY) to provide free and subsidised food rations. As food subsidies were expanded (and consolidated under the PMGKAY) as part of the emergency fiscal response to COVID-19, the Union food subsidy bill increased from 0.5 per cent to one per cent of GDP between FY19 and FY23. Microdata from the HCES 2022-23 confirm that most households currently purchase food rations—at a subsidised price or free of cost—via the PDS and PMGKAY entitlements. The widespread coverage of ration cards protects low income and vulnerable populations.

The survey also provides insights into the allocation of these benefits across different segments of the population. In 2022-23, 84 per cent of the population had access to a ration card, including 59 per cent who reported holding a Below Poverty Line (BPL), *Antyodaya Anna Yojana* (AAY), or Priority Household (PHH) card in their household. In practice, 74 per cent of the population actively consumes food rations (or kerosene) via the PDS/PMGKAY, with rice and wheat as the most commonly consumed food. Coverage of ration cards is higher in rural areas (at 89 per cent of the population) compared to urban areas (72 per cent).

The PDS/PMGKAY rations improve welfare

An imputation exercise was conducted⁹ based on HCES microdata to evaluate the welfare gains from PDS-related consumption. The results suggest that the market-equivalent value of the PDS/PMGKAY subsidy equals four per cent of the (final or post-subsidy) nominal

⁷ For more detailed discussion on this aspect, refer to Chapter 2, "Perspectives on the Inequality Debate in India", of the Ministry of Finance's publication, "RE-EXAMINING NARRATIVES: A Collection of Essays", <https://tinyurl.com/2nt6mubz>

⁸ This work was undertaken by World Bank staff, under the Taskforce on Indian Statistical System led by the NITI Aayog.

⁹ Following international best practices, the unitary value of food rations and kerosene consumption obtained via the PDS/PMGKAY, in 2011-12 and 2022-23, are imputed. The methodology aims to find an equivalent valuation of the PDS/PMGKAY items (paid at subsidised prices or received free of cost) in the local market economy for each household consuming rations in the survey.

monthly consumption expenditure per capita (MPCE), on average, across all households.¹⁰ The relative subsidy is higher in rural (four per cent) than in urban areas (two per cent). The imputed average subsidy is also equivalent to 7 per cent of (post-subsidy) food consumption (eight per cent among rural households). The average PDS benefits increased in 2022-23, relative to three per cent in 2011-12.

The imputation exercise suggests that the benefits (expressed relative to consumption) are higher among lower consumption groups. In 2022-23, the value of the subsidy accounted, on average, for seven per cent of household consumption among the rural bottom 20 per cent but only for two per cent among the top 20 per cent. A similar progressive pattern is observed in urban areas. The benefits are seen to decrease for higher consumption groups but remain positive. Across all quintiles, the relative benefits have increased since 2011-12. Finally, the PDS subsidy was also progressive in absolute terms. The subsidy amount (rupees per capita) was higher among lower-income and rural households and lower among higher quintiles and urban households. The concentration of larger benefits among lower consumption groups suggests that the PDS/PMGKAY policies support the low income and protect other vulnerable households against income fluctuations and impoverishment.

11.9 Box XI.2 offers a clearer insight into the consumption patterns and choices of rural households benefiting from direct benefit transfers (DBTs) and women in the target population obtaining loans from self-help groups (SHGs) based on findings from a primary survey.¹¹ The survey was conducted in selected districts of Bihar, Jharkhand, Madhya Pradesh, and Uttar Pradesh in November 2024.

Box XI.2: Consumption choices of rural households: Direct benefit transfers and self-help groups

To better understand the consumption choices of rural households, a survey was conducted among married women aged 25 to 45 in rural areas who were relatively less financially privileged. The survey focused on those receiving loans from SHGs, representing a population poorer than the average Indian population. The survey aimed to explore key aspects of women's labour force participation, household decision-making, and the impact of welfare schemes.

The survey asked respondents about their access to government schemes (e.g., Jal Jeevan Mission, PM Kisan Samman Nidhi, Ayushman Bharat, Swachh Bharat Mission - Grameen) and how they utilised funds when the schemes were delivered in cash, such as direct deposits into their or a household member's account. In total, 59 per cent of respondents reported that

10 The average subsidy is calculated across all Indian households. Considering only those households that consumed PDS items over the past 30 days, the market-equivalent value of the PDS subsidy is equivalent to 5 per cent of their (post-subsidy) MPCE or 10 per cent of (post-subsidy) food MPCE.

11 Artha Global's Centre for Rapid Insights (CRI) conducted a survey of approximately 2400 married women between the ages of 25 and 45 in rural areas, who were relatively less financially privileged, in selected districts of Bihar, Jharkhand, Madhya Pradesh, and Uttar Pradesh in November 2024.

The sample population is poorer than the Indian population on average. This demographic group was chosen for study because an increased female labour force participation rate (FLFPR) has been observed among this group. Furthermore, as a popular target for DBTs and cash as well as loans through SHGs from both the Centre and various state governments, a survey of this group allows for an analysis of patterns of consumption due to cash transfers and loans.

the primary benefit of government schemes was an increase in the quality of life. In comparison, another 19 per cent reported that the primary benefit was more time for economic activity. Evidence shows that government schemes have spurred consumption and income-generating activity in low-income households. The prevalence of cash schemes is also very high among the surveyed households, with 77 per cent of households receiving cash from either the centre or a state government, indicating a preference towards cash schemes among economically vulnerable households. The data suggests that economically disadvantaged households demonstrate a preference for cash schemes, likely attributable to the financial empowerment facilitated by the schemes.

These cash transfers are relatively universal and typically impose low levels of conditionality; that is, cash is often given as a function of government-verified social attributes rather than hard-to-monitor behaviours by the household. From a theoretical perspective, it is often argued that imposing strong conditions on cash receipts denies households the ability to use cash where they most need to use it.

The data show sophisticated expenditure patterns from household cash benefits. Overall, 44 per cent of the surveyed households spend the money on increased food consumption, and another 31 per cent spend primarily on non-food consumption (e.g., electricity, water), savings, or loan repayments, while 14 per cent spend on house repair.

However, there is a significant variation in expenditure patterns by wealth. Among the 10 per cent of 'better off' households in the sample, 52 per cent primarily spend on food consumption, and less than 20 per cent primarily spend on non-food consumption, savings, or loan repayments. Among the remaining households, 43 per cent primarily spend on food consumption, and 32 per cent primarily spend on non-food consumption, savings, or loan repayments — suggesting far more diverse expenditure patterns among the less well-off sections of society, bearing in mind that the entire sample itself consists of less financially privileged households.

A significant share of the sample (37 per cent) is engaged in SHGs. Among those in SHGs, 78 per cent have received a loan. While household consumption (34 per cent) is the most reported usage for SHG loans, there is significant usage for health expenditure (22 per cent), starting businesses (19 per cent) and agricultural expenditure (19 per cent). Relatively low use for education (3 per cent) may point to the success of DBTs provided for education.

This highlights the consumption benefits of cash transfers and loans to targeted poorer and lower-income households. These households report using the funds for various basic needs and debt repayments. The exercise reinforces the case for replacing in-kind subsidies with direct and targeted cash transfers.

11.10 Against this background, the chapter highlights the progress made by the economy in terms of economic well-being and presents certain challenges on the way. Section 1 discusses the education initiatives with a focus on foundational literacy and numeracy (FLN), the integration of social and emotional learning (SEL) in the school curriculum, and the importance of digital literacy in a technology-driven world. The section also addresses higher education challenges faced in medical education and the

role of regulation. Section 2 presents the situation in the health space in the country, its progress, and challenges. It further highlights the role of disruptive technologies in providing equitable healthcare and the impact of lifestyle choices on mental well-being. Section 3 explores the rural economy, focusing on infrastructure development and housing as key drivers of economic growth while advocating for the localisation of Sustainable Development Goals (SDGs) to foster rural progress.

EDUCATION: TREADING NEW PATHWAYS

11.11 Education plays a key role in developing an economy by cultivating individuals capable of rational thought and unleashing their agency to better themselves and society. Education and human capital development are among the foundational pillars of development. The National Education Policy 2020 (NEP) is built upon this principle.¹² The NEP states that –

‘It aims at producing engaged, productive, and contributing citizens for building an equitable, inclusive, and plural society as envisaged by our Constitution.’

School education

11.12 India's school education system serves 24.8 crore students across 14.72 lakh schools with 98 lakh teachers (UDISE+ 2023-24). Government schools make up 69 per cent of the total, enrolling 50 per cent of students and employing 51 per cent of teachers, while private schools account for 22.5 per cent, enrolling 32.6 per cent of students and employing 38 per cent of teachers. The NEP 2020 aims for a 100 per cent Gross Enrolment Ratio (GER) by 2030. The GER is near-universal at the primary (93 per cent) and the efforts are underway to bridge the gaps at the secondary (77.4 per cent) and higher secondary level (56.2 per cent), driving the nation closer to its vision of inclusive and equitable education for all.¹³

11.13 School dropout rates¹⁴ have steadily declined in recent years, standing at 1.9 per cent for primary, 5.2 per cent for upper primary, and 14.1 per cent for secondary levels. However, challenges persist, with retention rates¹⁵ at 85.4 per cent for primary (class I to V), 78 per cent for elementary (classes I to VIII), 63.8 per cent for secondary (classes I to X), and 45.6 per cent for higher secondary (classes I to XII). Improvements in basic facilities and infrastructure, including medical check-ups, sanitation, and information and communication technologies (ICT) availability, have been notable, reflecting a positive trend in school infrastructure development.¹⁶

¹² National Education Policy 2020 (<https://tinyurl.com/rdwuz8md>).

¹³ UDISE+ 2023-24 (<https://tinyurl.com/57c92kuv>).

¹⁴ Dropout rate is the proportion of pupils from a cohort enrolled in a given level at a given school year who are no longer enrolled at any grade in the following school year.

¹⁵ Retention rate is the percentage of a cohort of pupils (or schools) enrolled in the first grade of a given level of education in a given school year who are expected to reach the last grade of the level.

¹⁶ Ibid note 13 above.

Table XI.1 Improving School Infrastructure
(percentage of schools with basic facilities out of total)

Year	2019-20	2021-22	2022-23	2023-24
Girls Toilet	96.9	97.5	97	97.2
Boys Toilet	95.9	96.2	95.6	95.7
Hand wash Facility	90.2	93.6	94.1	94.7
Library/Reading Room/ Reading corner	84.1	87.3	88.3	89
Electricity	83.4	89.3	91.7	91.8
Medical check-ups in school in a year	82.3	54.6	74.3	75.2
Computer	38.5	47.5	47.7	57.2
Internet	22.3	33.9	49.7	53.9
Source: UDISE+ 2023-24				

11.14 The government has been striving to achieve the objectives of NEP 2020 through a range of programmes and schemes, including the Samagra Shiksha Abhiyan (along with its sub-schemes such as NISHTHA, Vidya Pravesh, District Institutes of Education and Training (DIETs), Kasturba Gandhi Balika Vidyalaya (KGBV), etc.), DIKSHA¹⁷, STARS¹⁸, PARAKH¹⁹, PM SHRI²⁰, ULLAS²¹, and PM POSHAN²², among others. The Economic Survey 2023-24 (Chapter 7, Table VII.4) highlighted the progress made under various government initiatives in school education.

11.15 The pivotal role of early years in development is well-recognised by the Indian education system, as 85 per cent of brain development occurs before the age of six years. To strengthen the Early Childhood Care and Education (ECCE) landscape, the government launched the National Curriculum for ECCE, *Aadharshila*, and the National Framework for Early Childhood Stimulation, *Navchetana*, in April 2024. *Navchetana* focuses on holistic development for children from birth to three years, offering 140 age-specific activities through a 36-month stimulation calendar. It emphasises the inclusion of differently-abled children, maternal mental health, and "*Garbh Sanskar*" (practices during pregnancy). *Aadharshila*, blending Indian and international research, promotes play-based learning with over 130 activities for children aged three to six years that support child-led and educator-led learning. It aims to lay a strong foundation for lifelong learning, aligning with the National Curriculum Framework for Foundational

17 Digital Infrastructure for Knowledge Sharing (DIKSHA).

18 Strengthening Teaching-Learning and Results for States (STARS).

19 Performance Assessment, Review, and Analysis of Knowledge for Holistic Development (PARAKH).

20 Prime Minister's Schools for Rising India (PM SHRI).

21 Understanding of Lifelong Learning for All in Society (ULLAS).

22 Pradhan Mantri Poshan Shakti Nirman (PM POSHAN).

Stage 2022 (NCF-FS) and improving the quality of ECCE through competency-based, user-friendly lesson plans. The objective is to improve the quality of ECCE delivered at the Anganwadi centre by prioritising competency-based lesson plans and activities presented in a simple and user-friendly manner.

Building strong foundations through literacy and numeracy

11.16 School education lays the foundation of a country's education system. The NEP 2020 stipulates that foundational literacy and numeracy (FLN) is critical for education and lifelong learning success. Towards this end, the Department of School Education & Literacy launched the National Mission, “National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN Bharat),”²³ in July 2021 to ensure that every child in the country necessarily attains FLN by the end of Grade 3, by 2026-27.²⁴ It covers three years of FLN in preschool and Grades 1, 2 and 3. Towards this, the education system is deploying innovative pedagogies and teaching methods to ensure that every child achieves FLN. **Box XI.3** discusses one such innovation, viz. peer teaching.

Box XI.3: Peer Teaching: A pathway to achieving FLN

Achieving the vision of universal FLN by Grade 3 requires not only reaching every child but also overcoming the limitations of traditional lecture-based teaching to address diverse learning needs. While teacher-led instruction is valuable, it may not fully support individualised learning, especially for children who lag behind and need extra support to catch up.

State governments have launched programmes to tackle these challenges. Mission *Ankur* in Madhya Pradesh and Gujarat focuses on engaging schools and communities for the holistic development of primary students, ensuring they achieve FLN skills.²⁵ Similarly, Bihar’s Mission *Daksh* aims to provide personalised mentoring for lagging students to achieve grade-level competencies by 2025. While these initiatives address key gaps, they heavily rely on teachers, highlighting the need for scalable, adaptable teaching strategies that offer personalisation without overburdening educators.

Peer teaching is a promising solution, where students learn by teaching and supporting their peers. In classrooms with limited resources and high student-teacher ratios, it provides scalable, accessible support tailored to students' needs. As ‘Student Champions,’ older or more knowledgeable students help guide younger or struggling peers through foundational concepts.

Peer teaching creates a collaborative environment where students learn from each other, boosting confidence and comprehension alongside teacher instruction. The NEP promotes

²³ <https://nipunbharat.education.gov.in/>

²⁴ PIB of Ministry of Education dated 5 July 2021 (<https://tinyurl.com/yc5ejpu8>).

²⁵ Madhya Pradesh & Gujarat: PMU for FLN – The Education Alliance

peer tutoring to foster inclusion and personalised learning, ensuring every child can learn.²⁶ It also encourages using community volunteers and alumni as peer tutors in schools and communities. The SARTHAQ (Students' and Teachers' Holistic Advancement through Quality Education) guidelines for NEP 2020²⁷ emphasise peer tutoring to improve FLN and educational outcomes, highlighting the need for training peer tutors and integrating sessions into school schedules.

Global evidence supports peer learning, showing improved academic performance in math and reading in the US²⁸, enhanced problem-solving abilities and social skills in Australia²⁹, and better literacy outcomes in sub-Saharan Africa³⁰. In sub-Saharan Africa peer-led programmes have successfully supported student-centred learning in under-resourced classrooms. Additionally, peer teaching fosters essential life skills such as leadership, empathy, resilience, and communication, benefiting both tutors and learners.

Experiments in integrating structured peer learning in India's Education system

The **Nalli-Kali (joyful learning in Kannada) programme**, launched in 1995 in Karnataka's Mysuru district, focuses on peer and group work to create a collaborative classroom environment that supports self-paced, personalised learning. It is now the primary pedagogy for Grades 1-3 in Karnataka to develop age-appropriate skills.³¹

The **Prerana model of education**, implemented in Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, and Telangana³² through the Sikshana Foundation, also emphasises peer learning and group work.³³ Small groups of four to five students collaborate on classroom activities, teaching and learning from each other.

Involve Learning Solutions Foundation³⁴ is working with educators in six districts across Uttar Pradesh, Bihar, and Karnataka states to integrate structured peer teaching into government schools, directly aligning with NIPUN Bharat's FLN goals. The model pairs among students identified as 'Student Champions' with 'Learners.' Each Student Champion, with better subject mastery, is trained further to support a group of four learners, their peers

26 The NEP in para 2.7 provides that, "Due to the scale of the current learning crisis, all viable methods will be explored to support teachers in the mission of attaining universal foundational literacy and numeracy. Studies around the world show one-on-one peer tutoring to be extremely effective for learning not just for the learner, but also for the tutor. Thus, peer tutoring can be taken up as a voluntary and joyful activity for fellow students under the supervision of trained teachers and by taking due care of safety aspects."; <https://tinyurl.com/mxp5wpfz>

27 <https://tinyurl.com/yc3y7jz2>

28 Fuchs, L. S., Fuchs, D., Yazdian, L., & Powell, S. R. (2002). Title: Enhancing First-Grade Children's Mathematical Development with Peer-Assisted Learning Strategies. Published in: *School Psychology Review*, Vol. 31, No. 4, pp. 569–583. DOI: 10.1080/02796015.2002.12086175.

29 Fawcett, L. M., & Garton, A. F. (2005). The Effect of Peer Collaboration on Children's Problem-Solving Ability. Published in: *British Journal of Educational Psychology*, Vol. 75, No. 2, pp. 157–169. DOI: 10.1348/000709904X23411.

30 Fry, K., Rogan, R., & Gruber, S. (2019). Improving Literacy Outcomes in Low-Resource Contexts Through Peer-Led Learning Approaches. Published by: *Educational Development Journal*, Vol. 35, No. 3, pp. 289–305.

31 <https://tinyurl.com/yauff8fc>

32 Sikshana Foundation Annual report 2022-23 (<https://tinyurl.com/cy5kr7fc>).

33 <https://www.sikshana.org/Program/Prerana/>

34 <https://involveedu.com/>

who struggle to understand concepts, thereby facilitating their progress through 40-minute sessions three to four times per week.

Early evaluations in Karnataka's Anekal block show increased learning outcomes in numeracy for students by 15 per cent compared to students who did not participate in the programme.³⁵ Similarly, in Bhagalpur, structured peer interactions have helped bridge reading and numeracy gaps among children who could not meet age-appropriate learning milestones. Anecdotal evidence also indicates positive shifts in student engagement and academic outcomes.

To support NIPUN Bharat's mission, peer teaching can be integrated into India's FLN strategy. This involves incorporating peer teaching into teacher training, scaling successful models, assessing its impact on learning outcomes, and using data to refine the approach based on feedback from teachers, students, and administrators. This will help transform classrooms into dynamic spaces where every child receives the support needed to thrive.

Empowering minds: Unlocking potential with social and emotional learning

11.17 The success of school education hinges not just on the student's academic achievements but also on enhancing their social and emotional learning (SEL). A good education enhances a child's mental and physical health, academic performance, and life skills. In this context, ECCE under NEP 2020 aims to achieve foundational literacy and socio-emotional development. The NEP 2020 states that

*'The overall aim of ECCE will be to attain optimal outcomes in the domains of physical and motor development, cognitive development, **socio-emotional-ethical development**, cultural/artistic development, and the development of communication and early language, literacy, and numeracy.'*

11.18 **Box XI.4** discusses the importance of SEL in education, providing examples of how the pedagogy can be developed to incorporate socio-emotional-ethical development in the school curriculum.

Box XI.4: Empowering minds and hearts through SEL techniques

SEL has emerged as a critical pillar within holistic education frameworks that contributes significantly to SDGs, particularly SDG 3 (Good Health & Well-being) & SDG 4 (Quality Education). UNESCO³⁶ defines SEL as a process of *acquiring the competencies to recognise*

35 Pratibha Narayann, P. N., Anna Daniel, A. D. and Dhanashree Balaran, D. B. (2024), Promoting Individualized Learning: The Effectiveness of Peer Teaching Pedagogy. Published by: International Conference on Technology for Education (T4E), Zenodo. doi: 10.5281/zenodo.14004916.

36 UNESCO (2024) Strengthening social and emotional learning in hybrid modes of education: building support for students, teachers, schools and families: a UNESCO-IBE discussion paper; <https://tinyurl.com/nmbafeat>

and manage emotions, develop care and concern for others, establish positive relationships, make responsible decisions, and handle challenging situations effectively. SEL significantly contributes to individual well-being, social participation, and broader individual development. Incorporating SEL from an early age equips children with essential skills that foster resilience and academic success. It also plays a crucial role in preventing future mental health issues and setting the foundation for a healthier society.

CASEL (Collaborative for Academic, Social, and Emotional Learning)³⁷ outlines five core components of SEL, which serve as foundational pillars in fostering holistic development. These components—Self-Awareness, Self-Management, Social Awareness, Relationship Skills, and Responsible Decision-Making—equip students with the skills necessary to navigate life challenges, enhance mental well-being, and improve academic performance. Some successful models effectively implementing SEL programmes worldwide include the Social, Emotional, and Ethical Learning (SEE Learning) by Emory University,³⁸ and the RULER programme³⁹ by Yale Center for Emotional Intelligence.

According to some estimates, for every dollar invested in SEL initiatives, the estimated long-term economic return is USD 11, with outcomes around mental health, education, and employability.⁴⁰ Further, a 2020 UNESCO study⁴¹, highlights that such investments not only yield immediate educational and behavioural benefits but also result in long-term economic gains, including a 30 per cent increase in per capita income. The literature indicates that integrating SEL components into classroom practices increases student commitment⁴², participation,⁴³ cognitive problem-solving abilities,⁴⁴ attendance rates, and overall academic success.⁴⁵ Other than enhancing academic performance, these interventions also promote positive social behaviour and interpersonal relationships, mitigate behavioural issues and

37 CASEL's SEL Framework (2020) What are the Core Competence Areas and Where are they Promoted? <https://casel.org/casel-sel-framework-11-2020/?view=true>

38 Emory University (2022) SEE Learning: Social, Emotional and Ethical Learning Program. (<https://seelarning.emory.edu/en/about>).

39 Yale Center for Emotional Intelligence (2023) RULER Program Overview (<https://www.ycei.org/ruler>).

40 Belfield, C. et.al. (2015). The economic value of social and emotional learning. *Journal of Benefit-Cost Analysis* (<https://tinyurl.com/36w8mft7>).

41 UNESCO (2020) Rethinking learning: A Review of Social and Emotional Learning for Education Systems. (<https://unesdoc.unesco.org/ark:/48223/pf0000373890>).

42 Hawkins, J. D., Smith, B. H., & Catalano, R. F. (2004). Social Development and Social and Emotional Learning. In J. E. Zins, R. P. Weissberg, M. C. Wang, & H. J. Walberg (Eds.), *Building academic success on social and emotional learning: What does the research say?* (pp. 135–150). Teachers College Press.

43 Murdock, T. B. (1999). The social context of risk: Status and motivational predictors of alienation in middle school. *Journal of Educational Psychology*, (<https://doi.org/10.1037/0022-0663.91.1.62>).

44 Battistich, V., Solomon, D., Watson, M., Solomon, J., & Schaps, E. (1989). Effects of an elementary school programme to enhance prosocial behavior on children's cognitive-social problem-solving skills and strategies. *Journal of Applied Developmental Psychology* ([https://doi.org/10.1016/0193-3973\(89\)90002-6](https://doi.org/10.1016/0193-3973(89)90002-6)).

45 Felner, R.D., Primavera, J., & Cauce, A.M. (1995). The impact of a comprehensive school-based intervention on the academic achievement of students: A longitudinal study. *Journal of Educational Psychology*, 87(1), pp. 1-14.; DePaoli, J.L., Elias, M.J., & Weissberg, R.P., 2017. Social and emotional learning: A framework for promoting academic success. *Educational Psychologist*, 52(1), pp. 1-11

psychological distress, and equip young people for success in employment, family life, and broader societal engagement.⁴⁶

Developments in India

The NEP 2020 emphasises the development of social, ethical, and emotional competencies as essential to holistic child development. The National Curriculum Framework 2023⁴⁷ also advocates for SEL-based pedagogies to improve educational outcomes and foster children's well-being. The NIPUN Bharat mission guidelines 2021⁴⁸ emphasise the importance of SEL as a core component of the holistic development objectives for young children in India's foundational education system. It promotes activities that foster self-awareness, social awareness, and responsible decision-making, advocating for inclusive, child-centred practices to create safe, supportive learning environments that nurture both cognitive and emotional growth.

SEL is increasingly being recognised as integral to India's educational and developmental priorities. Initiatives like SEE Learning India⁴⁹ and the Life Skills Collaborative⁵⁰ are paving the way for SEL in structured approaches. They are being adopted in the states of Maharashtra, Mizoram, Uttarakhand, and Rajasthan. SEL interventions are also being carried out in programmes implemented by the governments of Tripura and Uttarakhand etc. In several programmes, state governments have collaborated with non-profit organisations like Dream a Dream Foundation⁵¹ and Labhya⁵². Under these models, classrooms are envisaged as emotionally safe environments wherein children experience interactive group sessions, mindful practices, and spaces for reflection sharing to cope with various challenges and improve their well-being and learning outcomes. Through organisations such as the Aparajitha Foundation, students are taught important life skills, i.e., social and interpersonal skills, that can help them make informed decisions, communicate effectively, and develop coping and self-management skills (See **Box XI.5**).

The evidence supporting the benefits of SEL is robust. The imperative of integrating SEL with educational frameworks is underscored by its profound impact on mental health, academic success, and long-term life outcomes. This is particularly crucial in India, which is characterised by a youthful population poised to enter the workforce. The implementation of SEL, therefore, serves as a strategic investment in the nation's future.

46 Elias, M.J., 2014. Social-emotional learning and its impact on societal engagement. *Journal of Educational Psychology*, 106(3), pp. 1-10; Jones, S.M. and Kahn, J., 2017. The evidence base for how learning happens: A consensus on social, emotional, and academic development. *American Educator*, Winter 2017-2018 (<https://files.eric.ed.gov/fulltext/EJ1164389.pdf>).

47 Ministry of Education, Government of India (2023) National Curriculum Framework 2023. (<https://tinyurl.com/47z2b2m3>).

48 Ministry of Education, Government of India (2021) NIPUN Bharat Mission: National Initiative for Proficiency in Reading with Understanding and Numeracy- Guidelines 2021. (<https://tinyurl.com/mvxnc7k5>)

49 SEE Learning India (2024) SEE Learning India About <https://www.seelearningindia.com/Home/about>

50 Life Skills Collaborative (2024). Life Skills Collaborative Overview <https://lifekillscollaborative.in/>

51 Dream a Dream Foundation (2024). Dream a Dream Foundation Overview <https://dreamadream.org/>

52 Labhya Foundation (2024) Labhya Foundation Overview. <https://labhya.org;> <https://www.labhya.org/what-we-do/model>

11.19 NEP 2020 emphasises holistic schooling by integrating vocational and digital education with a supporting, well-equipped school infrastructure to enable the smooth transition of a GER of 100 per cent at the secondary level by 2030.

11.20 The importance of skill education in schools has grown significantly with the advent of Industry 4.0, a highly dynamic and skill-intensive era defined by automation, artificial intelligence (AI), internet of things (IoT), big data, and robotics. This industrial revolution has reshaped production and distribution across sectors like manufacturing and agriculture, significantly increasing the demand for a skilled workforce. Alongside technical proficiency, soft skills such as adaptability, problem-solving, and collaboration have become critical for navigating this evolving landscape. **Box XI.5** discusses the *Tim Tim Tare* initiative for imparting life skills.

Box XI.5: Imparting life skills: The Tim Tim Tare initiative

Tim Tim Tare (TTT)⁵³ is a pioneering initiative that aims to impart essential life skills to adolescent students across India. Unlike vocational training, which focuses on technical skills, TTT places emphasis on soft skills—key components of personal growth, effective communication, emotional intelligence, and social well-being. Through TTT, students are empowered to face life's challenges confidently and clearly.

This initiative equips students with essential life skills to navigate the complexities of modern life. Built on the World Health Organization's (WHO) Life Skills Framework, TTT addresses a wide range of 16 core life skills (such as empathy, critical thinking, etiquette, time management, etc) and over 100 related topics designed to meet the evolving needs of today's youth. These skills enable students to make informed, thoughtful decisions personally and professionally and equip them with the skills and attitudes necessary to thrive in their studies and beyond.

TTT's approach stands apart from traditional education due to its student-focused methodology, delivering content in an engaging, immersive manner and creating transformative experiences enabling students to absorb, internalise, and retain key concepts effectively. Each topic is designed with activity-based learning, such as experience sharing, role plays, sing-along songs and interactive games. This approach ensures that every lesson is lively, impactful, and engaging, allowing students to experience the learning process actively.

Started in 2009 in Tamil Nadu, TTT has now expanded to other states⁵⁴ in a phased manner, reaching millions of students across India. In addition to empowering students, TTT has prioritised training thousands of teachers across these states, ensuring that the programme's benefits are deeply rooted and widely disseminated.

A critical focus of TTT has been its commitment to understanding and addressing the needs of its stakeholders. Feedback from students, teachers, principals, and parents has been

53 <https://tinyurl.com/5yxkwerv>

54 Such as Gujarat, Madhya Pradesh, Rajasthan, Uttar Pradesh, etc.

systematically collected over the years. This feedback consistently highlights the programme's positive impact on individuals and communities and is a testament to TTT's transformative power and ability to create lasting change.

The TTT programme currently reaches more than 10 crore students, with a significant presence in central India and Gujarat. It is implemented in various types of schools, including government schools, *Navodaya Vidyalayas*, *Kendriya Vidyalayas*, *Kasturba Vidyalayas*, juvenile homes etc. It is also accessible through various platforms such as PM eVidya channels, state government relay centres, YouTube, and WhatsApp groups.

The State Council of Educational Research and Training (SCERT) officially approved the TTT programme, which adds credibility and ensures alignment with national educational standards.

Bridging the gap: Digital technology in education and the essentiality of digital literacy

11.21 Digital literacy ensures that students remain competitive by mastering skills like analysing, synthesising, and communicating digital information. The World Economic Forum (WEF) identifies ICT skills as foundational for the 21st century.⁵⁵ UNESCO defines digital literacy as– '*Includes competencies that are variously referred to as computer literacy, ICT literacy, information literacy and media literacy*'.⁵⁶ Digital literacy ranges from basic hardware and software use to advanced programming and network management.

11.22 Data from the Comprehensive Annual Modular Survey 2022-23 reveals a rural-urban digital divide in India with lower internet-searching capabilities in rural areas, especially among females.⁵⁷ Sixty-three per cent of males and 55 per cent of females in rural areas can search the internet for information compared to 74 per cent males and 69 per cent of females in urban areas. The results highlight the need for focused efforts to close the digital gap.

11.23 The NEP 2020 emphasises technology's role in improving education, removing barriers, and ensuring inclusivity for *Divyang* students. Schemes like DIKSHA,⁵⁸ Study Webs of Active Learning for Young Aspiring Minds (SWAYAM)⁵⁹, e-VIDYA⁶⁰, Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA)⁶¹ and e-content for *Divyang* are in place to achieve the objective of inclusive digital education. The government

55 New Vision for Education. World Economic Forum (WEF) <https://tinyurl.com/39m36x5h>

56 A Global Framework of Reference on Digital Literacy Skills. UNESCO. <https://tinyurl.com/3e832sct>

57 Comprehensive Annual Modular Survey, 2022-23, MoSPI <https://tinyurl.com/yxrtez7e>

58 <https://diksha.gov.in/data/>

59 <https://swayam.gov.in/explorer?category=SCHOOL>

60 <https://pmevidya.education.gov.in/>

61 PIB release of Ministry of Electronics and IT dated 26 July 2024 (<https://tinyurl.com/4w2bzwsa>).

launched PM e-Vidya DTH Channel for Indian Sign Language, a significant step towards an inclusive and accessible education system for hearing-impaired students in India.⁶² The ICT and Digital Initiatives component of *Samagra Shiksha* provides financial assistance to establish ICT labs and smart classrooms and covers government and aided schools having classes VI to XII across the country.

11.24 The rapid pace of technological change requires educators to stay up-to-date on new digital trends and teaching methods. In an effort to leverage technology towards enhancing the capabilities of educators and preparing them for the demands of the 21st century, the government has launched TeacherApp⁶³, a cutting-edge digital platform. The application offers over 260 hours of resources, including courses, videos, podcasts, and live expert sessions. It also features Teaching Kits with 900 hours of content, providing teachers with essential tools such as lesson plans, worksheets, and project-based learning activities. The application empowers teachers with essential skills and continuous capacity-building through innovative content and community-building features. It is accessible across multiple devices and offers practical strategies for improving pedagogical practices and student engagement.

11.25 Investments in skills, research, innovation ecosystems, government-academic partnerships, and faculty development are pivotal for efficiently delivering education services and improving learning outcomes. Technology acts as a powerful enabler, driving scalability, equity, accessibility, and sustainable learning opportunities across diverse groups, including schools, polytechnics, higher education institutions, out-of-job youth, and working professionals. **Box XI.6** discusses this further.

Box XI.6: Leveraging technology for efficient and effective education delivery.

The integration of technology, including AI, has become essential in addressing the rapidly evolving dynamics of the education system. AI-powered learning systems enable personalised learning experiences tailored to individual students' pace and comprehension, contrasting with traditional approaches that rely on a standardised curriculum and uniform pace for all learners. Additionally, AI facilitates adaptive assessments, aligning with students' unique needs and fostering growth at their own pace. The incorporation of technology also presents cost-effective solutions, making quality education more accessible and inclusive for a broader population.

To improve education systems, technology integration may be focused on three key areas: using AI for teacher development and student tutoring, integrating industry-relevant skills and certifications, and creating personalised learning software. These are discussed below.

62 PIB release of Ministry of Education dated 6 December 2024 (<https://tinyurl.com/59ka4zpb>).

63 PIB release of Ministry of Education dated 25 November 2024 (<https://tinyurl.com/2znk6u>).

Leveraging AI for teachers' professional development and providing AI-driven personal tutors for students

AI can automate tasks like lesson planning, assessment development, and fostering critical thinking, freeing teachers to focus on instruction and mentoring. AI tutors can assist across subjects, offering students the necessary support and allowing them to learn at their own pace and requirements. AI personal tutors may enhance learning with resource guidance, career counselling, and problem-solving strategies. Additionally, AI-driven analytics help teachers tailor their methods to students' needs, and AI-powered platforms can recommend personalised professional development to support teachers' growth. AI can also help both teachers and students in conducting automated assessments and helping in personalised learning of the student.

The government is envisioning and developing e-learning through digital pedagogy as a long-term strategy for the education sector. Various initiatives, such as PM eVidya, DIKSHA, and SWAYAM, are part of this effort. The government has also announced the establishment of a platform under DIKSHA to incorporate advanced technologies like AI and machine learning (ML).⁶⁴

Integrating industry-relevant skills and certifications into education

Incorporating industry-relevant skills and certifications into the educational curriculum will improve the workforce's employability. This may be achieved through the provision of certifications into education through partnerships with industry and certification bodies, practical training modules and AI-driven learning experiences.

Realising the importance of the industry-academia linkage, the Ministry of Education introduced the Apprenticeship Embedded Degree/Diploma Programme in 2020-21 to improve students' employability. Additionally, the National Credit Framework (NCrF) allows for the creditisation for apprenticeship learning hours subject to assessment/ evaluation of the same. NCrF also recommended the expansion of the Academic Bank of Credit (ABC) to include credits earned through apprenticeships, internships, project work, etc.⁶⁵ The National Apprenticeship Promotion Scheme provides financial support to industrial establishments undertaking apprenticeship programmes under the Apprentices Act, 1961.

Building personalised learning software layers & developing AI labs for research, learning and skilling

AI personal tutors in such labs can enormously benefit students across all disciplines and can be a huge aid for them. Virtual Science and AI labs offer unique, beyond-the-classroom experiences. These innovations enhance learning, strengthen foundational skills, and offer cost-effective solutions.

⁶⁴ <https://pmevidya.education.gov.in/diksha.html>

⁶⁵ <https://tinyurl.com/36dy8t8w>

Taking a step in this direction, Atal Innovation Mission (AIM) has introduced Frontier Technology Labs (FTLs) on the foundation of Atal Tinkering Labs (ATLs). FTL will provide students access to advanced technologies, including AI, AR/VR, blockchain, cybersecurity, robotics, 3D printing, and IoT. Building on the foundation of ATLs, which have been established in 10,000 schools across 722 districts, FTLs are designed to equip students with the skills required for the evolving technological landscape.⁶⁶

In conclusion, it is crucial to leverage technology to transform the educational landscape in India. By doing so, a more efficient, effective, and future-ready education system can be created.

11.26 While online learning and digital technology have expanded access to education, the traditional method of learning through physical methods in the classroom still holds merit. The Tamil Nadu government launched a cost-effective remedial programme to bring education to students' doorstep to bridge the learning gaps created by the covid 19 pandemic and ensure equity leading to improvements in learning (**Box XI.7**).

Box XI.7: Tamil Nadu's Illam Thedi Kalvi (Education at Doorstep): Innovation in public education

The Illam Thedi Kalvi Scheme was launched by the Tamil Nadu government to bridge the education gap brought about by the Covid-19 pandemic and the digital divide. The initiative focuses on education through physical methods, which is the primary goal of the *Illam Thedi Kalvi*.⁶⁷

The scheme was designed during Covid-19 to reduce students' reliance on internet resources for their learning, with volunteers assisting them. These volunteers conducted door-to-door efforts to educate the students. The initiative is helping close the educational gap by providing every student in Tamil Nadu the opportunity to receive education through this scheme.

The State Planning Commission conducted a rapid assessment of the programme's impact through a comprehensive survey in September 2022. This assessment involved the active participation of volunteers, teachers, headmasters, and parents from 362 schools across six districts: Ariyalur, Cuddalore, Nagapattinam, Salem, Thiruvarur, and Villupuram.⁶⁸ Parents reported a noticeable improvement in their children's learning experiences, noting that education has become a more enjoyable activity for them. At the same time, the teachers confirmed that the play-based approach has reignited children's interest in learning. As a result, students were interacting more freely and actively participating in regular classes. Students showed a greater interest in mathematics and made significant progress in language skills in their standard classrooms.

66 PIB release of NITI Aayog dated 6 March 2024 (<https://tinyurl.com/3x4tw78x>).

67 <https://illamthedikalvi.tnschools.gov.in/Welcome>

68 <https://tinyurl.com/29f74ccs>.







The scheme continues, post the pandemic, to provide necessary support to the students through remedial lessons. The scheme's volunteers work year-round to integrate out-of-school children into mainstream education, with particular attention to girls, Children with special needs (CwSN), transgender children, and those from migrant worker families. The volunteers can apply online to be a part of the programme and are also given monthly pay. The programme is managed with effective use of technology. To monitor the learning levels of primary school children, volunteers have been given achievement charts to record their progress.

Children with Special Needs (CwSN): Developing a culture of inclusivity

11.27 The National Education Policy (NEP) 2020 envisions a future where every child, including Children with Special Needs (CwSN), feels valued, supported, and included. Recognising their unique potential, the NEP emphasises creating inclusive classrooms where diversity is celebrated. It calls for barrier-free infrastructure, compassionate teacher training, and the integration of assistive technologies to ensure that CwSN can learn alongside their peers. The Samagra Shiksha scheme is in alignment with NEP 2020 and Rights of Persons with Disabilities (RPWD) Act 2016. Under Samagra Shiksha, dedicated funds have been allocated to support CwSN through aids and appliances, assistive devices, allowances, Braille materials, and therapeutic interventions including infrastructure strengthening. Infrastructure improvements include ramps in 11.35 lakh schools, handrails in 7.7 lakh, and accessible toilets in 5.1 lakh schools. The Accessibility Code for Educational Institutions (2024) examines the physical barriers and information & communication barriers of access to school facilities for CwSN.

11.28 Efforts have been made to boost CwSN enrolment at all levels, with notable increases observed in secondary and higher secondary enrolments. Although the COVID-19 pandemic caused a temporary decline, recovery efforts are ongoing to reintegrate out-of-school CwSN into formal education. According to the latest UDISE+ report (2023–24), 16.8 lakh CwSN are enrolled at the elementary level, 2.87 lakh at the secondary level, and 1.18 lakh are enrolled at the higher secondary level.⁶⁹ The various initiatives for CwSN are elaborated as below.

Chart XI.4. Initiatives for CwSN

 <p>PMeVidya Series NCERT's 'Teaching learning interventions for inclusive classrooms' promotes inclusive pedagogy with ISL interpreters for accessibility.</p>  <p>Accessible content 4250+ ISL Videos, 10,500-Word ISL Dictionary on DIKSHA, 24/7 educational channel on PM eVidya, and DTH Channels. 377 NCERT Talking Bookson e-Pathshala and third-party TTS apps , and 4048 Audio Chapters on DIKSHA</p>	 <p>Inclusive Cell in CBSE Schools To facilitate equitable and barrier free environment and full participation.</p>  <p>Inclusive Education National Guidelines and Implementation Framework on Equitable and Inclusive Education (NGIFEIE) (2021–2030) has been developed to provide a roadmap for creating inclusive schools, ensuring no child is left behind.</p>	 <p>Disability Screening-PRASHAST Covers 21 disabilities, available in 23 languages through a mobile app. Over 10 lakh users and 61.57 lakh screenings completed since 2022.</p>  <p>Capacity Building and Training 5-day capacity-building program for 60 lakh teachers under NISHTHA (2023-24). Additional online training for 15,964 teachers on digital resources and assistive technologies. Module on Inclusive Education for in-service training of general teachers under Samagra Shiksha.</p>
Source: Department of School Education and Literacy, MoE		

Higher education

11.29 India's higher education system ranks among the largest globally, with 4.33 crore students enrolled in 2021-22, a 26.5 per cent increase from 3.42 crore in 2014-15⁷⁰. The GER for the 18–23 age group also increased from 23.7 per cent to 28.4 per cent during this same period (2014-15 to 2021-22).⁷¹ To achieve the government's goal of increasing GER to 50 per cent by 2035 in higher education, there is a need to double the educational network and infrastructure.

11.30 Over the years, there has been a significant transformation in higher education, ecosystem. The number of Indian Institutes of Technology increased from 16 in 2014 to 23 in 2023, while Indian Institutes of Management grew from 13 in 2014 to 20 in 2023.⁷² Similarly, medical colleges experienced remarkable growth, increasing from 387 in 2013-14 to 780 in 2024-25.⁷³ Universities have also seen substantial expansion, rising from 723 in 2014 to 1,213 in 2024, registering a growth of 59.6 per cent.⁷⁴ Total Higher Education Institutions (HEIs) increased by 13.8 per cent from 51,534 in 2014-15 to 58,643 in 2022-23.⁷⁵

70 All India Survey on Higher Education (AISHE) 2021-22: <https://tinyurl.com/ykn75ump>

71 Ibid note 70

72 PIB release dated 22 April 2023 <https://tinyurl.com/58a9ntna>

73 Ministry of Health and Family Welfare (MoHFW)

74 PIB release of Ministry of Education 17 December 2024 <https://tinyurl.com/47e2e4sn>

75 Ibid note 74 above

11.31 The NEP 2020 visualises a paradigm shift in the Indian higher education system through a restructured system. It highlights key aspects of the system like Multi-disciplinary and Holistic Education; Research, Innovation, and Entrepreneurship; Governance and Capacity Building of Teachers; Quality, Ranking, and Accreditation; Digital Empowerment and Online Education; Equitable and Inclusive Education; Promotion of Indian Languages and Indian Knowledge Systems; Skill Development and Employability and Internationalisation of Higher Education.

11.32 Importantly, the NEP envisages autonomy for institutions to innovate on these foundational aspects. It recognises that '*regulation of higher education has been too heavy-handed for decades...*' and that the '*regulatory system is in need of a complete overhaul in order to re-energise the higher education sector and enable it to thrive.*' Towards this end, the NEP suggests several institutional reforms. It asks that regulation must be 'light but tight' aimed at financial probity and good governance. Regulation must also ensure transparency of key aspects in the functioning of a university such as finances, procedures, infrastructure, and faculty. Hence it calls for accreditation of institutions based on basic norms, public self-disclosure, good governance and outcomes.

11.33 By 2040, all HEIs are to become multidisciplinary institutions. The measures to achieve this aim include greater opportunities for outstanding public education; scholarships by private/philanthropic universities for disadvantaged and underprivileged students; online education and Open Distance Learning (ODL); and all infrastructure and learning materials accessible and available to learners with disabilities. The policy calls for making 'India a global knowledge superpower.'

11.34 Effective implementation of NEP 2020 requires collaboration across the centre, states, UTs, HEIs, and regulatory bodies. The University Grants Commission (UGC) has introduced several initiatives like Guidelines for Multiple Entry and Exit in Academic Programmes, Common Universities Entrance Test, Regulations on Academic collaboration with foreign HEIs for Joint and Dual Degree Programmes, Guidelines for Professor of Practice, Guidelines on Pursuing two Academic Programmes simultaneously, Guidelines for Internship/Apprenticeship embedded Degree programme, Guidelines for Admission and Supernumerary seats of International Students in Undergraduate and Postgraduate Programmes in HEIs in India, Guidelines for the Establishment of Research and Development Cells in HEIs, Guidelines on Fostering Social Responsibility and Community Engagement in HEIs in India 2.0 etc.

11.35 India's higher education sector exhibits considerable multiplicity where several institutions have achieved excellence, and many others are aspiring to reach that

standard. The challenges faced by the institutions vary, requiring tailored solutions. The regulatory framework (UGC/AICTE) currently includes over 50 regulations addressing different aspects of education and research. However, this approach does not fully align with the ‘light but tight’ regulatory model envisioned by the NEP.⁷⁶ For example, the UGC specifies minimum credits for various course categories (e.g., skill enhancement’, ‘value-added’) and prescribes the sequencing of courses over four years, aspects that could be entrusted to the institutions themselves.

11.36 Standardisation of key parameters and consistency of programmes across institutions is perhaps the objective of these regulations. Achieving compliance with UGC norms may be an excellent way for institutions to achieve credibility in the eyes of prospective students, faculty, and employees. On the other hand, such compliance is not essential for quality institutions. These have already achieved strong reputations in teaching, research, and placement of their students. These institutions have innovated on some dimensions of their functioning, and they should be encouraged to follow that path since that is the only way to compete with global institutions.

11.37 It should be explicitly stated that compliance with regulations beyond the minimum accreditation requirements (proposed in NEP) is voluntary. Such compliance will be desired by institutions wishing to signal their capability and credibility.

11.38 Institutions that desire to stand by their own hard-won reputations should be free to carve out their own path. There is no greater accountability than that demanded by the market through prospective faculty, students, their parents, and collaborating academic and non-academic institutions. In the spirit of good governance and transparency, these institutions should be required to publicise prominently that they are not complaint-certified by the regulator. It is important to embrace diversity and to trust the genius of faculty and students to come up with frameworks that are novel, creative, and impactful on society.

11.39 Further, there is an increasing focus on strengthening the ecosystem for professional/technical streams of education such as medicine. Emphasis on regulatory reform and enhancement of standards is being made. **Box XI.8** discusses the medical education landscape’s challenges and measures taken to address them.

⁷⁶ <https://tinyurl.com/bpn69rvx>

Box XI.8: Challenges to medical education and action

The medical education ecosystem in the country has made significant strides, with notable achievements that lay a strong foundation for future growth. However, there are exciting opportunities to further enhance the system and ensure it fully aligns with broader policy objectives. While the regulatory framework has made progress, there is an opportunity to evolve and keep pace with the dynamic needs of the healthcare sector.

The number of candidates aspiring to study MBBS has increased consistently over the years, from around 16 lakh in 2019 to around 24 lakh in 2024.⁷⁷ The National Eligibility cum Entrance Test – Under Graduate (NEET-UG) is the single mode of entry through which students enter into medical education, MBBS courses in India and abroad. There has been a sustained increase in the number of opportunities available for medical education in the previous ten years. Since FY19, the number of medical colleges grew from 499 to 648 in FY23 to 780 in FY25, during which time the MBBS seats increased from 70,012 to 96,077 in FY23 to 1,18,137 in FY25 and post graduate seats increased from 39,583 to 64,059 in FY23⁷⁸ to 73,157 in FY25.

There are 13.86 lakh practitioners of modern medicine registered as of July, 2024,⁷⁹ which converts into current availability for the whole population of the country in the ratio of 1:1263.⁸⁰ The WHO standard norm of 1:1000 seems to be attainable by 2030 with a conservative 50,000 doctors being licensed every year till 2030. Thus, numerical shortage of physician availability in India is perhaps no longer a primary concern. However, there are some larger concerns warranting attention. These are discussed below.

The issue of affordability

Unlike other professional education streams, fees for medical education is highly regulated. In case of government medical colleges, the respective state governments are responsible for fixation of fees. In the case of private unaided medical colleges, the fee structure is decided by a committee set up by the respective state government under the chairmanship of a retired High Court Judge in pursuance of the directions of the Hon'ble Supreme Court of India.⁸¹ The National Medical Commission (NMC) has issued guidelines for determination of fees and all other charges in respect of 50 per cent of seats in private medical institutions and deemed to be universities. Despite such measures, fees remain high – at ₹60 lakh to one crore or more⁸² in the private sector which holds 48 per cent of MBBS seats. This highlights the opportunity to make medical education more accessible and affordable for all, particularly

77 National Testing Agency, Press release 26 July 2024 (<https://tinyurl.com/3nxf8uru>).

78 Lok Sabha Reply to Starred Question No. 7 on 2 February 2024. <https://tinyurl.com/34ezez47>

79 Lok Sabha Reply to Starred Question No. 7 on 2 August 2024 <https://tinyurl.com/cbtfvemj>

80 Physician availability is calculated at 80 per cent of registered doctors, as per norms-and population of 140.07 crore for 2024, as projected in the Report of the Technical Group for Population Projections, Ministry of Health, and Family Welfare available at <https://tinyurl.com/3bn4mrym>

81 Lok Sabha Unstarred Question No. 391 on 21 July, 2023 <https://tinyurl.com/cks2yr5z>

82 157th Report on Quality of Medical Education in India, Department related Standing Committee on health and Family Welfare February, 2024. <https://tinyurl.com/472h232h>

for those from less privileged backgrounds. By reducing the cost of medical education, we can contribute to lowering healthcare service costs. If universal coverage is the goal, prioritising cost and equity in medical education will be key to achieving it.

The consequence is that every year thousands of students go abroad to around 50 countries especially those with lower fees such as China, Russia, Ukraine, Philippines, Bangladesh.⁸³ Medical education abroad entails hardships of studying abroad and productive years of youth invested in repeated attempts at exams - the NEET-UG before taking admission, the Foreign Medical Graduates (FMG) Exam⁸⁴ on completing the course and then complete compulsory internships of 12 months in India.

FMGs in China (during COVID lockdowns) and Ukraine (as the conflict escalated), had to return to India dropping their education and faced uncertain prospect. The subsequent regulatory issues in addressing the difficulties faced by FMGs and the need to maintain standards in allowing them to practice in India has been a challenge and has required interventions of the courts in more than one occasion. The very low pass percentage of FMGs in the qualifying exam (16.65 per cent in 2023⁸⁵) indicates sub-par quality of medical education abroad including lack of clinical training. As policy intervention to dissuade medical education abroad is crafted, keeping costs in India within reasonable limits is essential.

Geographical reach

The availability of opportunities for medical education appears to be geographically skewed, apparent from the fact that 51 per cent of undergraduate seats and 49 per cent of post-graduate seats are in the southern states.⁸⁶ Further, the availability is skewed in favour of urban areas with the urban to rural doctor density ratio being 3.8:1.⁸⁷ These patterns tend to follow the pattern in availability of healthcare services in general. It has been estimated that 75 per cent of dispensaries and 60 per cent of hospitals are in urban areas, where 80 per cent of doctors serve.⁸⁸ The imbalance in distribution can be attributed to the state/region level of economic development, demand for and expansion of healthcare services, and increasing market for medical value travel.

The growth in the number of medical practitioners offers a prospect to improve the distribution of healthcare professionals across regions. While many graduates and specialists prefer to practice in their home states or in major cities due to better amenities and professional opportunities, this presents a chance to enhance healthcare access in rural and underserved

83 Country-wise Performance in FMGE 2023 <https://tinyurl.com/yc2k6zuz>

84 The FMGE is conducted twice a year and the average pass percentage in 2023 was 16.65 per cent with 61,616 candidates appearing, showing that the quality of education abroad is not on par with standards in India and FMG then require multiple attempts to qualify. Students may require anywhere between a minimum of 8-10 years to become eligible to obtain the license to practice.

85 Ibid 83 above

86 As per numbers available for Andhra Pradesh, Karnataka, Kerala, Puducherry, Tamil Nadu, Telangana and Maharashtra in Lok Sabha Reply to Starred Question No. 7 on 2 February 2024. <https://tinyurl.com/34ezez47>

87 FAQs on National medical Commission (Bill) 2019 <https://tinyurl.com/b4y43cv3>

88 Mishra, S., Mohanty, S.K. Out-of-pocket expenditure and distress financing on institutional delivery in India. *Int J Equity Health* 18, 99 (2019). <https://doi.org/10.1186/s12939-019-1001-7>

areas. By offering incentives, improving infrastructure, and fostering professional growth in these regions, we can attract and retain healthcare professionals, ensuring a more balanced and equitable distribution of doctors to strengthen public healthcare services nationwide.

Specialisations

There is also a skewed distribution of seats in favour of specialisations like radiology, dermatology, gynaecology, cardiology while specialities like psychiatry, geriatrics etc., are neglected. The current shortage of specialists across specialities will further aggravate in streams that are currently not preferred but will be required in the future. Demand for post graduate education is not restricted by the need for clinical practitioners, these doctors form the resource pool for research and development in advanced fields of medicine, pharmaceuticals, biotechnology etc. They are also crucial as faculty and trainers of the next generation. While we focus on increasing facilities for specialisations it is also necessary to maintain distribution across geographies and streams.⁸⁹

Remuneration

Market estimates indicate that remuneration of fresh graduates is around ₹ 5 lakh and senior doctors earn between ₹12.5 -18.4 lakh per annum in cities.⁹⁰ This is almost similar or lower to the packages that are available to other graduates at the entry level. The attraction towards the medical profession, as seen from the consistently increasing number of aspirants, seems to arise more from the social status attached to it rather than its earning potential. This may mean that the availability of meaningful work and commensurate remuneration may reduce with increase in the number of doctors available in the future. This would reinforce the already occurring migration of doctors from India into greener pastures. The OECD countries reported in 2021 that there were close to 19,000 physicians from India in their workforce and migration in 2021 alone was over 2800 physicians. Increased public and private sector investments into medical education is in effect creating a global health workforce. The trends in migration need to be factored while incentives for service in public health system are calibrated to ensure availability of doctors in rural areas.

Other issues

Quality of education is directly related to the availability of qualified and experienced faculty and the clinical exposure at the hospital. Regulatory requirements in terms of both are robust. Non-compliance carries penalties including the cancellation of recognition of courses. The NMC is empowered to monitor and penalise such non-compliance. Measures such as CCTV cameras and an Aadhaar based attendance system which are centrally monitored by the national regulator have been put in place. The granularity of regulations may appear necessary given that medical profession deserves to be of the highest quality possible but also seem overbearing in terms of associated compliance and monitoring costs. Despite the

⁸⁹ The 157th Report on Quality of Medical Education in India, Department related Standing Committee on Health and Family Welfare February, 2024 – Para 2.7 -2.15

⁹⁰ <https://tinyurl.com/5573epev>.

elaborate regulations and monitoring, issues like shortage of faculty, ghost faculty, low patient load in hospitals etc., continue to affect the quality of training. There may be need to revisit the incentive-disincentive and design of regulatory measures to improve compliance, reduce costs and prevent associated rent-seeking.

The success of any policy, including regulatory ones, lies in its execution. If outcomes do not align with our goals or if there are unexpected effects, it is essential to take a step back and refine these policies to make them more meaningful and impactful.

Conclusion

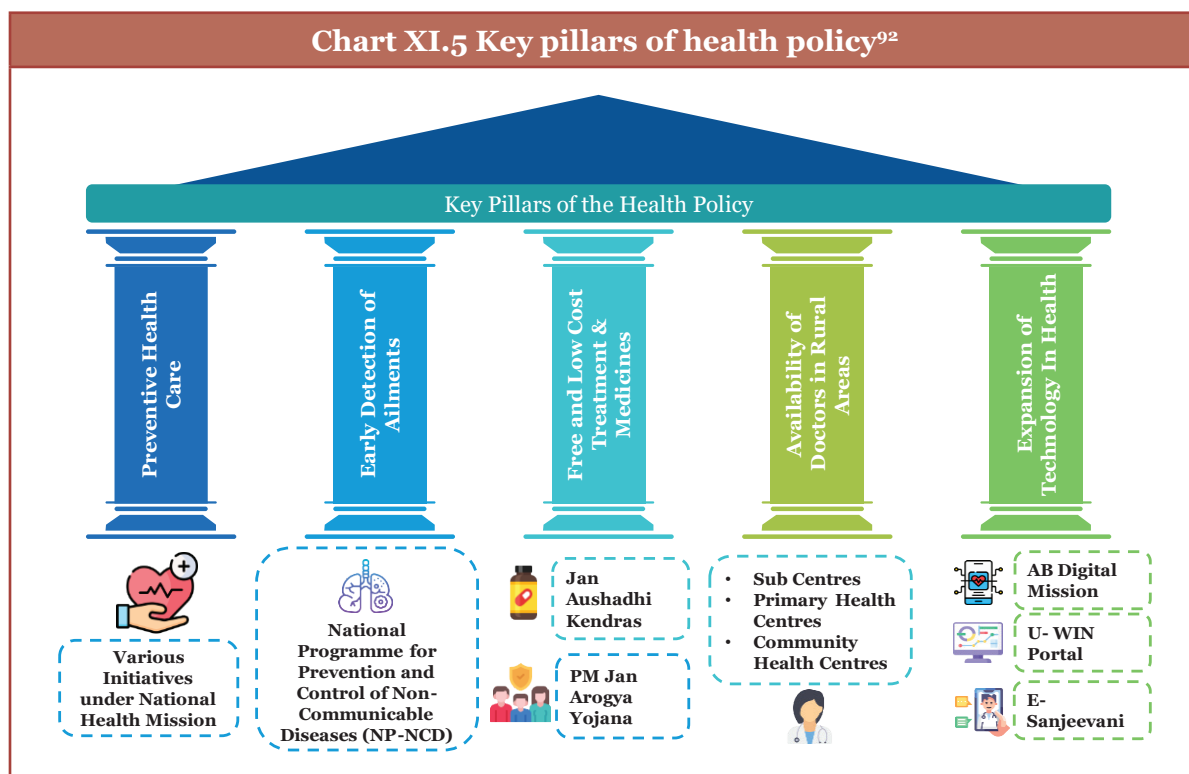
To address the uneven distribution of seats and to expand the availability of seats, the central government is supporting the states through three centrally sponsored schemes, viz., the construction of new medical colleges, creation of infrastructure for expansion of MBBS and post graduate seats.⁹¹ The regulatory reform process started with the setting up of the NMC in 2019. NMC has since brought into effect broad based regulations specifying minimum standards for establishment of colleges, increasing number of seats, opening new courses, introduction of a competency-based curriculum, minimum qualification, and training of teachers etc. In collaboration with the Quality Council of India, a rating and accreditation system for medical colleges has also been proposed.

With all these efforts being made and the private sector remaining an active participant, the medical education landscape presents large opportunities for the future and presents a bigger challenge to policymakers than any other field of professional education does.

TOWARDS A HEALTHY NATION

11.40 Health is a crucial component of human capital and a valuable asset for a prosperous and stable economy. It boosts productivity, reduces healthcare needs, enhances life expectancy, and supports social development. Furthermore, good health is foundational for the young generation to achieve their aspirations and contribute to society. The emphasis on health is important given that India is emerging into an economic powerhouse driven by its youthful population. Through concerted efforts by individuals, communities, and policy interventions, a robust and healthy generation of adults can be raised. Government initiatives, including preventive measures, universal access to high-quality healthcare, strengthened public health infrastructure, and advancements in medical education, have collectively contributed to making healthcare in India more accessible and affordable for all.

⁹¹ <https://mohfw.gov.in/?q=pressrelease-33>



Estimates of the National Health Accounts 2021-22

11.41 A study on the association of government health expenditures (GHE) and health outcomes based on OECD countries shows that health expenditures, economic growth (GDP) and healthcare provision (number of doctors), reduce infant mortality while positively impacting life expectancy.⁹³ Health expenditures have increased worldwide⁹⁴ as it has in India too.

11.42 According to the latest National Health Accounts⁹⁵ statistics for 2021-22, released in September 2024, the Total Health Expenditure (THE)⁹⁶ in FY22 is estimated to be ₹9,04,461 crore (3.8 per cent of GDP and ₹6,602 per capita at current prices). THE per capita (at constant prices) has shown an increasing trend since FY19.

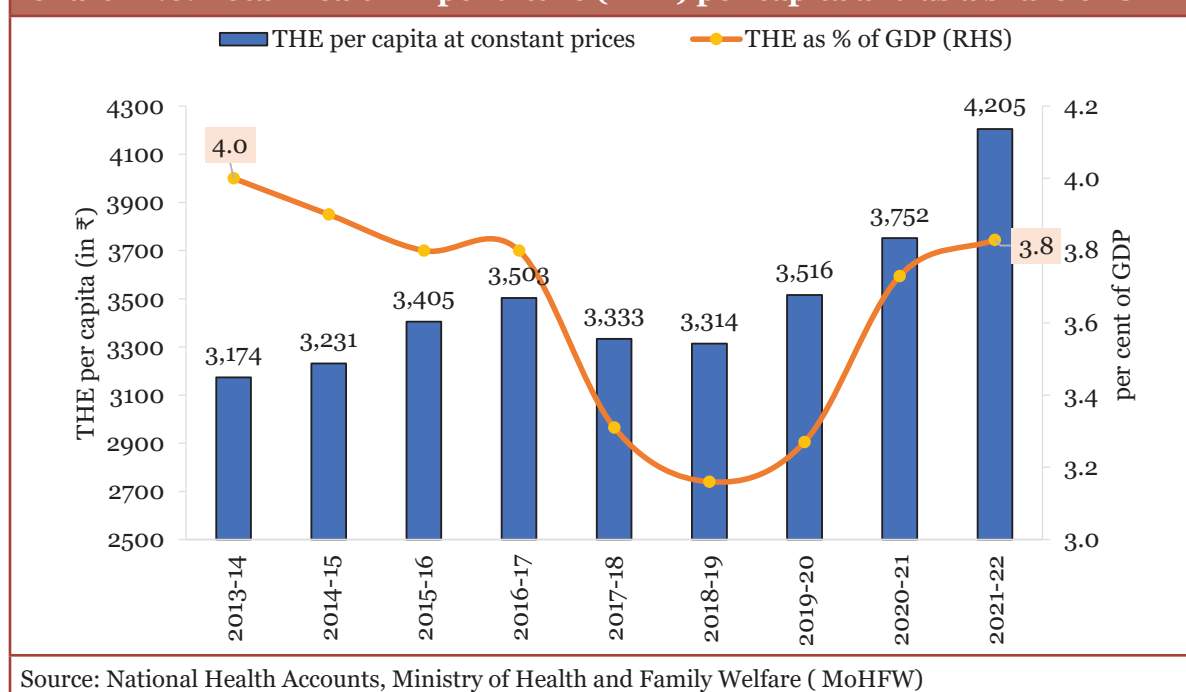
92 PIB release of Prime Minister's Office dated 29 October 2024 <https://tinyurl.com/2dk3562z>

93 Anwar A, Hyder S, Mohamed Nor N and Younis M (2023) Government health expenditures and health outcome nexus: a study on OECD countries. *Front. Public Health* 11:1123759. doi: 10.3389/fpubh.2023.1123759 (<https://tinyurl.com/yc2v39jm>).

94 WHO. Countries are Spending More on Health, But People are Still Paying Too Much Out of Their Own Pockets. WHO (2019). (<https://tinyurl.com/bd37wdat>).

95 National Health Accounts Estimates for 2021-22 (<https://tinyurl.com/7an49nkm>).

96 THE constitutes current and capital expenditures incurred by Government and Private Sources including External funds.

Chart XI.6: Total Health Expenditure (THE) per capita and as a share of GDP

11.43 Out of the THE, current health expenditure (CHE)⁹⁷ is ₹7,89,760 crore (87.3 per cent of THE), and capital expenditure is ₹1,14,701 crore (12.7 per cent of THE). An increase in the share of capital expenditure in THE from 6.3 per cent in FY16 to 12.7 per cent in FY22 is a positive sign as it will lead to broader and better health infrastructure.

11.44 Government health insurance schemes constitute a 5.87 per cent share in healthcare financing schemes, out of which social insurance schemes like Employees' State Insurance Corporation (ESIC)⁹⁸, Central Government Health Scheme (CGHS)⁹⁹, and Ex-Servicemen Contributory Health Scheme (ECHS)¹⁰⁰ have a 3.24 per cent share. Government-supported voluntary insurance schemes like Ayushman Bharat- Pradhan Mantri Jan Arogya Yojana (AB PM-JAY), Rashtriya Swasthya Bima Yojana (RSBY), state-specific government health insurance schemes, etc., have a 2.63 per cent share in healthcare financing schemes.

11.45 The increase in government spending on health has an important implication for the reduction of financial hardship endured by households. In the THE of the country between FY15 and FY22, the share of GHE¹⁰¹ has increased from 29.0 per cent to 48.0

97 CHE constitutes only recurrent expenditures for healthcare purposes net all capital expenditures.

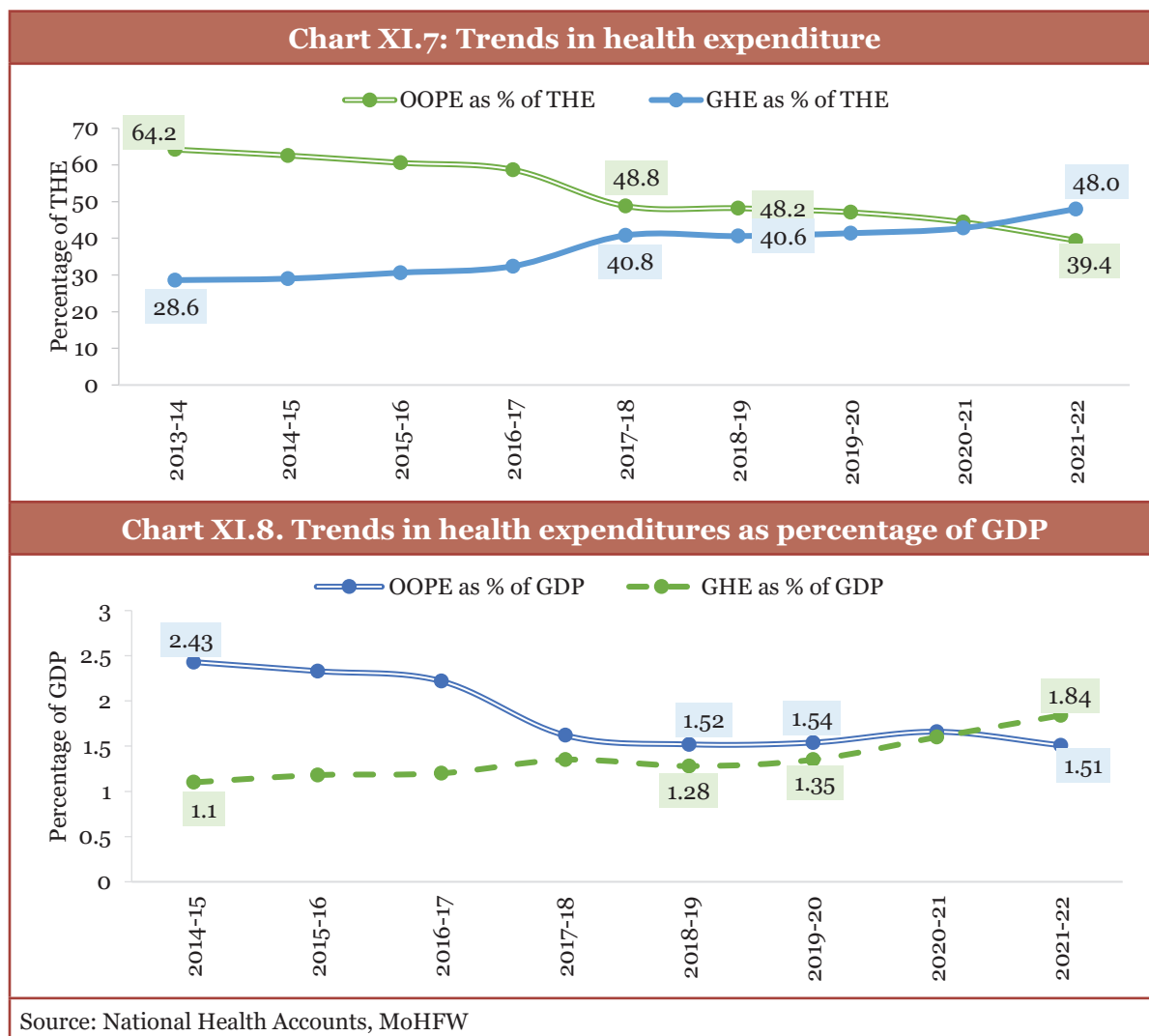
98 <https://www.esic.gov.in/information-benefits>

99 <https://cghs.gov.in/CghsGovIn/faces/ViewPage.xhtml>

100 <https://www.echs.gov.in/about>

101 GHE constitutes spending under all schemes funded and managed by Union, State, and Local Governments including quasi-Governmental organisations and donors in case funds are channelled through Government organisations. It has an important bearing on the health system as low Government health expenditures may mean high dependence on household out-of-pocket expenditures.

per cent. During the same period, the share of out-of-pocket expenditure (OOPE)¹⁰² in THE declined from 62.6 per cent to 39.4 per cent.



11.46 AB-PMJAY has played a decisive role in the significant reductions observed in OOPE through an increase in social security and primary health expenditure, with over ₹1.25 lakh crore in savings recorded.¹⁰³ Other initiatives, such as the Free Dialysis scheme, have benefited around 25 lakh people.¹⁰⁴ The reduction in OOPE goes hand-in-hand with increased public spending in healthcare, demonstrating progress towards universal health coverage.




11.47 The AB-PMJAY has revolutionised healthcare by providing health coverage

¹⁰² OOPE are expenditures directly made by households at the point of receiving health care. This indicates the extent of financial protection available for households towards healthcare payments.

¹⁰³ PIB release of MoHFW dated 23 September 2024 (<https://tinyurl.com/pcf3dby7>).

¹⁰⁴ Pradhan Mantri National Dialysis Programme: <https://pmndp.mohfw.gov.in/en>

to bottom 40 per cent of India's most vulnerable populations. It covers over 12 crore families, or approximately 55 crore individuals, and is the world's largest health assurance scheme, offering annual hospitalisation benefits of up to ₹5 lakh per family for secondary and tertiary care. Launched to address health inequities, AB PMJAY prioritises the poorest segments of the population based on the Socio-Economic Caste Census 2011, adopting a holistic and need-based approach. This initiative aligns with India's commitment to the SDGs, ensuring no one is left behind. As of 1 January 2025, over 36.36 crore Ayushman cards have been issued. Key statistics of AB-PMJAY are given below.

 30,000 hospitals empanelled	 13,352 private facilities empanelled	 49% of cardholders are women	 48% of hospital admissions are utilised by women
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11.48 On 11 September 2024, the expansion of AB PMJAY was approved to include senior citizens aged 70 and above, irrespective of their socio-economic status. This initiative provides free health coverage of up to ₹5 lakh per family, benefiting approximately six crore senior citizens across 4.5 crore families, regardless of income. Eligible seniors will receive a dedicated *Vay Vandana Card* to access the scheme's benefits. Additionally, those already covered under the scheme will get an exclusive top-up of ₹5 lakh annually for their healthcare needs, separate from their family's coverage.¹⁰⁵ As of 15 January 2025, more than 40 lakh senior citizens have been enrolled the scheme.

11.49 While the government's health initiatives play a crucial role in improving access to healthcare and ultimately enhancing health outcomes in the country, the overall health of a population is also affected by other socioeconomic factors. These factors include sanitation, education, nutrition, early child development, and personal habits.

Transforming healthcare for tomorrow

11.50 Healthcare infrastructure is essential to a functioning healthcare system, ensuring access to quality medical services and promoting public health. This includes hospitals, clinics, healthcare professionals, medical institutions, health centres, and information technology systems that work collaboratively to provide care.

11.51 Over the past few decades, India has made significant progress in health infrastructure, driven by advancements in medical technology and expanded public health programmes. Initiatives like Ayushman Bharat (AB), the PM-Ayushman Bharat

¹⁰⁵ PIB release of MoHFW dated 9 December 2024 (<https://tinyurl.com/yu95vs5d>).

Health Infrastructure Mission (PM-ABHIM), and the Free Drugs Service Initiative (FDSI) have transformed healthcare delivery. The progress made in public health infrastructure follows.

11.52 Ayushman Bharat: Launched in 2018, AB represents a paradigm shift from selective health services to a comprehensive continuum of care, addressing prevention, promotion, and treatment across primary, secondary, and tertiary levels. By transforming sub-health centres (SHCs) and primary health centres (PHCs), Ayushman Arogya Mandirs (AAM) (formerly Health & Wellness Centres) have been operationalised,¹⁰⁶ in rural and urban areas, offering a universal, free, and expanded package of preventive, promotive, curative, palliative, and rehabilitative services closer to communities.

Table XI.2: Factsheet of Ayushman Arogya Mandir

Component	Units
Number of AAMs operational	1,75,560 +
Figures in crore	
Number of footfalls	371.97
Hypertension screenings	100.57
Diabetes screenings	88.65
Oral cancer screenings	59
Breast cancer screenings	26.95
Cervical cancer screenings	17.69
Wellness Sessions, including Yoga	4.74
Teleconsultations conducted	31.86
Source: MoHFW, Figures are as on 31 December 2024	

11.53 PM-ABHIM: Launched in October 2021, the Mission is being implemented over five years from FY22 to FY26, with the aim to strengthen the public health infrastructure to fill critical gaps in health infrastructure, surveillance, and health research - spanning both the urban and rural areas.

Table XI.3: Factsheet of PM-ABHIM

Components	Units Approved
Building-less Sub Centre-Health Wellness Centre (HWC)	9594
Urban-HWC	4623
Block Public Health Unit	2033
Integrated Public Health Labs	703
Critical Care Blocks	577
Source: MoHFW; Figures are as on 15 November 2024	

11.54 **FDSI (2015):** To reduce OOPE for patients at public health facilities, the government launched the FDSI under the National Health Mission (NHM). This provides financial support to states/UTs for ensuring the availability of essential drugs: 106 drugs at SHCs, 172 drugs at PHCs, 300 drugs at CHCs, 318 drugs at Sub-District Hospitals (SDHs), and 381 drugs at district hospitals. The FDSI ensures drug quality by procuring only from Good Manufacturing Practices (GMP) certified manufacturers and conducting mandatory post-supply testing of medicines at the National Accreditation Board for Testing and Calibration Laboratories (NABL)-accredited laboratories before distribution.

11.55 **Commitment to universal vaccine coverage and health equity:** The Universal Immunisation Programme (UIP) is one of India's most impactful public health initiatives, providing life-saving vaccines to millions of newborns and pregnant women annually. Launched as the Expanded Programme on Immunisation in 1978, it was rebranded as UIP in 1985, extending coverage from urban to rural areas to bridge healthcare disparities.

11.56 Currently, the UIP offers 11 vaccines free of cost, protecting against 12 vaccine-preventable diseases. A child who has received Bacille Calmette Guerin (BCG), three doses of Oral Polio Vaccine (OPV), three doses of Pentavalent and one dose of Measles Rubella (MR) by the first year of age is called a fully immunised child. With full immunisation coverage for FY24 at 93.5 per cent nationally, the UIP continues to safeguard public health and ensure equitable access to essential vaccines.

11.57 The **Jan Aushadhi scheme**, launched to provide affordable medicines, has gained significant momentum, achieving record sales in 2024 and expanding to over 14,000 kendras nationwide.¹⁰⁷ Despite challenges like quality concerns, supply issues, and thin profit margins for pharmacists, the scheme has improved access to low-cost drugs. Awareness campaigns, expanded product offerings like sanitary napkins, and increased rural outreach have boosted its impact, particularly for low-income groups and those with chronic illnesses. For example, Jan Aushadhi distributors in Kerala reported expecting significant year-on-year turnover growth, driven by the addition of new Jan Aushadhi Kendra, expanded product offerings, and awareness camps initiated under Pharmaceuticals & Medical Devices Bureau of India and Department of Pharmaceuticals directives.¹⁰⁸ While profitability remains a hurdle for pharmacists and suppliers, the growing demand by consumers highlights the enduring need for affordable healthcare solutions.

¹⁰⁷ PIB release of Ministry of Chemicals and Fertilizers dated 23 October 2024 (<https://tinyurl.com/jc23rbt2>).

¹⁰⁸ Mint. (26 December 2024). After intensive care, people's pharmacy Jan Aushadhi sees healthy sales spike. (<https://tinyurl.com/8srzhp6e>).

Disruptive technology providing seamless and equitable healthcare.

11.58 Technology integration in healthcare delivery ranges from the utilisation of wearable devices for timely diagnoses and recommendations of personalised treatments to telehealth technologies that connect patients and health professionals in a virtual space, all aiming to improve efficiency and effectiveness. Public health professionals now have numerous opportunities to implement innovative public health technology solutions to enhance patient care significantly. Some of the initiatives of the MoHFW for the integration of technologies are discussed in this section.

11.59 **U-WIN:** The U-WIN portal¹⁰⁹ marks a transformative step in India's immunisation efforts, digitising vaccination records for pregnant women and children up to 16 years under the UIP. This user-friendly platform enables seamless access to immunisation records, flexible scheduling, and 'Anytime Access' and 'Anywhere' vaccination. Beneficiaries can self-register via the web portal or mobile app, track schedules, and receive SMS reminders for upcoming doses. U-WIN also generates QR-based e-vaccination certificates and facilitates the creation of Ayushman Bharat Health Accounts (ABHA) for parents and children, supporting holistic digital health management. The portal is accessible in 11 regional languages.¹¹⁰ Over 1.7 crore pregnant women and 5.4 crore children are registered digitally and tracked more than 26.4 crore vaccine doses in real-time.¹¹¹

11.60 **E-Sanjeevani:** E-Sanjeevani - the National Telemedicine Service, has emerged as the world's largest telemedicine implementation in primary healthcare. It has served over 31.19 crore patients through 1.29 lakh AAM as spokes, which are served by 16,447 hubs and 676 online OPDs with support of more than 225,286 doctors, medical specialists, super-specialists and health workers (Figures are as on 12 November 2024).

11.61 **Ayushman Bharat Digital Mission (ABDM):** Launched in September 2021 with the aim of creating a national digital health ecosystem, it supports universal health coverage and is the necessary backbone for an integrated digital health infrastructure in the country.

Table XI.4: Factsheet of ABDM

Component	Units
Total ABHA created	72.81 crore
Health records linked	47.79 crore

¹⁰⁹ <https://uwin.mohfw.gov.in/home>

¹¹⁰ As of 27 November 2024, it has registered 7.44 crore beneficiaries, conducted 1.26 crore vaccination sessions, and recorded 27.84 crore administered doses.

¹¹¹ Data updated as on 4 November 2024 at <https://www.undp.org/india/u-win-launch>

Facilities onboarded in the Health Facility Registry	3.60 lakh
Healthcare Professionals onboarded in the Healthcare Professionals Registry	5.51 lakh
Facilities using ABDM-enabled software	1.57 lakh
Source: MoHFW, Figures are as of 15 January 2025	

11.62 The integration and use of technology have the potential to offer viable solutions to problems of quality, accessibility, and affordability. One such example is the potential to prevent loss of lives and save time by leveraging drones for the delivery of medicines in difficult geographies and in times of emergencies (**Box XI.9**).

Box XI.9: Aerial angels: Changing the healthcare landscape

Drones are transforming healthcare in India by ensuring rapid delivery of life-saving medicines and collecting samples from remote and inaccessible areas, proving indispensable during emergencies. Their ability to navigate diverse terrains, such as roads, water bodies, forests, and high-rise buildings, makes them highly effective and reliable in the most challenging conditions making it crucial in emergencies, potentially preventing the loss of lives.

The WEF launched the project ‘Medicines from the Sky’ in collaboration with the government of Telangana in September 2021 in the Vikarabad district in Telangana. This programme was the first of its kind in Asia to deliver medicines and jabs to test the feasibility of medium-range delivery options.¹¹² Later, in 2022, the project was carried out in Arunachal Pradesh with the aim of analysing the response of the state’s healthcare system when integrated with drones. As of October 2024, the key progress highlights for Arunachal Pradesh¹¹³ are:

 over 650 drone flights	 10,000+ medical products delivered	 15,000km covered
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It was observed that the delivery times had drastically improved, with trips reduced from eight hours by ground transport to just 22 minutes by drone, cutting emergency response times and saving lives in critical situations. The International Civil Aviation Organization (ICAO) recognised the project's achievements for its innovative use of drones to enhance health supply chains in the region.

112 <https://www.indiatoday.in/india/story/telangana-launches-medicines-from-the-sky-drone-scindia-project-nationwide-1851848-2021-09-11>

113 World Economic Forum. (October, 2024). India is revolutionising healthcare with drone deliveries. <https://tinyurl.com/4ysnfaka>.

The project '**i-DRONE**' (ICMR's Drone Response and Outreach for North East) was launched under the aegis of the MoHFW in October 2021 with the view to assess the feasibility of using drones to deliver vaccines and medical supplies. The exercise was conducted in rugged geographical terrains of the northeast (Manipur and Nagaland), including land, islands, foothills and across the hills.¹¹⁴ Following the study's success, this initiative has been expanded and it now includes delivering medical essentials at high altitudes in Himachal Pradesh, transporting TB samples in Telangana, and moving pathological samples in Karnataka.¹¹⁵

Key Statistics about i-Drone¹¹⁶:

 130 hours flight time	 65 Health Centres connected	 22,000 medical essentials delivered	 7700 km covered
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Drones have significant potential to deliver essential goods to vulnerable populations, helping to overcome access barriers and facilitating faster delivery of lifesaving medicines.

Advancing healthcare through AI

11.63 The National Strategy for Artificial Intelligence (2018) developed by NITI Aayog discussed how AI could help address the challenges of quality, accessibility, and affordability for a large section of the population. The strategy emphasised how AI combined with robotics and the Internet of Medical Things (IoMT) can potentially become the 'new nervous system for healthcare', providing solutions to address healthcare problems and helping the government achieve universal health for all.¹¹⁷

11.64 As per NASSCOM, the widespread adoption of AI in healthcare can create new opportunities for the sector and bridge the accessibility, affordability, and quality gaps.¹¹⁸ Adoption of AI can help reduce drug discovery and delivery costs; it can improve the quality of medical devices, improve diagnosis accuracy and enable real-time monitoring of remote patients. For healthcare providers, AI helps streamline the overall patient journey, assists clinicians in reducing misdiagnoses, and enables personalised treatments and preventive care. One of the use case examples of how AI can efficiently deliver services and enhance the accessibility of healthcare for citizens are presented in **Box XI.10**.

114 PIB release of MoHFW dated 4 October 2021 (<https://tinyurl.com/4dwekvyh>).

115 <https://idrone-audit.icmr.org.in/>

116 ibid note 115 above

117 National Strategy for Artificial Intelligence (2018) (<https://tinyurl.com/bd9sd3sn>).

118 Advancing Healthcare in India: Navigating the Transformative Impact of AI. NASSCOM. 2024 (<https://tinyurl.com/y26f5869>).

Box XI.10: Use of Tele-Radiology and AI in silicosis management

Silicosis is a debilitating lung disease caused by inhaling silica dust. It is associated with severe comorbidities such as tuberculosis, cancer, ischemic heart disease, bronchitis, and infections from bacteria and fungi.

The Rajasthan state government has set a new benchmark in public health management of this disease, which is widespread in the state due to sandstone mining activities.¹¹⁹ The state government is effectively using digital X-rays, tele-radiology, and AI to streamline the diagnosis of Silicosis. The technology was developed by training an AI model on a vast dataset of over-labelled chest X-rays. By leveraging AI technology, the government enabled the automatic detection of the disease, making the diagnostic process faster and more accurate. This technology has significantly improved the identification and treatment of Silicosis patients. The government also introduced DBT self-approval portal, which allows diagnosed patients to receive financial assistance directly into their bank accounts, bypassing the previously cumbersome administrative procedures.¹²⁰ This system ensures that those affected by Silicosis receive timely relief.

11.65 Another example of technology integration in health care is the eSwasthya Dham portal¹²¹ launched by the Uttarakhand Government.¹²² The portal helps monitor the Char Dham Yatra pilgrim's (Yamunotri, Gangotri, Kedarnath, and Badrinath-together called as the Char Dham Yatra) health parameters and offers a variety of benefits for pilgrims, including the ability to generate an ABHA in under two minutes. Creating the ABHA, helps provide a reliable and secure identity for devotees, enabling them to manage their health records digitally. This system will also ensure prompt assistance for citizens in case of emergencies. As a result, it facilitates the smooth journey of pilgrims.

11.66 Despite its great potential, AI adoption in India is still in its early stages. In 2023, 34 per cent of healthcare organisations in India were piloting AI projects, and 16 per cent had moved their generative AI initiatives into production. However, the adoption of AI in the Indian healthcare sector faces several challenges, including a lack of specialised talent (both technical and domain-specific), data complexities, and difficulties in scaling up.¹²³ This requires attention going forward.

The Impact of lifestyle and work culture on mental well-being

11.67 Mental well-being is often conflated with happiness or mood. However, it is beyond that. It is the ability to navigate life's challenges and function productively.

119 Pradip K Tewari and Anand Krishnan Plappally. Impacting life in rural Rajasthan through Emerging Technologies. August 2020 (<https://tinyurl.com/5c5ypub3>)

120 <https://silicosis.rajasthan.gov.in/>

121 <https://eswasthyadham.uk.gov.in/>

122 PIB release of MoHFW dated 11 July 2024 (<https://tinyurl.com/2v2w7p44>).

123 *ibid* note 118 above

Mental well-being encompasses all our mental-emotional, social, cognitive, and physical capabilities. This can also be construed as the mind's composite health.

11.68 The Economic Survey 2023-24 recognised mental well-being as an economic issue and highlighted, in some detail, the increasing prevalence of mental health issues worldwide and in India and its likely impact on the economy. It emphasised a whole of community approach to tackling mental health problems. In this Survey, we take the discussion forward.

11.69 Data suggests that mental well-being is not static; indeed, there are a myriad of factors, including workplace culture, hours spent working, and lifestyle, that influence mental well-being. This section presents the results of a short survey conducted to understand how lifestyle, work culture, family bonds, eating habits, etc., are affecting the mental health of citizens in the country. Although a few prior surveys have been conducted to assess mental health in India¹²⁴, they do not allow us to have this understanding.¹²⁵

11.70 Since 2021, the Sapien Labs Centre for Human Brain and Mind (the Centre), India¹²⁶, has been collecting data on a comprehensive measure of mental well-being from over 150,000 internet-enabled individuals in India. The data is dynamic; each month, an additional sample of about 2,000-3,000 individuals residing in India gets added to the database. In the months of October and November of 2024, a special survey focused on understanding the impact of work culture, family bonds, eating habits, pastimes, and exercise on mental well-being and productivity was conducted by the Centre. This survey was conducted online on 5,233 digitally-enabled individuals between 18-64 years of age.¹²⁷

11.71 The Centre uses a comprehensive measure of mental well-being that explicitly accounts for an individual's ability to function and is not based on a symptom-based assessment that has been widely used previously. The measurement utilises the MHQ or Mental Health Quotient assessment that evaluates 47 aspects of mental function spanning six dimensions (**Chart XI.9.a**). These aspects include both mental health

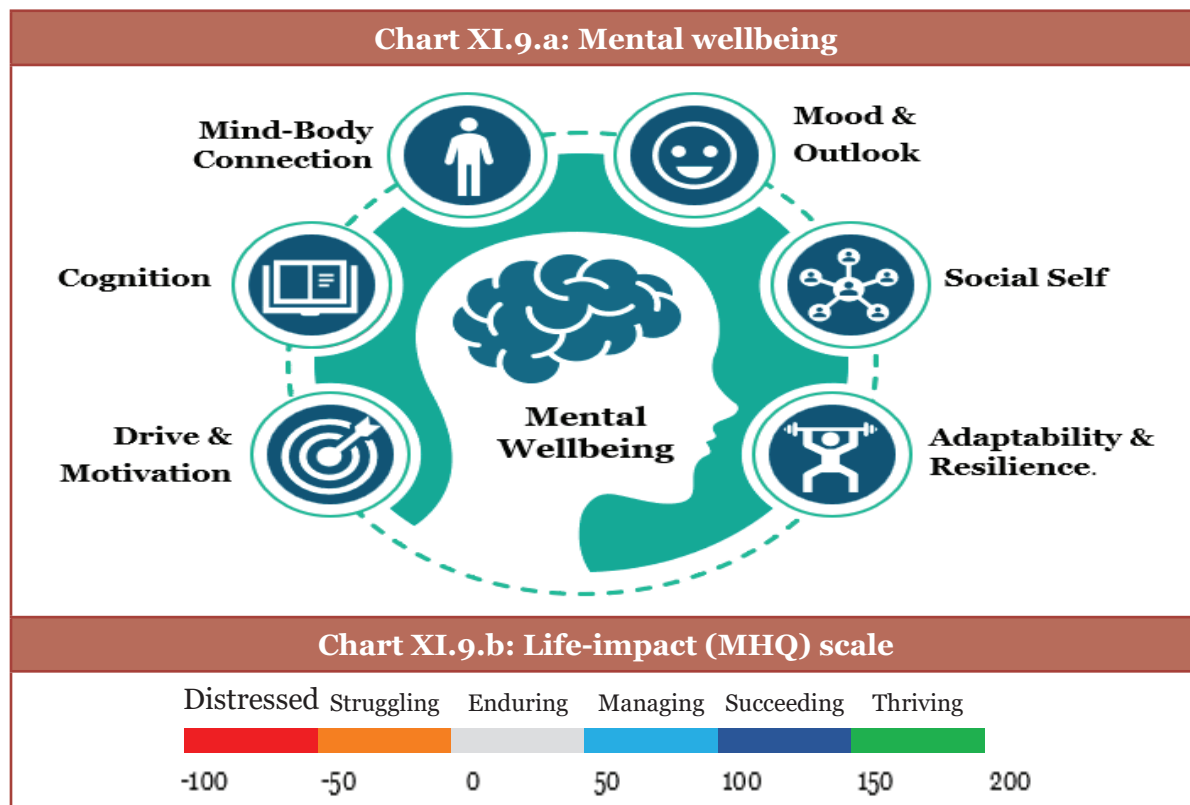
124 National Mental Health Survey of India, 2015-2016 Prevalence, Patterns and Outcomes, Supported by Ministry of Health and Family Welfare, Government of India, and Implemented by National Institute of Mental Health and Neurosciences (NIMHANS) Bengaluru: In Collaboration with Partner Institutions;

125 Patel V. et.al. Million Death Study Collaborators. Suicide mortality in India: a nationally representative survey. *Lancet*. 2012 Jun 23;379(9834):2343-51. doi: 10.1016/S0140-6736(12)60606-0. PMID: 22726517; PMCID: PMC4247159.

126 <https://www.sapienlabsindia.org/>

127 54 per cent were females, 45 per cent males, about 20 per cent reported household incomes less than 1 lakh per year and 10 per cent reported household incomes between 1-3 lakhs/year, and about 70 per cent had incomes greater than 3 lakhs/year, 15 percent lived in Delhi, and 45 per cent lived in cities that were not one of the following: Delhi, Mumbai, Kolkata, Hyderabad, Bengaluru, or Chennai. Individuals from 36 states/Union Territories were part of the sample.

‘symptoms’ as well as the positive aspect of mental function and are queried on a life-impact scale. The score ranges from -100 to + 200, categorised from distressed to thriving (**Chart XI.9.b**).^{128,129} The MHQ score is calculated from the responses provided.¹³⁰



11.72 Work culture comprises the myriad of factors that define an individual's experience at work, including work amount/load, manager and peer relationships, and perceived control. Global data¹³¹, mirrored in India, suggests that work culture strongly impacts mental well-being. In the survey, workers employed in the formal economy in India were asked to rate various work factors on a scale from 1 to 9, where one was the worst, and nine was the best.

128 Newson, J.J., Sukhoi, O. & Thiagarajan, T.C. MHQ: Constructing an aggregate metric of population mental wellbeing. *Popul Health Metrics* 22, 16 (2024). <https://doi.org/10.1186/s12963-024-00336-y>.

129 Newson JJ, Pastukh V, Thiagarajan TC. Assessment of Population Well-being with the Mental Health Quotient: Validation Study. *JMIR Ment Health* 2022;9(4):e34105. <https://mental.jmir.org/2022/4/e34105/>.

130 Please see: <https://tinyurl.com/s6n9j4dc>

131 Sapien Labs Rapid Report. Work Culture and Mental Wellbeing. <https://tinyurl.com/29hdzyru>

11.73 Individuals with the best manager and colleague relationships report a 100-point higher (or 33 per cent¹³²) mental well-being score compared to their counterparts working with the worst manager/peer relationships. Similarly, those reporting the best workload report 80 points or 27 per cent greater mental well-being than their counterparts with the worst workload.

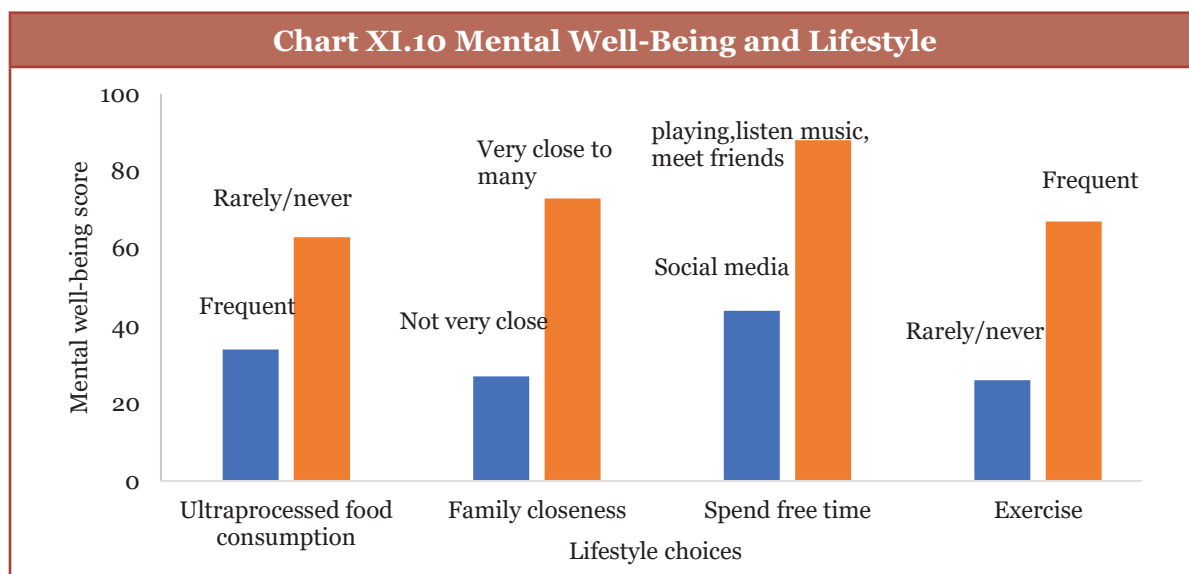
11.74 Further, individuals who report the best pride and purpose at work have a 100-point greater mental well-being score (or 33 per cent) and a 120-point (40 per cent) greater well-being score than those who report the worst. In addition, individuals in fully remote work situations have a mental well-being score about 50 points (17 per cent) lower than counterparts in either fully in-person or hybrid work models, suggesting that social interaction at work is essential to preserve mental well-being.

11.75 While the hours spent at work are informally considered a measure of productivity, a previous study has documented adverse health effects when hours exceed 55-60 per week.¹³³ Spending long hours at one's desk is equally detrimental to mental well-being. Individuals who spend 12 or more hours at a desk have distressed/struggling levels of mental well-being, with a mental well-being score approximately 100 points lower than those who spend less than or equal to two hours at a desk, according to the survey.

11.76 While promoting a better workplace culture will lead to better mental well-being, lifestyle choices and family situations also play a significant role. Results of the survey show that individuals who rarely consume ultra-processed or packaged junk food have better mental well-being than those who regularly do. Similarly, those who rarely exercise, spend their free time on social media or are not close to their families have worse mental well-being. **(Chart XI.10)**

¹³² Since MHQ is calculated on a 300-point scale (-100 to +200), a 100 point higher score translates into a $(100/300)*100=33$ percent.

¹³³ Pega F, Náfrádi B, et al (2021). Global, regional, and national burdens of ischemic heart disease and stroke attributable to exposure to long working hours for 194 countries, 2000-2016: A systematic analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury. *Environ Int.* Sep;154:106595. doi: 10.1016/j.envint.2021.106595.

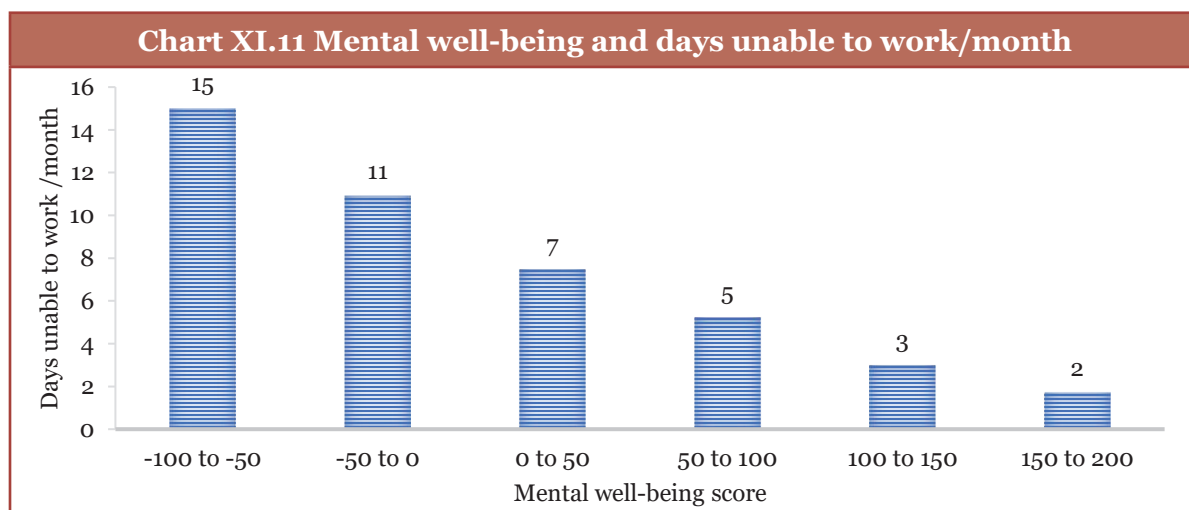


11.77 While the low levels of mental well-being are worrying, the ramifications of these trends on the economy are equally disturbing. **Chart XI.11** shows that individuals with well-being scores between -100 and -50 are unable to work about 15 days a month, while those with scores between 100 and 150 are unable to work three days a month, and those with scores about 150 are unable to work only two days a month. In addition to impacting mental well-being and lifestyle, the workplace culture also affects productivity.

11.78 The survey results show the extent to which lifestyle choices and workplace culture are associated with the number of days an individual is unable to work/month.¹³⁴ Better lifestyle choices/workplace cultures and family relationships are associated with 2-3 fewer days lost per month at work. Having poor relationships with managers and low (worst) pride and purpose at work are associated with the largest increases in the number of days one is unable to work. The findings also suggest that multiple factors affect productivity. For example, even in jobs with the best managerial relationships, about 5 days per month are lost. This is because workplace culture is but one factor (among several) in the determination of productivity (and mental well-being). A study¹³⁵ by the WHO finds that globally, about 12 billion days are lost annually due to depression and anxiety, amounting to a financial loss of \$1 trillion. In rupee terms, this translates to about ₹7,000 per day.

¹³⁴ Self-reported measure of productivity is used.

¹³⁵ Chisholm, D., Sweeny, K., Sheehan, P., et al. (2016). Scaling-up treatment of depression and anxiety: A global return on investment analysis. *The Lancet Psychiatry*, 3(5), 415–424. [https://doi.org/10.1016/S2215-0366\(16\)30024-4](https://doi.org/10.1016/S2215-0366(16)30024-4)



11.79 Lifestyle choices and workplace culture are critical for mental well-being and, hence, productivity. If India's economic ambitions are to be met, then immediate attention must be given to lifestyle choices that are often made during childhood/youth.¹³⁶ Furthermore, hostile work cultures and excessive hours spent working at the desk can adversely affect mental well-being and ultimately put the brakes on the pace of economic growth.¹³⁷

11.80 The increase in mental health issues in children and adolescents is often linked to the overuse of the internet and, specifically, social media. Jonathan Haidt, in his book *'The Anxious Generation: How the great rewiring of children is causing an epidemic of mental illness'*, which has now been voted as the book of the year by Goodreads,¹³⁸ provides a researched assessment of adolescent mental health. He suggests that the arrival of the "phone-based childhood" is rewiring the very experience of growing up. The recent announcements by government of Australia to ban the use of social media by children below 16 years of age is a testimony to the gravity of the situation. Similar interventions are being discussed in Sweden and Spain, as per news report.¹³⁹

11.81 While these interventions at government level are being contemplated, there is an urgent need for school and family-level interventions to encourage healthy pastimes (meeting with friends, playing outside). Investing time in building close family bonds would go a long way towards keeping children and adolescents away from internet and

¹³⁶ Sapien Labs, India Rapid Report. Mental State of India: The Internet Enabled Youth. <https://tinyurl.com/rwz6rws9>

¹³⁷ A caveat to these findings is that the data used here is only from the digitally-enabled population. Google and Facebook ads were used to recruit respondents to take the MHQ survey. It is therefore possible that the data are skewed towards those for whom mental health is a problem who took the survey to know their mental well-being score. However, this worry is not completely justified since the sample also includes individuals with good mental health scores- over 30 per cent report MHQ scores 100 or higher placing them in the succeeding/thriving range. Finally, the associations shown here-of lifestyle and work culture on mental well-being and productivity cannot strictly be interpreted as a causal effect.

¹³⁸ <https://www.goodreads.com/choiceawards/readers-favorite-nonfiction-books-2024>

¹³⁹ Le Monde. (2024, September 10). Australia plans to implement age limit to ban children from social media. <https://tinyurl.com/dxsy2h4r>

improving mental well-being. In many ways, returning to our roots may allow us to reach further for the skies in terms of mental health.

11.82 In summary, given the direct costs to human welfare and the spirit and sentiment of the nation, putting mental well-being at the centre of the economic agenda is prudent. The scale of the problem is immense as discussed in the Economic Survey 2023-24 (Chapter 7, para 7.28). Post-facto treatment will not be sufficient. It is about time to find viable, impactful preventive strategies and interventions. India's demographic dividend is riding on skills, education, physical health and, above all, mental health of its youth.

11.83 Recognising this, the government is committed to creating an accessible and inclusive mental health ecosystem. The Economic Survey 2023-24 (Chapter 7, Table VII.3) highlighted various initiatives aimed at addressing mental health and well-being. The National Mental Health Policy, 2014 provides an overarching vision for mental health in the country. The Mental Healthcare Act, 2017 lays down a rights-based framework for accessible and dignified mental health services. Currently, 47 Mental Health Institutes are operational across the country. Additionally, the government supports mental health services at primary, secondary, and tertiary levels under the National Mental Health Program. A dedicated Tele-MANAS Cell at the Armed Forces Medical College, Pune, supports Armed Forces personnel and their dependents. The Tele-MANAS Mobile Application, launched on 10 October 2024, provides a comprehensive mental health mobile platform. Additionally, video consultations on Tele MANAS have been initially rolled out in Karnataka, Jammu & Kashmir, and Tamil Nadu and will be scaled nationwide.

Impact of lifestyle choices on health

11.84 An individual's lifestyle, encompassing habits like diet, sleep, device use, and exercise, profoundly impacts overall well-being. This section discusses the crucial role of lifestyle on an individual's health.

11.85 According to WHO, non-communicable diseases (NCDs) are the reason behind the death of 41 million people each year, equivalent to 74 per cent of all deaths globally. Of all NCD deaths, 77 per cent are in low- and middle-income countries.¹⁴⁰ The burden of NCD risk factors arises partly from population growth and ageing.





11.86 According to the 2017 study report 'India: Health of the Nation's States' by the Indian Council of Medical Research (ICMR), the proportion of deaths due to NCDs in India increased from 37.9 per cent in 1990 to 61.8 per cent in 2016. The four major NCDs are cardiovascular diseases (CVDs), cancers, chronic respiratory diseases (CRDs), and

¹⁴⁰ <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>

diabetes. These diseases share four common behavioural risk factors: unhealthy diet, lack of physical activity, tobacco use, and alcohol consumption.¹⁴¹

11.87 Recognising the growing NCD challenge, the MoHFW launched the National Programme for Prevention and Control of NCD (NP-NCD), the erstwhile National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS). The programme has significantly strengthened healthcare infrastructure, decentralising services and ensuring quality care reaches rural and remote areas.

Table XI.5: Healthcare infrastructure developed under NP-NCD

	770 District NCD Clinics at District Hospital		6410 Community Health Centres NCD Clinics
	233 Cardiac Care Units		372 daycare cancer centres
Source: MoHFW			

11.88 **Population-Based Screening (PBS) initiative:** To enhance early NCD detection, the government launched the PBS initiative targeting individuals aged 30 and above for screening for common NCDs. The National NCD portal¹⁴², introduced in 2018, manages patient data and integrates health records with ABHA IDs. As on date, 42.2 crore individuals enrolled (aged more than 30 years), and 39.80 crore individuals were screened for diabetes, hypertension, and common cancers, enabling timely interventions, and reducing long-term healthcare burdens.

11.89 Among other factors, lifestyle choices play a crucial role in the prevention of NCDs.¹⁴³ Reducing excess calorie intake and improving dietary quality may help prevent many primary and secondary cardiovascular events.¹⁴⁴ The section on mental well-being discussed how the intake of ultra-processed food (UPFs) is associated with mental well-being. **Box XI.11** dwells on the impact of intake of UPF on the physical health of an individual.

Box XI.11: Ultra-processed food and health impacts

From sweetened breakfast cereals, soft drinks, and energy drinks to fried chicken and packaged cookies, UPFs have undeniably marked their formidable presence in everyday

¹⁴¹ PIB release of MoHFW dated 8th February 2022 (<https://tinyurl.com/vbsk3bk7>)

¹⁴² <https://ncd.nhp.gov.in/>

¹⁴³ Di Cesare M. Global trends of chronic non-communicable diseases risk factors. *Eur. J. Public Health.* 2019;29:ckz185.196. doi: 10.1093/eurpub/ckz185.196.

¹⁴⁴ Yu E., Malik V.S., Hu F.B. Cardiovascular disease prevention by diet modification: JACC Health Promotion Series. *J. Am. Coll. Cardiol.* 2018;72:914–926. doi: 10.1016/j.jacc.2018.02.085.

diet. The NOVA food classification system^{145, 146} categorises UPFs broadly as ready-to-eat products characterised as industrial formulations composed of substances extracted from food, along with additives for taste enhancement. These foods are generally energy-rich with high levels of sugar, salt and unsaturated fats and are nutrient deficient as they are made from ingredients derived from a limited variety of crops such as wheat or soy.

The National Dietary Guideline 2024¹⁴⁷ identifies UPFs as food and beverage products that have undergone extensive industrial processing and contain a high number of additives such as preservatives, sweeteners, emulsifiers, and other substances that are not commonly used in culinary preparations.

Convenience, hyper palatability, affordability, longer shelf life and vigorous advertising and marketing strategies have made a conducive environment for the thriving business of UPFs in India. WHO India¹⁴⁸, reports that, between 2011 and 2021, the value of retail sales in the UPF segment grew at a CAGR of 13.7 per cent. Though there was a YoY growth rate decline from 12.7 per cent to 5.5 per cent during 2020, the very next year, it was 11.29 per cent. According to the HCES 2022-23, almost 9.6 per cent of the food budget in rural areas and 10.64 per cent in urban areas is spent on beverages, refreshments, and processed food.¹⁴⁹

There is enough research to show that the shift in dietary practices from unprocessed to semi-processed and to UPF items exposes an individual to a wide range of adverse health outcomes ranging from obesity, chronic inflammatory disorders, cardiovascular diseases, and mental disorders.^{150,151,152} Being lower in fibre content, UPFs are observed to lead to weight gain and obesity in adults and children.^{153,154,155} Studies from across countries show a

145 Monteiro, C. A. et.al. (2016). NOVA. The star shines bright [Food classification. Public health]. *World Nutrition*, 7(1–3), 28–38. <https://tinyurl.com/NOVA2016WN>.

146 NOVA Food Classification system, which was designed by Center for Epidemiological Studies in Health and Nutrition, School of Public Health, University of Sao Paulo, Brazil. NOVA helps people “group foods according to the extent and purpose of the processing they undergo. The NOVA system classifies foods into four categories: (i) NOVA1 includes unprocessed or minimally processed foods, (ii) NOVA2 comprises culinary ingredients (iii) NOVA3 covers processed foods, and (iv) NOVA4 includes ultra-processed foods.

147 Indian Council for Medical Research - National Institute for Nutrition National Dietary Guidelines, <https://tinyurl.com/bdsdn9w6>

148 World Health Organization. (2023). The growth of ultra-processed foods in India: An analysis of trends, issues, and policy recommendations. World Health Organization Country Office for India. <https://tinyurl.com/madajds2>

149 <https://pib.gov.in/PressReleasePage.aspx?PRID=2026672>

150 Beslay M, Srour B, Méjean C, Allès B, ..& Galan P. (2020). Ultra-processed food intake in association with BMI change and risk of overweight and obesity: a prospective analysis of the French NutriNet-Santé cohort. *PLoS Med.* 2020;17(8):e1003256.

151 Levy RB, Rauber F, Chang K.,& Vamos EP. (2021). Ultra-processed food consumption and type 2 diabetes incidence: a prospective cohort study. *Clin Nutr.* 2021;40(5):3608–14.

152 de Miranda RC, Rauber F, de Moraes MM,& Levy RB. (2021) Consumption of ultra-processed foods and non-communicable disease-related nutrient profile in Portuguese adults and elderly (2015–2016): the UPPER project. *Br J Nutr.* 2021;125(10):1177–87.

153 Dicken, S.J., Batterham, R.L. (2024) Ultra-processed Food and Obesity: What Is the Evidence? *Curr Nutr Rep* 13, 23–38. <https://doi.org/10.1007/s13668-024-00517-z>

154 Martini D, Godos J, Bonaccio M, Vitaglione P, and Grosso G. (2021). Ultra-processed foods and nutritional dietary profile: a meta-analysis of nationally representative samples. *Nutrients.* 2021;13:3390.

155 Poti JM, Braga B, Qin B. (2017). Ultra-processed Food Intake and Obesity: What Really Matters for Health-Processing or Nutrient Content? *Curr Obes Rep.* 2017 Dec;6(4):420-431. doi: 10.1007/s13679-017-0285-4. PMID: 29071481; PMCID: PMC5787353.

direct association between exposure to UPFs and 32 health parameters spanning mortality, cancer, and mental, respiratory, cardiovascular, gastrointestinal, and metabolic health outcomes. They also indicate that greater exposure to UPFs leads to anxiety outcomes, mental disorder outcomes, prevalent adverse sleep-related outcomes, heart disease-related mortality, type 2 diabetes, depressive outcomes, wheezing, obesity, and cancer and higher risks of mortality.^{156,157} Further, there are also evidences that UPFs may hamper with immunity and may lead to increasing gut impermeability and can cause bacterial imbalance in the gut, with adverse implications to immunity.¹⁵⁸ Increased and frequent consumption of UPF is associated with an increased risk of multimorbidity, which refers to the prevalence of multiple chronic conditions due to non-communicable diseases for an extended period of time.¹⁵⁹

Historically, the correlation between poor dietary intake and adverse mental health has been documented. There is growing evidence that the level of food processing influences dietary quality and impacts mental health.¹⁶⁰ Studies also substantiate that increased consumption of UPF has an adverse impact on the mental well-being of children and adolescents.¹⁶¹ Multiple studies link highly processed food with low mood, depression, and anxiety. Increased frequency of intake of UPF impacts mental health function, including cognition, adaptability, and resilience. Also, they can lead to depression, anxiety, and long-term psychological distress.^{162,163}

India has made strides in addressing its growing disease burden as a result of UPF through notable interventions such as Advertising and Claims Regulations, 2018; School Children Regulation, 2020; and the Food Safety and Standards (Labelling and Display) Regulations, 2020. The Consumer Protection Act, 2019 addresses the issue of lack of a clear definition of misleading advertisement and prescribes fines for such advertising of unhealthy food products.

To date, much of the policy and public messaging about ‘unhealthy food’ or the regulations have focused on specific nutrients—saturated fats, sodium, and sugar.

156 Lane, M. M. et.al.(2024). Ultra-processed food exposure and adverse health outcomes: Umbrella review of epidemiological meta-analyses. *BMJ*, 384, e077310. <https://doi.org/10.1136/bmj-2023-077310>

157 Fiolet, T., et.al. (2018). Consumption of ultra-processed foods and cancer risk: Results from the NutriNet-Santé prospective cohort. *BMJ*, 360, k322. <https://doi.org/10.1136/bmj.k322>

158 Whelan, K., Bancil, A.S., Lindsay, J.O. et al. Ultra-processed foods and food additives in gut health and disease. *Nat Rev Gastroenterol Hepatol* 21, 406–427 (2024). <https://doi.org/10.1038/s41575-024-00893-5>

159 Cordova, R. et.al (2023). Consumption of ultra-processed foods and risk of multimorbidity of cancer and cardiometabolic diseases: a multinational cohort study. *The Lancet Regional Health–Europe*, 35.

160 Lane MM, Gamage E, Travica N., & Marx W. (2022). Ultra-Processed Food Consumption and Mental Health: A Systematic Review and Meta-Analysis of Observational Studies. *Nutrients*. 2022 Jun 21;14(13):2568. doi: 10.3390/nu14132568. PMID: 35807749; PMCID: PMC9268228.

161 O'Neil A, Quirk SE, Housden S, & Jacka FN. (2014). Relationship between diet and mental health in children and adolescents: a systematic review. *Am J Public Health*. 2014 Oct;104(10):e31-42. doi: 10.2105/AJPH.2014.302110. PMID: 25208008; PMCID: PMC4167107.

162 Hecht, E. M., Rabil, A., Steele, E. M., & Hennekens, C. H. (2022). Cross-sectional examination of ultra-processed food consumption and adverse mental health symptoms. *Public health nutrition*, 25(11), 3225-3234.

163 Ejtahed HS, et.al. (2024). Association between junk food consumption and mental health problems in adults: a systematic review and meta-analysis. *BMC Psychiatry*. 24. 10.1186/s12888-024-05889-8.

The Way Forward

The huge business of UPF segments has been built on hyper palatability of food items and marketing strategies involving misleading advertisements and celebrity endorsements targeting consumer behaviour. Often unhealthy packaged food items are advertised and marketed as healthy products. For example, breakfast cereals, tetra pack juices and chocolate malt drinks, often advertised as healthy and nutritious, come under the category of UPF based on their ingredients. Misleading nutrition claims and information on UPFs need to be tackled and should be brought under the scanner. Setting standards for permissible levels of salt and sugar and ensuring checks for UPF brands to adhere to the regulations are also required.

Many countries, including Brazil, Canada, Chile, France, Mexico, Israel, Peru, the UK and Uruguay, have been implementing the Nutrient Profile Model for labelling and restricting marketing as proposed by the Pan American Health Organisation (PAHO) in 2016. In 2011, Denmark introduced a tax on saturated food products.¹⁶⁴ Mexico has imposed a surcharge on carbonated drinks and a tax on junk food.¹⁶⁵

Making consumers conscious about what they eat, its ingredients and associated side effects is important not only to counter the intake of UPF but also to maintain a healthy lifestyle. Understanding the ingredients of packaged food, the ill effects of UPF, and healthy food choices should be a part of the school curriculum. Since UPF brands often target children and adolescents, massive awareness of the potential risk factors of UPF is of utmost necessity. Generating health-conscious consumers can further motivate and incentivise various UPF brands to come up with healthy alternatives or minimise the extent of the negative effects of the UPFs. This calls forth for enormous behaviour change campaigns and awareness-generating sessions. Efforts also need to be directed to promote local and seasonal fruits and vegetables and facilitate positive subsidies for healthy foods such as whole foods, millet, fruits, and vegetables to improve their availability, affordability, and consumption.

A study by Nutrition Advocacy in Public Interest (NAPI)/Breastfeeding Promotion Network of India (BPNI) 2023 recommended that efforts to curb the harmful impact of UPFs should be free from food industry influence. The MoHFW should urgently define nutrient thresholds for sugars, salt, and saturated fats to regulate advertising, adopt warning front-of-pack labels (FOPL), and impose stricter marketing restrictions on unhealthy foods, especially targeting children under 18. Schools, hospitals, and public areas should eliminate UPFs, while incentives should promote affordable healthy food production. High GST rates and amendments to consumer protection laws could deter misleading advertising. Additionally, a coalition of civil society and government entities, free from conflicts of interest, is vital to educate the public and counter food industry interference.¹⁶⁶

164 Jensen JD, Smed S, Aarup L, Nielsen E. Effects of the Danish saturated fat tax on the demand for meat and dairy products. *Public Health Nutr.* 2016 Dec;19(17):3085-3094. doi: 10.1017/S1368980015002360. Epub 2015 Aug 26. PMID: 26306542; PMCID: PMC10270788.

165 World Trade Organization. (2007). Mexico - Tax measures on soft drinks and other beverages - Status report regarding implementation of the DSB recommendations and rulings in the dispute Mexico - Tax measures on soft drinks and other beverages (WT/DS308/16). <https://www.wto.org>

166 Junk Push - rising ultra-processed food consumption in India - policy, politics and reality” 2023 (<https://tinyurl.com/3hzjauc6>).

The government has been making dedicated efforts to promote healthy foods and an active lifestyle by implementing initiatives such as Eat Right India¹⁶⁷ and Fit India Movement.¹⁶⁸ By prioritising whole, minimally processed foods rich in nutrients, fibre, and essential vitamins, individuals can lower their consumption of unhealthy additives, excess sugar, and refined grains often found in processed foods. This proactive shift not only enhances physical health but also supports mental clarity and sustained energy.

A multi-pronged approach would be required to address the concerns emerging from the increased inclusion of UPFs in diets in India. The Food Safety and Standards Authority of India (FSSAI) could consider bringing UPFs under regulation with a clear definition and standards, including stricter labelling requirements. Improved monitoring of branded products to ensure compliance would help build consumer confidence. A 22-country study established that self-regulation has not been very effective in this regard.^{169,170} Further, consumer protection efforts can be strengthened to deal with aggressive marketing and distribution practices and misleading nutrition claims in advertising, especially when they are targeted towards children and youth. A higher tax rate for UPFs may also be considered as a 'health tax' measure targeted specifically at brands/products that advertise. There is a need to generate greater awareness of the adverse impact of the consumption of UPFs through campaigns targeted at schools and colleges alongside existing health and lifestyle campaigns of the governments.

RURAL ECONOMY

11.90 The government's emphasis has been on improving the quality of life in rural areas to ensure more equitable and inclusive development. Various measures have been taken in this regard by focusing on infrastructure encompassing rural housing, drinking water and sanitation, clean fuel, social protection, and rural connectivity, along with enhancing rural livelihoods. The financing needs of rural households and small businesses are being met through microfinance institutions, SHGs, and other financial intermediaries. Taking digitisation and technology to the rural economy has also been a key aspect of the rural development agenda, be it in agricultural activities or governance. For instance, the emphasis on digital land records through SVAMITVA shows a structural shift in rural land management and individual economic empowerment. A primary focus has also been on the health parameters of the rural population, with enhanced emphasis necessitated by the pandemic.

167 <https://tinyurl.com/yre63w5k>

168 <https://fitindia.gov.in/>














169 Kelly, B. et al. (2019). Global benchmarking of children's exposure to television advertising of unhealthy foods and beverages across 22 countries. *Obesity reviews: an official journal of the International Association for the Study of Obesity*, 20 Suppl 2(Suppl 2), 116–128. <https://doi.org/10.1111/obr.12840>

170 Gupta, Arun (2024). Why there is a Need to Prioritise Regulation of Ultra-processed Foods and HFSS Foods in India?. *Preventive Medicine Research & Reviews* 1(2):p 90-93. | DOI: 10.4103/PMRR.PMRR_59_23 (<https://tinyurl.com/34dyy7bx>).

Rural Infrastructure

11.91 The summary of progress made under various schemes and initiatives for rural infrastructure development is as follows.

Table XI.6: Progress of Rural infrastructure development schemes

 Roads	Pradhan Mantri Gram Sadak Yojana (PMGSY) (as of 9 January 2025) ¹⁷¹ <ul style="list-style-type: none"> • 8,34,695 km of road length sanctioned. • 7,70,983 km of road length completed. • 99.6 per cent of the targeted habitations provided connectivity.
 Housing	2.69 crore houses completed since 2016 under Pradhan Mantri Awaas Yojana-Gramin (PMAY-G) . ¹⁷²
 Water bodies	68,843 Amrit Sarovars (ponds) constructed under Mission Amrit Sarovar. ¹⁷³
 Health Infrastructure National Health Mission ¹⁷⁴ (Figures in '000s.)	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  165.6 Sub-centres (SCs) </div> <div style="text-align: center;">  25.4 Primary Health Centres (PHCs) </div> <div style="text-align: center;">  5.5 Community Health Centres (CHCs) </div> </div>
	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  32.9 Doctors at PHCs </div> <div style="text-align: center;">  4.4 Total Specialists at CHCs </div> <div style="text-align: center;">  79.3 Nursing Staff at PHCs & CHCs </div> <div style="text-align: center;">  27.7 Pharmacists at PHCs & CHCs </div> <div style="text-align: center;">  23.2 Lab Technicians at PHCs & CHCs </div> </div>
 Drinking Water	12.2 crore households provided with tap water connections under Jal Jeevan Mission (as of 27 January 2025). ¹⁷⁵



171 <https://www.omms.nic.in/>

172 <https://dashboard.rural.nic.in/dashboardnew/pmayg.aspx>

173 <https://amritsarovar.gov.in/Masterreport>

174 <https://tinyurl.com/3ufvys6p>

175 <https://ejalshakti.gov.in/jjmreport/JJMIndia.aspx>

 <p>Sanitation</p>	<p>11.8 crore toilets and 2.51 lakh community sanitary complexes were constructed under Swachh Bharat Mission (Gramin) (As of 27 January 2025).¹⁷⁶</p>
 <p>Comprehensive transformation</p>	<p>Saansad Adarsh Gram Yojana (SAGY) (as of 10 January 2025)¹⁷⁷</p> <ul style="list-style-type: none"> • 3,361 Gram Panchayats (GPs) adopted by MPs. • 3,120 GPs uploaded Village Development Plans. • 2,30,206 projects completed.

11.92 For the development of Particularly Vulnerable Tribal Group (PVTG) under Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan (PM-JANMAN), a separate vertical has been launched under PMGSY by relaxing the population norms upto 100 to provide the connectivity to unconnected PVTG habitations. A total of 8,000 Km of Road length is targeted to be constructed under this vertical. The implementation period is till March 2028. A total of 1,557 road works of 4,781.44 Km of road length have been sanctioned till 9 January 2025.

Rural Housing: A Milestone for identity and economic growth

11.93 For most families in India, owning a house is both a milestone and a leap in living standards, especially for the rural poor, where it signifies identity and well-being. Beyond meeting basic needs, rural housing drives local employment and the economy and serves as a durable credit asset that enhances family welfare.

11.94 Providing housing for economically deprived rural households has long been integral to India's development strategy. Aligning with SDG Goal 11.1 on 'Safe and affordable housing' and India's vision of 'Housing for All,' the Pradhan Mantri Awaas Yojana-Gramin (PMAY-G) was launched on 1 April 2016. The Government of India has approved Phase-IV of PMGSY to provide all-weather connectivity to 25,000 rural habitations based on the population criteria of Census 2011. The PMGSY-IV will incorporate international benchmarks and good practices in road construction. The survey of habitations has started through GIS based App. The PM Gati Shakti is being utilized to plan and implement the programme. **Box XI.12** discusses the outcomes of PMAY-G, which is not merely providing housing but also many attended benefits that the scheme is bringing to the lives of the rural people.

¹⁷⁶ <https://sbm.gov.in/sbmgdashboard/statesdashboard.aspx>

¹⁷⁷ <https://saanjhi.gov.in/>

Box XI.12: The many outcomes of Pradhan Mantri Awaas Yojana-Gramin

PMAY-G aims to provide a pucca house with basic amenities to all houseless families and families living in *kutcha* and dilapidated houses in rural areas by 2029. The construction of 2.69 crore houses has been completed with support under the scheme since 2016. The scheme has been extended to construct an additional two crore rural houses over the next five years, i.e. till 2029.¹⁷⁸ Holistic design and efficient implementation elements of the scheme have contributed to its success.

The target beneficiary identification is made on the basis of a waitlist derived from the Socio-Economic Caste Census, 2011 and Awaas+ survey, 2018, done for this purpose and then verified by the Gram Sabhas. Recently, the number of objective exclusion criteria used for the identification of beneficiaries has been reduced from 13 to 10 (ownership of a fishing boat or motorised two-wheeler, raising the income threshold to ₹15,000 per month were removed) to enhance inclusivity in the target group. The Awaas+ survey, 2024 is also underway to verify eligible beneficiaries.

The scheme operates on the DBT model, where assistance is credited directly into the beneficiary's bank account, and construction work is monitored through geo-tagged photographs. Evaluation study (National Institute for Public Finance and Policy (NIPFP), July 2019¹⁷⁹) shows that the introduction of DBT, as well as geotagging, has reduced the levels of administrative clearances required and the time taken for funds to be released as verification became more efficient. It improves fund utilisation of the scheme as it reduces leakages. DBT under the scheme has improved financial inclusion in rural areas (NIPFP, Dec 2019¹⁸⁰).

PAHAL - a repository of designs of housing typologies that are suitable to different regions/states has been developed and made available to the beneficiaries. These designs incorporate elements of disaster resilience, the use of eco-friendly local materials and skills, the use of cost-effective technologies etc. A rural mason training programme has been developed in partnership with the Construction Skill Development Council of India (CSDCI) and the National Skill Development Corporation (NSDC) and launched as part of the scheme to improve the availability of skilled/trained masons in rural areas for construction under the scheme and other works. So far 2,86,843¹⁸¹ masons have been trained and certified. With the above measures on average, the time taken for the construction of one unit has improved to 114 days under PMAY-G from 314 days under IAY.¹⁸²

The scheme has been a source of employment for labourers, masons, and artisans. The construction of a house under PMAY-G generates direct employment of approximately 314

¹⁷⁸ <https://tinyurl.com/22fbpm48>

¹⁷⁹ National Institute for Public Finance and Policy NIPFP, July, 2019: Impact of Reforms in Pradhan Mantri Awaas Yojana -Gramin (A Secondary Data Analysis) available at <https://tinyurl.com/3yxpafzu>.

¹⁸⁰ NIPFP, December, 2019: Evaluation of Governance Parameters of Pradhan Mantri Awaas Yojana- Gramin, available at <https://tinyurl.com/39wxz2kz>.

¹⁸¹ As on 2 December 2024 and on basis of information received from CSDCI

¹⁸² Ibid note 179 above.

person-days, which includes 81 skilled, 71 semi-skilled, and 164 unskilled person-days. The total direct employment generated for houses completed in the first two years of the scheme was 4.82 crore person days for skilled labour and 7.60 crore person days for unskilled labour (NIPFP, 2018¹⁸³). Extrapolating the estimates, it is seen that more than 192 crore man-days of skilled labour and almost 250 crore man-days of unskilled labour could have been employed since 2016. The study also shows that indirect employment from the backward and forward linkages to construction activities is considerable and beneficial to the rural economy.

The AwaasSoft MIS and AwaasApp enable the implementation of all functions and transactions of the scheme and evidence-based monitoring. This is open to the public, allowing more transparency. The use of emerging technologies, such as AI/ML-based object detection in house images and geo-referencing, enhances transparency and enables better deduplication of PMAY-G assets. Additionally, an eKYC app integrated with Aadhaar and equipped with AI-enabled face authentication technology is used to verify PMAY-G beneficiaries.

The scheme reserves a minimum of 60 per cent of targets for SC/ST households, with 59.58 lakh SC houses and 58.57 lakh ST houses completed. Five per cent of the target is reserved for differently-abled beneficiaries, and another five per cent prioritises housing for families affected by natural disasters. Scheme has placed a special focus on women's empowerment, with 74 per cent of sanctioned houses owned by women solely or jointly.

PMAY-G converges with schemes like MGNREGA¹⁸⁴, SBM-G, Jal Jeevan Mission, and *Surya Ghar*, ensuring beneficiaries access to water, toilets, LPG, electricity, and solar energy. An evaluation shows that the ease of living of beneficiaries is enhanced due to the construction of the house and 88 per cent of respondents confirmed improvements in the standard of living with the construction of houses.¹⁸⁵ The scheme is one of the key interventions facilitating SDG achievements, specifically in terms of the percentage of households living in kuccha houses.¹⁸⁶

Localising SDGs: Powering rural progress

11.95 Localisation of SDGs ensures that rural development aligns with global goals, addressing basic amenities such as housing, sanitation, water supply, and electrification. This approach drives inclusive growth and improved quality of life at the grassroots level. SDGs localisation is being pursued at the Gram Panchayat (GP) level through Village Panchayat Development Plans under Mission Antyodaya¹⁸⁷ and the

183 NIPFP, April 2018 Impact of PMAY-G on Income and Employment <https://tinyurl.com/2aw8erjx>.

184 Mahatma Gandhi National Rural Employment Guarantee Act.

185 NITI Aayog, Evaluation of CSS Scheme – Rural Development Sector, in respect of PMAY-G - 2020-21

186 NITI Aayog SDG India Index 2023-24 <https://tinyurl.com/bddb4733>

187 Mission Antyodaya. Mission Antyodaya Dashboard 2020. Ministry of Rural Development, Government of India, <https://missionantyodaya.nic.in/ma2020/>.

Transformation of Aspirational Districts Programme (TADP), adopted in 2018¹⁸⁸ with districts as the lowest level of implementation. Accelerating forward, the preparation for a Local Indicator Framework (LIF) at the GP level is already in the process where nine themes have been designed spanning across the 17 SDGs. **Box XI.13** discusses these initiatives.

Box XI.13: Localisation of Sustainable Development Goals

The adoption of 17 SDGs in 2015 marked a paradigm shift in how the world understood and prepared itself to pursue the development agenda. India continues to wholeheartedly accept, engage, and progress with the idea of SDG implementation. Our timely submission of Voluntary National Reviews of 2017, 2020 and 2023¹⁸⁹ and the adoption of the SDG Index¹⁹⁰ reflects India's commitment to the cause. The call for '**Sabka Saath, Sabka Vikas**' and the vision of Viksit Bharat by 2047 lays the roadmap for achieving the SDGs.

A 'whole-of-the-government' strategy with an emphasis on cooperative and competitive federalism among states is being followed. The 'collaborative competition' approach, supported by comparative rankings on SDG progress, has generated momentum among states and complements the strategy.

There is a global shift towards the 'localisation' of SDGs to achieve the goals by 2030 and increase the rate and impact of progress. SDG localisation is the process of adapting and customising these goals and translating them into local development plans and strategies that fit the needs, context and priorities of a particular region or locality in coherence with national frameworks (United Nations, 2024).¹⁹¹ This approach places local communities at the centre of sustainable development and anchors development action on the principles of subsidiarity, inclusion, partnership and multilevel governance, with adequate data and financing availability at the local level.

In India, state governments have been proactive and have laid out strategies and frameworks for achieving SDGs at various administrative levels. Some states have extended their indicator frameworks to the district and block levels, ensuring that local budgets align with SDG objectives. This multi-layered approach to SDG implementation is based on the Indian model of SDG Localisation¹⁹² comprising four key pillars: creating institutional ownership, fostering collaborative competition, enhancing capacities, and embracing a whole-of-society approach.

188 NITI Aayog, Aspirational Districts Programme. Government of India, <https://tinyurl.com/bdhfrbxx>.

189 United Nations, Voluntary National Reviews (VNRs) <https://hlpf.un.org/vnrs>.

190 <https://sdgindiaindex.niti.gov.in/>

191 United Nations, Inter-agency Policy Briefs: Accelerating Progress on the 2030 Agenda from Local to Global Levels (United Nations, 2024) <https://tinyurl.com/mvwcm8ye>.

192 NITI Aayog, SDG India Index 2023-24 (NITI Aayog, 2024) <https://tinyurl.com/bdhdr8kx>

Kerala offers a replicable model for SDG localisation.

Kerala uses a robust, community-based model that leverages its strong local governance institutions. Awareness and community engagement efforts focus on educating local officials on the relevance of poverty alleviation and environmental resilience, which are led by state and national leaders. The Local Self Government Department, with technical support from the Kerala Institute for Local Administration (KILA), have developed comprehensive guidelines and processes to incorporate SDGs into local planning. They also train stakeholders in SDG-aligned development and data collection. The state has a real-time SDG dashboard to monitor the panchayats and is able to use such localised data for decision-making and to provide insights on development indicators.

Localisation efforts are driven by the SDG Coordination Centres (SDGCCs) in states and UTs by governments in partnership with implementing agencies. Currently, SDGCCs are operational in 10 states/UTs, namely Andhra Pradesh, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Nagaland, Punjab, Tamil Nadu, Uttar Pradesh, and Uttarakhand. These centres play a pivotal role in supporting and facilitating implementation on the ground. This is achieved through integrated policymaking, fostering interlinkages and synergies, establishing monitoring systems, adopting a convergence-based approach, and fostering participation at all levels of government among all stakeholders.

Over the past six years, the SDGCCs have established a strong foundation for understanding and ownership of the SDGs at the state level. With all levels of government fully committed to achieving the SDGs, there has been a shift in departmental mindsets towards adopting result-based, integrated planning. Through continuous training and handholding support, departments are increasingly aligning their efforts with outcome-linked planning and budgeting. This evolution has fostered evidence-based decision-making and the identification of viable solutions, to reach the most vulnerable population first, realising the principle of 'Leaving No One Behind'.

NITI Aayog is transitioning to SDG Coordination and Acceleration Centres (SDGCACs)¹⁹³ as we approach the 2030 deadline. The SDGCACs will uphold the current SDGCC approach while encouraging innovative solutions, scaling up successful initiatives and fostering synergistic collaborations among diverse stakeholders. They aim to (a) go beyond the planning department and intensify engagement with other key departments, especially the finance department (b) go beyond the whole of the government approach and foster the whole of the society approach for the systematic and sustained participation of civil society organisations (CSOs) and private sectors and (c) have an interconnected approach to challenges by identifying critical actors and working towards a collaboration.

In conclusion, the localisation of SDGs ensures that rural development is in harmony with international goals, focusing on essential services like housing, sanitation, water supply, and electrification. This strategy promotes inclusive growth and enhances the quality of life at the grassroots level.

¹⁹³ SDGCCs are Specialised Project Management Units within State Government departments of Planning, Economics and Statistics or Finance to align the planning process with the SDGs. (<https://sdgknowledgehub.undp.org.in/sdgcc/>)

Other measures towards rural welfare

11.96 **Food, Nutrition, Health, and WASH (FNHW):** To address health, nutrition, WASH, and sanitation issues, DAY-NRLM implements FNHW interventions, focusing on promoting the consumption of produce from nutri-gardens, poultry, small ruminants, and dairy. Currently, FNHW interventions are being implemented in 5369 blocks across 682 districts.¹⁹⁴

11.97 **Social Inclusion and Gender:** State Rural Livelihoods Missions (SRLMs) have developed state-specific strategies to integrate DAY-NRLM components and community institutions, addressing issues such as child education, early marriage, asset creation for women, and violence against women. Currently, 32 SRLMs are implementing these gender interventions.

11.98 Gender Resource Centres (GRCs) are being established to address gender issues at the local level, supported by Gender Point Persons (GPPs) who sensitise SHG members on gender-based violence and discrimination. GPPs are trained by Gender Community Resource Persons (Gender-CRPs), who build capacity in both SHG members and the wider community.

11.99 Over 25 lakh GPPs and more than 89,000 Gender-CRPs work within more than 31,000 Cluster Level Federations (CLFs) and 5,00,000 Village Organisations (VOs), tackling gender issues with the support of 40,061 GP-level Gender Forums and 1927 Block-level Gender Forums. A total of 3997 GRCs are operating across 18 States and UTs under DAY-NRLM, empowering women and gender-diverse persons to address violence and access their rights.

11.100 **Free legal assistance in remote and rural areas:** The National Legal Services Authority (NALSA), established under the Legal Services Authorities (LSA) Act of 1987, provides free legal services to disadvantaged sections of society to ensure equal access to justice, as outlined in Section 12 of the Act. It operates through legal service institutions from the Taluk Court to the Supreme Court, offering services such as legal aid, advice, awareness programmes, Lok Adalats, and the Victim Compensation Scheme.

11.101 Additionally, the government has launched the 'Designing Innovative Solutions for Holistic Access to Justice in India' scheme, which strengthens pre-litigation advice through Tele-Law, facilitates pro bono legal services via the Nyaya Bandhu programme, and promotes legal literacy through pan-India awareness campaigns, utilising technology, and region-specific IEC materials to improve accessibility for the poor and marginalised.

¹⁹⁴ Based on inputs received from MoRD

11.102 The Gram Nyayalayas Act, 2008 aims to provide access to justice at the grassroots level in rural areas. As of October 2024, 313 Gram Nyayalayas have disposed of over 2.99 lakh cases from December 2020 to October 2024.¹⁹⁵

11.103 The National Social Assistance Programme (NSAP) is a social security programme for the vulnerable section of our society. The objective of the programme is to provide a basic level of financial assistance to old age, widows, and disabled persons as well as to bereaved households in the event of the death of the breadwinner belonging to the Below Poverty Line. NSAP caters to 3.09 crore BPL beneficiaries. Further, States/UTs are also providing financial assistance to additional 5.86 crore beneficiaries through State Pension Schemes. Therefore, around nine crore beneficiaries (central NSAP plus additional state beneficiaries) are covered under the pension safety net of the country at an estimated annual expenditure of more than ₹1 lakh crore.¹⁹⁶

Enhancing rural incomes

Deendayal Antyodaya Yojana-National Rural Livelihood Mission (DAY-NRLM)

11.104 DAY-NRLM is a flagship poverty alleviation programme, launched in 2011 with the aim to reduce poverty by enabling poor households to access gainful self-employment and skilled wage employment opportunities, resulting in sustainable and diversified livelihood options for the poor. This is one of the world's largest initiatives to improve the livelihoods of the poor.

11.105 The Mission seeks to achieve its objective through investing in four core components viz., (a) social mobilisation and promotion and strengthening of self-managed and financially sustainable community institution so the rural poor women; (b) financial inclusion; (c) sustainable livelihoods; and (d) social inclusion, social development, and access to entitlements through convergence.





11.106 The programme leverages community resources (social capital) to build institutions and promote livelihoods, with trained SHG members serving as CRPs in various roles like Pashu Sakhi, Krishi Sakhi, Bank Sakhi, Bima Sakhi, CRP-EP, *Poshan Sakhi* etc. The key programme components and their progress is as follows.¹⁹⁷

¹⁹⁵ <https://pib.gov.in/PressReleasePage.aspx?PRID=2078998>

¹⁹⁶ Based on inputs received from MoRD

¹⁹⁷ Cumulative progress of key components (till October 2024)

Table XI.7: Progress under key programme components of DAY-NRLM

Capacity Building	Financial Inclusion	Farm Livelihoods	Non-Farm Livelihoods
 <p>Mobilised 10.05 crore rural poor Households into 90.90 lakh SHGs, 5.96 lakh VOs and 32,439 CLFs in 7,143 blocks of 745 districts</p>	 <ul style="list-style-type: none"> • 1.37 lakh SHG women members positioned as Banking Correspondent Sakhi. • ₹49,284 crore capitalisation support provided to SHGs. • ₹ 9.85 lakh crore of bank credit accessed by SHG. 	 <ul style="list-style-type: none"> • More than 2.64 crore households have agri-nutri gardens • Around 36,205 Custom Hiring Centres established to help small and marginal farmers hire farm tools and services at a nominal cost. • 4.30 crore Mahila Kisan covered 	 <ul style="list-style-type: none"> • Start-Up Village Entrepreneurship Programme (SVEP): nearly 3.13 lakh enterprises in 280 blocks of 31 States/UTs. • Aajeevika Grameen Express Yojana: 2297 vehicles operational in 26 states connecting remote villages.

Mahatma Gandhi National Rural Employment Guarantee Scheme

11.107 The MGNREGA 2005 aims at enhancing the livelihood security of households in rural areas of the country by providing at least 100 days of guaranteed wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work. The physical progress of MGNREGS (the Scheme through which MGNREGA is implemented) is indicated below:

Table XI.8: Key indicators on MGNREGS

Indicator	2020-21	2021-22	2022-23	2023-24*	2024-25*
Person-days generated (in crore)	389.1	363.3	293.8	308.9	220.11
Average person-days per household	51.5	50.1	47.8	52.1	42.77
Women participation rate (%age)	53.2	54.7	57.5	58.9	57.97
*As per MIS (as of 10 January 2025)					

11.108 Multiple efficiency reforms have been introduced to fully utilise the scheme. To ensure probity and elimination of leakages, geotagging before, during, and after the work is being done, 99.98 per cent payments are through National Electronic Fund Management System, wages are transferred under DBT, Aadhaar-based payment has been enabled for 96.3 per cent of total active workers, 99.23 per cent of total successful transactions for wage beneficiaries has been processed through APBS (Aadhaar Payment Bridge System) in Dec 2024 and social audit units have been set up in 28 states/UTs.

11.109 While MGNREGS began as a wage employment scheme, it has evolved into a durable rural asset creation programme for sustainable livelihood diversification, as seen in the rise in the share of individual beneficiary 'works on individual land' from 16.2 per cent of total completed works in FY15 to 71.2 per cent in FY25 (the share in terms of expenditure is much lower, yet rose from 11.65 per cent in FY15 to 28.9 per cent in FY25). MGNREGS has also helped in boosting rural ecological health through improvement of soil quality and plantation and has improved rural water management for agriculture through integrated watershed management (IWM) assets. Capacity development of workers is being promoted through initiatives like Bare Foot Technicians (BFT)¹⁹⁸ and UNNATI¹⁹⁹ skilling project.

11.110 Further, the scheme is converged with various initiatives, including Nutri-Gardens with NRLM, fodder farms with the Department of Animal Husbandry and Dairying (DAHD), horticulture with the Ministry of Agriculture, medicinal plantations with the Ministry of Ayush, Gram Panchayat buildings with the Ministry of Panchayati Raj, community sanitary complexes with SBM Grameen, construction of Anganwadi Centres with Ministry of Women and Child Development, promoting sericulture plantations with Ministry of Textiles, supporting rubber plantations with Rubber Board (Ministry of Commerce), promoting aquaculture in ponds and farm ponds with Department of Fisheries, rural roads with PM Gram Sadak Yojana, and all-weather roads with BRO for border areas. Apart from that, convergence is also made at the state level with different state departments such as Forest Department, agriculture Department, Horticulture Department, Tribal Development Department and others for implementation of developmental works in rural areas.

OUTLOOK

11.111 The Indian economy's growth story emphasises a welfare-enhancement approach by the government, focusing on empowering all citizens and ensuring the efficient delivery of welfare measures. The government's initiatives aim to provide opportunities

¹⁹⁸ So far, 9186 BFTs have been trained in 20 States.

¹⁹⁹ A total of 2,00,000 beneficiaries to be trained till March 2025 with an estimated financial expenditure of Rs.307.34 Crore. A total of 73,628 beneficiaries have been trained till 30th September 2025.

for everyone, enabling them to achieve their professional and personal goals. With the focus on education, health, skilling, and innovation, with improved social and economic infrastructure the aim is to achieve welfare for all.

11.112 While the education and health system has made significant progress through various initiatives aimed at achieving national goals, there is a critical need to enhance the delivery mechanisms. By rethinking and improving these systems and integrating innovation and technologies, one can ensure that benefits effectively reach the last mile and are fully realised by those who need them most.

11.113 The importance of focusing on learning outcomes is underscored by reports revealing the gap between class standards and actual learning levels. To address this gap and enhance learning outcomes, it is crucial to implement innovative teaching methods and strategies that prioritise peer learning, social and emotional development, digital literacy, and life skills. These approaches will not only boost academic performance but also foster cognitive and critical thinking skills among students.

11.114 Policymaking in India emphasises preventive health to enhance life expectancy, quality of life, and economic growth through lower healthcare costs and improved productivity. The National Health Policy 2017 advocates universal health coverage, affordable care, and prevention of NCDs. Advancements in physical and digital infrastructure, including eSanjeevani, UWIN, NDHM, drones, and AI, have improved healthcare access, particularly in underserved areas. Mental health initiatives and strategies to promote healthier lifestyles are crucial for addressing NCDs and boosting productivity.

11.115 The government's focus on rural infrastructure, housing, and livelihoods reflects a comprehensive 'welfare for all' approach. By improving rural connectivity, sanitation, housing, access to drinking water, and social inclusion, alongside supporting microfinance, SHGs, and localisation of SDGs, these initiatives ensure inclusive development. Together, they uplift rural communities, bridging gaps in equity and quality of life.

11.116 Regulatory institutions in the areas of health and education must constantly balance the needs of the society and that of the ease of provision of such services by the providers. Where the market can do an effective job, regulations can either be withdrawn or compliance made voluntary with disclosure. Tight regulations increase the compliance and supervision burden on state capacity that is already stretched. This gives rise to unfulfilled expectations on the part of the public. Therefore, for India to receive the demographic dividend in full in the coming years, regulatory institutions need to evolve to focus on allowing outcomes to happen without being fixated on

inputs. Trust-based regulation backed up by transparency and disclosure on the part of the regulated deserves a chance. Regulators must develop their assessment parameters and report on their own effectiveness transparently. There is no better way to demand right behaviour than to set an example.

EMPLOYMENT AND SKILL DEVELOPMENT: EXISTENTIAL PRIORITIES

India's labour market indicators have experienced substantial improvements in recent years driven by a robust post-pandemic recovery and increased formalisation. According to the Periodic Labour Force Survey, the unemployment rate has significantly declined over time, alongside positive trends in labour force participation and the worker population ratio. Factory employment data further reflects the manufacturing sector's resilience.

To fully capitalise on the demographic dividend, it is well-recognised that creating quality jobs that offer sustainable livelihoods is crucial. Further, by prioritising reskilling, upskilling, and new-skilling, the government is aiming to align the workforce with global demands, enhancing both domestic and international employability. Simplifying compliances, promoting labour flexibility, and strengthening workers' welfare are vital for driving sustainable job growth. Lowering the fixed costs of doing business through deregulation will create room for enterprises to hire more. To boost women's workforce participation, prioritising targeted skill development and providing entrepreneurial support is being pursued. Additionally, sectors like the digital economy and renewable energy offer vast potential for creating high-quality jobs, which is essential for achieving the Viksit Bharat's vision.

INTRODUCTION

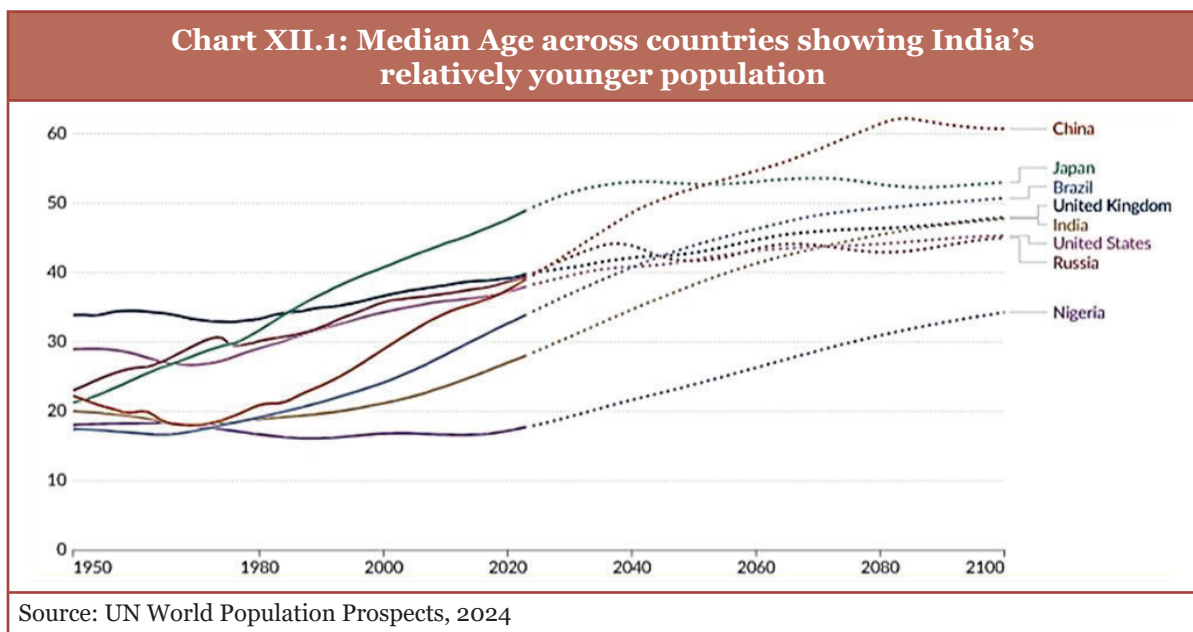
12.1. As the crucial link between growth and prosperity, the quantity and quality of employment in an economy determines how economic growth sustainably percolates the masses. With around 26 per cent of the population in the age group 10-24 years, India stands at the cusp of a once-in-a-lifetime demographic opportunity.¹ As one of the youngest nations globally, India's economic success depends on integrating its growing workforce into productive and meaningful roles, ensuring inclusive and long-term growth.

12.2. In 2014, India was ranked as the tenth-largest economy in the world. In under a decade, India surpassed the UK to reach the fourth position. She is poised to be the

¹ State of the World Population Report 2024, United Nations Population Fund (UNFPA) (<https://www.unfpa.org/swp2024>)

third largest economy by 2030, after the USA and China. By 2030, she will have a growing working-age population and healthy manufacturing sector. The country's demographic trend highlights the growing potential for a demographic dividend.² The currently young population, with a median age of around 28 years, compared to the ageing population of developed countries, is the key driver of the growth potential.³

12.3. The declining dependency ratio⁴, marked by the falling child dependency ratio following declining fertility rates, has contributed to this demographic advantage. This is further supported by a relatively gradual increase in the elderly dependency ratio due to increased life expectancy.⁵ The total dependency ratio has declined from 64.6 per cent in 2011 to 55.7 per cent in 2021 and is projected to fall further to 54.3 per cent by 2026.⁶ The expanding working-age population offers opportunities for economic growth, provided these individuals are employed in productive sectors.



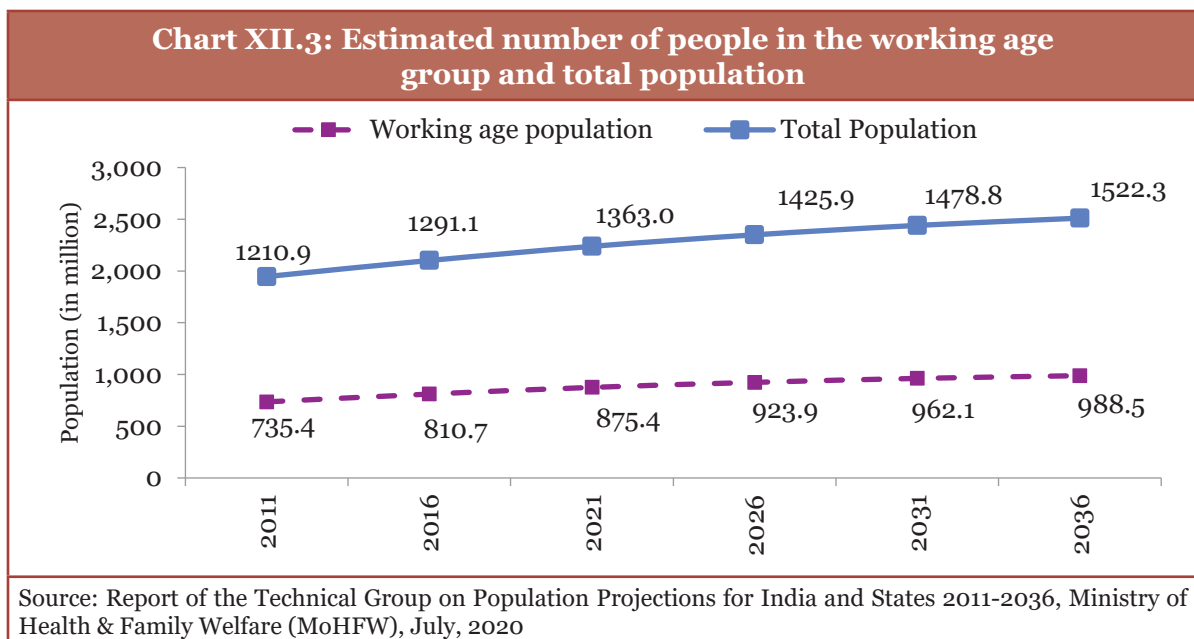
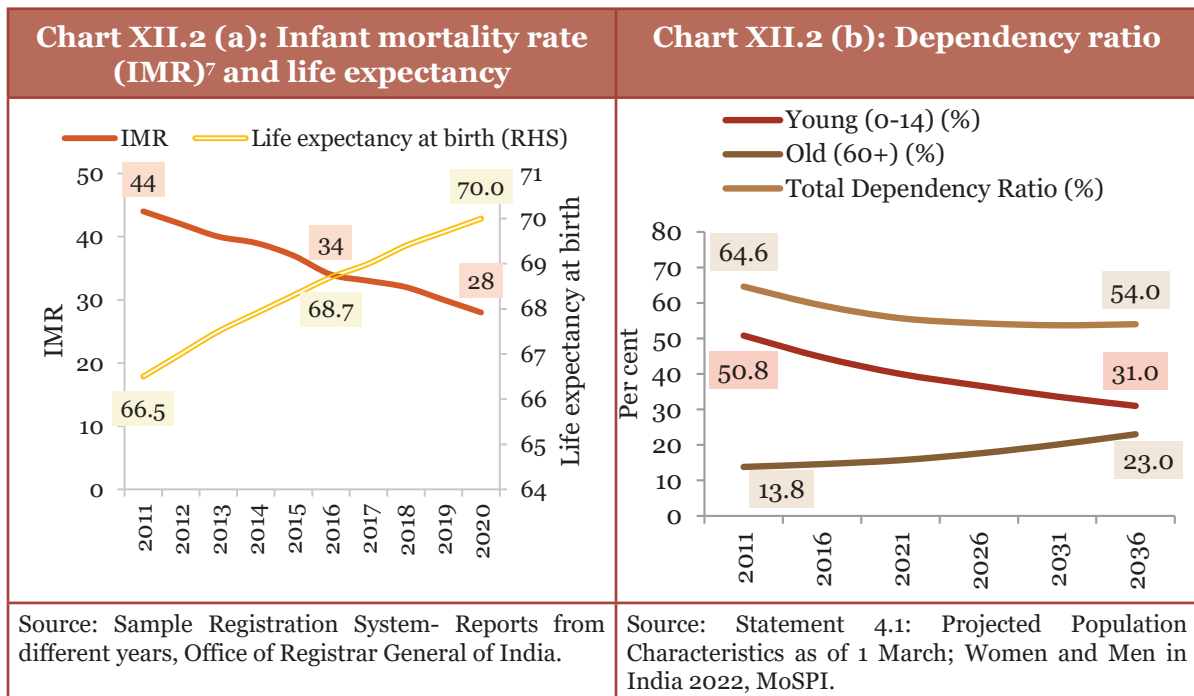
² The demographic dividend refers to the economic growth potential arising from a shift in a country's age structure, where the working-age population (15 to 59 years) outnumbers the non-working-age groups.

³ UN World Population Prospects, 2024. (<https://population.un.org/wpp/>)

⁴ The dependency ratio is the number of children (age 0-14 years) and older persons (age 60 years and above) per 100 working age population (15-59 years). The calculation of the ratio is given below: $\text{Dependency Ratio} = 100 \times \frac{\text{Population (0-14)} + \text{Population (60+)}}{\text{Population (15-59)}}$

⁵ Report of the Technical Group on Population Projections for India and States 2011-2036, Ministry of Health & Family Welfare, July, 2020 (<https://mohfw.gov.in/?q=documents/reports-archive>).

⁶ Ibid note 5 above



12.4. The Economic Survey 2023-24 highlighted that the Indian economy must generate, on average, 78.5 lakh non-farm jobs annually until 2030 to productively engage its growing working population. Creating quality jobs remains an ongoing endeavour and a well-recognised national priority, pivotal to ensuring inclusive and sustainable economic growth. Further, the ambitions and aspirations of the workforce align with the need to generate employment opportunities to leverage the country’s demographic dividend and to accelerate the structural transformation from farm to non-farm jobs.

⁷ Infant mortality rate (or IMR) is the number of infant deaths per 1,000 live births during the year.

12.5. Against this backdrop, this chapter analyses the employment and skill development trends and challenges in the economy. The first section delves into the state of employment, focusing on the sectoral and gender distribution of the workforce and state-wise trends. The second section focuses on job creation and outlines the government's actions to enhance employment opportunities. It highlights initiatives such as labour law reforms, potential sectors for job creation, and the role of skill development. The challenge of re-strategising the skills development framework to prepare the youth for evolving industry requirements domestically and internationally is discussed in the third section.

STATE OF EMPLOYMENT

12.6. India has experienced good employment growth in recent years, following the nation's sustained economic momentum. The 2023-24 annual Periodic Labour Force Survey (PLFS) report by the National Statistical Organisation (NSO) highlights a significant post-pandemic recovery in employment trends across India.⁸ The all-India annual unemployment rate (UR) for individuals aged 15 years and above (usual status)⁹ has steadily declined from 6 per cent in 2017-18 to 3.2 per cent in 2023-24.¹⁰ This recovery has been accompanied by an increase in the labour force participation rate (LFPR) and the worker-to-population ratio (WPR).¹¹ Moreover, even under the stricter current weekly status (CWS) criteria, employment levels have rebounded strongly in both urban and rural areas, reflecting a broad-based recovery since the COVID-19 pandemic.¹²

12.7. In addition, the quarterly urban unemployment rate (UR) for people aged 15 years and above has shown improvement. The urban UR has dropped from 6.6 per cent in Q2 FY 24 to 6.4 per cent in Q2 FY 25. This positive shift aligns with a broader strengthening of workforce metrics in urban areas, as the LFPR increased from 49.3 per cent to 50.4 per cent, and the WPR rose from 46 per cent to 47.2 per cent during the same period (Q2 of FY24 to Q2 FY25).¹³

8 <https://tinyurl.com/yaykmtat> ; The period of the PLFS surveys is July-June. For example the survey period for 2023-24 is July 2023 to June 2024.

9 For a person to be categorised as employed as per usual status (ps+ss), he/she must have pursued an economic activity for at least 30 days during the 365 days preceding the date of the survey.

10 UR is defined as the percentage of unemployed persons in the labour force.

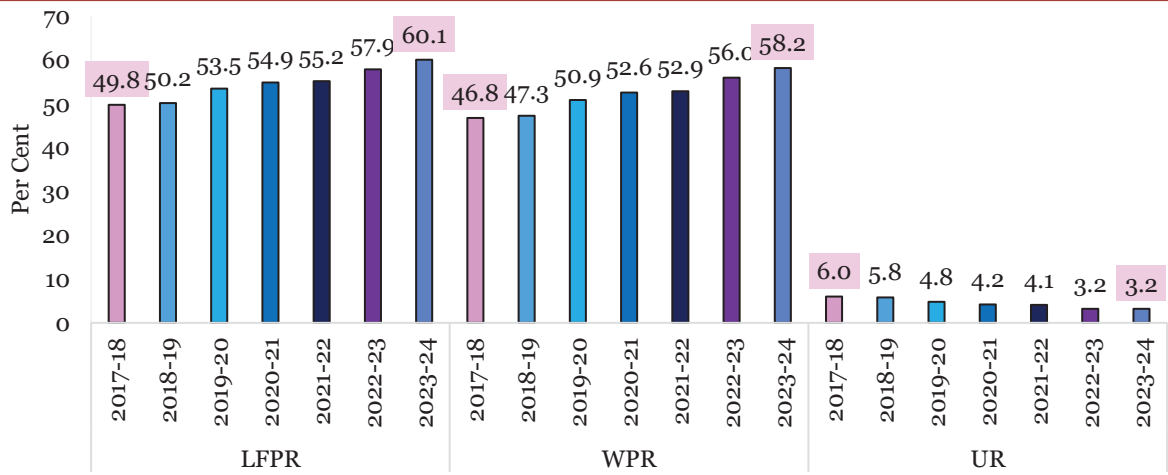
11 According to the PLFS, LFPR is the percentage of working-age population engaged in work or making tangible efforts to seek 'work' or being available for 'work' if it is available. 'Work' includes self-employment (subsistence agriculture and collection of firewood, poultry farming, etc., for self-consumption), regular wage/salaried employment, and casual labour. WPR is defined as the percentage of employed persons in the total population.

12 In the case of CWS, the activity status is determined on the basis of a reference period of the last 7 days preceding the date of the survey.

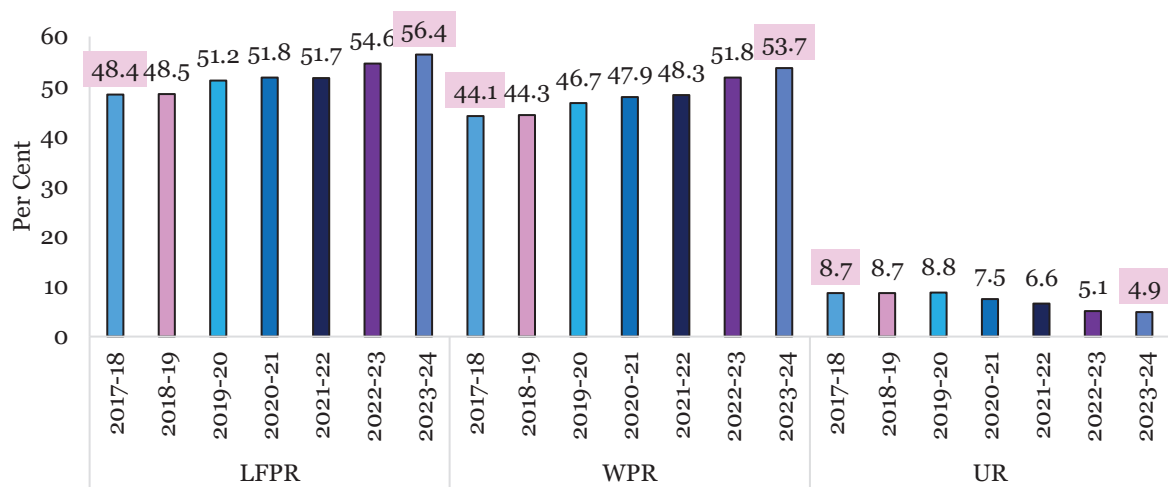
13 <https://tinyurl.com/2myhmmmed>, Quarterly PLFS, MoSPI

Chart XII. 4. Improvement in annual labour market indicators

(a) Usual status, aged 15 years and above (July – June Period)

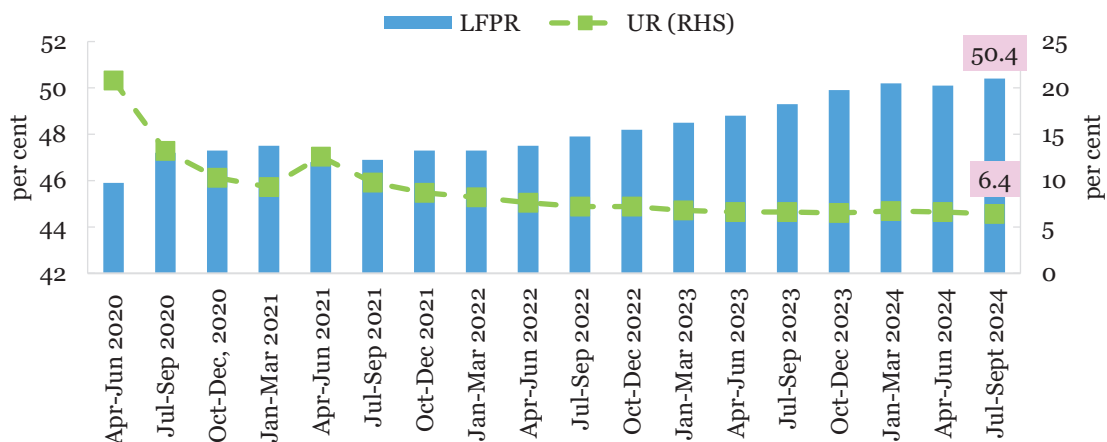


(b) Current weekly status, aged 15 years and above (July – June Period)



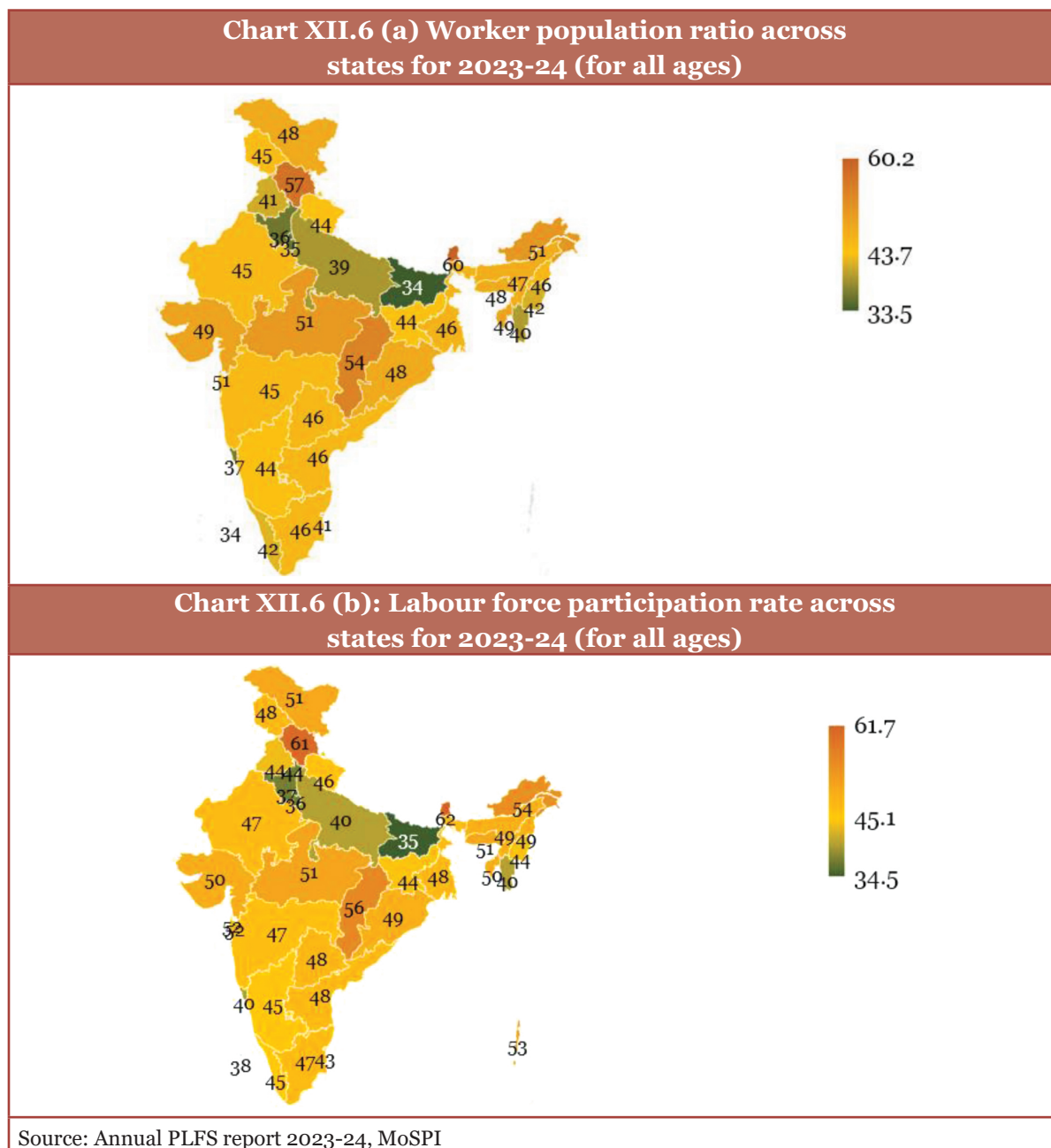
Source: Annual PLFS report 2023-24, Ministry of Statistics and Programme Implementation (MoSPI)

Chart XII.5. Declining quarterly urban unemployment



Source: Quarterly PLFS, MoSPI
 Note: Figures for Current Weekly Status, 15 years and above

12.8. The 2023-24 annual PLFS report highlights encouraging trends in labour market conditions across India. Among the 36 states and union territories, only 12 have a WPR (for all ages) below the national average of 43.7 per cent, and 12 fall short of the national LFPR (for all ages) average of 45.1 per cent (refer to Chart XII.6). Further, 14 states have achieved over a 10-percentage point increase in WPR¹⁴, and 11 states have recorded a similar increase in LFPR compared to 2017-18.^{15,16}



14 States/UTs with more than 10 percentage points increase in WPR: Arunachal Pradesh, Nagaland, Tripura, Jharkhand, Assam, Odisha, Uttarakhand, Sikkim, Gujarat, Rajasthan, Puducherry, Himachal Pradesh, Madhya Pradesh and Uttar Pradesh.

15 States/UTs with more than 10 percentage point increase in LFPR from 2017-18: Arunachal Pradesh, Nagaland, Tripura, Assam, Jharkhand, Odisha, Sikkim, Uttarakhand, Gujarat, Himachal Pradesh and Rajasthan

16 Figures for usual status for all ages. For a person to be categorised as employed as per usual status (ps+ss), he/she must have pursued an economic activity for at least 30 days during the 365 days preceding the date of the survey.

12.9. The proportion of self-employed workers in the workforce has risen from 52.2 per cent in 2017-18 to 58.4 per cent in 2023-24. This shift reflects growing entrepreneurial activity and a preference for flexible work arrangements. While the share of workers (male and female) in regular/salaried jobs decreased from 22.8 per cent to 21.7 per cent during the same period, the trend has stabilised since 2020-21, with employment levels either holding steady or showing gradual improvement. The decline in casual workers, from 24.9 per cent to 19.8 per cent, also indicates a shift toward more structured forms of self-employment. These changes suggest an evolving workforce that embraces flexibility and independence in response to industry transformations and individual preferences.

12.10. According to PLFS data, the shift in employment trends has been particularly impactful for women. While the proportion of women in regular wage/salaried employment decreased, more women engage in self-employment or contribute to household enterprises, especially in rural areas. For instance, in rural India, women's participation in regular wage jobs fell from 10.5 per cent in 2017-18 to 7.8 per cent in 2023-24, coinciding with an increase in women working as "own account workers/employers" or "helpers in household enterprises." In urban areas, salaried employment for women decreased from 52.1 per cent to 49.4 per cent. The bulk of the drop occurred in 2020-21, when it dropped to 50.1 per cent from 54.2 per cent the year before. This was accompanied by a rise in entrepreneurial ventures and flexible work roles.

12.11. Among rural women, the share of "own account workers/employers" surged from 19 per cent in 2017-18 to 31.2 per cent in 2023-24, highlighting a significant move toward independent work and entrepreneurship. Similarly, the share of "helpers in household enterprises", which represents unpaid family labour, grew from 38.7 per cent to 42.3 per cent, indicating a rise in family-oriented economic activities. The rise in casual wages could be one of the factors contributing to this increasing reliance on family labour within household enterprises. Urban areas also witnessed a positive shift, with "own account workers/employers" increasing from 23.7 per cent to 28.5 per cent and "helpers in household enterprises" from 11 per cent to 13.8 per cent over the same period.

12.12 PLFS covers the period from July to June; hence, the full force of the lockdowns in different states is felt in 2019-20. The impact of the pandemic felt in lost years of schooling, and the health of the elderly resulted in women leaving regular wage/salary work and taking up flexible work so that they could take care of children who stayed at home due to school closures and elders who needed extra care and attention. Subsequently, the enhanced flexibility that "own account work" allows and the expanded

opportunities it has brought for women have seen this category grow in the share of overall employment.

Chart XII. 7 (a) The trend in broad category-wise employment status

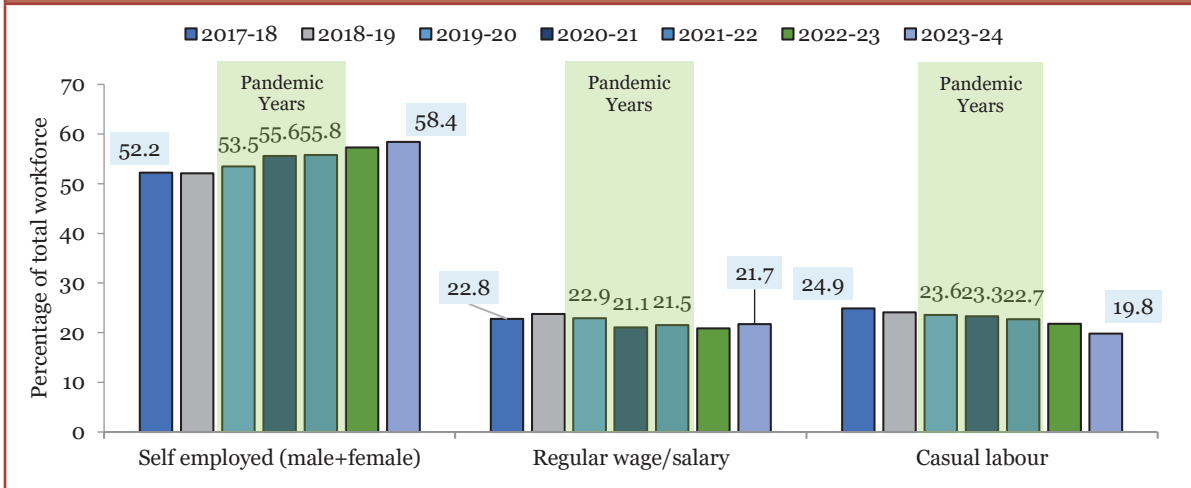
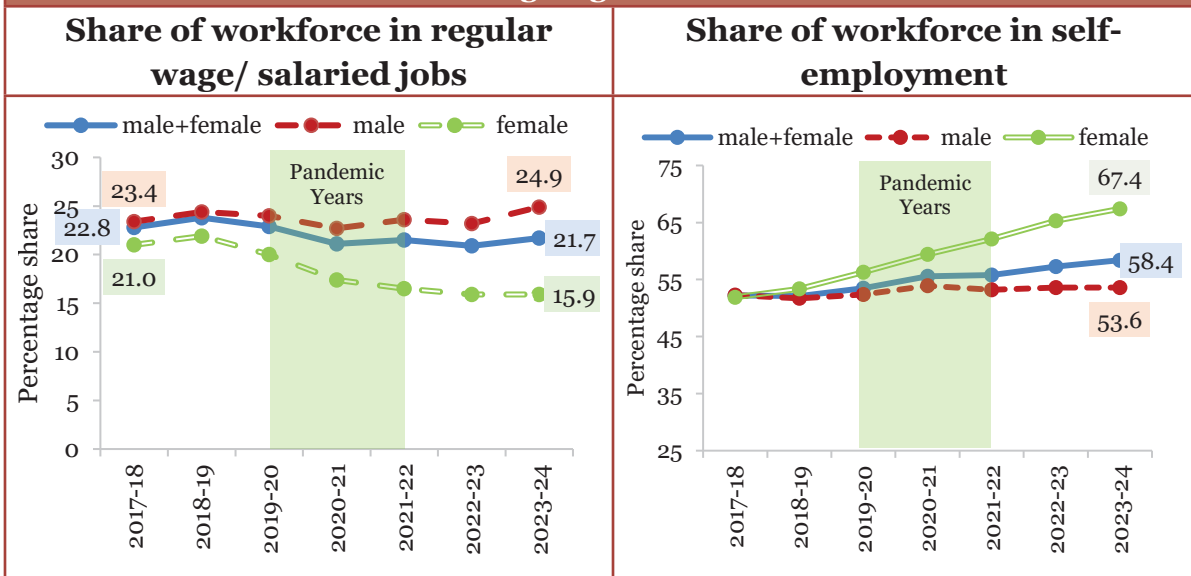


Chart XII. 7 (b) Trend in broad category-wise employment status: through a gender lens

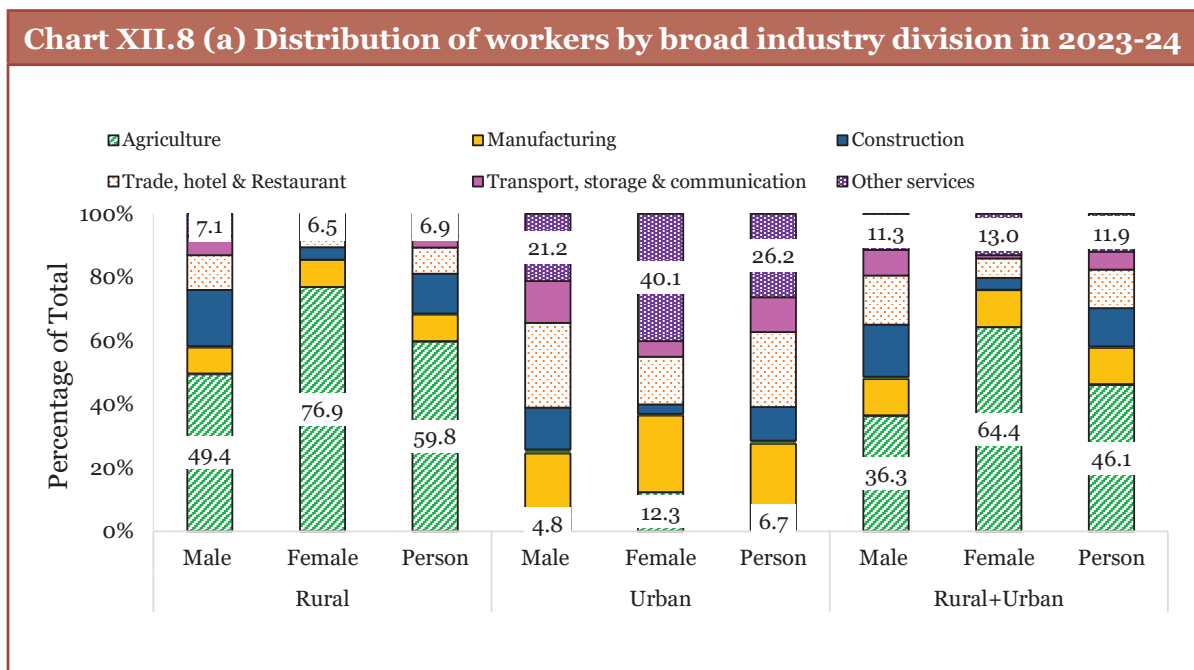


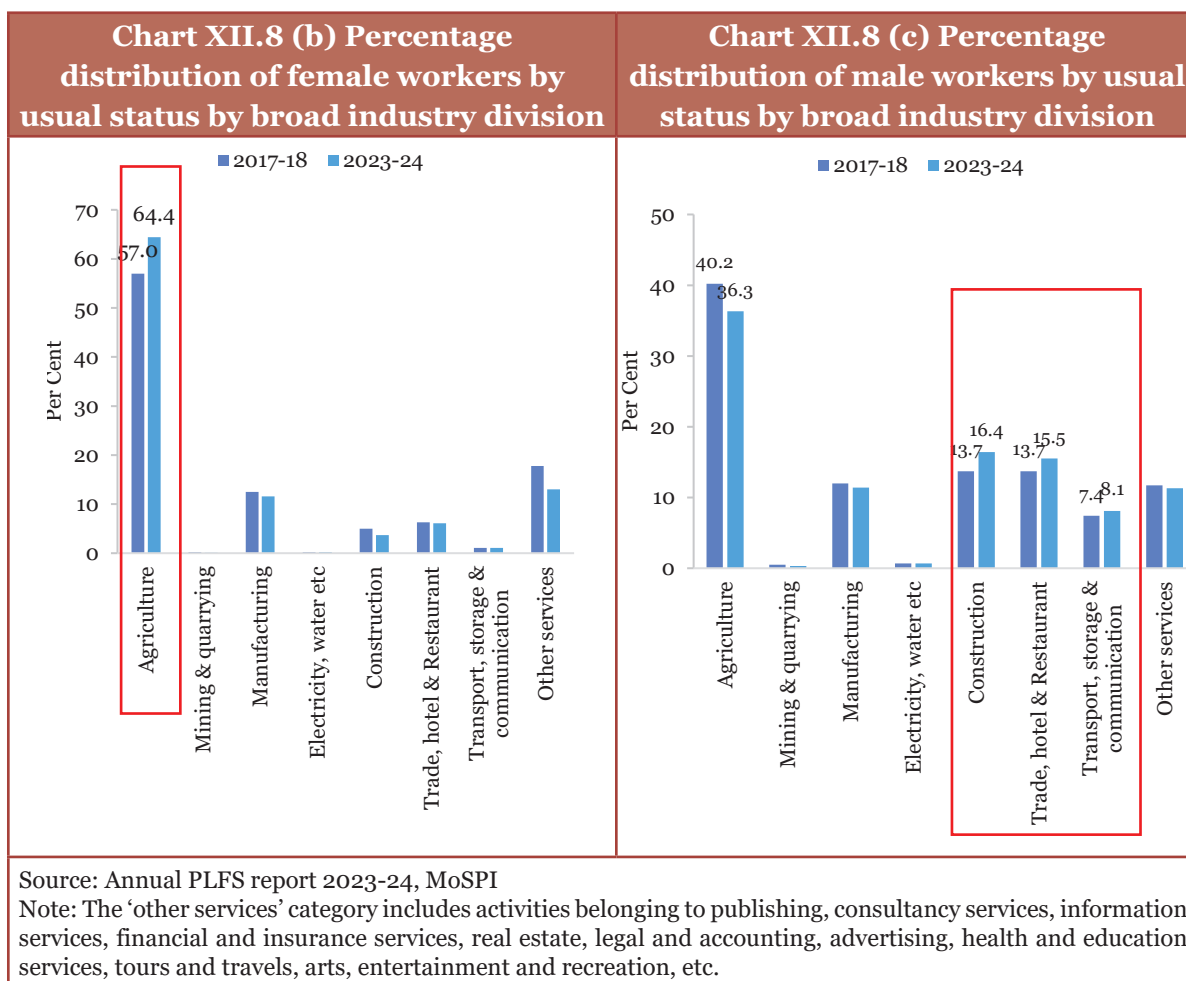
Source: Annual PLFS report 2023-24, MoSPI

12.13. Initiatives such as Mudra Yojana, Skill India, Start-Up India, and Stand-Up India have played a pivotal role in fostering entrepreneurship, providing skill training, and supporting individuals in creating self-reliant and sustainable livelihoods. This ecosystem of support reflects the growing emphasis on empowering individuals to chart their own professional paths.

Sectoral distribution of the workforce

12.14. According to the PLFS 2023-24, the agriculture sector remains dominant in employment, with its share rising from 44.1 per cent in 2017-18 to 46.1 per cent in 2023-24. The share of industry and services sectors saw declines in employment share, with manufacturing falling from 12.1 per cent to 11.4 per cent, and services from 31.1 per cent to 29.7 per cent during the same period. The share of female workers in agriculture has increased significantly, from 57.0 per cent in 2017-18 to 64.4 per cent in 2023-24, whereas, male participation in agriculture decreased from 40.2 per cent to 36.3 per cent. Greater male involvement in sectors like construction, trade, hotel, restaurant, transport, storage and communication services is observed.



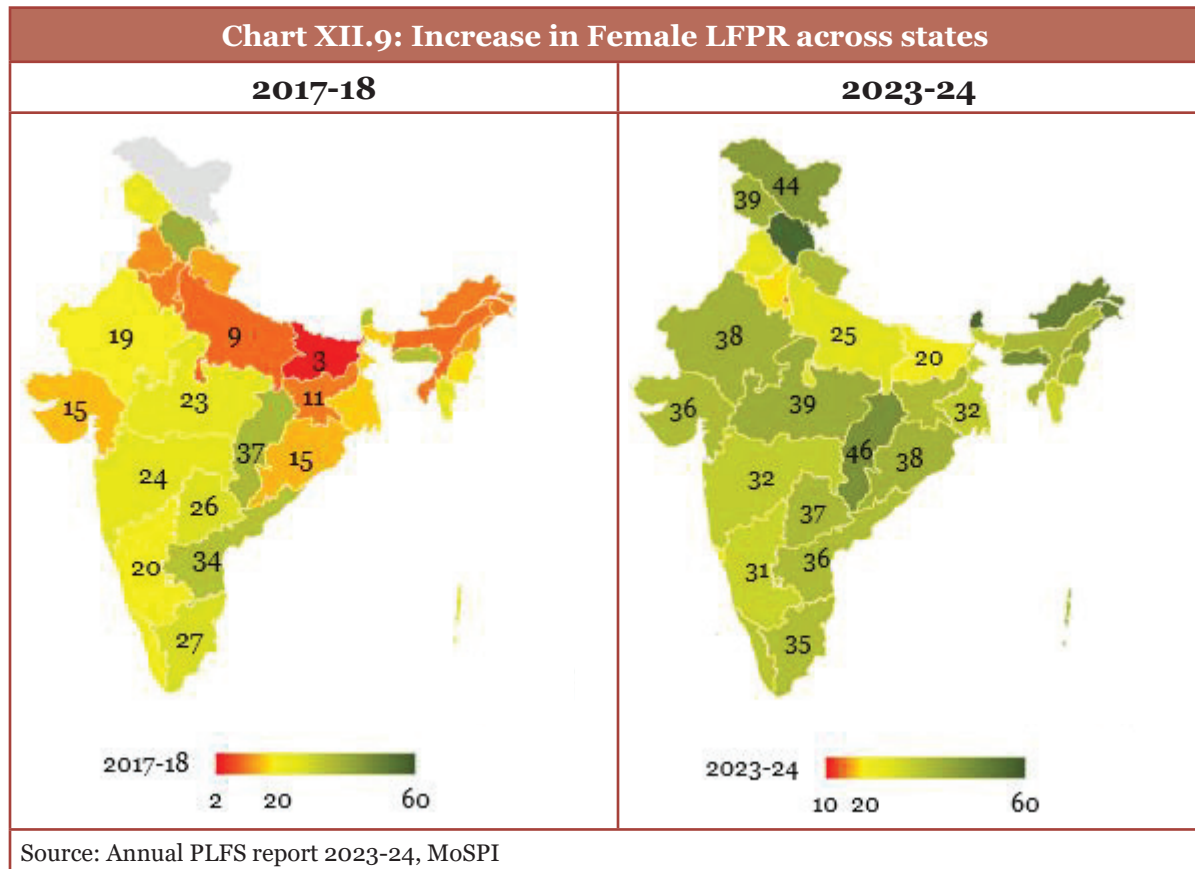


12.15. In rural areas, female agricultural employment rose from 73.2 per cent in 2017-18 to 76.9 in 2023-24 per cent, while male participation decreased from 55.0 per cent to 49.4 per cent, reflecting a shift towards non-agricultural sectors during the same period. In urban areas, women predominantly work in other services, though this share declined slightly from 44.4 per cent in 2017-18 to 40.1 per cent in 2023-24. Significant employment of females is also observed in manufacturing, trade, and agriculture. Male workers in urban areas are seen to be primarily employed in manufacturing, construction, and trade-related services.

Rise in Female LFPR: Tapping into female labour for economic growth

12.16. From the gender perspective, the female labour force participation rate (FLFPR) has been rising for seven years, i.e., from 23.3 per cent in 2017-18 to 41.7 per cent in 2023-24, driven mainly by the rising participation of rural women. The notable rise in the FLFPR is the primary driver of the overall improvement in the labour market indicators.

12.17. The FLFPR has improved across states. In 2017-18, 20 states/UTs had FLFPR of less than 20 per cent. This number has gone down to three in 2023-24. Currently, most states (21) have a FLFPR in the range of 30-40 per cent. Seven states/ UTs reported FLFPR greater than 40 per cent in 2023-24, with Sikkim reporting the maximum rate of 56.9 per cent.



12.18. The increase in the rural FLFPR largely drives the increase in FLFPR, which rose from 24.6 per cent in 2017-18 to 47.6 per cent in 2023-24. This rise could be attributed to women taking advantage of new opportunities brought about by the various government initiatives to promote female participation in the labour force. **Box XII.1** discusses the possible reasons for higher FLFPR in India. It also elaborates on findings from a primary survey conducted in selected districts of Bihar, Jharkhand, Madhya Pradesh, and Uttar Pradesh in November 2024 regarding the increase in FLFPR.

Box XII.1: Factors influencing the female labour force participation

PLFS 2023-24 shows enhanced participation of women in economic activities across various categories, including rural and urban. This increase in FLFPR can partly be attributed to better capturing female workers in unpaid work by the PLFS survey.¹⁷ Further, the increase

¹⁷ PIB release of Ministry of Labour & Employment dated 18 November 2024. (<https://tinyurl.com/3usymatj>).

in the rural FLFPR can be attributed to the skilling initiatives and improved access to credit for diversified livelihoods provided to women's collectives under the Deendayal Antyodaya Yojana - National Rural Livelihood Mission (DAY-NRLM). The increased push of government towards encouraging entrepreneurship is also likely a key contributor to the increased participation of women in the labour force. Some of these initiatives are discussed in Box XII.2.

To better understand the labour market choices of female workers, both paid and unpaid, a survey was conducted among married women aged 25 to 45 in rural areas who were relatively less financially privileged. The survey focused on those receiving loans from SHGs and represented a population poorer than the average Indian population.¹⁸ It was observed that 34 per cent of surveyed women were engaged in paid work, most pronounced among poorer households. In the households below average levels of wealth in the sample, 46 per cent of women are engaged in paid work, whereas less than 15 per cent of women are engaged in paid work if they come from the top 10 per cent of wealthiest households in the sample.

Among women not engaged in paid work, 58 per cent were engaged in unpaid work (helping the household in agricultural tasks). This suggests that more than 70 per cent of the married women were engaged in (paid or unpaid) labour, directly generating greater household income. Further, about 55 per cent of those currently out of the workforce cited household and childcare duties as barriers to entering the paid workforce.

According to some research, gender norms and the associated responsibilities/responsibilities of childcare and household responsibilities are prominent reasons for women not taking up paid work despite the desire to do so.¹⁹ This finding highlights the care sector's vast potential for increasing FLFPR, as noted in the Economic Survey 2023-24.

The Economic Survey 2023-24 (Box VIII.2) highlighted the systemic barriers that impede job opportunities for women. To sustain and enhance women's participation in the workforce, it is essential to remove restrictions on women working in certain occupations. This responsibility lies with state governments. As women cite childcare responsibilities as a consideration in deciding on employment, childcare facilities and crèches will go a long way in female participation in the labour force. Additionally, policies should prioritise targeted skill development and support for emerging sectors while encouraging transitioning from traditional to non-traditional roles. Aligning skill development programmes with industry needs and adopting a long-term strategy focused on women and girls will prepare them for evolving job opportunities and help India effectively leverage its demographic dividend. Reshaping the labour market with an emphasis on women-led development is crucial for achieving gender parity and fostering inclusive economic growth.

¹⁸ This was part of the same survey done by Artha Global's Centre for Rapid Insights (CRI) as reported in Box XI.2 in chapter 11. Artha Global's Centre for Rapid Insights (CRI) conducted a survey of approximately 2400 married women between the ages of 25 and 45 in rural areas, who were relatively less financially privileged, in selected districts of Bihar, Jharkhand, Madhya Pradesh, and Uttar Pradesh in November 2024. The sample population is poorer than the Indian population on average. This demographic group was chosen for study because an increased female labour force participation rate (FLFPR) has been observed among this group. Furthermore, as a popular target for DBTs and cash, as well as loans through SHGs from both the Centre and various state governments, a survey of this group, allows for an analysis of patterns of consumption due to cash transfers and loans.

¹⁹ Jayachandran, S. (2021). Social Norms as a Barrier to Women's Employment in Developing Countries. IMF Economic Review, 69, 576–595. <https://doi.org/10.1057/s41308-021-00140-w>

12.19. Women have been key beneficiaries of various initiatives designed to foster entrepreneurship. As of 31 October 2024, a total number of 73,151 startups with at least one woman director have been recognised under the Startup India Initiative. This represents nearly half of the 1,52,139 start-ups supported by the government. ₹3,107.11 crore has been invested in 149 women-led startups through Alternative Investment Funds (AIFs).²⁰ Since its inception in April 2021, the Start-up India Seed Fund Scheme (SISFS) has approved ₹227.12 crore in funding for 1,278 women-led startups.²¹ Credit Guarantee Scheme for Startups (CGSS)²² has guaranteed ₹24.6 crore in loans for women-led ventures.²³ These programmes offer women entrepreneurs financial support, training, and mentorship, empowering them to start and scale their businesses.

Harnessing the power of women entrepreneurs for India's economic future

12.20. A recent World Bank paper (Gupta et al., 2024) highlights that promoting women-owned, growth-oriented enterprises could significantly boost FLFPR and economic growth in rural India. The paper emphasises the importance of providing business development services to support and enhance women's entrepreneurial efforts.²⁴

12.21. Of the nearly 4.96 lakh people engaged in the khadi sector, over 80 per cent are women artisans.²⁵ It is estimated that more than 50 per cent of persons practising sericulture are women. Out of the total workforce engaged in the handicrafts sector, an estimated 56.1 per cent are women.²⁶ Certain crafts, like embroidery, mat weaving, etc., are practised predominantly by women. As per the Handloom Census 2019-20, handloom activity in India is also dominated by female workers (72 per cent).²⁷

12.22. However, the reins of ownership in entrepreneurship still remain dominantly male-held. Only 22 per cent of all micro, small and medium enterprises (MSME) are owned by women entrepreneurs. Diving further, as the size of the enterprise increases from micro to small and then to medium, women's share in ownership drops from 22 per cent to 12 per cent and further to 7 per cent, respectively.²⁸ However, this is not

20 PIB release of Ministry of Commerce & Industry dated 10 December 2024 (<https://tinyurl.com/yeyh54k2>).

21 <https://seedfund.startupindia.gov.in/>

22 PIB release of Ministry of Commerce & Industry dated 7 October 2022 (<https://tinyurl.com/df8jxwhb>)

23 Ibid note 20 above

24 Gupta, Arshia; Pinto, Alreena Renita; Madhavan Kutty, Balakrishnan. Fostering Female Growth Entrepreneurship in Rural India (English). Washington, D.C.: World Bank Group. (<https://tinyurl.com/3u4e4epp>)

25 Annual Report 2023-24, Ministry of MSME

26 Annual Report 2018-19, Ministry of Textiles

27 PIB release of Ministry of Textiles dated 16 March 2022 (<https://tinyurl.com/yku3tyvb>).








28 Data from Udyam Registration Portal, Ministry of MSME, Govt. of India not including Informal Micro-Enterprise registrations done through Udyam-Assist Platform

unique to India but is a ubiquitous trend. As per a report on gender diversity, women hold less than one-quarter of the world’s board seats (23.3 per cent in 2023). Across India Inc., women only held 18.3 per cent of board seats in 2023.²⁹ **Box XII.2** discusses some of the initiatives taken by the government to promote female entrepreneurship.

Box XII.2: Government initiatives to boost female entrepreneurship

To give a fillip to women's entrepreneurship, various ministries/ departments of the government of India have launched several initiatives, some of which are presented below.

Ministry of Micro, Small and Medium Enterprises³⁰

 <p>Formalisation of Enterprises³¹</p> <p>63 per cent of the 2.41 crore enterprises formalised since January 2023 are women-owned.</p>	 <p>Marketing Support³²</p> <p>Women’s trade fair participation is fully subsidised.</p>	 <p>PM Employment Guarantee Programme³³</p> <p>41 per cent of loans in FY24 were sanctioned to women, with higher subsidies (25–35 per cent) and lower contributions (5 per cent).</p>	 <p>Procurement</p> <p>3 per cent of procurement by CPSEs is reserved for women-owned enterprises.</p>
 <p>Skill Development</p> <p>Over 21,600 women trained in coir manufacturing in 5 years; free entrepreneurial training is offered.</p>	 <p>ZED Certification³⁴</p> <p>100 per cent subsidy on certification for women MSMEs.</p>	 <p>Access to Credit³⁵</p> <p>Women entrepreneurs receive 90 per cent guarantees (vs. 75 per cent for others) and reduced fees under the Credit Guarantee Scheme.</p> <p>Of 97.68 lakh guarantees approved, 22 per cent are for women.</p>	

Ministry of Skill Development and Entrepreneurship

29 Deloitte Global eighth edition of Women in the Boardroom: A Global Perspective, March 2024(<https://tinyurl.com/5y6u7nz4>)

30 Based on inputs from M/oMSME









31 <https://www.sidbi.in/udyam-assist-platform>

32 PIB release of M/oMSME dated 12 December 2024 (<https://tinyurl.com/436vvaad>).

33 <https://tinyurl.com/bdda6tdn>

34 <https://zed.msme.gov.in/>

35 <https://tinyurl.com/2t9w7phe>

 SANKALP³⁶		
<p>32,262 women (67 per cent of beneficiaries) trained in entrepreneurship between 2021 to 2024.</p>		
Department for Promotion of Industry and Internal Trade		
 Start-up Support³⁷	 Women Entrepreneurship Platform³⁸	
<p>10 per cent of the Fund of Funds for Start-ups is reserved for women.</p>	<p>Launched in 2018 to aggregate and showcase policies, with NSA awards recognizing women-led start-ups.</p>	
Ministry of Food Processing Industries 	Ministry of Tribal Affairs 	
PM Micro Food Processing Scheme³⁹	Adivasi Mahila Sashaktikaran Yojana⁴⁰	
<p>SHG members receive ₹40,000 seed capital and 50 per cent branding/marketing grants.</p>	<p>Loans up to ₹2 lakh at 4 per cent interest for ST women.</p>	
Ministry of Cooperation⁴¹		
 NCDC Support⁴²	 Nandini Sahakar Scheme	 Swayam Shakti Sahakar Yojna
<p>₹6,426 crore disbursed for women cooperatives; 25,385 registered cooperatives.</p>	<p>2 per cent interest subvention for innovative cooperative projects.</p>	<p>Working capital loan to support women SHGs.</p>

36 <https://sankalp.msde.gov.in/>

37 <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1941361>

38 <https://wep.gov.in/>

39 Launched in 2020, provides credit-linked subsidies for individuals and groups of women entrepreneurs. <https://tinyurl.com/5d5axh3u>

40 <https://tinyurl.com/5fmen9uy>

41 PIB release of Ministry of Cooperation dated 4 December 2024 (<https://tinyurl.com/3m34bndn>).

42 National Cooperative Development Corporation (NCDC)

Other flagship schemes: Besides these, certain flagship schemes of the government of India, such as Pradhan Mantri Mudra Yojana, DAY-NRLM etc., are also oriented towards promoting women-led enterprises. Other schemes and initiatives, such as Yashasvini mass awareness campaigns, are also available for women entrepreneurship development.

12.23. Building a strong ecosystem for women's entrepreneurship requires innovative solutions alongside government initiatives focusing on credit access, skill training, and formalisation. Rural women entrepreneurs face additional challenges, including limited business skills, market access, and technology gaps, compounded by a lack of mentorship and networking. Streamlining support through credit linkages, sensitising bankers, and efficient delivery mechanisms is essential. Cost-effective strategies, such as raising awareness, providing skill training, and improving access to government benefits, can empower women entrepreneurs. Institutions like the Global Alliance for Mass Entrepreneurship (GAME) address systemic barriers, supporting women-led MSMEs with access to markets, credit, and growth opportunities.⁴³

12.24. NRLM partnered with GAME to empower rural women entrepreneurs through the Women Entrepreneur Financial Empowerment Programme (WEFEP).⁴⁴ The programme improves credit access for rural women entrepreneurs by identifying and supporting aspiring individual rural women entrepreneurs through enterprise formalisation, business planning, and loan application processes. This is done with the support of NRLM's ground cadres like "Vitta Sakhis." *Vitta Sakhis* guide women on loan options and assist with bank visits, documentation, and business proposals, reducing bank linkage time. Under the initiative, 862 *Vitta Sakhis* were trained, outreach and assessment of 20190 women entrepreneurs were done, 10713 loan applications were submitted, 2400 loans were sanctioned, and banks disbursed ₹30 lakh in loans to rural women entrepreneurs.⁴⁵ Meanwhile, the "Growtherator" programme accelerates MSME growth, fostering profitability, job creation, and long-term success through mentorship and peer networks.⁴⁶

12.25. Systemic challenges such as skill gaps, compliance barriers, and limited mobility restrict women's access to digital platforms. GAME's Women Economic Empowerment (WEE) programme fosters gender-responsive policies to bridge this gap. It builds replicable models with private partners for rural e-commerce, social commerce, gig work, and job tech, enabling women entrepreneurs to participate actively in the platform

43 <https://massentrepreneurship.org/about/>

44 WEFEP was launched in 16 districts across Madhya Pradesh, Rajasthan, and Maharashtra.

45 <https://tinyurl.com/597jepam>

46 <https://massentrepreneurship.org/growtherator/>

economy. The programme aims to positively impact 2.5 lakh women across the digital platform economy by 2025.⁴⁷

12.26. WE Hub - The Women Entrepreneurs Hub is a good example from the state of Telangana of how the support of the government can help women's entrepreneurship flourish. It is India's first state-led incubator for women entrepreneurs.⁴⁸ WE Hub was started with the mission to ensure that all women entrepreneurs in the country have access to technical, financial, governmental, and policy support required to start up, scale up, sustain, and accelerate with global market access. It has raised ₹177 crore in funding. 6376 start-ups and SMEs have been incubated. It has engaged around 7828 entrepreneurs and has launched 87 start-up programmes, and 75 per cent of the start-ups survive beyond 2 years.⁴⁹

12.27. As women continue to overcome challenges and dismantle barriers, their progress drives empowerment, creates job opportunities and builds the foundation for more inclusive economic growth. The growing participation of women in entrepreneurship can propel the country towards higher levels of development by tapping into their latent potential to contribute to economic activities.

Trends in wages and earnings

12.28. The 2023-24 PLFS results provide earnings data segmented by status (regular/salaried, casual, and self-employed workers), gender and location (urban and rural). The average monthly earnings of workers vary across different segments. While the average monthly earnings for regular wage/salaried workers and self-employed workers grew at a CAGR of 5 per cent during the period 2018-19 to 2023-24, the daily wage of casual workers increased at a CAGR of 9 per cent during the same period. Earnings for self-employed workers showcased a dynamic trajectory, with a brief dip from 2017-18 to 2020-21, followed by a significant rebound post-pandemic. Nominal wages have shown good growth across all categories, outpacing growth in real wages.

⁴⁷ <https://tinyurl.com/mushjrd7>

⁴⁸ <https://invest.telangana.gov.in/we-hub/>

⁴⁹ Data as of 19 December 2024 (<https://wehub.telangana.gov.in/>)

Table XII.1: Average earnings segmented by employment status, gender and location (for 2023-24)

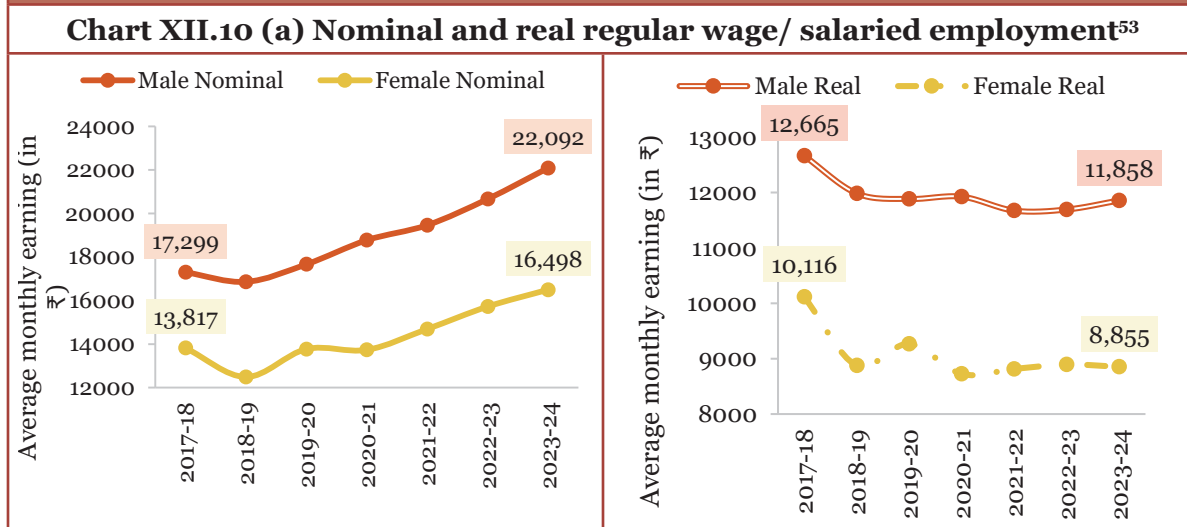
₹ Nominal Value	Rural			Urban			Total		
	Male	Female	Person	Male	Female	Person	Male	Female	Person
Self-employed⁵⁰	13,907	4,907	11,422	22,930	8,489	20,055	16,007	5,497	13,279
Regular⁵¹	18,029	11,914	16,626	25,501	19,709	23,974	22,092	16,498	20,702
Casual⁵²	434	290	402	529	354	506	450	296	418

Note:1. For regular and self-employed workers, average monthly nominal earnings are reported.
2. For Casual workers, the average per-day earnings are reported.
Source: Annual PLFS 2023-24, MoSPI

Table XII.2: Trends in earnings

₹ Nominal Value	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Self-employed	10323	10454	10563	11678	13131	13279
Regular	15885	16728	17572	18391	19491	20702
Casual	277	291	318	374	403	418

Note:1. For regular and self-employed workers, average monthly nominal earnings are reported.
2. For Casual workers, the average per-day earnings are reported.
Source: Annual PLFS 2023-24, MoSPI

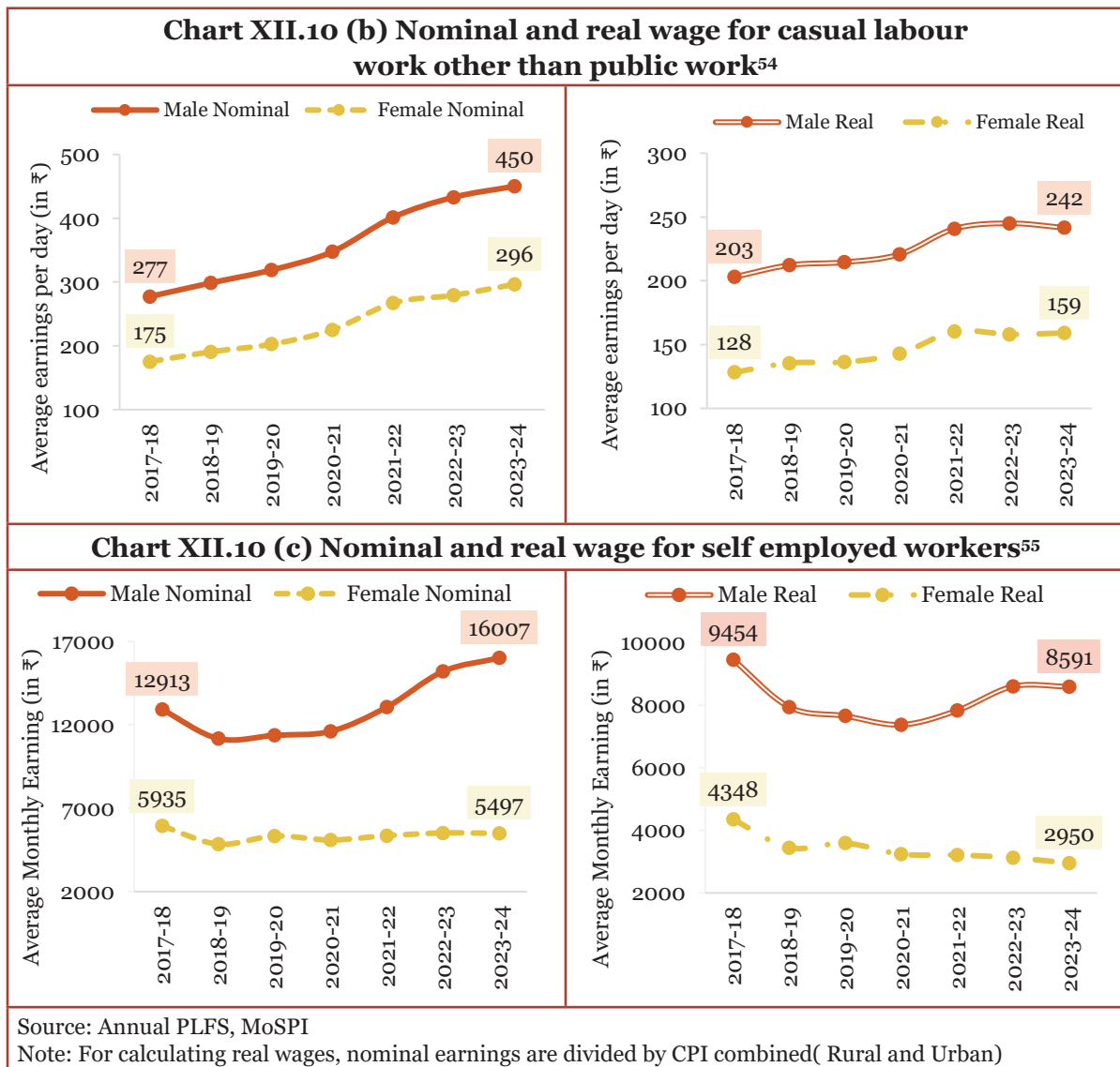
Chart XII.10 Male and female earnings

50 For self-employed persons in current weekly status, information on earnings during the last 30 days from the self-employment activity in which the person was working as per current weekly status was collected.

51 For regular wage/salaried employees in the current weekly status, information on earnings during the preceding calendar month from the regular wage/salaried work in which the person was employed in the current weekly status was collected.

52 For casual labour, information on earnings was collected for the casual labour work in which the person was engaged for each day of the reference week.

53 Average wage/salary earnings during the preceding calendar month from regular wage/salaried employment among the regular wage/salaried employees in CWS



Trends in rural wages

12.29. As per data of Labour Bureau⁵⁶, in FY25 (April- September 2024), rural wages rose at above-4 per cent every month, YoY. On average, the nominal wage rate in agriculture grew by 5.7 per cent for men and 7 per cent for women. In non-agricultural activities, nominal wage growth was slightly lower for men, at 5.5 per cent, but higher for women, at 7.9 per cent during the same period.

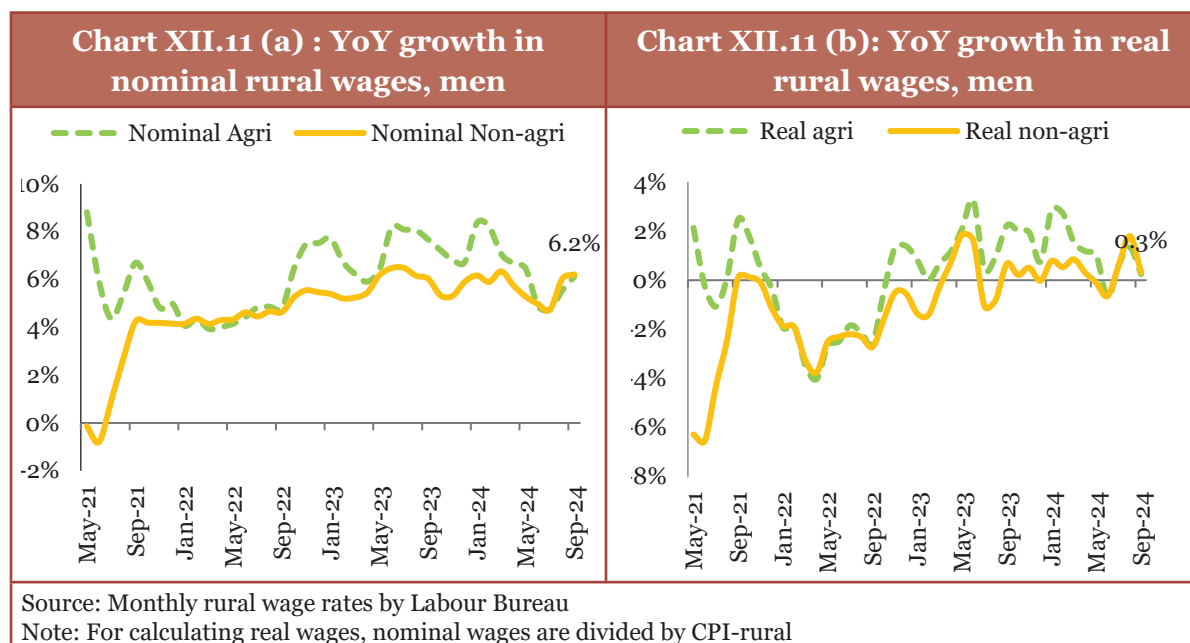
12.30. When adjusted for inflation, the real wage rate in agriculture demonstrated modest growth, increasing by 0.6 per cent for men and 1.8 per cent for women. In

54 Average wage earnings per day from casual labour work other than public works in CWS

55 Average gross earnings during last 30 days from self-employment among self-employed persons in CWS

56 Monthly nominal rural wage data reported by Labour Bureau for agricultural and non-agricultural activities (<https://labourbureau.gov.in/rural-wages>).

non-agricultural activities, real wage growth was particularly noteworthy for women, reaching 2.6 per cent, compared to 0.4 per cent for men during the same period. These trends highlight a steady improvement in real wages for rural workers, with women experiencing a comparatively stronger increase.



Wages in unincorporated sector enterprises

12.31. As per the Annual Survey of Unincorporated Sector Enterprises (ASUSE) results for 2023-24⁵⁷, the average emolument per hired worker rose by 13 per cent in 2023-24 compared to 2022-23, with the average emolument per hired worker rising from ₹1,24,842 in 2022-23 to ₹1,41,071 in 2023-24, signalling improved wage levels⁵⁸. This growth, led by a 16.1 per cent increase in the manufacturing sector average emolument per hired worker, is strengthening the labour market, boosting productivity, and driving economic demand.

12.32. The ASUSE 2023-24 results highlight the notable labour market improvements of the non-agricultural unincorporated sectors, with hired workers increasing from 2.95 crore in 2022-23 to 3.15 crore in 2023-24, reflecting healthy employment growth.

⁵⁷ The period for the survey is October 2023 to September 2024.

⁵⁸ ASUSE conducted by NSSO, is a survey of unincorporated non-agricultural establishments belonging to three sectors viz., Manufacturing, Trade and Other Services. Ownership-wise, this Survey covers unincorporated non-agricultural establishments pertaining to proprietorship, partnership (excluding limited liability partnerships), self-help groups, cooperatives, societies/trusts etc (<https://tinyurl.com/b9k4apur>).

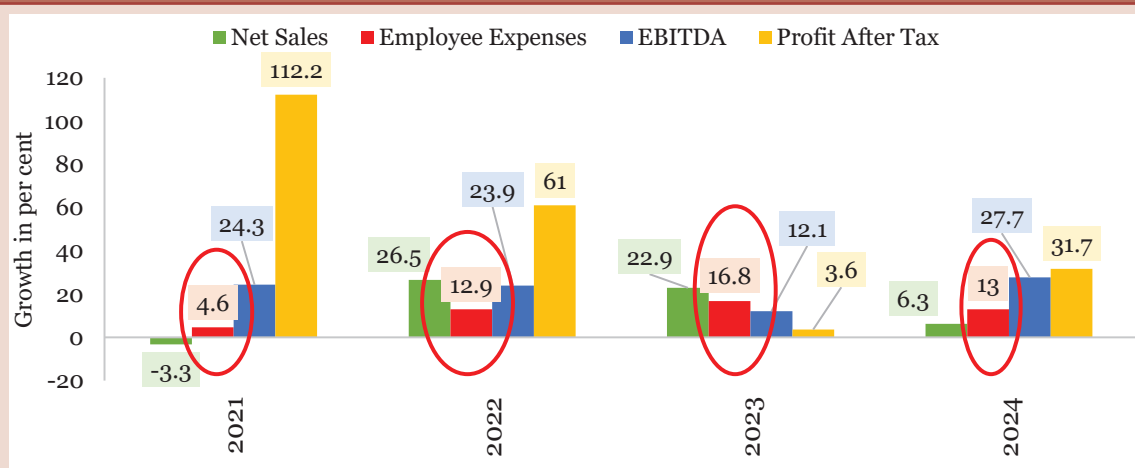
12.33. Beyond wage trends, examining corporate profits and wage share is crucial to understanding how income distribution between labour and capital influences productivity, competitiveness, and sustainable growth. The same has been discussed in **Box XII.3**.

Box XII.3: Corporate Profitability Hits 15-Year High even as wage growth moderates

Corporate profitability soared to a 15-year peak in FY24, fuelled by robust growth in financials, energy, and automobiles. Among Nifty 500 companies, the profit-to-GDP ratio surged from 2.1 per cent in FY03 to 4.8 per cent in FY24, the highest since FY08.⁵⁹ Large corporations, especially in non-financial sectors, significantly outperformed their smaller peers in profitability.

However, while profits surged, wages lagged. A striking disparity has emerged in corporate India: profits climbed 22.3 per cent in FY24, but employment grew by a mere 1.5 per cent.⁶⁰ State Bank of India (SBI) analysis reveals that 4,000 listed companies recorded a modest 6 per cent revenue growth. At the same time, employee expenses rose only 13 per cent -down from 17 per cent in FY23 - highlighting a sharp focus on cost-cutting over workforce expansion.⁶¹

Chart XII.12: Growth of key parameters of 4000 listed entities



Source: Cline; SBI Research; around 4000 listed entities

Despite Indian companies achieving a stable EBITDA margin of 22 per cent over the last four years, wage growth has moderated. This uneven growth trajectory raises critical concerns. Wage stagnation is pronounced, particularly at entry-level IT positions.

59 India Strategy.Nifty-50: 23,290. 10 June 2024. Motilal Oswal Financial Services (<https://tinyurl.com/9xxbkrkp>)

60 Ibid note 59 above

61 State Bank of India. (2024). Contours of inflation (<https://tinyurl.com/53a5scd5>)

While the labour share of GVA shows a slight uptick, the disproportionate rise in corporate profits—predominantly among large firms—raises concerns about income inequality. A higher profit share and stagnant wage growth risk slowing the economy by curbing demand. Sustained economic growth hinges on bolstering employment incomes, which directly fuel consumer spending, spurring investment in production capacity.

To secure long-term stability, a fair and reasonable distribution of income between capital and labour is imperative. It is essential for sustaining demand and supporting corporate revenue and profitability growth in the medium to long run.

Japan succeeded in industrialisation and in becoming a developed economy, despite its defeat in WW II through a social contract between the government, the businesses and workers, write Matthew C. Klein and Michael Pettis in “Trade Wars are Class Wars”:

“Japanese workers, consumers, and retirees all subsidised industrial development by overpaying for goods and services, by taking home a lower share of national output than their counterparts in the West, and by using a financial system designed to transfer purchasing power from households to businesses. Japanese companies returned the favour by upgrading the country’s manufacturing base, passing along productivity gains to workers, and refraining from excessive executive pay, while the government invested in top-tier infrastructure.”

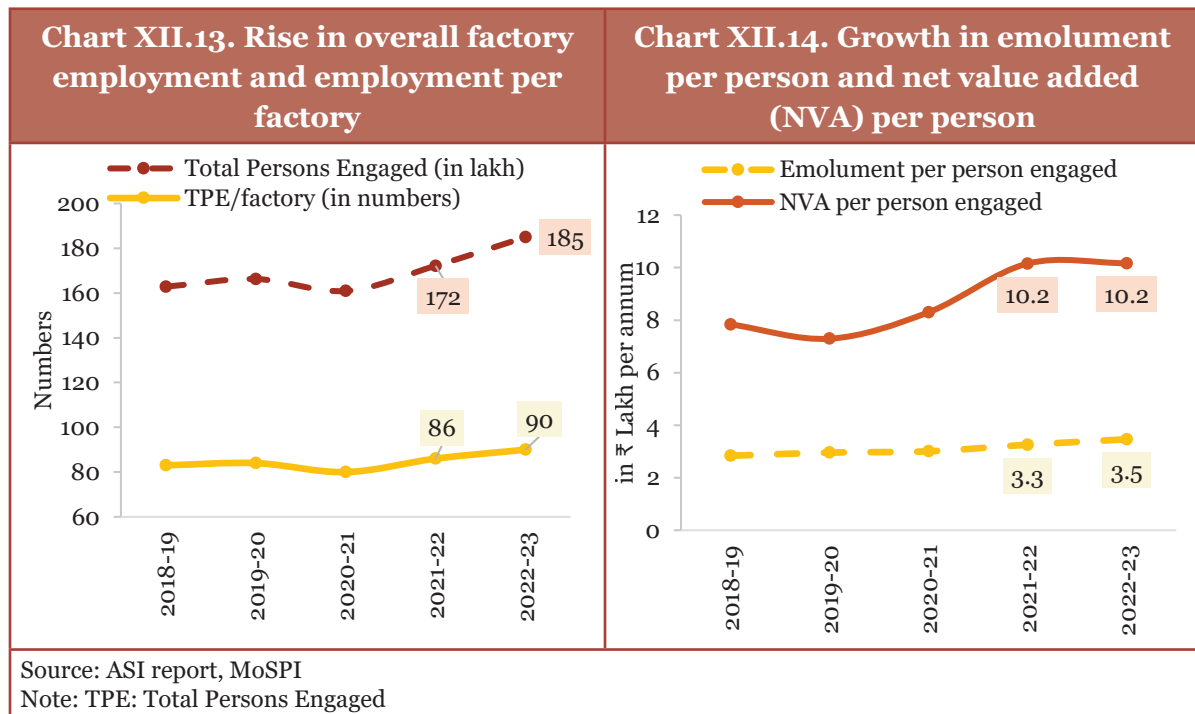
Employment in factories

12.34. The Annual Survey of Industries (ASI) results for the FY23⁶² highlight the manufacturing sector’s resilience, showing a more than 7 per cent increase in employment over the previous year.⁶³ This translates into an addition of over 22 lakh jobs in FY 23 over FY 19 (pre-pandemic level), underscoring the sector’s robust post-pandemic recovery.⁶⁴ During the pandemic in FY 21, the sector lost approximately 5 lakh jobs. The growth of the sector in FY 23 indicates a strong rebound of the sector as economic conditions improved.

62 Reference period of the survey is April 2022 to March 2023.

63 The ASI, conducted by the MoSPI, covers the organised manufacturing sector. Its coverage extends to the entire Factory Sector comprising industrial units (called factories) registered under the Sections 2(m)(i) and 2(m)(ii) of the Factories Act, 1948, with ten or more workers with electricity or twenty or more workers without electricity. (https://www.mospi.gov.in/sites/default/files/asi_results/ASI_per_cent20Summary_per_cent20Results_per_cent202022-23.pdf)

64 It may be noted that employment refers to total persons engaged (TPE), which includes the employees (which include workers and clerical/administrative staff) and all working proprietors and their family members who are actively engaged in the work of the factory even without any pay, and the unpaid members of the cooperative societies who worked in or for the factory in any direct and productive capacity.



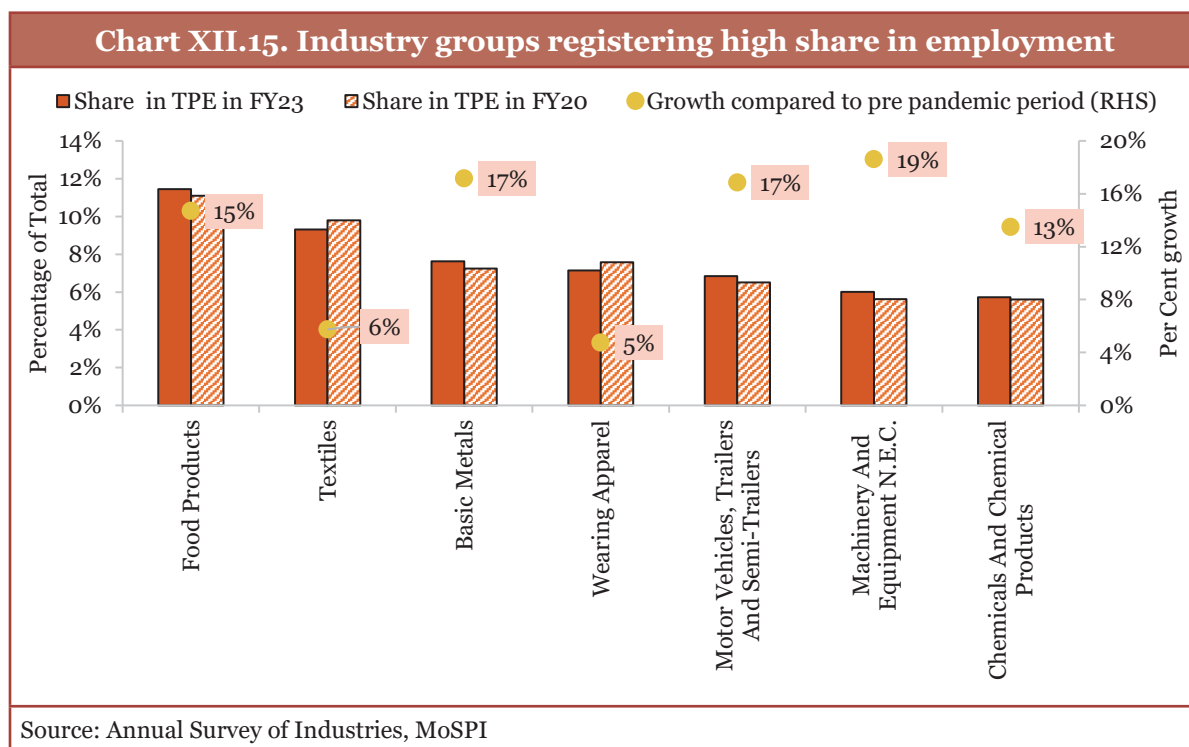
12.35. The results of ASI FY23 indicate a continued increase in the number of large factories i.e., those employing more than 100 workers. The number of such factories saw a robust growth of 7 per cent compared to FY22, while small factories (employing fewer than 100 workers) also experienced a steady increase of 2 per cent. Notably, large factories now account for around 22 per cent of all operational factories, reflecting their growing presence and contribution to the industrial landscape.

12.36. In terms of the share of employment, large factories continue to employ about 80 per cent of the total workers⁶⁵ and 78 per cent of the TPE⁶⁶ in the sector, whereas small factories, although larger in number, comprise a smaller share of employment in the sector.

12.37. Seven industry groups in the sector contribute to around 54 per cent of the total employment. These are food products, textiles, basic metals, wearing apparel, motor vehicles, trailers and semi-trailers, machinery and equipment N.E.C., and chemicals and chemical products. Other than these leading industries, industry groups representing computer, electronic and optical products and the manufacture of furniture have seen strong growth in employment compared to the pre-pandemic level with around 50 per cent growth in TPE. This indicates a positive shift towards electronics manufacturing in India.

⁶⁵ Workers are directly involved in the manufacturing process or in activities incidental to the manufacturing process, such as cleaning and repair. They can be employed directly or through an agency.

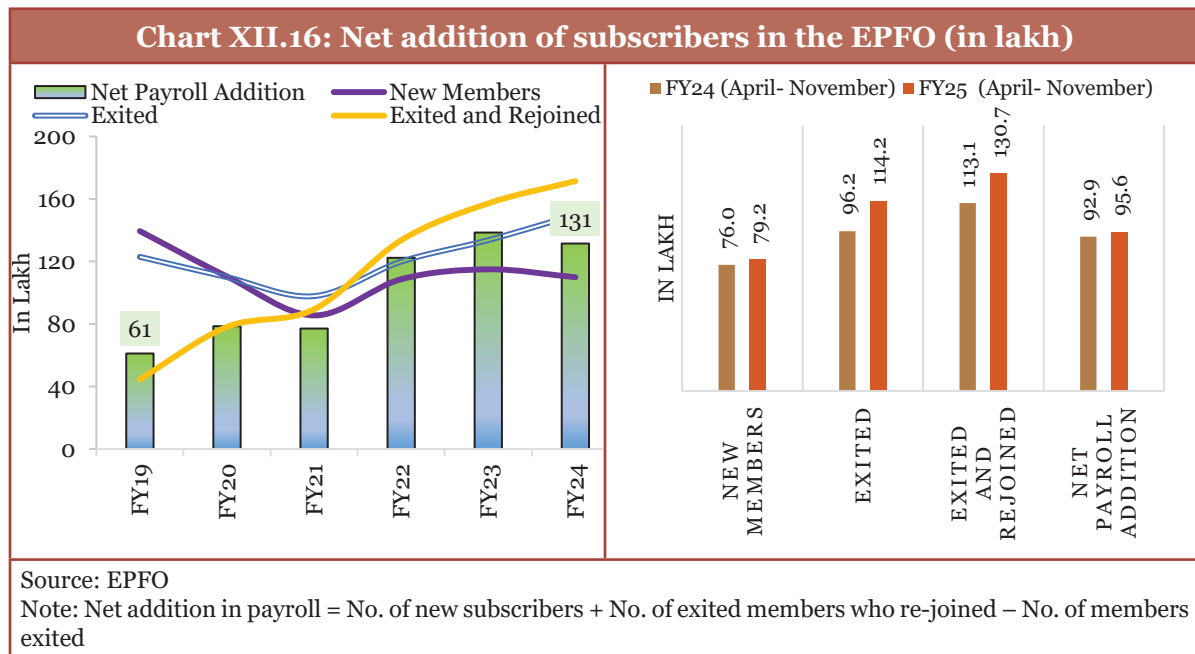
⁶⁶ Ibid note 64 above.



Growing formal sector in India

12.38. Formalisation of the job market, as reflected in payroll data from the Employees’ Provident Fund Organisation (EPFO), indicates that government initiatives are helping foster greater economic formalisation.⁶⁷ Net additions to EPFO subscriptions have more than doubled, rising from 61 lakh in FY19 to 131 lakh in FY24. During the first eight months of FY25 (April to November 2024), cumulative net additions reached 95.6 lakh, marking a 3 per cent YoY increase compared to the 92.9 lakh recorded during the same period in FY24. EPFO membership stands at 32.7 crore as of March 2024, compared to 29.9 crore as of March 2023.

⁶⁷ The EPFO data covers the low-paid workers in medium and large formal sector establishments. EPFO publishes subscription data every month, with a lag of two months.



12.39. In terms of industrial composition, expert services form the largest share of EPFO payroll addition (50 per cent in FY25, April-November), followed by trading-other industries (12 per cent) and trading-commercial establishments (7 per cent). Over the years, expert services have consistently led in formal job creation, as reflected in net payroll additions.

12.40. Across age groups, the age group of 18-25 years contributed to 47 per cent of the net payroll addition in April-November 2024. With nearly 61 per cent of net payroll addition coming from less than 29 years of age (in the same period), new jobs in the organised sector are mainly going to the youth.

12.41. The eShram portal⁶⁸, was launched by the Ministry of Labour and Employment (MoLE) on 26 August 2021 to recognise unorganised workers. The portal helps register and support unorganised workers by providing them with a Universal Account Number (UAN) and for the creation of a comprehensive National Database of Unorganised Workers (NDUW).⁶⁹ As of 31 December 2024, over 30.51 crore unorganised workers have already registered on the eShram portal.

12.42. Further, in keeping with the vision of developing eShram as a One-Stop-Solution for unorganised labour to have access to various social sector schemes, MoLE launched the eShram– “One-Stop-Solution” on 21 October 2024, which entails the integration of different social security/ welfare schemes on a single portal, i.e., eShram. This enables unorganised workers registered on eShram to access social security schemes and see benefits availed by them so far through eShram. So far, 12 schemes of different central

68 <https://eshram.gov.in/>

69 PIB release of Ministry of Labour and Employment dated 19 December 2024 (<https://tinyurl.com/3p2eab93>)

ministries/departments have already been integrated/ mapped with the eShram. These include Pradhan Mantri Surakhsha Bima Yojana, Pradhan Mantri Jeevan Jyoti Bima Yojana, Ayushman Bharat - Pradhan Mantri Jan Arogya Yojana, Prime Minister Street Vendors AatmaNirbhar Nidhi, PM Awas Yojana- Urban, PM Awas Yojana- Gramin, Mahatma Gandhi National Rural Employment Guarantee Scheme etc.

JOB CREATION: ACTION TOWARDS ENHANCED EMPLOYMENT OPPORTUNITIES

Security vs. Flexibility: The role of regulation in job creation

12.43. One key aspect of creating an enabling environment for businesses to grow is improving the ease of doing business and increasing flexibility in the labour market. In this regard, the government has worked to simplify labour laws. These reforms aim to foster job creation, enhance transparency, and improve accountability within the system. **Box XII.4** informs about the progress on this front.

Box XII.4: Labour laws strengthening workers' rights

The central government has formulated four Labour Codes, namely, the Code on Wages, 2019; the Code on Social Security, 2020; the Industrial Relations Code, 2020; and the Occupational Safety, Health, and Working Conditions Code, 2020 after simplifying, rationalising, and amalgamating the 29 existing central laws. The Code on Wages, 2019, was notified on 8 August 2019, and the remaining three Codes were notified on 29 September 2020.

The new Labour Codes constitute a significant step for workers' rights in India by strengthening the protection available to workers, including unorganised workers, regarding statutory minimum wage and its timely payment, social security, occupational safety, healthcare of workers, etc. The central government and 29 states/UTs have pre-published their draft rules under the four Labour Codes. Some of the remaining seven states/UTs have pre-published their draft rules for one or more Labour Codes.

Many states have already carried out various reforms in the spirit of the Labour Codes, such as:

- (a) Increasing the threshold of the number of workers from 100 to 300 for prior approval of appropriate government before retrenchment/ layoff/ closure of establishments in factory/plantation/ mining sector has been done by 14 states viz., Rajasthan, Andhra Pradesh, Arunachal Pradesh (AP), Assam, Bihar, Goa, Gujarat, Haryana, Jharkhand, Madhya Pradesh (MP), Uttar Pradesh (UP), Meghalaya, Punjab and Odisha under existing Industrial Disputes Act. Himachal Pradesh (HP) has increased it to 200.
- (b) Six states viz. Bihar, Haryana, Goa, Punjab, Odisha, and HP have notified Fixed Term Employment under the existing Industrial Employment (Standing Orders) Act, 1946.

- (c) 15 states/UTs viz. Maharashtra, Goa, Haryana, Odisha, J&K, HP, Punjab, UP, Uttarakhand, West Bengal, MP, Rajasthan, Karnataka, Andhra Pradesh, Assam have allowed women to work in night shifts subject to fulfilment of safety provisions.
- (d) 12 states/UTs viz. Gujarat, Maharashtra, Andhra Pradesh, UP, Odisha, Rajasthan, Haryana, Goa, MP, Uttarakhand, Bihar, and Punjab increased the threshold from 20 to 50 for applicability of the Contract Labour (Regulation & Abolition) Act, 1970. J&K and Ladakh increased the threshold from 20 to 40, and Himachal Pradesh increased the threshold to 30.
- (e) 14 states/UTs viz. Haryana, Gujarat, Punjab, Karnataka, Uttarakhand, Andhra Pradesh, J&K, Ladakh, Bihar, HP, Assam, Odisha, Manipur, and Jharkhand have increased the threshold for applicability of the Factories Act from 10 to 20(with power).
- (f) 16 states/UTs viz. Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Gujarat, Haryana, HP, Jharkhand, Karnataka, Maharashtra, MP, Meghalaya, Punjab, Rajasthan and UP have already increased the threshold for applicability of the Factories Act from 20 to 40(without power). This increase in the threshold is significant as it extends the protection of the Factories Act to a larger number of workers, thereby enhancing workplace safety and labour rights.
- (g) Seven states viz. Maharashtra, Haryana, HP, Odisha, Punjab, Karnataka and UP have increased the ceiling of overtime hours from 75 up to 144 hours in any quarter.

12.44. Labour regulations play a significant role in safeguarding worker rights and holding firms accountable for their working conditions. The regulatory framework not only shapes the business environment and the competitive dynamics of firms and factories but also ensures workers' well-being. Among these, Occupational Safety and Health (OSH) regulations stand out as foundational measures to ensure secure and dignified working conditions, providing a sense of security and confidence to the workforce.

12.45. Business experts, governments, economists, and management academics have repeatedly advocated for the role of working conditions, especially worker safety and well-being, in improving worker productivity. The role of OSH in enhancing worker productivity is discussed in **Box XII.5**.

Box XII.5: Occupational safety and health, labour productivity, and the role of Labour Laws.

OSH regulations⁷⁰ not only protect workers but also enhance efficiency and productivity. These regulations can be viewed as an investment in the long-term health of businesses and the economy. Literature and studies show that improving working conditions and implementing

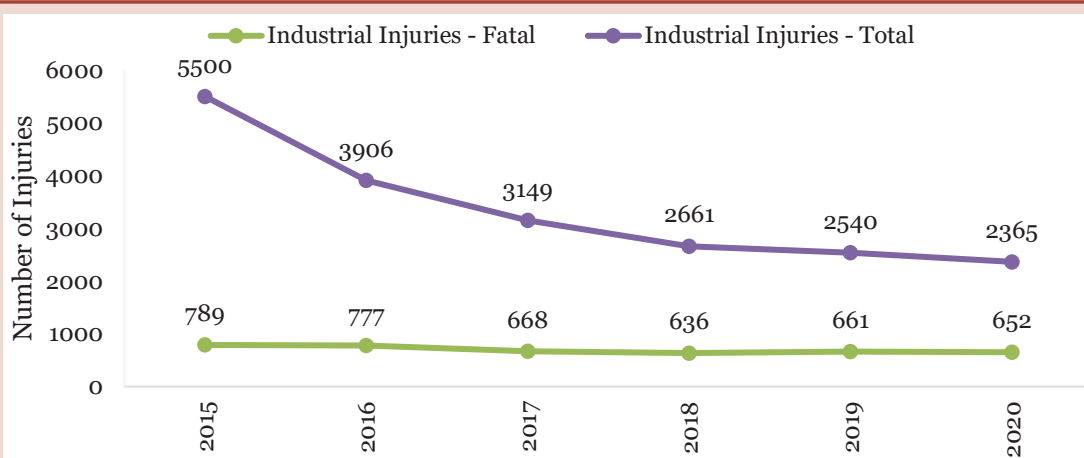
⁷⁰ The Occupational Safety, Health and Working Conditions Code, 2020 has been notified to consolidate and amend the laws regulating the occupational safety, health and working conditions of the persons employed in an establishment. <https://tinyurl.com/25j6hxw2>

OSH improve the GDP. The role of OSH in improving worker productivity is significant. This positive correlation underscores the importance of focusing on the effective implementation of OSH laws, as it directly contributes to increased productivity and economic growth.⁷¹

The labour laws for OSH have been in place since the Factories Act of 1948, and over time, new regulations have been brought in with the Employees' State Insurance Act of 1948 and the Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act of 1996. The new Occupational Safety, Health, and Working Conditions (OSH&WC) Code, 2020 has introduced several worker-friendly provisions to enhance occupational safety, health, and labour productivity.⁷²

India's manufacturing (11.4 per cent of total workforce) and construction (12 per cent of total workforce) workforce are prone to workplace accidents. The Directorate General Factory Advice Service & Labour Institute (DGFASLI) monitors injuries in factories and major industries. Its data notes a decline in reported industrial injuries since 2015.⁷³ The number of injuries has reduced from 5500 in 2015 to 2365 in 2020.

Chart XII.17: Fall in the number of industrial injuries



Source: DGFASLI - Standard Reference Note - 2023

Challenges

While the National Guidelines for Responsible Business Conduct (NGRBC)⁷⁴ emphasise the role of businesses in ensuring OSH in supply chains, many leading corporations have yet to effectively implement these principles, as highlighted in Safe in India Foundations (SII's)⁷⁵

71 Ministry of Labour and Employment, National Policy on Safety, Health and Environment at Workplace (<https://tinyurl.com/yvmvn3u6>).

72 OSH&WC Code 2020 (<https://tinyurl.com/2d782hha>)

73 Standard Reference Note - 2023

74 Ministry of Corporate Affairs (<https://tinyurl.com/2ku384n5>)

75 Safe in India Foundation (SII) is a civil society organisation that works to improve safety and social security for workers in India; <https://www.safeinindia.org/>. SII has been supporting ESIC, including during COVID-19, and is working with the Government of Haryana, MCA, M/o MSME, etc., in these areas; Report available at <https://tinyurl.com/24xt9cxd>.

SafetyNiti reports. The report highlights the prevalence of injuries due to inadequate safety sensors and audit and training lapses in the automobile sector, as an example.⁷⁶

This underscores the need for the industry to improve focus on prevention, training, and compliance through monitoring and audits. Enlightened self-interest and long-term thinking require employers to realise that a safe, secure, and satisfactory workplace is the key to long-term employee morale and productivity. Ethical conduct and fairness in business are the signs and bedrock of a mature and developed society. Treating workers humanely and, providing for their safety and looking after them when injured make as much business sense as it is the fair and ethical thing to do. Industry associations and collective bodies must champion this cause among their members. Addressing these challenges would be essential to fostering a robust and safe working environment across industries.

Way ahead

Technology-Driven Solutions: App-based worker reporting, can significantly enhance monitoring efforts. A good example is the Philippines' Online Labour Inspection System, which serves as a centralised digital platform for submitting safety records and accessing necessary templates.⁷⁷ The Employees' State Insurance Corporation (ESIC) data can help identify unsafe hotspots, enabling targeted actions. Additionally, incorporating a safety module in the ASI would improve the quality of safety data.

Utilising wearable technology in accident-prone areas, adopting the internet of things (IoT) for risk detection in MSMEs, and offering affordable virtual reality training modules can greatly enhance safety standards. Additionally, employing blockchain technology for tracking of claims will improve the transparency of ESIC claims and audits.

More substantial Incentives: Implementing tiered safety protocols for various industries and simplifying regulations for smaller businesses can encourage compliance. Incentives such as safety awards, tax breaks, and a machine safety subsidy programme can motivate industries to enhance their safety measures. An example of this is South Korea's Voluntary Safety Certification.⁷⁸ Furthermore, shared safety officers and subsidised training through public-private partnerships can further bolster industry support. For example, Thailand's Industrial Estate Authority provides shared safety services for industrial zones, including training, inspections, and safety audits.⁷⁹

By adopting these measures aligned with occupational safety, health, and well-being, India can drive its manufacturing goals sustainably, thereby improving worker dignity, increasing business profitability, and enhancing labour productivity.

76 SafetyNiti 2024. Safe In India Foundation (<https://tinyurl.com/2zuwnhsz>)

77 Department of Labor and Employment (Philippines) Online Systems: <https://tinyurl.com/nm7af385>

78 ILO. (2019). Labour market governance and the future of work: Ensuring inclusive growth. International Labour Organization (p.39). (<https://tinyurl.com/ybrevcvk>)

79 <https://www.ieat.go.th/en/roles-responsibilities>

12.46. India's labour regulations impose extensive compliance requirements on businesses (Rajagopalan & Shah, 2024).⁸⁰ For example, the Factories Act of 1948 mandates the placement of spittoons, specifies the materials for toilet paper, and dictates the design of washrooms. Similarly, other laws, like the Minimum Wages Act (1948) and the Maternity Benefit Act (1961), impose detailed specifications, through Rules, on register paper colours, font sizes on wage slips, and the distance between work areas and crèche facilities. Rather than focusing on essential safety and hygiene standards, these micromanaging regulations create unnecessary administrative burdens that hinder business growth. Implications of some of the laws on workers and firms are summarised in **Box XII.6**.

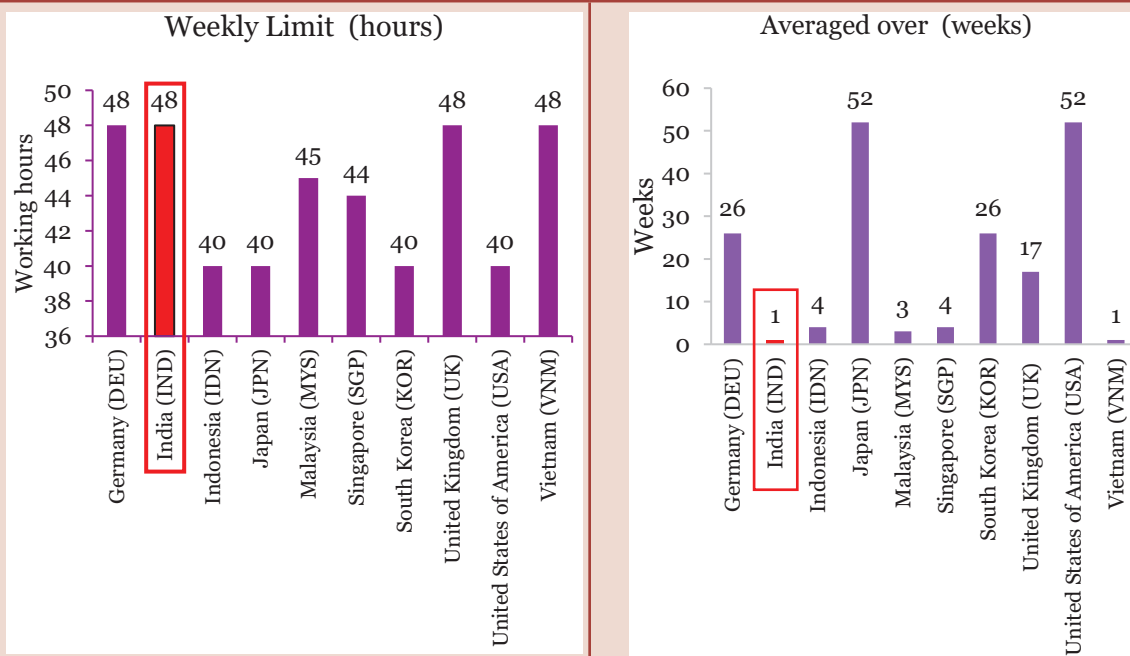
Box XII.6: Flexible labour regulations: Striking a balance for employment growth

Fostering an enabling environment that supports business growth is crucial for driving employment and economic development. However, there are instances where labour regulations designed to protect workers' rights perhaps inadvertently hinder the growth of firms, especially small and medium enterprises, by restricting their ability to expand operations when needed compared to global peers. In doing so, it dampens employment generation as well. Some such examples are presented here:

Inflexible working hours

Section 51 of the Factories Act (1948) states, '*No adult worker shall be required or allowed to work in a factory for more than forty-eight hours in any week.*' This clause limits the number of hours a worker can work in a day and a week. However, unlike India, certain countries allow these caps to be averaged over multiple days and weeks.

⁸⁰ Shruti Rajagopalan and Kadambari Shah. "Why Indian Firms Don't Scale: Labor Edition." Mercatus Policy Research, Mercatus Center at George Mason University, Arlington, VA, September 2024. (<https://tinyurl.com/37ep929p>).

Chart XII.18: Cap on average weekly working hours across some countries


Source: Country-specific laws and regulations⁸¹

India's working hour regulations prevent manufacturers from meeting demand surges and participating in global markets. Manufacturers stay competitive by minimising the time to bring a product to the market (Afonso et al., 2000; Vesey, 1991).⁸²

To reduce time-to-market, manufacturers must be capable of temporarily scaling up production. Labour laws in other countries allow manufacturers to average working hour limits across weeks and sometimes months. The International Labour Organisation (ILO) also recommends allowing manufacturers the freedom to average working hour limits across 3 weeks.⁸³ However, India's working hour limits may increase the cost, time, and risk of manufacturing.

Restrictions on overtime for factory workers

Section 65(3)(iv) of the Factories Act (1948) states, '*No worker shall be allowed to work overtime for more than seven consecutive days, and the total number of overtime hours in any quarter shall not exceed seventy-five.*' This law limits the number of overtime hours

81 Germany: Hours of Work Act, 1994, Section 3; India: Factories Act, 1948, Section 51; Indonesia: Manpower Act, 2003, Article 77; Japan: Labour Standards Act, 1947, Article 32; Malaysia: Employment Act, 1955, Section 60C; Singapore: Employment Act, 1968, Section 40; South Korea: Labour Standards Act, 1953(Act No. 8372), Section 50 and 51-2; United States of America: Fair Labour Standards Act, 1938, Section 207 (B); United Kingdom: The Working Time Regulations 1998, Section 4(1); Vietnam: The Viet Nam Labour Code, 2019, Article 105.

82 Vesey, J. T. (1991). The new competitors: They think in terms of 'speed-to-market'. *Academy of Management Perspectives*, 5(2), 23–33. <https://doi.org/10.5465/ame.1991.4274671>

83 ILO. 'Hours of Work (Industry) Convention, 1919', adopted in the 1st International Labour Conference session on 28 November, 1919.

workers can perform and the overtime wages they can earn. While states may set their own limits, these are generally lower than those established by other countries. The earning potential of workers across countries can be assessed based on the restrictions on overtime hours.⁸⁴

Table XII.3: Overtime work regulations across some countries

Country	Quarterly limits on overtime (hours)	Overtime wage rate (per cent of regular wage)	Overtime earnings per quarter (in ₹) ^{a b}
India (Union)	75	200	10,556
India (Best state: TG) ⁸⁵	156	200	21,957
South Korea (KOR) ⁸⁶	156	150	16,468
Vietnam (VNM) ⁸⁷	120 ^c	150	12,668
Indonesia (IDN) ⁸⁸	182	200 ^d	29,921
Singapore (SGP) ⁸⁹	216	150	22,802
Japan (JPN) ⁹⁰	240	125	21,113
Malaysia (MYS) ⁹¹	312	150	32,396
United Kingdom (UK) ⁹²	364 ^e	—	37,402 ^f
Germany (DEU) ⁹³	351 ^e	—	28,590 ^f
United States of America (USA) ⁹⁴	No Limit	150	44,882 ^g

Notes:

- a. Overtime earnings = hourly wage rate * overtime premium * number of overtime hours allowed.
 - i. Hourly wage rate = average daily wage rate (₹ 657.61) / 8 (the length of a day's shift in India)
 - ii. Overtime premium = mandated minimum premium under the country's laws.
 - iii. Average daily wage rate = Yearly wages paid per Indian manufacturing worker (as given in Annual Survey of Industries 2022-23)⁹⁵ / Maximum number of working days in a year = 2,05,175/312 = 657.61. This wage has been applied to all countries for the calculation.
 - iv. Number of working days in a year = Number of months * Number of working days in a month = 12 * 26 = 312).

84 Anand, B., Roy, S., Prisha, & Singh, A. (4 October 2023). #11: Lower the bar, increase the earnings. Prosperiti Insights (<https://tinyurl.com/5cw84bbu>).

85 India (TG): Factories (Telangana Amendment) Act, 2023, Section 3.

86 South Korea: Labour Standards Act, 1953 (Act No. 8372), Articles 53 and 56.

87 Viet Nam: The Viet Nam Labour Code, 2019, Articles 98 and 107.

88 Indonesia: Manpower Act, 2003, Article 77.

89 Singapore: Employment Act, 1968, Article 38

90 Japan: Labour Standards Act, 1947, Articles 36 and 37

91 Malaysia: Employment (Limitation of Overtime Work) Regulations, 1980, Clause 2

92 United Kingdom: The Working Time Regulations 1998, Sections 4, 10 and 12

93 Germany: Hours of Work Act, 1994, Sections 3, 4 and 5

94 United States of America: Fair Labour Standards Act, 1938, Section 207(A)

95 Government of India. (2022). Annual Survey of Industries, 2021-22. Ministry of Statistics and Programme Implementation(<https://tinyurl.com/mr2sf8pe>)

- b. The earnings data assumes that the worker can access the whole number of overtime hours allowed under the law. In practice, a higher overtime rate reduces the likelihood of workers accessing their desired number of overtime hours. Workers can earn more overtime income if higher limits are coupled with a lower overtime rate.
- c. Viet Nam's annual limit is lower than the sum of four quarterly limits. The quarterly limit is used here for calculation.
- d. This minimum overtime wage rate only applies from the second overtime hour of a workday. The first overtime hour in a workday may be compensated at 150 per cent or more of the regular wage.
- e. The law does not impose any specific limits on overtime. The overtime limit has been derived from other daily-hour restrictions and spread over.
- f. The law does not mandate a minimum overtime premium. To calculate overtime earnings, the ILO-recommended premium of 1.25 is used.
- g. The law does not impose any specific limits on overtime hours. The law does not set other limits from which overtime limits may be derived. Therefore, an overtime limit of 325 (the highest across countries) has been assumed.

Working hour restrictions are introduced to protect workers' health and prevent overwork. However, the various limits on working hours—per day, week, quarter, and year—often conflict, reducing workers' earning potential. For instance, Section 56 of the Factories Act limits a worker to a maximum of ten and a half hours at a factory daily, equating to approximately 63 hours in a six-day week. Of these, only 48 hours are considered regular (Section 51), three hours are considered rest intervals, and the remaining 12 hours count as overtime. Over a 13-week quarter, this would allow for 156 overtime hours; yet another provision (Section 65) caps overtime at only 75 hours per quarter. As a result, these laws inadvertently hinder workers' earning potential, ultimately affecting their financial well-being, as depicted in the table above. Notably, under the new Labour Laws, seven states viz. Maharashtra, Haryana, HP, Odisha, Punjab, Karnataka and UP have increased the ceiling of overtime hours from 75 up to 144 hours in any quarter.

In general, these compliance requirements are extensive and elaborate, demanding considerable management bandwidth, which is a scarce resource in small enterprises. However, the new Labour Laws represent a step in the right direction. With the introduction of flexible regulations and their effective implementation, these laws could lead to growth for firms, creating more employment opportunities. They also safeguard labour rights and allow workers to increase their earnings.

12.47. The Code on Social Security, 2020, is one of the four Labour Codes enacted by the Parliament. The Code provides for the framing of suitable social security measures for gig workers and platform workers on matters relating to life and disability cover, accident insurance, health and maternity benefits, old age protection, etc. The Code also provides for setting up a Social Security Fund to finance the welfare scheme.⁹⁶

12.48. To create a universal social security system for all Indians, especially the poor and the underprivileged, the government launched two social security schemes viz., the Pradhan Mantri Suraksha Bima Yojana (PMSBY) and the Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) on a pan-India basis in May 2015. The Schemes are being

⁹⁶ Rajya Sabha Unstarred question no. 2795 To be answered on 19 December 2024(<https://tinyurl.com/34ez7598>).

offered by public sector insurers and other insurers who offer the product on similar terms, with necessary approvals and ties with banks and post offices. As of 27 November 2024, 47.76 crore and 21.75 crore persons have been enrolled cumulatively under PMSBY and PMJJBY, respectively. Further, 1,48,023 and 8,64,094 claims have been paid under PMSBY and PMJJBY, respectively.⁹⁷ Through the eShram portal, workers in the unorganised sector can easily access social security schemes and receive benefits.

Driving employment opportunities through the digital economy

12.49. OECD defines digital economy as “*alleconomic activity reliant on, or significantly enhanced by the use of digital inputs, including digital technologies, infrastructure, digital services, and data. It refers to all producers and consumers, including the government, utilising these digital inputs in economic activities*”.⁹⁸ According to the Ministry of Electronics and Information Technology (MeitY), India's digital economy is projected to surpass USD one trillion by 2025.⁹⁹

12.50. The digital economy has significantly broadened job opportunities, encompassing roles from delivery personnel, cab drivers, and beauty professionals to software engineers and data analysts. Hyperlocal service platforms have revolutionised the job landscape in the transportation, food delivery, and home services industries. These platforms have created flexible employment options by leveraging technology while transforming traditional service sectors into digitally driven ecosystems. According to NITI Aayog, the gig workforce is projected to reach 23.5 crore by 2029-30, comprising 6.7 per cent of the non-agricultural workforce and 4.1 per cent of total livelihoods, reshaping the labour market. India's gig economy is proliferating, fuelled by platformisation and remote work.¹⁰⁰

12.51. Digital technologies have a dual effect on employment. As Acemoglu and Restrepo (2019) note, automation replaces human labour through a displacement effect but also boosts demand for new roles through a reinstatement effect in both automated and complementary sectors.¹⁰¹ This technological reinstatement effect has the potential to drive labour demand and create numerous new job positions, positively impacting employment.

97 Department of Financial Services, Ministry of Finance.

98 OECD (2020), A G20 Roadmap toward a Common Framework for Measuring the Digital Economy. A report for the G20 Digital Economy Task Force (DETF) (<https://tinyurl.com/4txhh9z5>).

99 India's Trillion-Dollar Digital Opportunity, MeitY (<https://tinyurl.com/4thkuud>).

100 India's Booming Gig and Platform Economy. NITI Aayog, 2022 (<https://tinyurl.com/46u6bfxp>).

101 Acemoglu, Daron, and Pascual Restrepo. 2019. "Automation and New Tasks: How Technology Displaces and Reinstates Labor." *Journal of Economic Perspectives*, 33 (2): 3–30. DOI: 10.1257/jep.33.2.3 (<https://tinyurl.com/bdddfu8x>).

12.52. The digital economy offers a unique opportunity to bridge the gender gap and positively impact the gender structure of employment. Women often face distinct challenges in the labour market compared to men, including unequal access to education, limited job opportunities, cultural bias, mobility and time restrictions, and concerns about workplace safety. Such barriers frequently exclude women from participating in traditional labour markets, particularly in developing economies. The development of the digital economy can positively impact the gender structure of employment. The key benefit of the digital economy is that it allows and encourages remote working, where gender may not matter as much as in the physical economy. It opens opportunities for women in developing countries with increased financial independence and empowerment.¹⁰²

12.53. A study based on fintech data for 114 economies worldwide by Loko and Yang (2022) states that fintech adoption significantly improves female employment and reduces gender inequality.¹⁰³ Also, it mitigates the financial constraints of female-headed firms. Similar findings are reported by Sioson and Kim (2019), who note that fintech may play a role in bridging the gender gap in financial inclusion and promoting financial independence.¹⁰⁴ These findings highlight the role that fintech advancements and the digital economy play in creating an enabling environment for women, promoting economic participation and reducing systemic barriers to access to finance.

12.54. The digital economy holds immense potential to increase employment, but the extent of this impact varies across different industries. To ensure the long-term benefits of digitalisation on employment, it is crucial to have the right policies to address potential negative impacts on labour share due to automation and digital integration. The special essay on Artificial Intelligence (AI) (chapter 13) discusses the labour market implications of advances in the field of AI.

Building a green workforce: Job creation in the renewable energy sector

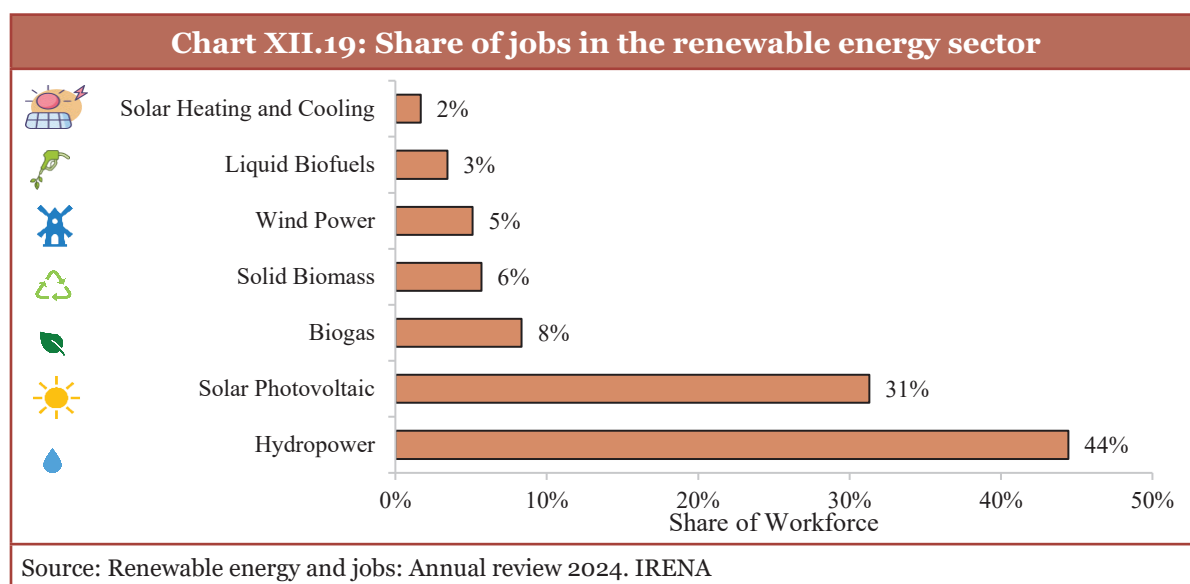
12.55. The Economic Survey 2023-24 discussed the impact of climate change and green transition on the job landscape. The efforts to mitigate the impact of climate change by adopting green technologies and transitioning to greener energy alternatives are expected to witness a strong job-creation effect.

102 World Bank Feature Story. Empowering Women through Jobs in the Digital Economy. October 20, 2015 (<https://tinyurl.com/krytxpsy>).

103 Loko, Boileau and Yuanchen Yang (2022): "Fintech, Female Employment, and Gender Inequality, IMF Working Paper, African Department. Paper No WP/22/108, International Monetary Fund. (<https://tinyurl.com/yp92wd3e>).

104 Sioson, Erica Paula and Chul Ju Kim (2019). Closing the Gender Gap in Financial Inclusion through Fintech," ADBI Institute Policy Brief, 2019-3, Asian Development Bank Institute. (<https://tinyurl.com/4u53w3rd>).

12.56. According to the 2024 Annual Review by the International Renewable Energy Agency (IRENA), the total number of jobs in the renewable energy sector in India reached an estimated 1.02 million in 2023.¹⁰⁵ Hydropower is the largest employer in India's renewable sector, providing approximately 453,000 jobs and accounting for 20 per cent of the global total, ranking second only to China.



12.57. In addition to creating livelihood opportunities, the renewable energy sector provides an opportunity for job creation for women, enhancing their participation in the labour market. The Solar Urja Lamps project in Dungarpur, Rajasthan, is a notable example of how the renewable sector provides a unique opportunity for women's empowerment. The project was initiated to provide an economical and sustainable solar lighting solution. Women's self-help group (SHG) members were trained and mentored to become solar entrepreneurs. The project resulted in the employment of 83 women, the establishment of five solar shops, and the assembly, sale, and maintenance of 40,000 solar lamps.¹⁰⁶ The tribal women engaged in the project could earn ₹ 5,000-6,000 per month.

12.58. Another example is the Global Energy Alliance for People and Planet (GEAPP) interventions. GEAPP India works closely with the DAY-NRLM to design and develop programmes to provide reliable clean energy access leading to improved livelihood for women enterprises. GEAPP India, in collaboration with the rural livelihood mission of UP, has rolled out a programme targeting solarising 50,000 women enterprises in 2025. The objective is to bring one lakh women enterprises under this programme by 2027 and five lakh by 2030.¹⁰⁷

¹⁰⁵ Renewable energy and jobs: Annual review 2024. IRENA. (<https://tinyurl.com/2w77au5s>).

¹⁰⁶ <https://tinyurl.com/5c8fu3b7>

¹⁰⁷ <https://tinyurl.com/2dw3zvrn>

12.59. Climate change and frequent disasters disproportionately impact women, especially those in rural and low-income households, threatening their livelihoods. As climate risks grow, there is an increasing thrust for SHGs to enable alternative livelihoods, creating opportunities for women in agriculture, home-based work, and MSMEs. Achieving this requires an ecosystem with access to tailored technologies, reliable energy, financial support, and business development services.

12.60. Technological, financial, and social challenges exist for women engaging in alternative livelihoods. Gender-biased tools, limited financing, and socio-cultural and geographic barriers constrain women's productivity and economic participation. Poorly designed, energy-inefficient tools force manual labour, while high costs and complex credit processes hinder technology adoption. Remote and hilly areas face additional challenges, including limited mobility, market access, and energy reliability.

12.61. Climate-smart solutions that use Decentralised Renewable Energy (DRE) (primarily solar energy) to power efficient appliances present a promising option to begin addressing these challenges in women-led livelihoods. There is substantial scope for these DRE-enabled livelihood solutions in agriculture, agro-processing, dairy, poultry, fisheries, textiles, crafts, and micro-enterprises.

12.62. The SELCO Foundation¹⁰⁸ demonstrates how DRE solutions can boost women's entrepreneurship and economic participation. It has empowered over 6,200 women in farming, food processing, textiles, and digital services across 24 states through energy-efficient technologies, affordable financing, training, market linkages, and climate-resilient infrastructure. Two such examples are discussed. Hundreds of women farmers in North Karnataka are advancing millet cultivation and local consumption through a solar-powered processing unit, boosting incomes and confidence for farmers, SHGs, and Farmer Producer Organisations (FPOs). Similarly, the *Boipariguda-Sabujima* FPO under Odisha's Millet Mission has adopted solar-powered processing, enhancing value capture, reducing costs, and fostering a productive, energy-reliable ecosystem.

12.63. The DRE solutions have the potential to improve well-being, cut energy costs, and strengthen local skills and financial inclusion while mitigating CO₂ emissions. With the right policies and strategies, the DRE solutions may be leveraged to address women entrepreneurs' challenges and support women-led livelihood.

SKILL DEVELOPMENT: UPSKILLING, RESKILLING AND NEW SKILLING FOR A CHANGING WORLD

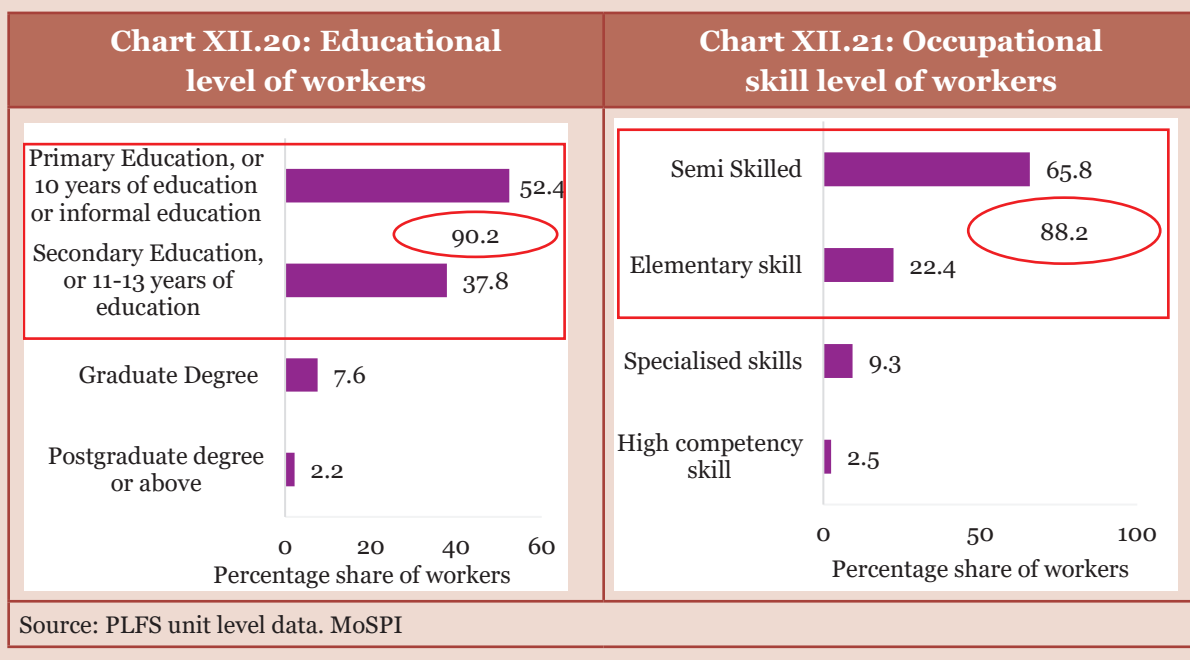
12.64. India's skilling and employment ecosystem is an ever-evolving framework shaped

¹⁰⁸ <https://selcofoundation.org/>

by factors such as economic policies, technological advancements, globalisation, and the dynamic demands of the labour market. In the context of emerging global trends, including automation, generative AI, digitalisation, and climate change, aligning the nation's skill development initiatives with the anticipated transformations in the labour market is vital. The increasing pace of these disruptive changes necessitates the establishment of a resilient and responsive skilled ecosystem. It is imperative to assess how well-prepared India's youth are for emerging opportunities. **Box XII.7** discusses India's current skill landscape.

Box XII.7: India's evolving skill landscape¹⁰⁹

A detailed examination of the annual PLFS 2023-24 unit-level data has been conducted to understand India's skill and job landscape here. The PLFS data shows that 90.2 per cent of the workforce has equivalent to or less than a secondary level of education. This educational skill composition, as a result, leads to most of the workforce (88.2 per cent) being involved in low-competency occupations- elementary skilled and semi-skilled occupational skills.¹¹⁰



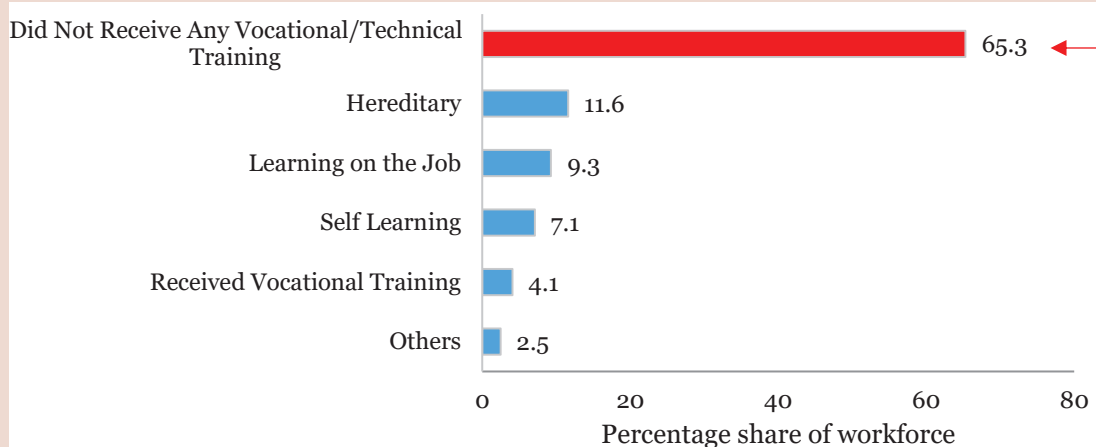
¹⁰⁹ Based on inputs from Institute for Competitiveness.

¹¹⁰ Elementary occupations/ skills for occupations like hawkers, shoe shine, refuse workers, mining and construction labourers, agricultural, forestry and fishery labourers, etc.
 Semi-skilled occupations include clerks, skilled agricultural and fisherman, plant and machine operators, assembly workers, craft and related trades workers, service workers, shop and market sales workers, etc.
 High competency occupations/skills include associate professionals like government regulatory associate professionals, sales and purchasing agents and brokers, medical and pharmaceutical technicians, veterinary technicians, traditional medicine associates, etc.
 Specialised Skills for occupations like medical doctors, software, app developers and analysts, university and higher education teachers, legal professionals, administration professionals, authors, journalists and linguists, agriculture production managers, creative and performing artists, etc.

The composition of skills by education and occupations has major implications on the earnings of individuals and the economy. According to the PLFS data, there is a strong link between educational attainment, occupational roles, and income levels. While 4.2 per cent of the workforce, equipped with advanced education and specialised skills, earns between ₹4 lakh and ₹8 lakh annually, about 46 per cent earn less than ₹1 lakh, predominantly comprising low to semi-skilled workers like agricultural labourers, clerical staff, factory workers, and small-scale service providers. This highlights the urgent need for upskilling initiatives, considering the high concentration of India's workforce in lower-skilled roles.

Unlike general education, which tends to be broad and academic, Technical and Vocational Education and Training (TVET) in India offers specialised training to develop practical skills required by specific industries or job roles. The PLFS 2023-24 reports data on the workforce's vocational training status. Notably, 65.3 per cent of the workforce received no form of vocational training.

**Chart XII.22: Status of vocational training in India for 2023-24
(age group 15-59 years)**



Source: Annual PLFS report 2023-24. MoSPI

Challenges in the skill landscape

A key challenge in the skill landscape is the prevalence of low-skilled workers, which is attributable to the quality of educational outcomes across different levels of education. Low educational skills in the workforce make a mismatch between their academic qualifications and job market demands. This mismatch has resulted in over 53 per cent of graduates and 36 per cent of postgraduates being underemployed in roles below their educational qualifications.

Table XII.4: Matrix of mismatch between education skills and occupations

Occupational skill of workers	Education level/skills of workers			
	Primary Education, or 10 years of education or informal education	Secondary Education, or 11-13 years of education	Graduate Degree	Postgraduate degree or above
Elementary skill	32.13	19.25	3.22	0.96
Semi-skilled	66.3	72.18	50.3	28.12
High competency skill	0.29	2.79	8.25	7.67
Specialised skills	1.28	5.77	38.23	63.26

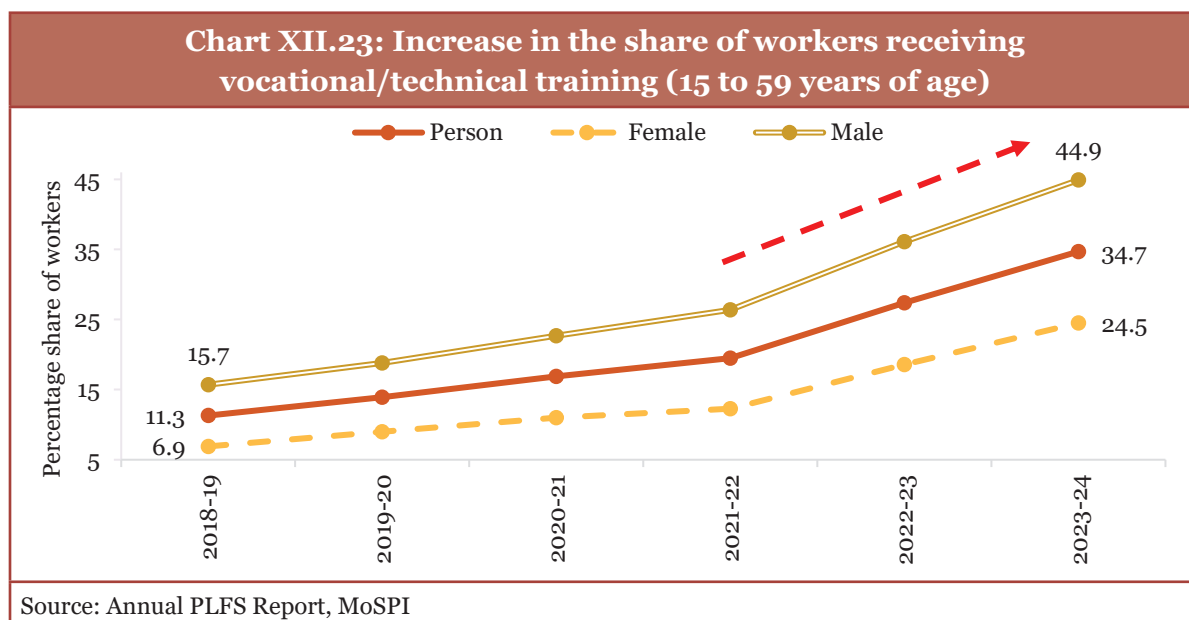
Note: The figures in the table represent the percentage of the workforce with a specific educational skill level and the corresponding occupational skill where they are employed. For instance, the figure in the first cell (32.13 per cent) indicates that 32.13 per cent of the workforce that has attained up to primary education (10 years of education, or informal education) are employed in elementary-skill jobs.

The main diagonal cells represent the skill match between educational and occupational skills (green cells). Cells above the main diagonal represent workers employed below their educational qualifications (in blue), while cells below the main diagonal indicate those in roles exceeding their educational qualifications (in orange).

Source: Institute for Competitiveness.


Skill mismatch can result from imperfect matching between employers and workers, primarily driven by labour market inefficiencies or an imbalance between aggregate supply and demand for specific skills. When the mismatch is due to the gap between the expected and actual skills of workers, it reflects a broader issue of misalignment between the demand for specific competencies and their availability in the labour force.

12.65. Over time, there is an improvement in the proportion of skilled people across all socio-economic classifications, including rural, urban and gender classification. According to the PLFS report 2023-24, 4.9 per cent of the youth in the age cohort of 15-29 years have received formal vocational/technical training, while another 21.2 per cent received training through informal sources. There is a significant improvement in the proportion of skilled people from 2018-19 to 2023-24 across all socio-economic classifications.







12.66. This improvement in the skilling of the workforce results from the government's continuous efforts through its various initiatives. A summary of progress in this regard is summarised in **Table XII.5**.

Table XII.5: Advancing India's skill development initiatives

 <p><i>Re-skilling, Up-skilling and New-skilling of the workforce.</i></p>	<ul style="list-style-type: none"> • Over 1.24 crore persons enrolled for long-term training under the Craftsmen Training Scheme at Industrial Training Institutes (ITIs). • Over 1.57 crore persons have been trained, and over 1.21 crore have been certified under the Short-Term Training (STT), Special Projects (SP), and Recognition of Prior Learning (RPL) components of Pradhan Mantri Kaushal Vikas Yojna (PMKVY). • Over 27 lakh people have been trained, and over 26 lakh have been certified under Jan Sikshan Sansthan (JSS). • 11.79 lakh artisans have been imparted basic skill training in 3,145 Skill centers, spanning 559 districts under PM Vishwakarma. • National Council for Vocational Education and Training: 200+ new age and future skill courses approved. • 4.65 Lakh candidates enrolled in 100 New-age/futuristic job roles; 3.02 Lakh candidates have completed training, and around 98,000 are undergoing training under PMKVY.¹¹¹ • 29 new-age courses under CTS have been introduced in ITIs.
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111 As of 31 October 2024.

 <p><i>Skilling Initiatives for Women Workers</i></p>	<ul style="list-style-type: none"> • The share of women among those trained under PMKVY has increased from 42.7 per cent in 2015-16 to 58.0 per cent 2024-25. • Under JSS, the special focus lies on the disadvantaged group, including women. Thus, women constitute about 82 per cent of the total beneficiaries in the JSS scheme. • In the long-term ecosystem, i.e., in ITIs and National Skill Training Institutes (NSTIs), women's participation has increased from 9.8 per cent in 2015-16 to 13.3 per cent in 2023-24. • Participation of women has increased from 7.7 per cent in 2016-17 to 22.8 per cent in 2024-25 (up to 31 October 2024) under the National Apprenticeship Promotion Scheme (NAPS).
 <p><i>Industry collaboration to meet the demands of the employer</i></p>	<ul style="list-style-type: none"> • The number of 'Establishments' registered on NAPS portal for taking up Apprentices has risen from 17,608 in 2016-17 to 2.38 lakh till 31 October 2024. • A total of 37.94 lakh apprentices have been engaged from 2016-17 to 2024-25 (up to 31 October 2024). • The New ITI Upgradation Scheme has been announced in the Union Budget 2024 to upgrade 1,000 ITIs in the hub and spoke arrangements in collaboration with the state governments and industry. <ul style="list-style-type: none"> o 20 lakh youth will be skilled over a 5-year period in courses aligned to the human capital requirement of industries.
 <p><i>Credit Facilitation</i></p>	<p>The modified Credit Guarantee Fund Scheme for Skill Development (CGFSSD), or Model Skill Loan Scheme, was notified by the MSDE on 9 July 2024. Key changes include.</p> <ul style="list-style-type: none"> • The maximum loan limit was raised to ₹7.5 lakh (from ₹1.5 lakh). • Guarantee coverage now varies: 75 per cent for loans up to ₹4 lakh; 70 per cent for ₹4–7.5 lakh loans. • Eligible lenders expanded to include NBFCs, NBFC-MFIs, and Small Finance Banks. • Course coverage broadened to include non-NSQF-aligned courses via the Skill India Digital Hub (SIDH).
 <p><i>Entrepreneurship Training</i></p>	<ul style="list-style-type: none"> • 3,21,258 beneficiaries provided training from April 2018 to March 2024 by National Institute for Entrepreneurship and Small Business Development (NIESBUD). • Indian Institute of Entrepreneurship (IIE), Guwahati, provided training and handholding services to 1,43,470 beneficiaries from April 2018 to March 2024.

12.67. India has made progress in strengthening its skill infrastructure. The SIDH, a transformative digital portal, leverages the digital infrastructure to synergise and empower the skill ecosystem. The portal is a key step forward to democratise skill development with easy access to a diverse array of courses tailored to the demands of

the industry. The dual training system exposes trainees to an actual industry/workplace environment.

12.68. However, even with the government's continued efforts to evolve the skill landscape, technological advancements are rapidly changing the nature of work and presenting new challenges. Advanced technologies such as automation, AI, and digitalisation are reshaping industries and creating demand for new skill sets. This technological transformation underscores the need for a dynamic, forward-looking strategy that prepares the workforce for emerging opportunities.

12.69. A robust future roadmap must prioritise industry-academia partnerships, continuous skill development, and flexible learning models to create a globally competitive workforce. Several key areas require focused attention and strategic intervention to achieve this vision of a robust skilling ecosystem. The Ministry of Skill Development and Entrepreneurship (MSDE) has continuously brought initiatives to create a workforce matching the industry's demand (**Table XII.5**).

12.70. There is a need to focus on improving learning outcomes and employability. The improvement in learning outcomes that translate into employability may need to be made on two levels. The first is at the school level, for basic language, mathematics, and science proficiency. The focus on Foundational Literacy and Numeracy (FLN) under the National Education Policy (NEP) 2020 has already been discussed in the social chapter. Second at the higher education level, by incorporating skills that align with Industry 4.0 and new-age technologies like Generative AI and machine learning. Recognising this, the NEP 2020 aims to ensure that by 2025, at least 50 per cent of students in school and higher education gain exposure to skill education. Over the next decade, skill education will gradually become a part of all secondary schools.

12.71. A strategic plan for skills and education is essential to leverage the demographic dividend and achieve the Viksit Bharat 2047 goals. Targeted schemes that incentivise skilling and employment creation can help bridge the skill gap by providing practical experience and promoting job generation through the right incentives.

12.72. Early vocationalisation of education may be carried out to improve employability through vocational training. This will enable a smooth transition from learning to the job market. The existing ITIs provide formal vocational training. The relevance of the existing courses offered under the programme needs to be evaluated through a placement and demand analysis under which placement uptake studies should be conducted to identify underperforming and redundant courses. Such courses should be replaced by courses catering to up-and-coming sectors such as AI, sustainability, Big data analytics, etc.

12.73. The Union Budget 2024-25 introduced a package of five key schemes aimed at benefiting 4.1 crore youth over five years with a central outlay of ₹2 lakh crore to promote employment and skilling. These are discussed in Box XII.8.

Box XII.8: Package of schemes for employment and skilling

Government announced the Prime Minister's package of five schemes and initiatives for employment, skilling, and other opportunities for 4.1 crore youth over a 5-year period. These schemes are a stepping stone towards creating long-term quality jobs for Viksit Bharat.

Scheme A - for first-timers: This initiative provides a one-month salary of up to ₹15,000 in three instalments to first-time employees, as registered in the EPFO. With a salary cap of ₹1 lakh per month, this scheme aims to support 2.1 crore youth entering the workforce for the first time.

Scheme B - Job Creation in manufacturing: An incentive will be provided at a specified scale to the employee and the employer directly with respect to the EPFO contributions made in the first four years of employment. This scheme incentivises job creation in the manufacturing sector.

Scheme C - Support to employers: Under the scheme, the government would reimburse up to ₹3,000 per month for two years towards the EPFO contribution of employers for each additional employee. This is expected to benefit 30 lakh youth and additional employment across all sectors.

New centrally sponsored scheme for skilling: 20 lakh youth to be skilled over a five-year period and 1,000 ITIs to be upgraded in hub and spoke arrangements. This is expected to boost the formation of skilled human capital, aiding in the generation of quality employment.

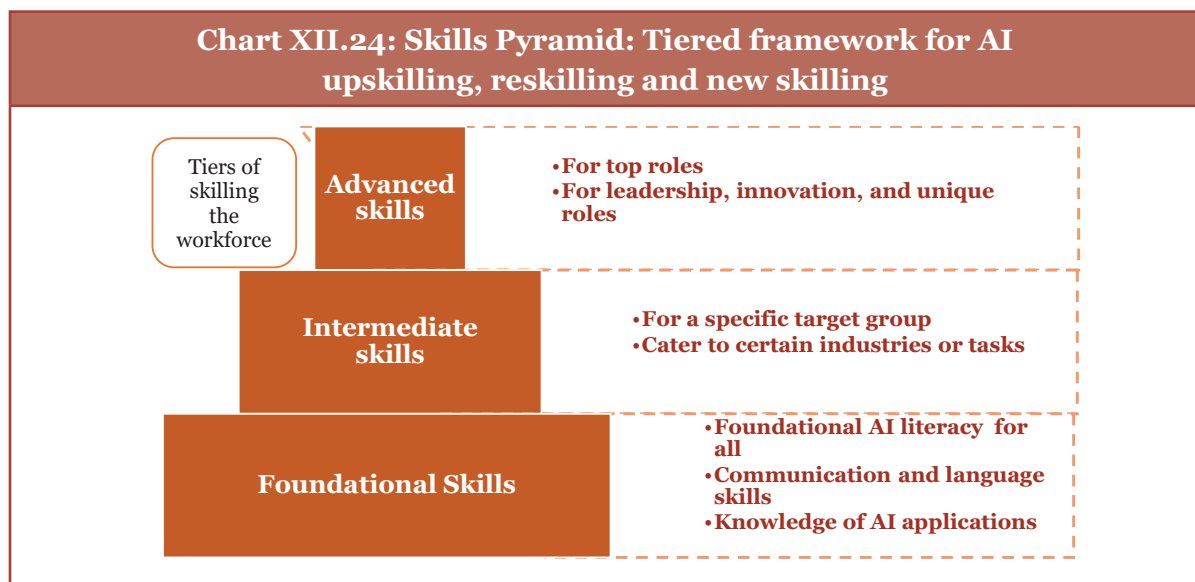
Prime Minister's Internship Scheme: Scheme for internship in 500 top companies to one crore youth in five years. This programme provides 12 months of real-life business exposure, with an internship allowance of ₹5,000 per month and one-time assistance of ₹6,000. This scheme aims to bridge the gap between academic knowledge and industry requirements and aligns with broader goals of improving employability and stimulating economic growth.

Tiered skill framework and the importance of internship programmes

12.74. The evolving transformations of the labour markets worldwide, and in India, revolve around the need for skilled workers, AI-ready workers, and workers who are ready even before they formally enter the job markets. The changing job market needs flexible skill strategies to keep up with fast-moving technologies like AI and large language models (LLMs). Policies should focus less on skilling for "AI jobs" and more on understanding how AI affects different tasks. In the future, most jobs will use AI, with some tasks fully automated and others made easier and more efficient. The impact of AI on employment has been discussed in detail in this survey in Chapter 13.

12.75. Most of the current skill policies are focused on re-skilling and up-skilling for AI jobs and roles or training on the use of AI. In order to re-skill and up-skill IT professionals to be adept with emerging technologies, the IT-ITeS Sector Skill Council, in partnership with MeitY, has launched the FutureSkills Prime platform, which aims at re-skilling/ up-skilling IT professionals in 10 new/emerging technologies including AI. The programme aims to up-skill/ re-skill 13.21 lakh beneficiaries up to March 2027, ensuring their continued relevance in a rapidly changing technological environment. Under the FutureSkills Prime programme, 119 courses specifically focused on the cutting-edge fields of AI. So far, 1.27 lakh individuals have been trained in various AI-related courses and provided training to 1,236 government officials and 292 trainers.¹¹²

12.76. In addition to such programmes and courses, the skilling strategy needs to adopt a layered approach to address diverse industry demands and workforce needs effectively. This new approach could include skills tailored for specific tasks or job roles, targeted at selected groups of workers, and foundational AI skills provided universally to everyone and across all sectors. By aligning these skill tiers with the aspirations and needs of workers, the strategy can better prepare the workforce for a dynamic job landscape with changing demands. The tiered approach allows for training cost-effectively. The basic three tiers of the skill strategy are elaborated in Chart XII.24.



112 Rajya Sabha Unstarred Question No – 1084 Skill Development In Artificial Intelligence (AI) For Youth. Answered On – 31 July 2024. (<https://tinyurl.com/r3k4tuhb>)

12.77. Time is of the essence when picking up tasks in a workplace. In this context, education researchers and learning scientists have long recognised the importance of work-based learning or experiential learning. Scholars such as David Kolbs¹¹³, John Dewey¹¹⁴ Kurt Lewis and others have been pioneers of experiential learning approaches, which have been proven to be important instruments in workforce development in various studies worldwide.

12.78. Internships are one such type of work-based learning aiming to provide skills in a professional setting alongside gaining career and life experience. Internships are mutually beneficial arrangements between young aspirants and employers. Advocates of this approach present many positives of hands-on experiences towards jobs in the form of internships, such as providing real-world contexts. Internships hone communication, collaboration, creativity, and critical thinking. Recognising the importance of internships, the PM Internship scheme launched by the government is discussed in **Box XII.9**.

Box XII.9: PM Internship Scheme: Democratising the idea of learning by doing

The Union Budget of 2024-25 announced a new scheme for internship, named the PM Internship Scheme (PMIS), in 500 top companies to one crore youth over a period of five years. The key aspects of the Scheme are:

- The internship opportunities span 24 sectors, including oil, gas, energy, travel, hospitality, automotive, banking and financial services, etc.
- 12-month paid internship opportunities with top companies of India offered to those aged 21-24 years, from, and with educational qualifications ranging from matriculate to graduate (excluding IIT grads, CAs, etc.) are eligible to apply. The scheme is specifically for Indian nationals who are not employed full-time or engaged in full-time education.
- The scheme offers a monthly stipend of ₹5000, funded jointly by the government (₹4500) and the company (₹500), with an additional ₹6000 for incidentals.

The scheme's pilot phase, launched on 3 October 2024, aims to benefit 1.25 lakh youth in FY25, with a five-year target of facilitating internships for one crore youth. Companies can also use their corporate social responsibility (CSR) funds for expenditure under the scheme.

The scheme is being implemented through an online portal¹¹⁵ developed by the Ministry of Corporate Affairs. The portal is acting like a centralised platform for managing the entire internship lifecycle. The top companies for this pilot project have been identified voluntarily based on the average CSR expenditure of the last three years.

113 Kolb, A. Y., & Kolb, D. A. (2012). Experiential learning theory. In N. M. Seel (Ed.), *Encyclopedia of the sciences of learning*. Springer. https://doi.org/10.1007/978-1-4419-1428-6_227

114 Smith, M. K. (2001). John Dewey and experiential learning: Developing the theory of youth work. *The Encyclopedia of Informal Education*. <https://tinyurl.com/ynfm5zbn>

115 Online portal of PM Internship scheme: www.pminternship.mca.gov.in

Industry partnership to tackle the skill-gap problem: This scheme will help bridge the gap between academic knowledge and industry requirements and align with broader goals of improving employability, stimulating economic growth, and promoting sustainable development. It offers a market-led and youth-driven solution to the issue of constrained higher education, employment and training options to citizens residing in tier 2 or 3 cities, in keeping with the government's commitment to youth empowerment.

While internships are a norm in India's premier institutions and professional courses, they remain unusual in state universities and less famous colleges attended by most youth due to a lack of career counselling and job-oriented networking.

The democratisation of learning by doing: Mass-level internships through PMIS aims to level the playing field for youth from non-metro cities and act as door opener for potential placements. At a personal level, the newfound financial freedom will help boost confidence and motivate young minds to do better and aim higher. For young women, financial freedom and a sense of self-worth can alter life decisions, such as the age of marriage and pre-nuptial terms.

With 65 per cent of India's population residing in rural areas, as highlighted by the Economic Survey 2023-24, many regions remain disconnected from corporate prospects. To address this disparity and ensure inclusivity, the scheme encourages companies to leverage their forward and backward linkages, vendor networks, and MSMEs, providing a more equitable distribution of opportunities nationwide. In its pilot phase, the scheme facilitated over 1.27 lakh internship opportunities through 280 companies across 36 states and union territories, covering more than 740 districts.

What sets this Scheme apart is its independence from existing skill development schemes, apprenticeships, and student training initiatives currently implemented across all states and union territories of India. By focusing solely on internships, the PIMS seeks to create a tailored experience that enhances employability and gives young people real-world exposure. Through this effort, the government aims to equip India's youth with the tools they need to thrive in the job market, fostering a skilled workforce ready to meet future challenges. Ultimately, this initiative reflects a commitment to nurturing talent and unlocking the potential of the next generation, contributing to the nation's overall growth and development.¹¹⁶

For young aspirants, internships under the PMIS are not only opportunities but also transformative experiences. They provide exposure to the real world of corporate work, which is quite dissimilar from the relatively more structured and stable world of academics as taught in most colleges across the country. Besides developing and identifying their optimal career path, aspirants can also get hands-on training in handling responsibility, problem-solving, decision-making, teamwork, and time management.

For the employer, internships are not just good low-cost experiments for testing a candidate's suitability for long-term employment but also a strategic tool for bridging the skills gap and

¹¹⁶ PIB release of Ministry of Corporate Affairs dated 12 October 2024. (<https://tinyurl.com/3267x2sp>)

meeting its CSR mandate. Over 12 months, the company can credibly observe an intern's IQ and EQ and confidently hire deserving candidates.

For the economy at large, PMIS is aligned with the NEP 2020 and is a more immediate measure for promoting youth employment and bringing equity in employment prospects for youth from underprivileged backgrounds. By acting as a finishing school for young pass-outs, internships help reduce the economy's deadweight loss of 'talent sans employability'. Such a segue from education to employment would be crucial in the coming age of AI, where job suitability would be determined by adaptability to change and life skills. In the long run, it could also influence the capital-to-labour ratio in the manufacturing sector.

With over three lakh candidate profiles created and 6.5 lakh applications submitted, the PMIS Scheme has emerged as a transformative catalyst for employment generation. To fully harness India's demographic dividend, the scheme requires widespread publicity and meticulous implementation, continuously aiming at a better fit with India's demographic dividend. The high interest shown by corporates since the launch of the scheme augurs well for the success of the scheme's goal of skilling Indian youth, boosting their employability and the ultimate aim of enhancing their livelihoods.

12.79. Along with internships, a public-private partnership for skill development and vocational training is another effective way of creating an industry-ready workforce. The Directorate General of Training, MSDE, has forged partnerships with industry leaders to enhance and upgrade training infrastructure. Notable collaborators include Dassault for aeronautical structure and equipment fitter, Pidilite and Jaguar for plumbing sector, Skoda for Automobile and HAL and Siemens for advanced CNC machinery training.¹¹⁷

12.80. Building a resilient skill ecosystem requires a collaborative effort from all stakeholders. To navigate the evolving job market, job seekers must focus on developing industry-specific skills. Employers should prioritise workforce planning, anticipate skill shortages, and understand the cost implications of adopting new technologies and regulatory standards. Trainers must design sector-specific programmes that address emerging industry needs and integrate governance, compliance, and innovation elements. A collaborative effort between job seekers, employers, and trainers will be crucial in navigating challenges and seizing opportunities in the future of work.

International mobility of skilled workers

12.81. India has a diaspora population of 32 million¹¹⁸, up from 18 million in 2020, making her one of the countries with the largest diaspora globally as of 2020.¹¹⁹ There is likely to be a demand for 97 million new jobs worldwide by 2025 in sectors such as healthcare, construction, IT, agriculture, and financial services, as estimated by the

¹¹⁷ Inputs from Ministry of Skill Development and Entrepreneurship

¹¹⁸ Population of Overseas Indians, MEA (<https://tinyurl.com/mvupc9n6>)

¹¹⁹ International Migration 2020 Highlights, United Nations (<https://tinyurl.com/y462r55p>)

World Economic Forum (WEF).¹²⁰ With 65 per cent of its population under 35 years and a median age of 28, India's demographic dividend makes it a global talent hub, provided it can cultivate a workforce with employable, industry-relevant skills.

12.82. By creating a skilling ecosystem with a high-quality, globally competitive workforce, India can enhance employability for youth in global job markets. This attracts international investments, stimulates growth, drives innovation, and strengthens India's global economic position. Skill development is key to 'Aatmanirbhar Bharat,' ensuring the workforce has the competencies to meet evolving industry demands and global standards. The government is taking several measures to facilitate skilled labour mobility internationally, as elaborated in **Box XII.10**.

Box XII.10: International cooperation in skill development

- **Bilateral partnerships** are key to facilitating skill-based pathways for the migration of India's workforce. The Indian Government, through the Ministry of External Affairs (MEA), with agreements like **Migration and Mobility Partnership Agreements (MMPA)**, **Labour Mobility Agreements (LMA)**, and **Labour Welfare Agreements** ensure skill alignment, worker rights, pre-departure support and forecast sector-specific demands fostering safe and sustainable international employment opportunities. MMPAs and LMAs with eight countries, including Australia, Israel, Denmark, Italy, Germany, the UK, Japan, and Austria, focus on vocational training and skill alignment.
- The MSDE has seven active **G2G Memorandums of Understanding (MoUs)** with Australia, Denmark, Germany, Japan, Qatar, Singapore, and the UAE. These MoUs focus on skill development, vocational training, capacity building, and international certification, enhancing the global mobility of skilled Indian workers and promoting the recognition of Indian qualifications abroad. By fostering technical collaboration, these partnerships align skilling outcomes with international standards, facilitate information exchange, and contribute to creating a globally benchmarked skills ecosystem.
- MSDE, via the National Skill Development Council (NSDC), conducts **skill gap assessments** in 16 countries, including the USA, Canada, and the UAE, and studies global practices through Sector Skill Councils (SSCs). India also emphasises training for international mobility, offering domain-specific, foreign language, and Recognition of Prior Learning programmes to address skill gaps in emerging fields like AI and robotics. PMKVY and Craftsmen Scheme include language training to improve worker integration abroad.
- Curriculum development under the **National Skills Qualification Framework (NSQF)** ensures alignment with international standards, enhancing employability and mutual recognition of qualifications.
- **Skill India International Centres**, designed as hubs for global job seekers, will reduce the time and cost of international mobility with the goal of establishing a 'Trusted

120 WEF, Future of Jobs, 2020 (<https://tinyurl.com/bdh5kmwp>)

Workforce Supply Chain'. Currently, two SIICs are operational in Varanasi and Bhubaneswar, with five more under renovation.

- **The Pre-Departure Orientation Training** programme, launched in 2018, provides free 8-hour training to migrant workers on destination countries' cultural, legal, and welfare aspects.
- The **MEA's e-Migrate platform** streamlines emigration by connecting stakeholders and offering services like online registration, PDOT, and grievance redressal. Currently, 2,171 recruiting agents and 284,345 employers are registered on the platform.

12.83. As the way forward to tap the global demand, there is need to periodically conduct regular detailed demand-supply analyses to map global skill gaps and align skilling programmes with international labour market needs.

CONCLUSION

12.84. In conclusion, India has seen good growth in employment in recent years, as highlighted by labour market indicators that show strong signs of post-pandemic recovery and increased formalisation of the economy. This growth can be attributed to notable achievements in entrepreneurship, formalisation, skill development, and the transformation of the regulatory framework.

12.85. Labour laws intended to protect the rights of women workers have, more often than not, discouraged hiring by creating systemic barriers to their entry into the workforce. India's new Labour Codes address this by enabling night shifts for women with safety measures, extending 26 weeks of maternity leave to gig and informal workers and mandating creche facilities in workplaces with 50 or more employees. The Codes ensure equal pay and prohibit gender discrimination in recruitment while allowing women to work in all sectors, including hazardous roles, with safeguards. These reforms will promote gender inclusivity, workplace safety, and social security for women.

12.86. By simplifying compliance, fostering labour flexibility, and promoting worker welfare, labour reforms have created an enabling environment that balances ease of doing business with the protection of worker rights. Together, these measures foster a 'virtuous cycle of job creation,' supporting sustainable employment growth and economic inclusivity. Chapter 5 of the survey 'Medium Term Outlook' discusses in detail the important role of deregulation in the economy. Deregulation, in general, whether or not related to labour, will boost employment because it helps lower the cost of doing business and allows for the resource to be used for expanding capacity through more labour and more and better equipment.

LABOUR IN THE AI ERA: CRISIS OR CATALYST?

The rapid advancement of artificial intelligence (AI) presents both unprecedented opportunities and significant challenges for labor markets worldwide. In this context, as policymakers, it is important to pay attention to the evolving technological landscape and the potential impact it can have on the labour market. Historical parallels with earlier technological revolutions reveal the critical role of inclusive institutions in managing disruption and ensuring equitable outcomes.

Barriers to large-scale AI adoption persist in the present, which include concerns over reliability, resource inefficiencies, and infrastructure deficits. These challenges, along with AI's experimental nature, create a window for policymakers to act. India's demographic advantage and diverse economic landscape position it uniquely to benefit from AI. However, achieving these benefits requires significant investments in education and workforce skilling, supported by enabling, insuring, and stewarding institutions. These mechanisms can help workers adapt to changing demands while providing essential safety nets.

By fostering collaboration between policymakers, the private sector, and academia, India can align AI-driven innovation with societal goals. Ensuring inclusivity and sustainability in this transition is key to maximizing benefits while minimizing disruptions. With robust institutional frameworks and strategic planning, AI can serve not as a crisis but as a catalyst for equitable economic transformation, positioning India to thrive in an increasingly automated world.

INTRODUCTION

13.1 Concerns and fears about Artificial Intelligence (AI) disrupting labour markets have intensified as developments in the field have continually demonstrated rapid progress over the last four years. The increasing complexity of the models being developed today represent a paradigm shift in the field of AI, showing the world that in a few years, 'intelligent machines' will be capable of performing tasks that are predominantly handled by humans today. The founder of the AI research and deployment company OpenAI recently stated in a blog post how they are expecting to have office ready 'AI workers' by the end of 2025¹.

¹ Reflections by Sam Altman. 6th January 2025, <https://tinyurl.com/59t77hv4>

13.2 Expectations point toward a trend where AI begins outperforming humans in critical decision-making processes in areas like healthcare, criminal justice, education, business and financial services among others. Adding to the uncertainties of tomorrow is the fact that the speed of research and development is outpacing the regulatory and ethical frameworks needed to manage its risks. Further, with executives optimistic about the capabilities of AI² and the cost-saving potential they expect it to possess, the impact of AI on the labour market, particularly entry-level jobs is turning into a point of concern for policymakers. This economic displacement adds to a broader sense of unease about whether AI will exacerbate existing social and economic divides.

13.3 With AI research and development currently concentrated in the hands of a few, very large companies that control the resources to erect high entry barriers, AI adoption in place of humans presents the risk of concentrating the benefits of automation. Korinek and Stiglitz (2021) warn that labour- and resource-saving automation could produce a ‘winner-takes-all’ approach to the detriment of developing countries who are labour- and resource-rich³. Technological developments that worsen inequality can erode any possible benefit that the innovation brings, leaving the public sector responsible for addressing the cost of the transition. This has led to calls for a more responsible approach to AI adoption⁴, especially in a country like India where employment numbers make the magnitude of impact something worth paying attention to.

13.4 Although until this point, the use of AI/Machine Learning (ML)⁵ enabled tools and applications were already widespread and part of productivity suites for years, the end-user’s facetime with the integrated ‘AI’ features was essentially minimal and unconscious. Examples include the autocomplete function on a smartphone keyboard, Google’s and Apple’s smartphone virtual assistants, personalised recommendations on e-commerce platforms and media streaming services, and curated feeds on social media sites, among many others. Most users never paid much attention to the host of ML-powered features while enjoying the convenience they delivered. This changed in light of the developments witnessed in the last four years. The perceptions about AI has now drastically shifted, spurring debates about the need to align AI developments with broader societal goals.

13.5 OpenAI has initiated an ‘arms race’ in AI as between 2022 and 2024, many companies, including big tech firms, have scrambled to capitalise on the demand for AI.

2 2024 Gartner CEO and Senior Business Executive Survey. Gartner. 27th June 2024, <https://tinyurl.com/yez68sp8>

3 Korinek, Anton and Joseph E Stiglitz (2021). Artificial Intelligence, Globalization, and Strategies for Economic Development. Working Paper 28453. National Bureau of Economic Research, <https://tinyurl.com/2vvxkwdx>

4 A letter jointly written by Dr. Rajiv Kumar (former Vice Chairman of NITI Aayog), Sridhar Vembu (CEO, Zoho Corporation) & Sharad Sharma (Co-founder of the iSPIRT Foundation) highlights their concerns.

5 While Artificial Intelligence is used to describe the ability of a machine to mimic human intelligence, machine learning is a subset of AI that allows machines to learn from data and improve without being explicitly programmed.

Examples include but are not limited to Google (Gemini), Microsoft (Co-Pilot), Meta (MetaAI with Llama), X/Twitter (Grok), Anthropic (Claude AI), Midjourney, Perplexity AI (Perplexity) and Stability AI (Stable Diffusion), among others. The number of AI patents granted globally increased 62.7 per cent to just over 62,000 between 2021 and 2022⁶. Similarly, the annual global private investments in Generative AI surged from approximately USD 3 billion in 2022 to USD 25.2 billion by the end of 2023⁷. Between 2021 and 2023, global corporate investments in all types of AI totalled USD 761 billion. Additionally, an increasing share of companies have been referencing AI in their earning calls lately⁸, with CEOs expecting AI adoption to lower labour requirements.

13.6 If one were to look at these trends and the value generation expected from the investments, it would appear as if the ‘AI revolution’ is here and labour is soon going to be a thing of the past. Unease about what AI entails for workers and what it means for humanity as a whole has become part of daily discussions among academicians and policymakers, as reflected in many publications and reports. Making sense of these fears and anxieties would require a more in-depth breakdown of the short-term and long-term implications. Since there are many unknowns associated with AI at this point, looking at the present through the lens of previous technological revolutions may provide some insights into the way forward. Advancing the understanding about the challenges and opportunities that lie ahead is the purpose of this essay.

13.7 In this regard Section 2 brings to light the adverse effects that emerged during previous technological revolutions and how they pertain to present-day concerns about Artificial Intelligence. The section also elaborates on the importance of remaining cognisant, as disruptions that are not carefully managed can lead to permanent societal damage for a country like India. Section 3 then goes on to discuss how these risks can be minimised through the creation of Social Infrastructure i.e., Institutions. The priority here is minimisation since the risks can never be fully mitigated. That is the price of innovation induced creative destruction. The various types of institutions detailed in this section can provide a much needed support system to ease the pains of a transition.

13.8 However, building institutions is a time consuming process, requiring concerted effort from the public sector, the private sector and members of academia. In Section 4, we put forward the hypothesis that India, at present, is afforded this time due to the challenging nature of scaling up technological adoption. Deployment at scale will require AI developers to address certain key challenges which requires a non-trivial

6 Figure 1.2.1. Artificial Intelligence Index Report 2024, Stanford University, <https://tinyurl.com/y4edef43>

7 Ibid.

8 Aakash Kalyani, Serdar Ozkan, Mickenzie Bass and Mick Dueholm, "AI Optimism and Uncertainty: What Can Earnings Calls Tell Us Post-ChatGPT?," St. Louis Fed On the Economy, Sept. 30, 2024, <https://tinyurl.com/bdhnyu7>

amount of time. Section 5 then outlines possible opportunities that AI may open up for India. It seeks to visualise a possible labour market evolution where the future of work is augmented by AI. Whether or not we go down this path will depend entirely on how robust our institutions are. Section 6 concludes the essay.

REVOLUTIONS AND RIPPLES

13.9 The present discourse on AI from international organisations and social science researchers postulates that large scale labour market disruptions due to AI may materialise in the near-term. The International Monetary Fund states that AI poses risks of job displacements, notably for emerging markets and developing economies, which are not well placed to leverage the technology relative to the advanced economies⁹. The International Labour Organisation estimates that nearly 75 million jobs globally are at complete risk of automation due to AI¹⁰. Estimates for the UK show that 7 per cent of the existing UK jobs face a high risk of automation in the near term, rising to around 18 per cent after 10 years¹¹. Industry experts have told media outlets that ‘AI models could dramatically disrupt the labour market, including replacing routine jobs in some sectors.’¹² A study by the Bank for International Settlements finds that 45 per cent of the jobs in the upper quartile of the wage distribution remain exposed to AI in the United States. If AI becomes highly capable, exposure increases across all quartiles of the income distribution¹³.

13.10 Estimates from private sector firms paint a similar picture. Goldman Sachs economists state that nearly 300 million full-time jobs remain exposed to AI-driven automation¹⁴. McKinsey estimates demonstrate how, by 2030, up to 30 per cent of current work hours could be automated by generative AI¹⁵ across Europe and the United States. They state that businesses will ‘need a major skill upgrade’ as the deployment of AI would raise the demand for social and emotional skills along with a need for

9 Cazzaniga, M., Jaumotte, M. F., Li, L., Melina, M. G., Panton, A. J., Pizzinelli, C., ... & Tavares, M. M. M. (2024). Gen-AI: Artificial intelligence and the future of work. International Monetary Fund, <https://tinyurl.com/33hjum83>

10 Minimizing the negative effects of AI-induced technological unemployment. Janine Berg. ILO. 9th October 2024, <https://tinyurl.com/4f7thztd>

11 Brione, P., Powell, A., Francis-Devine, B., Rough, E., Codd, F., & Buchanan, I. (2023). Potential impact of artificial intelligence on the labour market. House of Commons Library, <https://tinyurl.com/jjj68k86>

12 Will ChatGPT take your job – and millions of others? Published in Al Jazeera. 28th March 2023, <https://tinyurl.com/bdejbpxk>

13 Auer, R., Köpfer, D., & Švéda, J. (2024). The Rise of Generative AI: Modelling Exposure, Substitution, and Inequality Effects on the US Labour Market. Substitution, and Inequality Effects on the Us Labour Market, <https://tinyurl.com/3t6hekt4>

14 Generative AI could raise global GDP by 7%. Goldman Sachs Research. 5th April 2023, <https://tinyurl.com/2vypxt3d>

15 A new future of work: The race to deploy AI and raise skills in Europe and beyond. McKinsey Global Institute. 21st May 2024, <https://tinyurl.com/48tnydzu>

critical thinking and creativity. In line with the IMF estimates, insights from Ernst & Young state that while the impact of AI on emerging economies is lower relative to the advanced economies, one can still expect 57 per cent of occupations in emerging countries to be affected by higher Generative AI adoption¹⁶. Similar sentiments are prevalent among surveyed CEOs¹⁷ and other private sector estimates¹⁸.

13.11 Anxieties about the effects of AI remain high in India as well, considering our country is a services-led economy. Among white-collar workers, an IIM Ahmedabad Survey highlights how 68 per cent of the surveyed employees expect their jobs to be partially or fully automated by AI within the next five years¹⁹. Forty per cent of the employees believe AI will make their skills redundant. Copestake et al. (2023) also state that firms have substantially increased AI skill demand across regions, industries, firms and occupations²⁰. As per their findings, these jobs pay a 13 to 17 per cent salary premium over baseline estimates. India's banking sector is also witnessing adoption among well-capitalised and larger banks, per a recently published RBI study²¹. With trends expected to continue towards even higher AI adoption by the private sector and the market, NASSCOM estimates that the Indian AI market will grow at 25 to 35 per cent CAGR by 2027²².

13.12 These estimates are substantial and when viewed through the lens of history, one could argue that concerns, to a degree, are valid. Previous technological revolutions have been painful, and the damage brought on has been long lasting. Andrew Haldane illustrates that in the pursuit of productivity and profits, the substitution of labour for capital has resulted in widespread economic hardship, damaging social cohesion²³. Each revolution displaced large segments of the workforce. Many struggled to find new employment, especially in geographies and occupations where the scale of impact was unanticipated or underestimated. Consequently, income inequality rose, as those who adapted to new technological demands saw their wages increase, while others experienced declining pay and fewer opportunities. Recent experiences of the same,

16 The impact of GenAI on the labor market. Gregory Daco. EY-Parthenon. 14th February 2024, <https://tinyurl.com/m9vs3c4a>

17 2024 Gartner CEO and Senior Business Executive Survey. Gartner. 27th June 2024. <https://tinyurl.com/mr3ybvss>

18 AI Jobs Barometer 2024. PricewaterhouseCoopers, <https://tinyurl.com/4dnwdfs8>

19 Labour-force Perception about AI: A study on Indian White-collar Workers. Brij Disa Centre for Data Science and Artificial Intelligence, IIM Ahmedabad. August 2024, <https://tinyurl.com/2mjmu4>

20 Copestake, A., Marczinek, M., Pople, A., & Stapleton, K. (2023). Ai and services-led growth: Evidence from Indian job adverts. Working Paper, International Monetary Fund and World Bank, Washington, DC, <https://tinyurl.com/2ms6y2sz>

21 How Indian Banks are Adopting Artificial Intelligence? Shobhit Goel, Dirghau K. Raut, Madhuresh Kumar and Manu Sharma. RBI Bulletin, October 2024, <https://tinyurl.com/4jznsbcs>

22 AI Adoption Index 2.0. NASSCOM.

23 Ideas and Institutions – A Growth Story. Speech by Andrew Haldane. 23rd May 2018, <https://tinyurl.com/246jvy5p>

such as the drastic loss of employment among coal mining workers across the United States brought about by the energy transition, demonstrates just how susceptible to shocks the labour market can be²⁴.

13.13 Societal impacts of these revolutions also extends to economic disparity. Workers may not immediately benefit from the productivity and profitability gains associated with technological advancements. For instance, during the early stages of the industrial revolution, wages frequently lagged behind increases in productivity. These transitions were also protracted, as it could take decades for displaced workers to find alternative livelihoods. The first Industrial revolution exemplifies this dynamic, with workers who were laid off facing sustained unemployment well into the 19th Century – a period known as ‘Engle’s pause’. Thus, societies where the balance between capital and labour was not carefully managed by capable institutions were marked by enduring hardships for many who were affected.

13.14 Protracted labour displacement is something that a labour-surplus country like India cannot afford. Our primary challenge is the challenge of numbers. As highlighted in the Economic Survey 2023-24, India would have to create an average of 78.5 lakh jobs annually in the non-farm sector by 2030 to cater to the rising workforce. Further, India is a majorly services driven economy, with a significant share of the I.T. workforce employed in low value added services. Such jobs are the most susceptible to automation, as firms in a bid to cut costs may substitute labour for technology. We already see this in case of tech-firms in India²⁵ and the BPO sector in Philippines²⁶. India is also a consumption based economy, thus the fall in consumption that can result from the displacement of its workforce is bound to have macroeconomic implications. If the worst-case projections materialise, this could have the potential to set the country’s economic growth trajectory off course.

13.15 In such a situation, placing a higher weightage on the possibility of an adverse consequence is required as complacency can amplify any negative effects by creating a long-lasting impact. It is the uncertainty associated with the timeline and magnitude of effects that demands the attention of policymakers. In the words of Alan Greenspan, ‘Uncertainty is not the same as risk...Uncertainty involves unknown probabilities and outcomes with tremendous consequences.’²⁷ Any outcome with tremendous

24 Mark, E., Rafaty, R., & Schwarz, M. (2024). Spatial-temporal dynamics of structural unemployment in declining coal mining regions and potentialities of the ‘just transition’. *Energy Policy*, 195, 114338, <https://tinyurl.com/mz557rfd>

25 PhonePe cuts 60% of support staff as AI drives 40-fold transaction surge. Published in *Business Standard*. 21st October 2024, <https://tinyurl.com/2nf8wfua>

26 The World’s Call Center Capital is Gripped by AI Fever – and Fear. Published in *Bloomberg*. 28th August 2024, <https://tinyurl.com/9r47nk4h>

27 We will never have a perfect model of risk by Alan Greenspan. Published in *The Financial Times*. 16th March 2008, <https://tinyurl.com/58ma6ujh>

consequences needs to be taken seriously, no matter how low the probability is. Since policymaking is a wicked problem, one would rather overestimate the uncertainties and be overprepared than underestimate the effects and have to manage the fallout.

13.16 Responding to these uncertainties requires coordinated efforts aimed at addressing the structural issues that can intensify the impact of AI on India's labour market. It is here, the establishment of new, and upgrading existing Institutions will play a pivotal role. Social Infrastructure will provide the required foundation for ensuring that the gains from technology can translate into inclusive growth.

THE NEED FOR ROBUST INSTITUTIONS

13.17 Minimising the magnitude of the negative effects resulting from creative destruction has always necessitated a 'societal response', one where new social infrastructure is created to foster environments where innovation drives inclusive growth. The most notable work highlighting the importance of institutional capacity is Daron Acemoglu and James Robinson's book, 'Why Nations Fail²⁸.' Inclusive Institutions can promote broad participation in the gains from innovation and create the conditions for sustained economic growth and prosperity. They are the hands that shape a country's economic destiny.

13.18 Eric Posner reinforces the importance of building adequate institutional capacity by pointing out a grim scenario that is possible if the most optimistic AI projections are to be believed. He states, 'There is no social safety net generous enough to protect people from the mental-health effects, and society from the political turmoil, that would follow from widespread disappointment and alienation [due to substantial and permanent unemployment].²⁹' This would be the least desirable outcome.

13.19 High-quality institutions act as mediators, ensuring that technological advancements yield broad-based benefits, while weak or absent institutions often exacerbate disparities, resulting in uneven economic and social outcomes. For India to seriously consider the effects of AI, actions will have to focus on strong Institution Building. In this context, Andrew Haldane splits the institutional requirement along two broad categories; enabling institutions and insuring institutions.

13.20 Enabling Institutions are focused on equipping the workforce with the necessary skills needed to adapt and thrive in a shifting landscape. They impart skills and augment

28 Robinson, J. A., & Acemoglu, D. (2012). *Why nations fail: The origins of power, prosperity and poverty* (pp. 45-47). London: Profile.

29 *The Future of Work in the AI Era* by Eric Posner. Published in Project Syndicate. 11th April 2024, <https://tinyurl.com/bde9ksce>

the content of education, ensuring that learning keeps up with the demands of the job market. Further, as new auxiliary tasks and sectors emerge from the widespread adoption of technology, enabling institutions facilitate the smooth transition of the workforce to these new jobs, reducing the damage to worker income and preventing loss employability. The latter is of paramount importance, because if transitions are not carefully managed, workers can experience a long-lasting unemployment, with little prospect of catching up to market demands. As India's workforce in low-skill and low-value-added services remains vulnerable to AI, robust enabling institutions are essential to help transition workers to medium- and high-skilled jobs, where AI can augment their efforts rather than replace them.

13.21 Insuring Institutions are intended to provide a soft-landing for workers whose finances have been hit and whose well-being has been affected during the transitional period. These institutions help secure a standard of living during the shift, keep inequalities in check and aid in keeping the social fabric cohesive. They are also responsible for reducing the recession risk, for individuals and for societies. Insuring Institutions build safety nets (such as the National Insurance Act, 1911 and the Beveridge Report, 1942 in the UK), protect worker rights, provide finances (such as credit unions), housing (the emergence of the Young Men's Christian Association during the 19th century), and social and emotional support during periods of displacement.

13.22 In addition to the two outlined by Haldane, we propose the necessity of a third institution, Stewarding Institutions. The products of science are neither good, nor bad and what determines their net-impact on society is how they are applied. This application depends on how society comes to define the technology's utility, the ethics that govern its applications and the rules that structure their place in society. It is important to clarify that stewarding in this case does not imply placing restrictions on innovation or dictating a narrow set of applications for technology. It implies that policymakers demonstrate a certain degree of cognisance when it comes to emerging technologies, so that when the need arises, they stand well-placed to mitigate any adverse effects that emerge as by-products of technological applications. These institutions would be agile, crosscutting across sectors and up to date on the latest developments, so that they are equipped to identify both opportunities and threats. Stewarding institutions will have to be responsible for designing an approach that delicately balances public welfare without stifling innovation. They are also required for fostering the social acceptability of AI by promoting the right levels of transparency and accountability in AI applications. For instance, AI applications in healthcare, health insurance and education would greatly benefit from higher-degrees of transparency and accountability, as these sectors are way more human-centric relative to others. Biases in models being applied to these sectors can result in adverse, unintended consequences.

13.23 Building each of these institutions is a time-consuming process due to the challenges involved in mobilising the required intellectual and financial resources. Their need is not immediately clear and aligning our social structures, regulators, cooperatives, and policymaking institutions towards a distant goal is often an uphill battle. However, unlike previous technological revolutions, advancements in AI today and the utility it has the potential to deliver are being shared by all countries thanks to a globalised world. AI presently being in its infancy has made it so that every nation, irrespective of its income level is on equal footing as far as discovering its applicability goes. This level playing field provides India the time to build the necessary institutions that will minimise the disruptions and maximise societal benefits.

13.24 Another reason we postulate that India has the time available to reinforce and build supporting institutions is due to the nature of technological revolutions. For technologies to be widely adopted, they have to overcome several obstacles that make them ubiquitous. Historically, technologies that have positioned themselves as General Purpose Technologies have done so through refinement and increasing cost-effectiveness. This then created the demand for the technology, reorienting macroeconomic processes around it by changing the way we invest, what we demand, the education we impart and the quantity of labour we demand. The road to a reorientation of this size is long and we hypothesize that it could be no different for scaling AI adoption. For AI to be widely applicable in the real world, it needs to be made practical, reliable, requires the establishment of supporting infrastructure and has to achieve sufficient levels of resource efficiencies to be viable.

VISION TO VIABILITY: AI'S REAL WORLD CHALLENGES

Differentiating between Breakthrough and Practicality

13.25 A breakthrough in the context of technology refers to a significant discovery that overcomes a major barrier, enabling new possibilities or dramatically advancing the state of the art. It is also characterized by its ability to solve previously unsolvable problems, introduce novel capabilities, or revolutionise existing systems, processes, or industries. This is the stage at which Artificial Intelligence finds itself right now. Large Language Models are capable of acing exams and achieving high test scores, but the field is still far from having a model come up with original, publishable research.

13.26 Conversely, practicality refers to feasibility, effectiveness, and usefulness in addressing real-world problems or needs. This also encompasses ease of implementation, cost-effectiveness, scalability, user access, and the ability to deliver clearly measurable benefits. Achieving this stage is the most challenging part since many innovations

that emerged over the years have been clear breakthroughs but failed to find the mass acceptance that comes to characterise a General Purpose Technology. AI today has the potential to deliver clearly measurable benefits in terms of productivity, but the costs, especially in terms of investment required is high.

13.27 At its current stage of development, AI is more experimental as it is still finding its footing. This is not inherently negative, as it signifies innovation's curious and exploratory nature. However, from a practical standpoint, its experimental nature makes its real-world utility unclear despite the technology demonstrating impressive capabilities. For instance, the pursuit of smarter AI models promises to propel the applicability of self-driving cars but identifying why they are needed, their cost-effectiveness, and social acceptability remains an ongoing challenge. Similarly, chatbots can convincingly simulate human conversation but their practical effectiveness in customer service is not established since customers prefer having their complex questions dealt with by humans³⁰.

13.28 The industry has placed its chips on increasing AI adoption, hoping that if the technology reaches as broad an audience as possible, users will, on their own, eventually come up with more applications, thus validating the technology. For now, while AI is useful in exploring and optimising certain jobs, particularly ones that are knowledge-based or creative, the full scope of its practicality is still limited due to the degree of human intervention necessary in order to extract useful outputs. AI models, particularly overly complex generative AI which are too rich and have too many parameters are unconcerned with the truth, unconcerned with the 'correctness' of its output and unconcerned with the realities of the world. It is known to 'hallucinate' and generate outputs that are not based on what is true but rather on what is the best fit for question³¹. Utilising AI to the best of its abilities right now requires one to be fully aware of its limitations.

Reliability

13.29 In most day-to-day use cases involving personal use, even an error rate of 10 per cent would not have any significant impact since the user would most likely identify the error and correct it. The stakes are much higher when it comes to deploying AI in business and real-world applications as the severity of the consequences will vary from one application to another. A customer service chatbot might have many chances to correct misunderstandings, whereas a path planning algorithm for an autonomous vehicle gets only one chance to get it right. Ignoring the reliability problem and hasty implementation results in severe, unintended consequences.

³⁰ Cogito Customer Experience Survey Results. 6th August 2024, <https://tinyurl.com/ynf37mm6>

³¹ Hicks, M. T., Humphries, J., & Slater, J. (2024). ChatGPT is bullshit. *Ethics and Information Technology*, 26(2), 38, <https://tinyurl.com/3cun5e9d>

13.30 Several examples noted in a publication by McKendrick and Thurai (2022) demonstrate the non-negotiable nature of reliability³². A self-driving car fatally struck a pedestrian on a four-lane road because it failed to recognize the individual as a pedestrian, as the person was not near a crosswalk, which was the typical circumstance represented in its training data. Application of AI in recruitment turned out to prefer male candidates over female applicants due to the larger number of males in its training sample. The company attempted several times to make the AI screener gender-neutral but failed. Predictive Policing using AI also tends to have a bias against minorities³³.

13.31 Time-tested liability frameworks applicable to commercial products may not apply in a straightforward manner to AI products as solving the reliability problem is also necessary to mitigate risks from AI applications³⁴. Additionally, given the nuanced relationship between humans and accountability, individuals tend to feel less responsible as their direct involvement in actions decreases. This phenomenon becomes particularly significant when artificial intelligence is used to replace human decision-making within firms and organizations. The introduction of AI further distances humans from the ethical responsibilities traditionally tied to decision-making, potentially exacerbating a lack of accountability. In such frameworks, where firms increasingly rely on AI as a substitute for human judgment, the importance of ensuring AI's reliability becomes paramount. This is because, unlike humans, AI lacks the inherent capacity for accountability, making the ethical and operational implications of its use even more critical to address.

13.32 Arvind Narayanan and Sayash Kapoor of Princeton note that LLMs are 'not reliable enough to be successful products' – yet³⁵. They state that for AI to achieve mass adoption, companies need to start approaching AI development like Software development. The product needs to be reliable and dependable. Until such a time, the labour displacement effects of AI may not be widespread since human oversight will be a must for any kind of AI application.

The Infrastructure Challenge

13.33 The third criterion for the diffusion of new technology is growth in supporting infrastructure. As illustrated by Carlota Perez in her book investigating the history of technological revolutions³⁶, the necessary infrastructure is crucial for the proliferation

32 McKendrick, J., & Thurai, A. (2022). AI isn't ready to make unsupervised decisions. *Harvard Business Review*, 15, 10, <https://tinyurl.com/4uxf3bbz>

33 Predictive Policing Algorithms are racist. Will Douglas Heaven. *MIT Technology Review*. July 2020, <https://tinyurl.com/yaef2evv>

34 Rahul Matthan (Trilegal), Unpublished Manuscript, December 2024.

35 AI Agents that Matter. Sayash Kapoor and Arvind Narayanan. 3rd July 2024, <https://tinyurl.com/3pd7ftkk>

36 Perez, C. (2002). *Technological revolutions and financial capital: The dynamics of bubbles and golden ages*. In *Technological revolutions and financial capital*. Edward Elgar Publishing.

of new technology as it provides the externalities that facilitate adoption and widespread use. The infrastructure is installed in the initial phase when the excitement over the potential of the new technology runs high, creating the conditions for the full deployment of the technology in the coming decades.

13.34 Canals, waterways, and turnpike roads provided the connectivity required for the industrial revolution, facilitating the movement of inputs and finished goods. The age of the automobile gained momentum due to the construction of roads and highways all across the United States. The expansion of the electricity grid provided households access to power, thus fuelling the demand for home appliances and leading to the era of mass production. The proliferation of computers and infrastructure created for telecommunications gave impetus to the adoption of the Internet.

13.35 Once a technology had proven its practicality (more than its reliability, as reliability would be fine-tuned with subsequent iterations of the technology), infrastructure creation naturally followed. However, since building infrastructure is a highly time-consuming process, the full potential of the technology could not be harnessed till the support infrastructure was widely available. The development of AI, and the rate of adoption is similarly going to depend on the availability of quality infrastructure and the pace of its creation.

13.36 Infrastructure, in the case of AI, is not as straightforward as in previous technological revolutions since its requirements transcend the physical realm. Apart from the already-known aspects such as land, reliable chip supply, and data centres, chief among AI infrastructure is data, which is the lifeblood of AI development. Training AI models cannot be done on raw data, as previously discussed; data is highly prone to bias the model. Additionally, data in its raw form can include instances of toxicity, vulgar content, and other dimensions that can lead to the model performing unexpectedly. More often than not, prior to data making its way into the training set for a model, it is extensively cleaned by humans who filter the dataset for any and all of the issues mentioned above. Cleaning introduces its own set of biases as data can be included or excluded at the discretion of the developers, biasing the overall output of the model.

13.37 For AI to be widely adopted across industries, a holistic infrastructure that combines technological resources, human expertise, and organisational readiness is needed. Changes of this magnitude take time to materialise, and even longer to reach the point where the new technology seamlessly synergises with the entire value-addition process. Thus, concerns over AI displacing labour may be somewhat ameliorated by the time it takes for complementary facilities needed for AI adoption at scale, to emerge.

The Resource Challenge

13.38 The most critical obstacle to the large-scale proliferation of AI in the medium term is resource efficiency. For AI to scale effectively, technological advancements and performance gains must be coupled with significant reductions in costs and more efficient utilisation of scarce resources—an achievement that remains elusive. The challenge is compounded by the fact that modern AI systems, still in their developmental infancy, demand enormous investment in research and development. Moreover, the prevailing trajectory in AI development prioritises performance over cost-effectiveness, driven by a belief that any compromise on model performance in favour of cost savings would lead to subpar outcomes. This approach, while understandable, underscores the urgency of addressing the pressing need for sustainable and efficient AI innovations.

13.39 Training AI models are becoming increasingly expensive as the availability of data is saturating and high-quality data acquisition costs are rising. Training the first ‘Transformer’ model developed by Google, which laid the foundation for ChatGPT, cost around USD 930 dollars. In stark contrast, training OpenAI’s GPT-4 cost the company USD 78.4 million, while the costs incurred by Google for training Gemini Ultra stood at USD 191.4 million³⁷. As costs are only expected to go up, developers have been exploring the idea of using ‘Synthetic Data’, but this is rife with its own set of challenges. Artificially generated data come with data distribution bias, are characterised by completeness which influences the model’s resilience, can contain many inaccuracies and errors, can neglect temporal and dynamic aspects found in real data and are highly inconsistent when evaluated on factors present in real data³⁸. Utilising synthetic data to augment previous training data leads to the model’s learning essentially coming to a halt and repeated use of synthetic data leads to ‘model collapse’.

13.40 Secondly, developing more sophisticated models comes with significant costs as well. Since processing user queries utilises vast computational resources, AI firms incur running costs for the model. For instance, in the case of OpenAI’s o3 model mentioned earlier, the breakthrough in processing capability came at a very high cost. In running the ARC-AGI benchmark, which is considered one of the most challenging tasks for an AI to undertake, OpenAI incurred a cost of USD 200,000³⁹ for its low-efficiency model. While the firm asked the author not to disclose its high-efficiency cost, the author does state that the amount to compute was 172 times the low-efficiency model’s figure. Running increasingly complex models is computationally tasking, exerting hardware, energy and other resource demands.

37 Visualizing the Training Costs of AI Models Over Time. Visual Capitalist, <https://tinyurl.com/bderacpn>

38 Hao, S., Han, W., Jiang, T., Li, Y., Wu, H., Zhong, C., ... & Tang, H. (2024). Synthetic data in AI: Challenges, applications, and ethical implications. arXiv preprint arXiv:2401.01629, <https://tinyurl.com/zkau6cn4>

39 OpenAI o3 breakthrough high score on ARC-AGI-PUB. Francois Chollet. 20th December 2024, <https://tinyurl.com/2xy69wu8>

13.41 In this regard, AI's energy requirements are no mystery. Globally, all data centres already consume more electricity than countries such as Italy, Taiwan, Australia, Spain and Malaysia among others⁴⁰. These requirements will only increase with greater adoption. A recently published Bloomberg analysis estimated that powering Data Centres for AI around the world is expected to reach up to 1580 terawatt-hours, which is as much electricity as India consumes⁴¹. Hardware also needs cooling, which is reliant on water, much of it drinking quality. Cooling is estimated to need over a billion litres of water per day. Further, Data Centre campuses are built on a vast amount of land, and finding the right piece of land that fulfils the power and water requirements is going to drive up land prices in resource-rich areas. The chips powering AI are reliant on a steady supply of minerals such as silicone, gold, silver, aluminium, tin, and other rare earth minerals. The magnitude of scarce resources required for AI proliferation would not be much of a concern if there were no competing needs driving demand for the same resources. However, this is not the case and scaling up AI has the potential to start a bidding war for minerals, land, and water, driving up prices for essential resources.

13.42 Without ground-breaking innovations and strategies to make AI scaling economically viable—both financially and in terms of resource consumption—efforts to democratise AI will jeopardise critical global priorities such as energy security, water security, and even housing or food security. The construction of sprawling data centres risks displacing essential land use, further exacerbating these challenges. The imperative for AI developers is clear: scaling down resource consumption while simultaneously boosting performance is not just a technical hurdle but the defining bottleneck that will shape the future of AI. The time to address this pressing issue is now.

13.43 Technological revolutions that achieved mass adoption only did so because, over the course of time, they got the delicate mix of the factors outlined in the previous sections right. Practicality, reliability, infrastructure and efficiency need to all work in tandem before true large scale adoption happens. No amount of investment can force mass adoption unless the technology makes economic sense for the user and for the society. In the case of AI, if it makes sense for the former and not the latter, policymakers have to step in and take some hard decisions.

AI AND INDIA: ARE THERE OPPORTUNITIES?

13.44 As India contemplates the integration of AI into its economy, the lessons of past technological revolutions underscore the critical importance of proactive institutional response. The time afforded now must be well utilised to minimise the adverse effects

⁴⁰ AI is already wreaking havoc on Global Power Systems. Bloomberg. 21st June 2024, <https://tinyurl.com/rdk9p3c9>

⁴¹ Published in Bloomberg, 13th December 2024, <https://tinyurl.com/4c66sa22>

to the best of our capabilities involves equipping the workforce with future-ready skill. We must also use this time to put in place mechanisms to cushion societal impacts, a challenge that resonates deeply with India's unique demographic and economic landscape.

13.45 Looking ahead, the nation's predominantly services-driven economy, coupled with its young and dynamic population, offers a fertile ground for leveraging the benefits of emerging technologies, only if proactively and carefully managed. Technology does not always have to displace labour but instead can be put to use in augmenting the productivity of the workforce. Just as history provides a reason for caution, history also provides a cause for optimism about the effectiveness of strong institutions which can foster an environment where man and machine work together.

13.46 Further, the exposure of medium- to high-skill jobs to AI driven automation may not be as high as certain estimates, due to the inherent limitations of AI as detailed in Box XIII.1. Thus, the labour augmenting potential of AI should also not be ignored.

Box XIII.1: Demystifying Artificial Intelligence

In the simplest terms, the 'AI' tools on the market today, particularly Generative AI, are statistical models, utilising significant computing power, that are a function of large amounts of text, images, and other forms of data fed into them. The processing of any input is broken down across many layers for the most complex models, with each layer containing several thousand nodes (or neurons⁴²). This combination of layers and nodes allows the model to 'think', 'reason', and process data at unimaginable scales, generating an output along the parameters the model has been trained for.

When you ask any modern chatbot driven by an underlying large language model a simple question such as 'Where does the sun rise and set?', the model does not interpret the language in the question as an actual human does. This is because 'AI' has no understanding of the concepts of letters and syllables. The machine processes input text using a series of mathematical computations involving matrices. First, the text is broken into smaller units called tokens in a process known as tokenisation, where each token is mapped to a unique number. For example, the phrase 'AI revolution' might be tokenised to [342, 2591], where these numbers correspond to the indices of the words in the model's vocabulary.

Once tokenised, the model uses mechanisms to compute the frequency of token pairs, triplets, and other sequences between each word and all other words in the input. This allows the model to assign importance (weights) to different words based on their context.

⁴² In the 1940s, Warren McCulloch and Walter Pitts developed a mathematical model to mimic how the brain processes information. They proposed that neurons in the brain function like switches, turning "on" or "off" based on signals they receive from other neurons. Their model used simple logic, where a neuron activates if the sum of incoming signals surpasses a certain threshold, similar to binary decision-making in computers. This foundational concept inspired the development of artificial neural networks, computer systems designed to emulate the brain's signal processing for tasks like pattern recognition, decision-making, and problem-solving.

These weighted representations are passed through layers of the neural network, where patterns and relationships are refined. The network output assigns probability values to each possible token, representing how likely each one will appear next. The tokens with the highest probabilities are selected and mapped back to their corresponding words in the vocabulary, generating a coherent text output. The new tokens generated are then fed back into the model, making it appear that the bot is equipped to have a flowing conversation with the user.

Thus, to respond to a user's query, the data analysis performed by the model is essentially a game of 'guess the next word'. In other words, it is a highly complex version of the autocomplete function we already see on our computers and smartphones. Generative AI are trained to simply predict the next word in a sequence of words by calculating probabilities based on the user input text. Considering the non-linearity and complexity of language, such an exercise is computationally very expensive. To generate a single-line response to the user's question (in our example, 'The sun rises in the east and sets in the west'), the model may need to perform anywhere between 10 to 20 trillion arithmetic operations to generate a 11-word response. Similar principles govern the functioning of other generative AI.

Strides made in AI-research is awe-inspiring and will most likely be helpful in the coming years⁴³. However, Michael Wooldridge from the University of Oxford had suggested that claims of intelligence required more rigorous scrutiny, stating that large language models, despite their dazzling appearance of human-like competence, are not 'AI'⁴⁴. While capable of some superficial logical reasoning and problem-solving, these models are limited in their extended capabilities. Anything additional expected from these models must be explicitly coded into them, which is very different from what is traditionally considered 'intelligent'. To claim that machines are 'learning' is to assign the wrong label since these models use predictive and probabilistic statistics to generate an output.

Consider an AI-powered marketing tool that determines campaign success based solely on click-through rates and conversions. While efficient, it might ignore brand perception, customer loyalty, and the long-term impact of the campaign on the business. In education, implementing an AI-based grading system for students that evaluates essays based on grammar, structure, and word count can be quick and efficient. But the AI may miss the value brought by creativity, originality, and critical thinking expressed in the content.

Along similar lines, AI in healthcare can recommend treatments that prioritise statistical outcomes since it cannot factor parameters such as quality of life, patient preferences, and ethical considerations. Relying on AI for judicial decisions also involves risks since predicting recidivism or determining bail requires balancing subjective considerations such as fairness, individual circumstances, and social impact. Judgements passed in courts are much more than simple prediction tasks and are a product of personal experience combined with domain-specific knowledge, the former of which AI lacks.

⁴³ However, the efficiency of the models is still a research question that remains unanswered thus far in the Generative AI community. Larger models drive up the demand for more computational resources and energy, which in turn drives up the cost of running these models.

⁴⁴ ChatGPT is not 'true AI'. Michael Wooldridge, 2023, <https://tinyurl.com/45s6dkad>

Advancements in computer science may just as well address these concerns in the future. However, in the meantime, just as machines are designed for specific tasks rather than universal application, AI functions as a tool tailored to particular purposes. This means it is more suited to supplement human action rather than be a total replacement for work performed by them.

THE LABOUR MARKET EVOLUTION

13.47 Labour and Technology, when integrated in the right way, have complemented one another rather than being substitutes. Further, technical change did not always lead to declining employment in the affected industry; rather, it has resulted in strong employment growth during the decades the technology was being refined. For instance, Bessen (2018)⁴⁵ investigated the impact automated manufacturing had on the textiles, steel, and automotive industries of the United States. The findings demonstrated that productivity gains due to automation led to robust job growth and higher earnings for workers over the course of nearly four decades before plateauing.

13.48 Studies assessing the introduction of robots in factories corroborate the same. While the employment share in routine manual jobs declined due to the adoption of automated robots on the factory floor, this in no way led to capital substituting for labour in the advanced economies⁴⁶. Such effects were also visible in developing countries, where robots in fact reduced unemployment growth as robotic work and human work integrated with one another over time⁴⁷. Specifically in the case of India, a study by Mani (2018) illustrated how the introduction of robots only accounted for the replacement of only 10 jobs per 10000 in the manufacturing sector by 2016⁴⁸. This was primarily concentrated in automobiles, while the rest of the manufacturing sector remained largely unaffected by automation.

13.49 Similarly, Albanesi et al. (2024) introduced some much-needed balance to the literature on the effects of AI/ML led automation on white-collar jobs⁴⁹. Their assessment of the impact of AI/ML on white-collar jobs in Europe suggests that there exists a positive association between AI-enabled automation as the sector-occupation employment share of high-skilled workers increases in the range of 3.1 per cent to 6.6 per cent over the course of a decade.

45 Bessen, J. (2019). Automation and jobs: When technology boosts employment. *Economic Policy*, 34(100), 589-626, <https://tinyurl.com/2c7zmj3c>

46 De Vries, G. J., Gentile, E., Miroudot, S., & Wacker, K. M. (2020). The rise of robots and the fall of routine jobs. *Labour economics*, 66, 101885, <https://tinyurl.com/5ffv2wjm>

47 Focacci, C. N. (2021). Technological unemployment, robotisation, and green deal: A story of unstable spillovers in China and South Korea (2008–2018). *Technology in Society*, 64, 101504, <https://tinyurl.com/mvfmxc4>

48 Mani, S. (2017). Robot apocalypse: Does it matter for India's manufacturing industry?. Centre for Development Studies Working Paper, (474), <https://tinyurl.com/5vtbfc4v>

49 Albanesi, S., Dias da Silva, A., Jimeno, J. F., Lamo, A., & Wabitsch, A. (2024). New technologies and jobs in Europe. *Economic Policy*, eiaeo58, <https://tinyurl.com/ymarmumr>

13.50 Research has already demonstrated how the introduction of generative AI assistants augmenting customer support personnel increased productivity by 14 per cent on average, including a 34 per cent improvement for new and lower-skilled workers⁵⁰. Employees were able to substantially improve their problem resolution, leading to higher customer satisfaction. Cogito, a customer support firm, has been encouraging the use of AI assistants, which are able to analyse customer sentiments and provide real-time feedback to customer support representatives, improving the efficiency of issue resolution. Implementing AI as a tool helps bridge the skill gap in this domain, allowing low-skilled workers to produce outputs closer in quality to the work high-skilled workers do without any tools. The reduction in skill inequality is a big positive on aggregate since the overall productivity increases.

13.51 In more complex fields such as scientific research, Human-AI teams are able to generate high-quality outputs by capitalising on the best of human and machine intelligence. For instance, Charness et al. (2023) find that AI-assisted research design benefits in five core aspects: Questions and Literature, generating testable hypotheses and methodologies for testing, instructions and comprehension checks, generating experimental code and related documentation, and auditing for errors⁵¹. Prof. Noshir Contractor of Northwestern University also cites several other instances in his research where AI-enabled researchers benefitted from the capacity of the machine for processing vast amounts of scientific data for hypothesis generation, enhanced data collection, manuscript review, and meta-analysis, among others⁵².

13.52 Supplementing human decision-making with AI assistants would be the ideal and the most desirable outcome for maximising the micro- and macroeconomic benefits of the technology. This is what the leading AI firms seek to achieve as well. In his most recent blog, Sam Altman (the co-founder of OpenAI) stated that their intentions are to put ‘great tools in the hands of people’, with the goal of achieving broadly distributed outcomes⁵³. Similarly, in Alphabet Inc.’s 2024 Q3 earnings call, the CEO of Google stated that the company internally is using AI to augment their engineers’ productivity by automating low level tasks, which allows their people to focus on more complex tasks⁵⁴.

13.53 Further, factors such as accountability, an understanding of the subjective and practical realities of the world, consistently adapting reasoning, cognisance of

50 Generative AI at work, NBER Working Paper 31161, November 2023, <https://tinyurl.com/m2uzkkt>

51 Charness, G., Jabarian, B., & List, J. A. (2023). Generation next: Experimentation with AI, <https://tinyurl.com/3d4yfnwh>

52 Scientific Research: Two Paradigm Shifts? Presented by Prof. Noshir Contractor at the Vienna University of Technology, Austria, <https://tinyurl.com/yh7yj9sf>

53 Reflections by Sam Altman. 6th January 2025, <https://tinyurl.com/49xwbtam>

54 2024 Q3 Earnings Call. Alphabet Investor Relations. 29th October 2024, <https://tinyurl.com/34mkpesz>

consequences, and critical thinking are all important factors which human capital brings to any enterprise. Replacing authentic, intelligent deliberation with a brutal, calculative algorithm will result in a society where algorithms serve as an escape from reason, an excuse not to think. AI must be seen for and utilised as what it is supposed to be, a tool, as the arc of technological history does not bend towards the replacement of humans by machines.

AUGMENTING INDIA'S SERVICES SECTOR

13.54 India is a services-driven economy, and the opportunities for enhancing the productivity of the workforce are ample. Further, the younger population of the country makes a rich talent pool available for capitalising on emerging technologies. This is significant because the study by Albanesi et al. (2024) analysing the effects of AI/ML implementation in Europe revealed that youth and high-skilled workers were the demographic most capable of understanding and adapting to technological changes⁵⁵.

13.55 Education and skilling are going to play a critical role in driving the success of human-centric AI adoption in the country while minimising labour displacement as best we can. If history has taught us anything, it is that with each subsequent technological revolution, the floor for what is considered a basic skill has risen. As automation handles the routine and mundane tasks, the mind is now free to focus on more complex questions and issues, thus raising skill requirements. The Industrial Revolution demanded a labour force skilled in handling factory machines and engineers who maintained them. The Age of Steam and Railways shifted the employment landscape towards industrial and urban jobs, primarily in construction, operations and maintenance. The Age of Steel, Electricity and Heavy Engineering demanded a workforce capable of handling large-scale machinery, electrical equipment and several other jobs in the technical fields. With the Information and Telecommunications era, jobs shifted towards knowledge-based and service-oriented jobs.

13.56 As developments in the field of AI create tools capable of automating basic knowledge creation and processing, skills such as critical thinking, higher degrees of creativity, and the capacity for more specialised knowledge may well be the new normal. Thus, India's employment challenge is not just about numbers but also about raising the overall 'quality' of the workforce. Quality in this case does not just mean imparting knowledge through a step-by-step guide to leveraging AI, or providing very specific training related to 'AI oriented jobs.' Technology specific skills run the risk of becoming obsolete very soon, especially in today's world where the requirements shift rapidly.

⁵⁵ Albanesi, S., Dias da Silva, A., Jimeno, J. F., Lamo, A., & Wabitsch, A. (2024). New technologies and jobs in Europe. *Economic Policy*, eiaeo58, <https://tinyurl.com/yjn8y9ju>

13.57 In addition to the above, improvements in the quality of the workforce must focus on more foundational skills as well, such as soft skills and core competencies which are valuable across industries and roles. Foundational skills support the learning of tech-specific skills by fostering adaptability and cognitive agility and are significantly more resistant to the risk of becoming obsolete. The silver lining is that due to the R&D nature of AI, India, this time, has the opportunity to catch up with, if not get ahead of the curve and prepare its workforce.

13.58 Furthermore, Bessen (2018)⁵⁶ finds that technological change is only labour displacing and brings about mass unemployment if the demand for the product/service offered by the industry is saturated. If the market has large, unmet needs, then labour augmented by machines increases productivity and employment. This implies that new technology should increase employment if the demand elasticity for the sector is high.

Box XIII.2: Connecting the dots - Employment, automation and demand-elasticities

What happens to work in the presence of automation? Often automation does away with sub-tasks within a job, in turn leading to a modification of the job profile than the job being suppressed entirely (ILO,2019)⁵⁷. The role of a bank-teller over time exemplifies how automation leads to new sub-tasks being taken up alongside other routine, so far un-automated work. For instance, the introduction of labour-saving innovations such as the ATM did not lead to a loss of bank employment. Rather bank employment has grown, and the role of the bank teller has shifted from clerical work to sales and counselling over time (Bessen, 2015)⁵⁸.

Ultimately, the capacity of a sector to create jobs in response to automation depends on whether the new grouping of sub-tasks into specific job profiles is deemed profitable (ILO,2019). This is in turn a function of the demand for particular services delivered than the supply of skills to fill these jobs (Acemoglu and Autor, 2011⁵⁹; Bessen, 2018⁶⁰). Understanding the nature of demand for a particular sector can therefore reveal clues as to how the sector will respond to technological change.

To gauge the employment impact of a technological revolution, it makes sense to look at how employment in the past responded to the industrial revolution of the early 20th century.

56 Bessen, J. (2019). Automation and jobs: When technology boosts employment. *Economic Policy*, 34(100), 589-626, <https://tinyurl.com/2c7zmj3c>

57 International Labour Organisation 2018, *The Economics of AI: Implications for the future of work*, <https://tinyurl.com/5n7kc29e>

58 Bessen, J. (2015). *How computer automation affects occupations: Technology, jobs, and skills*, Law and Economics Research Paper No. 15-49 (Boston, Boston University School of Law), <https://tinyurl.com/yshuxcm6>

59 Acemoglu, D. Autor, D. 2011. "Skills, tasks and technologies: Implications for employment and earnings", in O. Ashenfelter and D. Card: *Handbook of labor economics* (Amsterdam, North Holland), Vol. 4B, pp. 1043-1172, <https://tinyurl.com/4w3muny8>

60 Bessen, J. (2018). Automation and jobs: When technology boosts employment. *Economic Policy*, 34(100), 589-626, <https://tinyurl.com/53vrz2w5>

Gleaning insights from the days of the industrial revolution, Bessen (2018)⁶¹ looks at data since the 1930s for the US cotton, steel, motor vehicle and textile industries. He finds that technological change is only labour displacing and brings about mass unemployment if the demand for the product/service offered by the industry is saturated. If the market has large, unmet needs, then labour augmented by machines increases productivity and employment. This implies that new technology should increase employment if the demand elasticity for the sector is high.

While some level of worker displacement is inevitable for those unable to align with shifting skill requirements, the scale of this displacement is shaped by the interplay between displacement effects and productivity gains. For instance, in highly demand-elastic markets, the "reinstatement effect" has historically acted as a counterbalance against the displacement effect caused by automation. Technological advancements in markets with unmet demand often give rise to auxiliary tasks where labour maintains a competitive edge. As Acemoglu and Restrepo (2019)⁶² observe, such tasks not only enhance productivity but also reinstate labor into a broader spectrum of roles, thereby altering the task composition of production in labor's favor.

Elasticities for India's services sectors – An estimation

As established in the section before, demand elasticities can help gauge a sector's ability to raise employment because of productivity enhancements from automation. As shown by Bessen (2018), the per capita real demand for a sector (D) can be written as a function of real wages (w) and real prices (p). This is shown by equation (1)

$$\ln D(p/w, w) = \alpha + \beta_1 \ln \frac{w}{p} + \beta_2 (\ln \frac{w}{p})^2 + \gamma_1 \ln w + \gamma_2 (\ln w)^2 + \epsilon \quad (1)$$

This can also be re-written⁶³ as,

$$\ln D(A.s, w) = \alpha + \beta_1 \ln A.s + \beta_2 (\ln A.s)^2 + \gamma_1 \ln w + \gamma_2 (\ln w)^2 + \epsilon \quad (2)$$

Where A denotes labour productivity and s is the labour share of income

$$\text{The elasticity of demand is given by } \epsilon_D = \frac{(\partial \ln D)}{(\partial \ln w/p)} \quad (3)$$

Further the elasticity of demand with respect to labour productivity can then be interpreted as:

$$\frac{(\partial \ln D)}{(\partial \ln A)} = \epsilon_D \left(1 + \frac{\partial \ln s}{\partial \ln A} \right) \quad (4)$$

On the right-hand side, ϵ_D is the price elasticity of demand while the partial derivate shows the influence of productivity on labour's share of output. The equation shows that price elasticity of demand and productivity elasticity of demand are positively correlated.

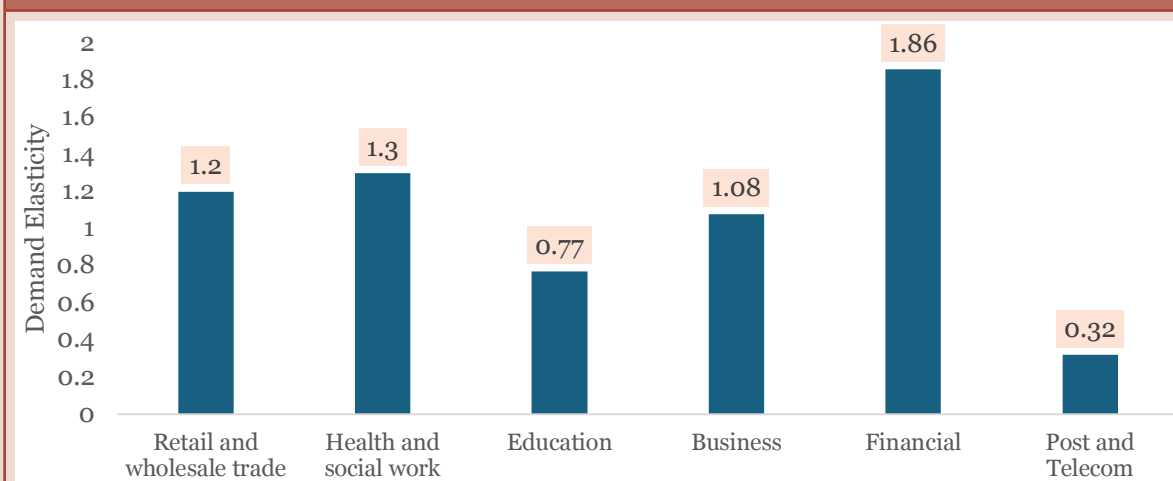
61 Ibid

62 Acemoglu, D., & Restrepo, P. (2019). Automation and new tasks: How technology displaces and reinstates labor. *Journal of economic perspectives*, 33(2), 3-30, <https://tinyurl.com/yeynaaj4>

63 Since share of income can be re-written as $s = \frac{wL}{pY} = \frac{w}{pA}$

To understand the potential for employment increases in India's services sector, Bessen (2019)'s theoretical model is replicated with the help of data from RBI's KLEMS database. The data studied is for the period of 1994 to 2023. The demand elasticities estimated for India's services sectors (based on the classification provided by RBI KLEMS)⁶⁴ are shown by chart XIII.1. Note that elasticities for transport services and hotel services were insignificant at the 10 per cent level and are hence not depicted in the chart.

Chart XIII.1: Demand Elasticities across services sectors for India



Source: Author's estimates

As the estimates show, the financial sector shows the highest elasticity at 1.86 followed by Health and social work (1.3), Retail and wholesale trade (1.2), Business services (1.08), Education (0.77) and post and telecom (0.32). It must be noted that the elasticity estimation is at a broad level which does not consider aspects such as product quality. Further, since the classification is sufficiently broad (i.e, industries instead of sectors), it may well be that sub-sectors within the industry show higher or lower elasticities than the industry average.

Implication for the services sector in India

A sectoral comparison of estimates reveals that demand elasticities are high for sectors such as financial services, trade services, health and social work and business services.

The high elasticity in financial services could be indicative that the sector is yet to reach a stage of market saturation. Productivity enhancement may therefore prove employment generating for the financial sector. Research also corroborates that information technology improvements tend to raise employment in finance, retail and wholesale industries⁶⁵.

High elasticities in the health and social work industry shows that automation can aid productivity and employment gains in this sector. For instance, as research by Shwalbe and

64 The detailed concordance between National Account Statistics and RBI KLEMS classification can be accessed at <https://tinyurl.com/4cnemd5y>

65 Gaggi, Paul, and Greg C. Wright. "A Short-Run View of What Computers Do: Evidence from a UK Tax Incentive." Working Paper (2014), <https://tinyurl.com/4dn6prc6>

Wahl, 2020⁶⁶ shows, AI can aid productivity through interventions in diagnosis, patient mortality risk assessment, disease outbreak prediction and health policy and planning. In the social work industry, AI can maximise the effectiveness of frontline workers.

The high elasticity in retail and wholesale trade in the country is indicative of a large consumption base in the country. Thus, effective productivity gains are likely to make it profitable for new roles to co-exist with automated tasks on average for this industry. Productivity gains for businesses engaged in retail and wholesale activities include identifying customer preferences, enhanced marketing techniques and inventory management and forecasting.

The business sector is a export-oriented sector with activities such as IT and IT enabled services, R&D services in the areas such as accounting and legal professions. The sector's elastic demand shows that, on average, services employment may rise in the presence of AI for this particular sector. However, it should be noted that the elasticity estimate does not give a picture of sub-sector elasticities. It is possible then for employment in lower value-added sub-sectors in the industry (such as Business Process Outsourcing Units) to respond negatively to automation as compared to higher value-added sub-sectors (such as Global Capability Centers).

The education sector shows an inelastic demand for services. Theoretically, this may imply that productivity enhancements through AI-based learning models can lead to a decline in teacher employment. For instance, there maybe a reduction in the need for personnel as a result of cost-effective access to high quality interactive learning media, and customised learning paths for students. However, the essential nature of the service and its high degree of regulation are likely to act as buffers which will ensure that productivity improvements will not come at the expense of teacher employment.

Interestingly, post and telecom also show low elasticity. This sector in particular has reached a high degree of market saturation over the past three decades. The oligopolistic nature of the industry may also imply that increases in labour productivity may come with lower costs which would translate to higher profit margins (and not necessarily lower prices). A high degree of market saturation and oligopolist market structure imply that prices may not reflect declining costs. Automation may therefore behave as a labour-displacing force than a labour augmenting one.

13.59 While initial displacement is to be expected for workers who fail to catch up to the market demands, the magnitude of displacement also depends on how displacement and productivity effects weigh against each other⁶⁷. For a sufficiently demand-elastic market, the displacement effects historically have been counterbalanced by the 'reinstatement effect'. Demand for new products and services due to new technology in a market with unmet demand has created new, auxiliary tasks where labour has a

66 Schwalbe, N., & Wahl, B. (2020). Artificial intelligence and the future of global health. *Lancet* (London, England), 395(10236), 1579–1586, <https://tinyurl.com/mr3t97cv>

67 Acemoglu, D., & Restrepo, P. (2019). Automation and new tasks: How technology displaces and reinstates labor. *Journal of economic perspectives*, 33(2), 3-30, <https://tinyurl.com/yeynaaj4>

competitive advantage. Acemoglu and Restrepo (2019) state that, ‘such new tasks not only generate a positive productivity effect, but also a reinstatement effect – reinstating labour into a broader range of tasks and thus change the task content of production in favour of labour. This increases labour demand and labour share.’

13.60 Looking at the history of the labour market through this lens, we can now decode why, despite major new technologies that automated economic value addition, the employment-to-population ratio rose over the 20th century⁶⁸. Along these lines, the future of work is ‘Augmented Intelligence’, one that expands the workforce to accommodate both humans and machines, with the aim of improving humanity while also bringing about a greater level of efficiency in how we perform our jobs⁶⁹.

13.61 What new opportunities will emerge from the spillover effects of AI will only be clear once AI goes from experimental to practical, but reinforcing the point made earlier, it is up to policymakers, academia, and the private sector to work together to raise the overall quality of human capital in India. This tripartite compact is also going to be instrumental in ensuring that the gains from productivity are distributed widely creating a social surplus, rather than concentrating in the hands of an increasingly oligopolistic sector⁷⁰.

CONCLUSION

13.62 In the seven decades since the development of Artificial Intelligence began, the progress made in the last decade lays down an important milestone for the domain. While impressive in its own right, AI still remains in its developmental stage and has a long way to go before it achieves the scope of adoption that have made technologies such as the personal computer and the internet ubiquitous. The scale of challenges left unaddressed are significant, and so is the time required by developers to come up with cost-effective and resource-efficient solutions. Therefore, as the essay suggested, estimates about the magnitude of labour market impacts may be well above what might actually materialise. Nevertheless, complacency about the ‘low probability-high impact’ nature of the issue at hand could prove to be very costly for a country like India.

13.63 As policymakers, it would benefit us to ask ourselves the question, “What were the problems in the world that demanded AI as the answer?” In other words, is AI a solution in search of a problem? This question is not easily answered as innovation does

68 Autor, D. H. (2015). Why are there still so many jobs? The history and future of workplace automation. *Journal of economic perspectives*, 29(3), 3-30, <https://tinyurl.com/bdprpw9a>

69 AI Should Augment Human Intelligence, Not Replace It. David De Cremer and Garry Kasparov. *Harvard Business Review*. 18th March 2021, <https://tinyurl.com/42pt7r8j>

70 The AI Octopus by Eric Posner. Published in Project Syndicate. 8th January 2024, <https://tinyurl.com/y9hv7kdf>

not always respond to a problem, rather emerges as a product of human ingenuity. Thus, in some sense, AI represents the human drive for improvement, for creating something previously thought impossible. However, when innovation has the possibility of coming at great societal cost, the value of innovation must then be judged in the context of its potential loss generation.

13.64 Despite the limitations of AI and the pre-requisites necessary for its widespread application, it is worth taking notice of the fact that labour markets are shifting at present in anticipation of a distant future. Nobody knows how long these changes may last, but they can definitely leave a lasting impact on the physical and mental well-being of those affected. The responsibility for course correction will then fall in the hands of the public sector. Therefore, from a policymaker's perspective, it may be costly to dismiss fears as exaggerated and adverse impacts as overestimated. Rather, they underscore the need for constant vigil and timely action.

13.65 Learning from the lessons of the past, capacity building and institution building is the need of the hour for India to capitalise on the opportunity that lies ahead. Structural changes to how we educate our children will be required in addition to safety nets that can shield existing workers from economic and social fallouts. Additionally, regulatory frameworks will need to be revisited and amended to ensure that the use of AI aligns with societal values, balancing innovation with accountability and transparency. However, regulations will go only thus far.

13.66 The corporate sector has to display a high degree of social responsibility. Although the impact of AI on labour will be felt across the world, the problem is magnified for India, given its size and its relatively low per capita income. If companies do not optimise the introduction of AI over a longer horizon and do not handle it with sensitivity, the demand for policy intervention and the demand on fiscal resources to compensate will be irresistible. The state, in turn, has to resort to taxation of profits generated from the replacement of labour with technology to mobilise those resources, as the IMF suggested in its paper⁷¹. It will leave everyone worse off and the country's growth potential will suffer, as a result.

13.67 Utilising this window of time available during the nascent stages of AI to build robust institutions can ensure that we, as a nation, are well placed to minimise the costs as much as possible. This can then help tilt the scale towards the benefits, bringing a balance to the 'cost-benefit' aspect in a labour driven, services dependent economy like India. Navigating this transformation necessitate coordinated participation from all

⁷¹ Cazzaniga, M., Jaumotte, M. F., Li, L., Melina, M. G., Panton, A. J., Pizzinelli, C., ... & Tavares, M. M. M. (2024). Gen-AI: Artificial intelligence and the future of work. International Monetary Fund, <https://tinyurl.com/33hj83>

agents of the economy. A tripartite compact between the government, private sector and academia can ensure that the gains from AI-driven productivity are widely distributed, taking us in the direction of the ideal inclusive growth strategy. The probability of success in this endeavour is directly proportional to the appreciation of the enormity of the challenge and the gravity of the consequences of failure.



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