



ECONOMY SURVEY

2024-25

Open Session - 2
15th Feb. 2025

(Supplementary Reading Resource)

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ECONOMIC SURVEY 2024-25

CHAPTER 6: INVESTMENT AND INFRASTRUCTURE: KEEPING IT GOING

UPSC CSE Mains Syllabus (GS-III):

- ⦿ Infrastructure: Energy, Ports, Roads, Airports, Railways etc.
- ⦿ Science and Technology- Developments and their Applications and Effects in Everyday Life.

- ⦿ 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
- ⦿ **Capital expenditure** by the union government on major infrastructure sectors has been increased at a trend rate of **38.8 per cent from FY20 to FY24**.
- ⦿ 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. 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**.
- ⦿ To boost private investment in brownfield assets, the **National Monetisation Pipeline (NMP) was launched in August 2021**. 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.

PHYSICAL CONNECTIVITY

Railways	<ul style="list-style-type: none">⦿ Between April and October 2024, 17 new pairs of Vande Bharat trains were introduced to the network, and 228 coaches were produced. <p>Recent initiatives in the rail system:</p> <ul style="list-style-type: none">⦿ 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.⦿ 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.⦿ 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.
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Steps for enhancing passenger amenities in railways:

- **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.
- **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.

Key initiatives to improve signalling systems in railways:

- **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.

Roads

- India has a total road network of 63.4 lakh km, including National highway (NH) network of 146,195 km. **NH network** forms 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 overall road freight traffic.
- **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.

Key Initiatives for logistics efficiency in road connectivity:

- **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.

	<ul style="list-style-type: none"> ⦿ 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.
Civil Aviation	<ul style="list-style-type: none"> ⦿ 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.
Ports & Shipping	<ul style="list-style-type: none"> ⦿ On waterway transport connectivity, the Sagarmala programme aims to harness India's coastline and waterways fully, improving logistics efficiency. <p>Major achievements and initiatives in port sector:</p> <p>Infrastructure Development:</p> <ul style="list-style-type: none"> ⦿ 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. <p>Port-led Industrialisation:</p> <ul style="list-style-type: none"> ⦿ 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. <p>International Linkages:</p> <ul style="list-style-type: none"> ⦿ 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. ⦿ 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. ⦿ 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.

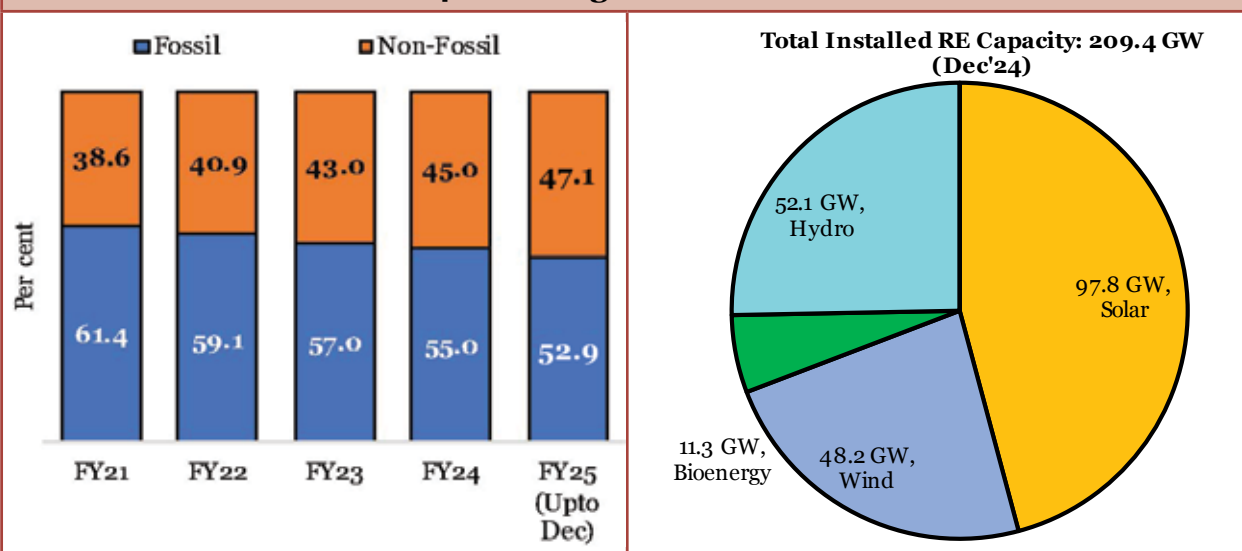
Inland waterways transformation: key projects and initiatives:

- **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.
- **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

- 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.
- **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.**

Chart VI.14: Growing reliance on renewables



Source: Executive Summary Report, Central Electricity Authority

- 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.
- 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.
- 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.

DIGITAL CONNECTIVITY

- 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	<ul style="list-style-type: none"> By October 31, 2024, 5G services were launched in all states and union territories. Currently, 5G services are available in 779 out of 783 districts. 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). 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.
Information Technology	<ul style="list-style-type: none"> 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.

RURAL INFRASTRUCTURE

Rural Drinking Water and Sanitation:

- 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.
- There are **2,160 water quality laboratories**, 1,570 of which are accredited by National Accreditation Board for Testing and Calibration Laboratories, ensuring safety of drinking water.
- Community Water Purification Plants (CWPPs):** 618 CWPPs have been installed under JJM, out of which 573 are installed in arsenic and fluoride-affected areas.
- 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 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

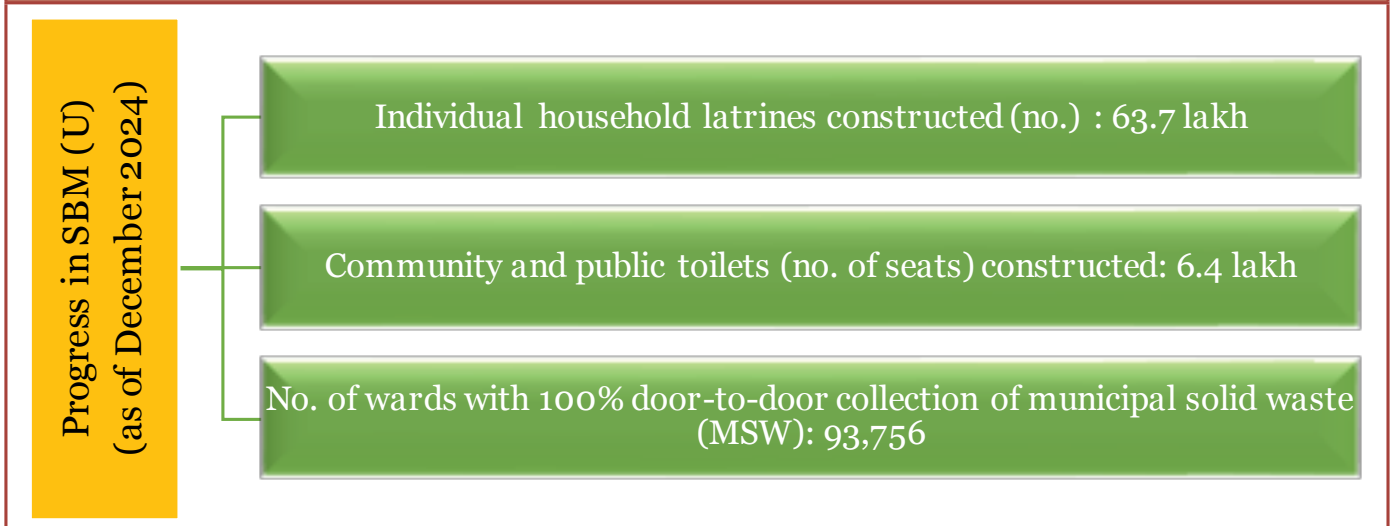
Transforming Waste into Wealth: NADEP Composting, Chhindwara, Madhya Pradesh:

- 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.
- 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.

URBAN INFRASTRUCTURE

- 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.

Chart VI.19: The cumulative progress under SBM-U



- As per the 78th round report of NSSO, 97 per cent of households in urban areas report access to toilets.
- Further, to encourage cities to improve urban sanitation, the government developed the ODF, ODF+, ODF++ and Water+ protocols to evaluate urban local bodies (ULBs) on standardised parameters of sustainable sanitation.
- The Swachhata App effectively allows citizens to report grievances, directing them to the relevant municipal corporation for resolution. 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.

- ⊙ **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.
- ⊙ **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.
- ⊙ **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. **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. **AMRUT 2.0 actively involves self-help groups and promotes innovative technologies.**
- ⊙ **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.

Initiatives driving urban transformation

- ⊙ **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.
- ⊙ **National Urban Digital Mission:** seeks to establish shared digital infrastructure across cities, enhancing citizen-centric governance and service delivery by 2024.

TOURISM INFRASTRUCTURE

- ⊙ **Pilgrimage Rejuvenation and Spiritual Augmentation Drive (PRASHAD)** aims to develop tourism infrastructure at identified pilgrimage destinations and heritage cities.
- ⊙ **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.**

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SPACE INFRASTRUCTURE

- 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.

Space-based infrastructure monitoring platforms

- 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.
- 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.

Mains Practice Questions:

- Railways play important role in regional development through physical connectivity. Discuss the measures taken by the government to improve railway infrastructure and safety in India.
- Inland waterways are economically efficient and environment friendly mode of transport. To this end, what measures are being taken by the government to promote inland waterways in India?
- Describe the significance of Jal Jeevan Mission in improving access and quality of drinking water in rural India.

CHAPTER 07: INDUSTRY: ALL ABOUT BUSINESS REFORMS

UPSC CSE Mains Syllabus (GS-III):

- Effects of Liberalization on the Economy, Changes in Industrial Policy and their Effects on Industrial Growth.
- 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.

GLOBAL BACKGROUND

- In the global manufacturing space, high-income countries have lost a significant part of their share during the last decade. 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. **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 ladder.**
- According to IMF, 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 diversification.
- Recently, the global manufacturing is facing a range of challenges, including persistent supply chain disruptions, political instability, pressure to reduce emissions and move towards renewables, increased logistics costs and other effects of regional conflicts.**
- 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.

RECENT DOMESTIC DEVELOPMENTS

- 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.
- The **industrial sector grew by 6.2 per cent in FY25, driven by robust growth in electricity and construction.**
- 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.

CORE INPUT INDUSTRIES

Cement	<ul style="list-style-type: none"> ⦿ India is the second largest cement producer in the world after China. ⦿ Most of the cement plants in India are 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 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.
Steel Industry	<ul style="list-style-type: none"> ⦿ 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. ⦿ The sustained growth in steel sector was fuelled by ongoing development projects and increased public infrastructure spending. Government initiatives on housing, urban and rural infrastructure also contributed to the rising demand. ⦿ 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. ⦿ Steel's Scrap Recycling Policy encourages efficient recycling of scrap. 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 cent.
Chemical and Petrochemical Sector	<ul style="list-style-type: none"> ⦿ 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 intermediates.
Automobile Industry	<ul style="list-style-type: none"> ⦿ In FY24, industry recorded automobile domestic sales growth of 12.5%. ⦿ Recognising the sector's potential, the government has extended the PLI Scheme by one year.
Electronics Industry	<ul style="list-style-type: none"> ⦿ 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. ⦿ 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.

Textiles	<ul style="list-style-type: none"> ⦿ 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. ⦿ 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. ⦿ Technical textiles are another area of potential growth. India's technical textile industry is rapidly growing, ranking fifth globally. 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. ⦿ 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.
Pharmaceuticals	<ul style="list-style-type: none"> ⦿ The Indian pharmaceutical industry is the world's third largest by volume. ⦿ 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. ⦿ PLI scheme aims to attain self-reliance and reduce import dependence in critical Key Starting Materials (KSMs)/Drug Intermediates and Active Pharmaceutical Ingredients (APIs). ⦿ Strengthening of Pharmaceuticals Industry (SPI) addresses the demand to support the existing pharma clusters and MSMEs across the country to improve their productivity, quality and sustainability. ⦿ India holds an estimated 1.5 per cent share of the global medical devices market. ⦿ In October 2023, the Central Drugs Standard Control Organisation approved India's first indigenously developed CAR-T cell therapy. ⦿ 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

- 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.

Initiatives to encourage IP protection

- 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.
- 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.

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.
 - 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 Asia.
 - 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 clusters.
- 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.
 - India lags in R&D, with a significant gap across major sectors. The **gross expenditure on research & development (GERD) in India 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.

- ⊙ The funding for R&D in India is predominantly sourced from government entities. 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 cent. There is a need for more contribution from the private sector in India.
- ⊙ 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. To bridge this gap, we need to foster industry-academia collaboration, enhance private-sector participation, and prioritise applied research.

MICRO SMALL AND MEDIUM ENTERPRISES (MSME)

- ⊙ As of November 26, 2024, MSMEs have reported employing 23.24 crore individuals (second only to agriculture).
- ⊙ 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.
- ⊙ 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.

TReDS (Trade Receivables Discounting System): Transforming MSME Financing Through Timely Payments

- ⊙ 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 MSME Act 2006.
- ⊙ It 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.
- ⊙ 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.

- ⊙ To provide equity funding to MSMEs with potential to scale up, 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.
- ⊙ 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.
- ⊙ 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.

APPROPRIATE POLICIES LIKELY TO BRING IN GREATER EQUITY IN STATE-WISE PATTERNS IN INDUSTRIAL PRODUCTION

- ⦿ **Developmental disparities across States have always been a matter of concern. 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 GVA.** In contrast, six states of the Northeast (excluding Sikkim and Assam), account for only 0.7 per cent of the industrial GVA.
- ⦿ **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 GVA.
- ⦿ State level industrial growth drivers are infrastructure, human development and policy and institutional environment for industrial development.
- ⦿ **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.

Mains Practice Questions:

1. Discuss the challenges faced to file Intellectual Property Rights (IPRs) in India. What measures are being taken to streamline the process by the government?
2. Analyse the issues faced by India's industrial sector with specific examples. What approach should be followed to boost industrial growth in the country?
3. MSME sector has huge potential to drive economic growth, generate employment and exports. Comment in the light of measures taken by the government in this sector.

CHAPTER 08: SERVICES: NEW CHALLENGES FOR THE OLD WAR HORSE

UPSC CSE Mains Syllabus

1. Effects of Liberalization on the Economy, Changes in Industrial Policy and their Effects on Industrial Growth.
- ⦿ **Services value added accounts for about 62 per cent of the global GDP.**
 - ⦿ **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. **Initiatives such as Open Network for Digital Commerce (ONDC) are making these transformations more inclusive.**
 - ⦿ **Global supply chains continue to face significant disruptions due to geo-political uncertainty, i.e., the rise of protectionism, wars, and climate-related challenges.** These disruptions in supply chains pose a risk to the global services landscape.

SERVICES SECTOR PERFORMANCE IN INDIA

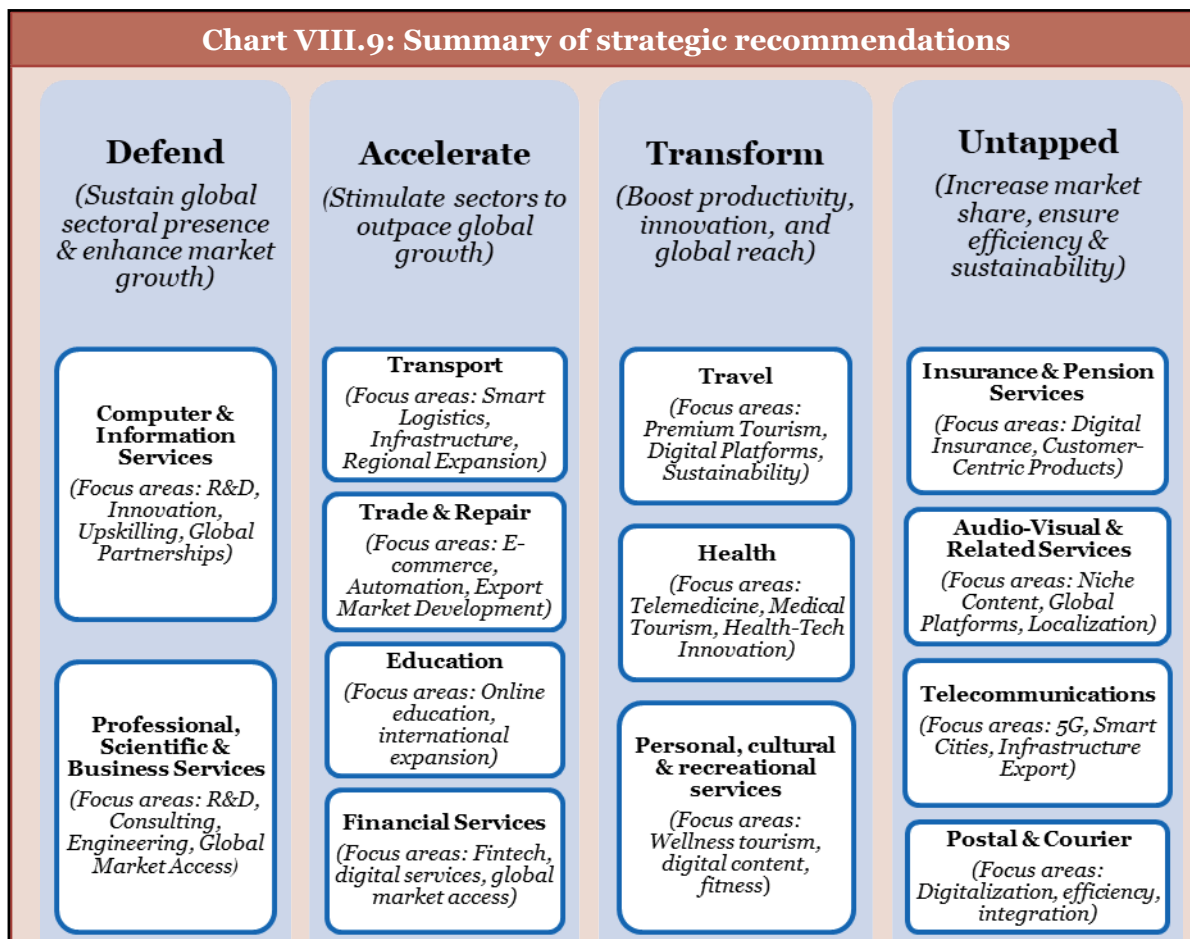
- Its contribution to the total GVA at current prices has increased from 50.6 per cent in FY14 to about 55 per cent in FY25. It also provides employment to approximately 30 per cent of the workforce. **Services also contribute indirectly to the GDP through the servicification of manufacturing**, i.e., increasing utilization of services in manufacturing production and post-production value addition.
- 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.
- 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.

Trade in the services:

- 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.

SOURCES OF FINANCING: BANK CREDIT AND FDI

- FDI equity inflows stood at USD 29.8 billion in FY25 (April- September), while the services sector witnessed USD 5.7 billion inflow in the same period. **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.**



PROGRESS IN LOGISTICS AND PHYSICAL CONNECTIVITYBASED SERVICES

Indian Railways: keeping the development on track:

- ◎ **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.
- ◎ **Steps taken:** 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.
- ◎ **To encourage tourism, Bharat gaurav trains** have been introduced as themebased 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.

Road Transport:

- ◎ 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.**
- ◎ 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 seconds.
- ◎ **For road safety, 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

- ◎ **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.
- ◎ **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

- ◎ 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.
- ◎ 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.
- ◎ **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.

Tourism and hospitality

- ⊙ 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.
- ⊙ **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.

AI adoption in the services sector in India

- ⊙ **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.
- ⊙ **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

- ⊙ 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 tele density of 84 per cent, and 941 million broadband users as of 31st October 2024.

Open Network for Digital Commerce: thinking beyond platforms

- ⊙ 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.
- ⊙ **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 lastmile 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.
- ⊙ **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 2024, the platform joined hands with the National Cooperative Consumers' Federation of India, and Otipy to make onions available at affordable prices across the NCR region, in order to help reduce the prices.

Mains Practice Questions:

1. Discuss the significance of services sector in economic growth of India.
2. What is Open Network for Digital Commerce (ONDC)? Explain its role in growth of e-commerce and inclusive growth of India.
3. Describe the role of AI in service sector. What measures are taken to harness its potential in India's service sector?

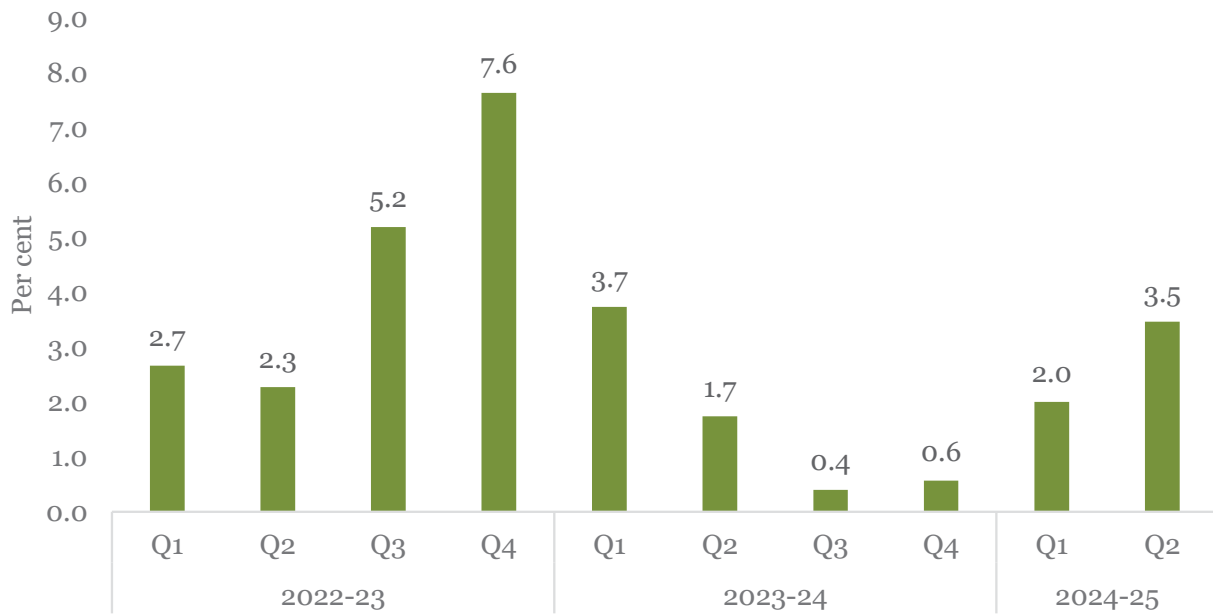
CHAPTER 9 - AGRICULTURE AND FOOD MANAGEMENT: SECTOR OF THE FUTURE**UPSC Syllabus (GS-III):**

- ⊙ Major Crops - Cropping Patterns in various parts of the country, - Different Types of Irrigation and Irrigation Systems; Storage, Transport and Marketing of Agricultural Produce and Issues and Related Constraints; E-technology in the aid of farmers.
- ⊙ Issues related to Direct and Indirect Farm Subsidies and Minimum Support Prices; Public Distribution System - Objectives, Functioning, Limitations, Revamping; Issues of Buffer Stocks and Food Security; Technology Missions; Economics of Animal-Rearing.
- ⊙ Food Processing and Related Industries in India- Scope' and Significance, Location, Upstream and Downstream Requirements, Supply Chain Management.

OVERVIEW OF AGRICULTURE & ALLIED ACTIVITIES SECTOR

- ⊙ **Sector growth:** Averaging 5 per cent annually from FY17 to FY23.
- ⊙ **Contribution to GDP:** It contributes approximately 16% of the country's GDP for FY24 (PE) at current prices and supports about 46.1% of the population.
- ⊙ **Agricultural income:** It has increased at 5.23% annually over the past decade, compared to 6.24% for non-agricultural income and 5.80% for overall economy.

Chart IX.1: Agriculture's Steady performance



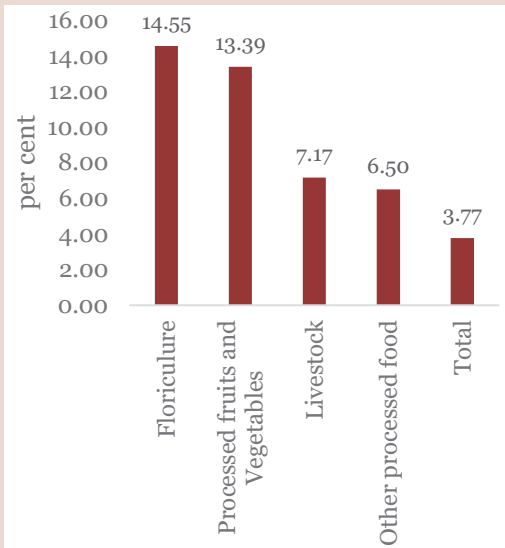
Source: National Accounts Statistics, MOSPI

India's Floriculture: A Sunrise Industry

Growing global demand for flowers.

- Commercial floriculture is 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, pot plants, flower seeds, perfumes and essential oils.
- Inter cropping 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.4 Exports of agri-and processed foods (April-Oct FY25 over April-Oct FY25)



Source: APEDA

- Cereal production:** India accounts for 11.6% of the world's total output.
- Oilseeds production:** Slower growth rate of oilseeds at 1.9% and heavy reliance on imports.
- Major contributors of growth:** 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 cent during FY15 to FY23(at current prices).

Transforming Rural Economies: The Rise of Horticulture (Story of Grape cultivation in Nashik)

- ⦿ India is a leading exporter, shipping 343,982.34 MT of fresh grapes worth ₹3,460.70 crore (USD 417.07 million) globally in 2023-24.
- ⦿ 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 2023-24.
- ⦿ 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.
- ⦿ Nashik grape story shows how **export-oriented agriculture, technology, and collective efforts can transform a region's socio-economic conditions.**

INFRASTRUCTURAL & INSTITUTIONAL FACTORS AFFECTING AGRICULTURE SECTOR

Factors	Details
Crop production	<p>Incentivising productivity increase, crop diversification and efficiency in the use of inputs:</p> <ul style="list-style-type: none"> ⦿ 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. ⦿ 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. ⦿ 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 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.
Seed quality	<ul style="list-style-type: none"> ⦿ Climate-resistant seeds: In north-western India, heat-tolerant wheat varieties have seen widespread adoption to alleviate the effects of heat stress. To ensure that these varieties are readily available, seed banks have been established. ⦿ National Innovations in Climate Resilient Agriculture initiative: In FY24, demonstrations of climate-resilient technology packages were conducted in 121 vulnerable districts under this initiative.

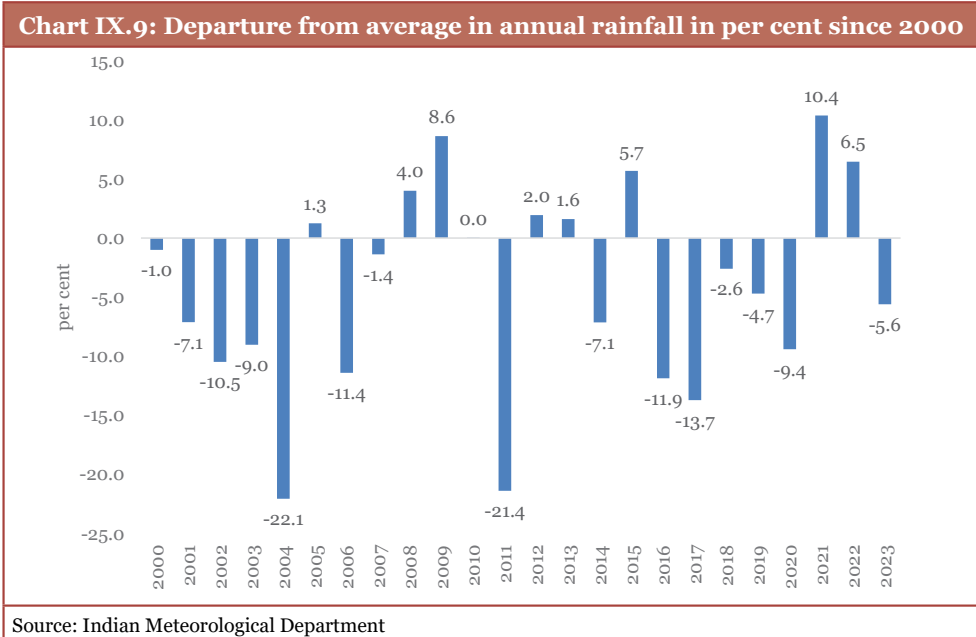
Use of fertilisers

- Major threat: Soil degradation, particularly the decline in organic carbon content. This deterioration of soil health adversely affects fertility, productivity, and overall agricultural sustainability.
- Recently introduced, 'Urea Gold' combines urea with sulphur, minimizing wastage and enhancing plant nutrient uptake.
- Use of drones and fertigation techniques are being implemented to optimize fertiliser applications. (Note: Fertigation involves delivering liquid fertilizers to plants through an irrigation system. It reduces the amount of fertilizer needed and minimizes nutrient leaching.)
- 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.

Rainfall & irrigation system

Need to build efficiency & extend the coverage:

- Only about 55% of the net sown area receiving irrigation & remaining is susceptible to fluctuations in precipitation.
- More than two thirds of India's agricultural land face the threat of drought.
- Implications of erratic monsoon patterns are particularly pronounced for marginal and small-scale farmers owning 85% of India's agricultural holdings.
- Climate Change: There has been an increase in the frequency of dry spells during the summer monsoon season, which are 27% more common from 1981 to 2011 compared to 1951 to 1980.
- 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% from 1950 to 2015.



- 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.

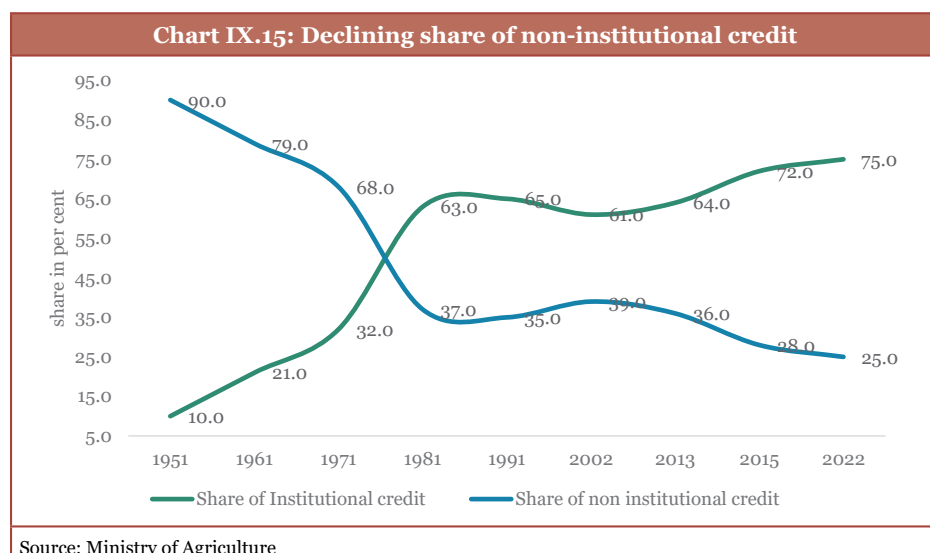
- ⦿ **Coverage of irrigation area** has increased between FY16 and FY21 from 49.3% to 55% of the gross cropped area (GCA), while **irrigation intensity** has risen from 144.2% to 154.5%.
- ⦿ **Area under micro-irrigation in India is 8% of irrigated area.** It is still slow as compared to the USA (68.6%) and China (13.7%).
- ⦿ **Benefits of micro-irrigation:** Resource conservation, reduction in cultivation costs, improved crop yields, and enhanced farm profitability.
- ⦿ **Per Drop More Crop (PDMC) initiative**, a component of the **PM Krishi Sinchayee Yojana (PMKSY)** to promote water efficiency through micro-irrigation.
- ⦿ **Micro Irrigation Fund (MIF)** supports innovative projects through 2% interest subvention to states on loans availed under MIF.
- ⦿ **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).**
- ⦿ 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.

Agricultural credit

Kisan Credit Card (KCC):

- ⦿ It aims to enable farmers to meet their **short-term working capital requirements.** 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.
- ⦿ **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, claim processing has been digitised through **Kisan Rin Portal** for faster and more efficient capturing and settlement of MISS claims.

Priority sector lending by the banks to agriculture sector.



	<p>Kisan Rin Portal: Streamlining Agri Credit for Farmers' Prosperity:</p> <ul style="list-style-type: none"> ⦿ It was launched in September 2023 to address 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. <p>Pradhan Mantri Fasal Bima Yojana (PMFBY):</p> <ul style="list-style-type: none"> ⦿ It acts as a safety net for farmers against crop losses due to natural calamities, pests, and diseases. ⦿ 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.
Agricultural Mechanisation	<ul style="list-style-type: none"> ⦿ Sub-Mission on Agricultural Mechanisation (SMAM): It 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. As of 31 December, 26,662 CHCs were established under this initiative, with 138 CHCs set up in the year FY25 alone. ⦿ NAMO Drone Didi Scheme: 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 percent 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
Agricultural Extension	<ul style="list-style-type: none"> ⦿ Sub-Mission on Agricultural Extension (SMAE) aims to bolster agricultural extension services, enhance entrepreneurship and improve productivity. ⦿ 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. ⦿ 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.

Agriculture Marketing Infrastructure	<ul style="list-style-type: none"> ⦿ Agriculture Marketing Infrastructure (AMI): A sub-scheme, introduced in 2014, provides capital subsidies to individuals, farmers, and cooperatives to develop storage infrastructure and marketing facilities. ⦿ Agriculture Infrastructure Fund (AIF): It was 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. ⦿ e-NAM Scheme: It aims to enhance efficiency in agricultural marketing and improve price discovery. It 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.
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CLIMATE ACTION IN AGRICULTURE

- ⦿ **National Mission on Sustainable Agriculture (NMSA):** It is recognised as one of the nine missions within the National Action Plan on Climate Change (NAPCC). It has identified key climate adaptation strategies, including enhancing water efficiency, managing soil health and nutrients, managing agricultural waste, developing integrated farming systems, and supporting organic and natural farming practices.
- ⦿ **Paramparagat Krishi Vikas Yojana (PKVY) and the Mission Organic Value Chain Development for North Eastern Region (MOVCDNER):** They aim to promote organic farming. 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.

‘Composite Index of Agricultural Sustainability’ by ICAR

- ⦿ It uses 51 indicators related to environmental health, soil and water quality, and socio-economic 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. In contrast, arid Rajasthan has the least sustainable agricultural practices.

UNLOCKING THE POTENTIAL OF ALLIED SECTORS

- ⦿ The livestock sector has emerged as a significant engine of growth in agriculture. There is 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.
- ⦿ **Rashtriya Gokul Mission:** It is launched for the development and conservation of indigenous bovine breeds.
- ⦿ **Multipurpose AI Technicians in Rural India (MAITRIs):** It has been established to deliver breeding inputs to farmers’ doorstep. In the last 4 years, 38736 MAITRIs have been inducted under Rashtriya Gokul Mission.

- ⊙ **Livestock Health and Disease Control Program:** It is launched to enhance well-being of livestock.
- ⊙ **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.
- ⊙ **Pradhan Mantri Matsya Sampada Yojana (PMMSY):** It was established to boost aquaculture productivity and improve fisheries management.
- ⊙ **Fisheries and Aquaculture Infrastructure Development Fund (FIDF):** It was introduced to provide financial support for developing infrastructure in both marine and inland fisheries.
- ⊙ **Adoption of innovative production technologies** such as cages, Recirculating Aquaculture Systems (RAS), bio flocs.
- ⊙ **National Fisheries Digital Platform (NFDP):** Launched under the Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY), successfully mobilising and registering 16.35 lakh fish producers, workers, vendors, and processors within a short timeframe of just four months.

COOPERATIVE SOCIETIES & AGRICULTURE

- ⊙ 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.
- ⊙ **Model Bye-Laws specifically for Primary Agricultural Credit Societies (PACS)**, designed to provide a structured framework for their operations.
- ⊙ Government has prioritised **computerisation of PACS** to enhance efficiency and transparency.
- ⊙ **Transformation of PACS into Common Service Centres (CSCs)**, which are intended to provide services beyond financial assistance.
- ⊙ **Establishment of retail petrol and diesel outlets and the setting up of micro-ATMs** within cooperative societies to facilitate easier access to banking services.
- ⊙ The **issuance of RuPay Kisan Credit Cards** specifically for dairy cooperatives aims to improve the financial capabilities of these entities and their members.
- ⊙ 35,293 PACS are now functioning as **Pradhan Mantri Kisan Samridhi Kendras (PMKSK)**, which are dedicated to providing essential **fertilisers and related services to farmers**, directly impacting agricultural productivity.

FOOD PROCESSING INDUSTRIES (FPIs)

Data/Facts about FPIs

- ⊙ It accounts for 12.41 per cent of total employment in the organised sector.
- ⊙ In the fiscal year FY24, the value of agri-food exports constituted roughly 11.7 per cent of India's total exports.
- ⊙ 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.

- ⊙ **Pradhan Mantri Kisan Sampada Yojana:** It 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.
- ⊙ **Production Linked Incentive Scheme for Food Processing (PLISFPI):** It was launched in 2021, seeks to cultivate globally competitive food processing leaders by facilitating branding and marketing initiatives in international markets.
- ⊙ **Pradhan Mantri Formalisation of Micro Food Processing Enterprises (PMFME) scheme:** It was launched in 2020 to provide comprehensive support—including technical, financial, and business assistance for establishing or upgrading micro food processing enterprises.

FOOD MANAGEMENT & FOOD SECURITY

What is food security?

- ⊙ 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.
- ⊙ **National Food Security Act (NFSA) 2013:** It legally entitles up to 75% of rural population and up to 50% of urban population to receive foodgrain, free of cost, under 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.
 - ⊙ **Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY):** It 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. Government has extended the provision of free food grains under PMGKAY for another five years, with effect from 1st January 2024.
 - ⊙ **One Nation, One Ration Card (ONORC) scheme:** It allows 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.
 - ⊙ **Credit Guarantee Scheme for electronic-negotiable warehouse receipt (e-NWR)-based Pledge Financing (CGS-NPF):** It was launched to facilitate post-harvest lending for farmers, especially small and marginal farmers. 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.

Measures to support foodgrain storage infrastructure in the country

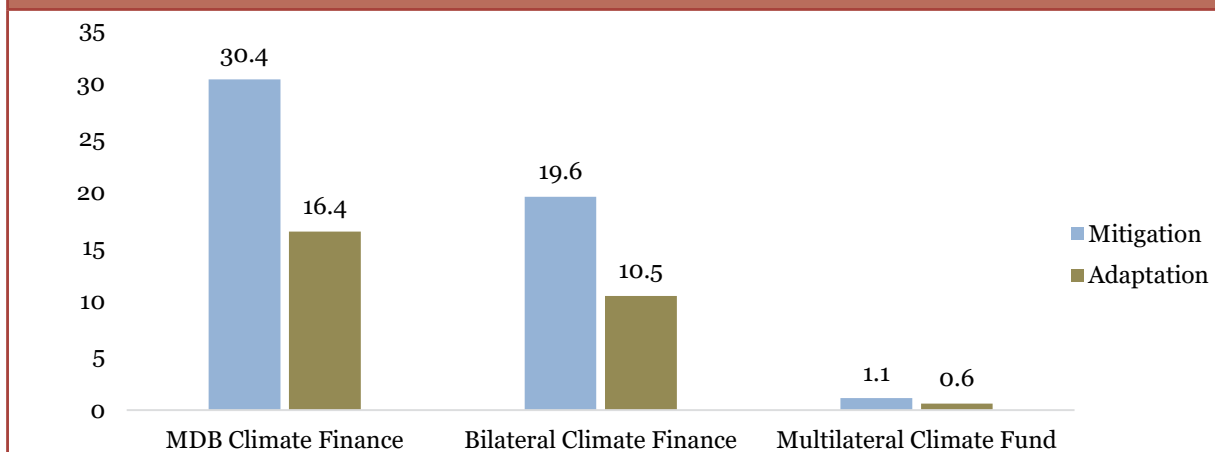
- ⊙ To support and upgrade the storage infrastructure for foodgrains and to ramp up the storage capacity in India, **steel silos are being created in PPP.**
- ⊙ Government is creating capacity under **Hub and Spoke Model Silos**, where “Hub” silos have a dedicated railway siding and container depot facility. 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 (Indian Grain Storage Management & Research Institute, Hapur, U.P.) 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.

Practice Mains Questions:

1. Livestock sector is a cornerstone of agricultural prosperity and food security, propelling the rural economy and livelihoods along the way. Examine.
2. What is food security? Discuss the measures being taken by the government to support foodgrain storage infrastructure in India.
3. Explain the role of access to credit in improving agricultural productivity and farmer's income. What measures have been taken by the government to ensure adequate credit support to farmers?

CHAPTER 10 - CLIMATE AND ENVIRONMENT: ADAPTATION MATTERS**UPSC Syllabus (GS-III):**

- ⊙ Environment- Conservation, Environmental pollution and degradation, Environmental impact assessment
- ⊙ Adaptation refers to changes in processes, practices and structures to moderate potential damages or to benefit from opportunities associated with climate change.
- ⊙ According to India's Initial Adaptation Communication, submitted to UNFCCC in December 2023, reveals that the **total expenditure related to adaptation in FY22 was 5.6% of GDP** largely financed through domestic resources.

Chart X.1: International flow of finance in 2021-22 (in USD billion)

Source: Based on the Sixth Biennial Assessment and Overview of Climate Finance Flows by the Standing Committee of Finance, UNFCCC. The flow of finance to cross-cutting actions has not been included here. The report can be accessed at <https://tinyurl.com/52md2zht>.

- ⊙ **Outcome of COP29 at Baku, Azerbaijan:** 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.

BRINGING ADAPTATION TO THE FOREFRONT

- ⊙ **India is the seventh most vulnerable country to climate change, according to Global Climate Risk Index 2021.** It suffers from weather extremes and hazards, slow onset events such as sea-level rise, biodiversity loss, and water insecurity.

Adaptation in agriculture	<ul style="list-style-type: none"> ⦿ Impact of climate change: Heat and water stress can negatively impact yields, posing challenges for India's food security. ⦿ Adaptation strategies: enhanced focus on research & development of climate-resilient seeds, measures to preserve & enhance groundwater resources, improve soil health, and modify cropping practices.
Building resilience in urban areas	<ul style="list-style-type: none"> ⦿ Impact of climate change: heat stress, urban heat island effect, urban flooding, and depleting groundwater. ⦿ 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. ⦿ 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. ⦿ 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. ⦿ AMRUT 2.0 aims to enhance ease of living by creating water-secure cities through water conservation, augmentation and rejuvenation. It also focuses on the reuse of water and greywater management. ⦿ 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. <p>Vertical Gardens and Environment Sustainability:</p> <ul style="list-style-type: none"> ⦿ They are also called living walls or vertical greenery systems (VGS). ⦿ 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. ⦿ Global best practices observed in Singapore, Japan, and the European Union, where vertical greening has become integral to urban development. ⦿ 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. ⦿ Energy Conservation and Sustainable Building Code (ECSBC) 2024: It advocates energy-efficient and environmentally sustainable building practices. There is need of explicit guidelines for vertical gardens under Code.

Adaptation in coastal regions

- ⦿ **Impact of climate change:** heavy rain, severe storms, high tide flooding, sea level rise.
- ⦿ **Adaptation action in coastal regions:** planting and sustaining mangroves, building sea walls and artificial reefs, beach nourishment, dune planting, sand bypassing, etc.
- ⦿ **‘Conservation and Management of Mangroves and Coral Reefs’ scheme** under the National Coastal Mission Programme.
- ⦿ **Coastal Regulation Zone (CRZ) Notification (2019)** under the Environment (Protection) Act, 1986.

“Enhancing Climate Resilience of India’s Coastal Communities” project:

- ⦿ It 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.
- ⦿ The 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.

Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI):

- ⦿ It 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.
- ⦿ **Objective:** to restore mangrove forests through reforestation and afforestation measures along India’s coast.
- ⦿ **Aim:** to enhance sustainable **livelihood options for coastal communities** and improve the support and services the mangrove ecosystem provides to the community and the economy.
- ⦿ It will be implemented 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.
- ⦿ It 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.

Adaptation action for water management

- ⦿ **Jal Shakti Abhiyan** was initiated in 2019 to address the acute water stress in various parts of the country.
- ⦿ **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.
- ⦿ **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.
- ⦿ **Bhu-Neer portal**, launched in September 2024, is a Central Ground Water Authority portal for managing & regulating groundwater resources, promoting transparency, efficiency & sustainability in groundwater usage.
- ⦿ **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.

State level initiatives:

- ⦿ **‘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.
- ⦿ **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.
- ⦿ **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.

ENERGY TRANSITION - LEARNING FROM THE EXPERIENCE OF DEVELOPED COUNTRIES AND WEIGHING THE OPTIONS

- ⦿ 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**, which aims to reduce dependence on Russian gas supplies.
- ⦿ **In 2023, the US administration** also approved the onset of the **country’s largest oil drilling project in the Alaska region**.
- ⦿ 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**.
- ⦿ **SDG 7 - “ensure access to affordable, reliable, sustainable and modern energy for all”**

- ⦿ **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.
- ⦿ **Several challenges hinder renewable energy's cost-effective and efficient integration into the energy mix such as 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.**
- ⦿ The US and European countries may transition from coal to natural gas because they have access to 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, 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.**
- ⦿ Government is implementing measures such as **utilising super-critical (SC), ultra-super-critical (USC) and the recent Advanced Ultra Super Critical (AUSC) technologies in coal-based power plants.**
- ⦿ **Nuclear energy:** 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.** **Geographical concentration of uranium** and other essential minerals also poses a challenge. Nuclear energy relies heavily on the stability of fossil fuel supply chains to produce sulfuric acid for uranium extraction.
- ⦿ **Challenge of disposing of renewable energy technologies,** especially solar panels, reveals how environmental policies can create complex issues. 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.

India's progress: 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. The goal is to reach 50 per cent by 2030.**

Initiatives to boost energy transition in India:

New Solar Power Scheme	<ul style="list-style-type: none"> ⦿ Ministry of New and Renewable Energy ⦿ on 4 January 2024, which was later revised on 18 October 2024 ⦿ cover electrification of one lakh unelectrified 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.
PM - Surya Ghar: Muft Bijli Yojana	<ul style="list-style-type: none"> ⦿ It 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.
Viability Gap Funding (VGF) scheme	<ul style="list-style-type: none"> ⦿ 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.

Green Energy Corridor (GEC)	<ul style="list-style-type: none"> ⦿ 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
National Bioenergy Programme	<ul style="list-style-type: none"> ⦿ It is structured around three main pillars: 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.
Scheme for the Development of Solar Parks and Ultra-mega Solar Power Projects	<ul style="list-style-type: none"> ⦿ It 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.
Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PMKUSUM)	<ul style="list-style-type: none"> ⦿ It 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
Production Linked Incentive Scheme for the National Programme on High-Efficiency Solar Photovoltaic Modules	<ul style="list-style-type: none"> ⦿ The goal is to achieve a gigawatt-scale manufacturing capacity of high-efficiency solar photo-voltaic modules.
National Green Hydrogen Mission	<ul style="list-style-type: none"> ⦿ It 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.

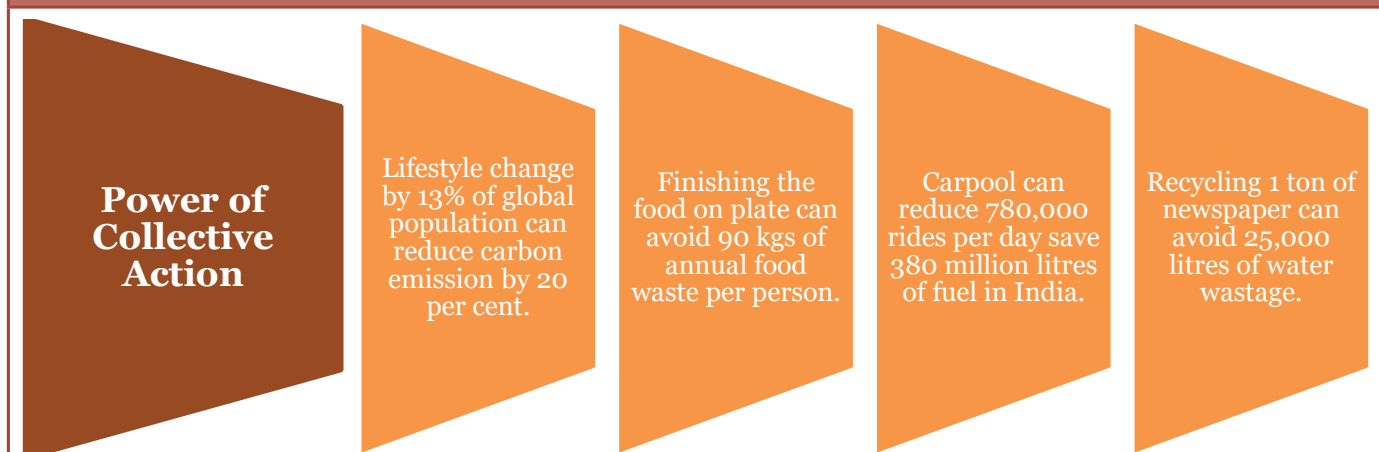
OPTIMISING LIFESTYLES FOR SUSTAINABLE DEVELOPMENT

- ⦿ 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.
- ⦿ **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.
- ⦿ 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”. This highlights the significant potential for change through initiatives like Mission LiFE.

- ⦿ **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) emissions. As per the UNFCCC, cutting dairy and meat from our diets can reduce our emissions by 66%. 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.

Chart X.7: Harnessing the Power of Collective Action for Environment



Source: Prepared internally based on the NITI Report titled ‘Lifestyle for Environment (LiFE): A global mass movement to promote climate-friendly behaviours among individuals’.
(<https://tinyurl.com/4wzvb4xt>)

CIRCULAR ECONOMY AND RESOURCE EFFICIENCY

- ⦿ The 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.
- ⦿ **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.
- ⦿ 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.
- ⦿ **Plastic pollution will account for 15 per cent of global greenhouse gas emissions by 2050.** 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.
- ⦿ **Plastic Waste Management Rules, 2016** mandate urban local bodies and gram panchayats to undertake plastic waste management, including plastic waste collection, and impose restrictions on their open incineration. **Ban on identified single-use plastic with effect from 1 July 2022, coupled with the implementation of EPR,** will further reduce pollution.

Mains Practice Questions:

1. A strong adaptation strategy should be a priority for India, given its significant vulnerability to climate change, stemming from its geographic and agro-climatic diversity. Analyse the statement.
2. Examine the challenges faced by India in energy transition and give the measures being taken by the government to ease this transition.
3. Explain the role of promoting circular economy and resource efficiency in combating climate change.

CHAPTER 11: SOCIAL SECTOR: EXTENDING REACH AND DRIVING EMPOWERMENT

UPSC CSE Mains Syllabus:**GS-II:**

- ⦿ Government Policies and Interventions for Development in various sectors and Issues arising out of their Design and Implementation.
- ⦿ Development Processes and the Development Industry — the Role of NGOs, SHGs, various groups and associations, donors, charities, institutional and other stakeholders.
- ⦿ Welfare Schemes for Vulnerable Sections of the population by the Centre and States and the Performance of these Schemes; Mechanisms, Laws, Institutions and Bodies constituted for the Protection and Betterment of these Vulnerable Sections.
- ⦿ Issues Relating to Development and Management of Social Sector/Services relating to Health, Education, Human Resources.
- ⦿ Issues relating to Poverty and Hunger.

GS-III:

- ⦿ Indian Economy and issues relating to Planning, Mobilization of Resources, Growth, Development and Employment.
- ⦿ Inclusive Growth and issues arising from it.
- ⦿ **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.
- ⦿ 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.
- ⦿ **Policies are required to aim towards empowering citizens and enhancing their capability** to achieve their

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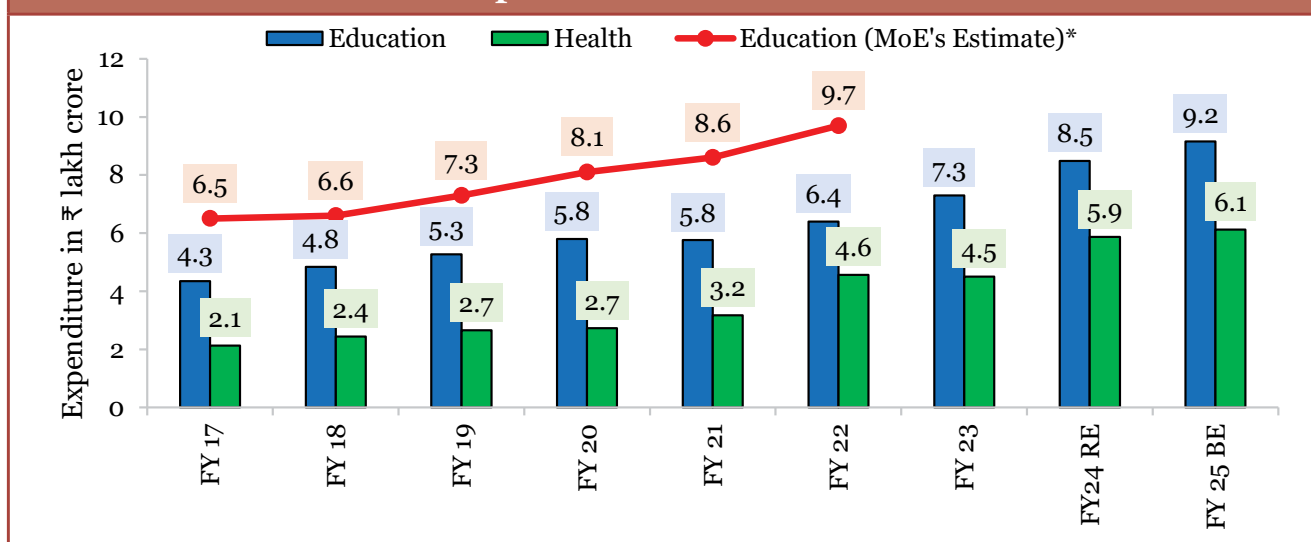
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aspirations. This requires providing them with opportunities for self-growth and progress (Amartya Sen's Capability Approach).

- The SSE (social services expenditure) as a percentage of total expenditure (TE) has increased from 23.3% in FY21 to 26.2 per cent in FY25 (BE). Expenditure on education has grown at a CAGR of 12% from ₹ 5.8 lakh crore in FY21 to ₹ 9.2 lakh crore in FY25 (BE). Expenditure on health grew at CAGR 18% from ₹ 3.2 lakh crore in FY21 to ₹ 6.1 lakh crore in FY25 (BE).

Chart XI.2. Expenditure on education and health



Sources: Budget Documents of Union and State Governments.

- Various government welfare schemes such as free foodgrain or subsidised availability of foodgrains, subsidised cooking fuel, insurance cover, etc, are lifting household incomes.

Evidence on the distribution of benefits from the PDS

- 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.
- Union food subsidy bill increased from 0.5 per cent to one per cent of GDP between FY19 and FY23.
- 74 per cent of the population actively consumes food rations (or kerosene) via the PDS/ PMGKAY.
- Coverage of ration cards is higher in rural areas (at 89 per cent of the population) compared to urban areas (72 per cent).
- 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

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.
- In total, 59 per cent of respondents reported that 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.
- ⦿ 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.

EDUCATION: TREADING NEW PATHWAYS

School Education:

- ⦿ 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.
- ⦿ 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.
- ⦿ 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.
- ⦿ Government initiatives: 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.), DIKSHA, STARS, PARAKH, PM SHRI, ULLAS, and PM POSHAN.

Early Childhood Care and Education (ECCE):

- ⦿ 85 per cent of brain development occurs before the age of six years.
- ⦿ 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 agespecific 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.

Building strong foundations through literacy and numeracy:

- ⦿ 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)**," **in July 2021** to ensure that every child in the country necessarily attains FLN by the end of Grade 3, by 2026-27. It covers **three years of FLN in preschool and Grades 1, 2 and 3.**

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.
- ⊙ The **Prerana model of education, implemented in Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, and Telangana through the Sikshana Foundation**, also emphasises peer learning and group work. Small groups of four to five students collaborate on classroom activities, teaching and learning from each other.

Empowering minds: Unlocking potential with social and emotional learning (SEL)

- ⊙ **UNESCO defines SEL** as a process of acquiring the competencies to recognise and manage emotions, develop care and concern for others, establish positive relationships, make responsible decisions, and handle challenging situations effectively. 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.
- ⊙ 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)**.
- ⊙ **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.
- ⊙ **The NEP 2020 emphasises the development of social, ethical, and emotional competencies as essential to holistic child development.** The **National Curriculum Framework 2023 also advocates for SEL-based pedagogies** to improve educational outcomes and foster children's well-being.
- ⊙ **The NIPUN Bharat mission guidelines 2021 emphasise importance of SEL** as a core component of holistic development objectives for young children in India's foundational education system.

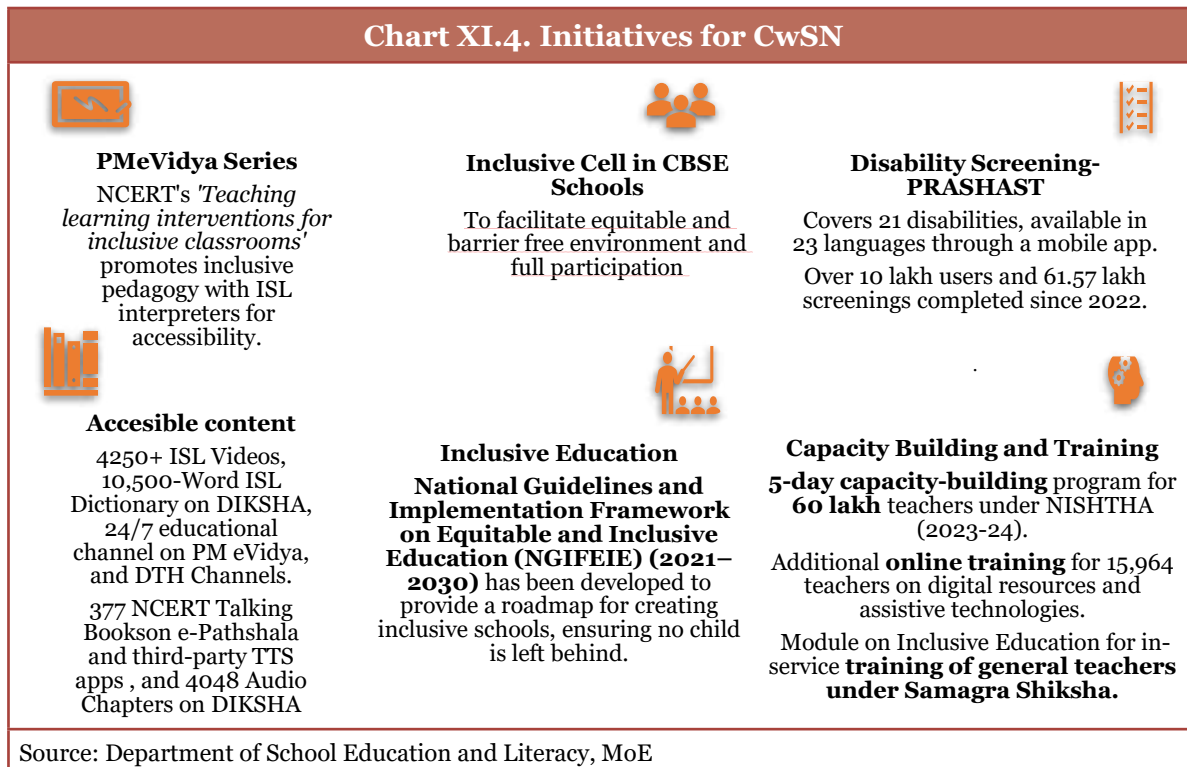
Bridging the gap: Digital technology in education and the essentiality of digital literacy

- ⊙ **UNESCO defines digital literacy** as— 'Includes competencies that are variously referred to as computer literacy, ICT literacy, information literacy and media literacy'.
- ⊙ 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.
- ⊙ Schemes like **DIKSHA, Study Webs of Active Learning for Young Aspiring Minds (SWAYAM), e-VIDYA, Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) and e-content for Divyang** are in place to achieve the objective of inclusive digital education. **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.

Tamil Nadu's Illam Thedi Kalvi (Education at Doorstep): Innovation in public education

- It 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. 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.

Chart XI.4. Initiatives for CwSN



Initiatives for Children with Special needs

Higher Education:

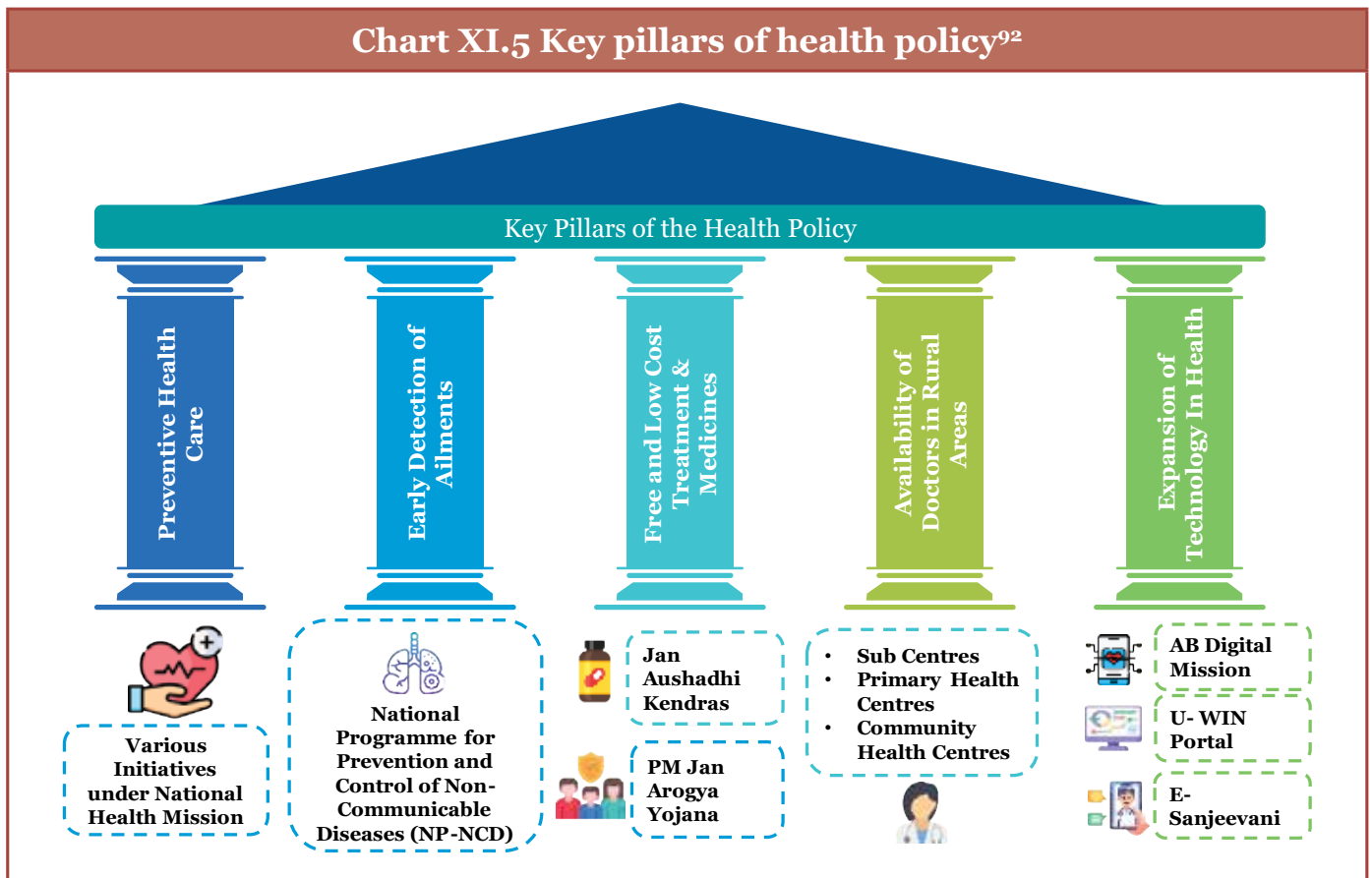
- GER for the 18–23 age group also increased from 23.7 per cent to 28.4 per cent during 2014-15 to 2021-22.**
- To achieve the **government's goal of increasing GER to 50 per cent by 2035 in higher education**, there is a need to double the educational network and infrastructure.
- The **number of Indian 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. Medical colleges experienced remarkable growth, increasing from 387 in 2013-14 to 780 in 2024-25.
- NEP 2020 highlights key aspects of the system** like Multidisciplinary 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.

- Importantly, the NEP envisages autonomy for institutions to innovate on these foundational aspects. 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.

TOWARDS A HEALTHY NATION

- 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.

Chart XI.5 Key pillars of health policy⁹²



- According to the latest National Health Accounts⁹⁵ statistics for 2021-22, released in September 2024, the Total Health Expenditure (THE) in FY22 is estimated to be ₹9,04,461 crore (3.8 per cent of GDP).
- In the THE of the country between FY15 and FY22, the share of GHE has increased from 29.0 per cent to 48.0 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.
- AB-PMJAY has revolutionised healthcare by providing health coverage 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.
- 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.

- ⊙ **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.
- ⊙ **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.

Disruptive technology providing seamless and equitable healthcare:

- ⊙ 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.
- ⊙ **U-WIN:** The U-WIN portal 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.
- ⊙ **E-Sanjeevani:** E-Sanjeevani - the National Telemedicine Service, has emerged as the world's largest telemedicine implementation in primary healthcare.
- ⊙ **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.

Drones in Healthcare service

- ⊙ 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.
- ⊙ 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.

Advancing healthcare through AI:

- ⊙ **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.

- ⊙ **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.
- ⊙ **eSwasthya Dham portal launched by the Uttarakhand Government** 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 minute.

Use of Tele-Radiology and AI in silicosis management (Case Study)

- ⊙ 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.
- ⊙ **Rajasthan 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.
- ⊙ 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.

The Impact of lifestyle and work culture on mental well-being:

- ⊙ Mental well-being encompasses all our mental-emotional, social, cognitive, and physical capabilities. This can also be construed as the mind's composite health. Lifestyle choices and workplace culture are critical for mental well-being and, hence, productivity.
- ⊙ The increase in mental health issues in children and adolescents is often linked to the overuse of the internet and, specifically, social media. 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.
































RURAL ECONOMY

- ⊙ 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.
- ⊙ 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

Rural Infrastructure:

- ⊙ 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.

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.)	<table border="0" style="width: 100%; text-align: center;"> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>165.6</td> <td>25.4</td> <td>5.5</td> </tr> <tr> <td>Sub-centres (SCs)</td> <td>Primary Health Centres (PHCs)</td> <td>Community Health Centres (CHCs)</td> </tr> </table> <table border="0" style="width: 100%; text-align: center;"> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>32.9</td> <td>4.4</td> <td>79.3</td> <td>27.7</td> <td>23.2</td> </tr> <tr> <td>Doctors at PHCs</td> <td>Total Specialists at CHCs</td> <td>Nursing Staff at PHCs & CHCs</td> <td>Pharmacists at PHCs & CHCs</td> <td>Lab Technicians at PHCs & CHCs</td> </tr> </table>				165.6	25.4	5.5	Sub-centres (SCs)	Primary Health Centres (PHCs)	Community Health Centres (CHCs)						32.9	4.4	79.3	27.7	23.2	Doctors at PHCs	Total Specialists at CHCs	Nursing Staff at PHCs & CHCs	Pharmacists at PHCs & CHCs	Lab Technicians at PHCs & CHCs
																									
165.6	25.4	5.5																							
Sub-centres (SCs)	Primary Health Centres (PHCs)	Community Health Centres (CHCs)																							
																									
32.9	4.4	79.3	27.7	23.2																					
Doctors at PHCs	Total Specialists at CHCs	Nursing Staff at PHCs & CHCs	Pharmacists at PHCs & CHCs	Lab Technicians at PHCs & CHCs																					
 Drinking Water	12.2 crore households provided with tap water connections under Jal Jeevan Mission (as of 27 January 2025). ¹⁷⁵																								
 Sanitation	11.8 crore toilets and 2.51 lakh community sanitary complexes were constructed under Swachh Bharat Mission (Gramin) (As of 27 January 2025). ¹⁷⁶																								
 Comprehensive transformation	Saansad Adarsh Gram Yojana (SAGY) (as of 10 January 2025) ¹⁷⁷ <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. 																								

Rural Housing: A Milestone for identity and economic growth

- ☉ 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 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.
- ⊙ 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.**
- ⊙ 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.
- ⊙ **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.**
- ⊙ 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 scheme reserves a minimum of 60 per cent of targets for SC/ST households. 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.

Localising SDGs: Powering rural progress

- ⊙ 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.
- ⊙ SDGs localisation is being pursued at the Gram Panchayat (GP) level through **Village Panchayat Development Plans under Mission Antyodaya and Transformation of Aspirational Districts Programme (TADP)**, adopted in 2018 with districts as the lowest level of implementation.
- ⊙ **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

Kerala offers a replicable model for SDG localisation





- ⊙ Kerala uses a robust, community-based model that leverages its strong local governance institutions. 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.
- ⊙ 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.

Enhancing rural incomes:

Deendayal Antyodaya Yojana-National Rural Livelihood Mission (DAYNRLM):

- DAY-NRLM is a **flagship poverty alleviation programme, launched in 2011** with 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 poor.
- 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.
- 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.

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:

- ⦿ 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.

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
<i>*As per MIS (as of 10 January 2025)</i>					

- ⦿ 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.
- ⦿ 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.
- ⦿ The scheme is converged with various initiatives, including NutriGardens with NRLM, fodder farms with the Department of Animal Husbandry and Dairying (DAHD), horticulture with the Ministry of Agriculture, 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, rural roads with PM Gram Sadak Yojana, and all-weather roads with BRO for border areas.

Mains Practice Questions:

1. Explain the importance of Early Childhood Care and Education. What steps are being taken by the government in line with the vision and objectives of National Education Policy 2020?
2. To what extent can we say that MGNREGA has helped in improving conditions of people in rural India? Justify your view.
3. What are the features of Pradhan Mantri Awaas Yojana-Gramin? How does it promote rural prosperity in India?

ETHICS

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