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OFFICERS' PULSE

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CURRENT AFFAIRS MONTHLY

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Foreword

Officers Pulse-In Depth provides detailed analyses of significant articles from a variety of sources including The Hindu, Indian Express, Business Standard, Down To Earth, Yojana, Kurukshetra, and others. These insights are extremely valuable for UPSC CSE Mains preparation. To ensure comprehensive preparation for both Prelims & Mains, we recommend studying Officers Pulse-In Depth along with Officers Pulse-Digest.

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1) SOURCE TO SEA APPROACH IN WATER MANAGEMENT

(GS-I: Important Geophysical Phenomena such as earthquakes, Tsunami, Volcanic activity, cyclone etc., geographical features and their location-changes in critical geographical features (including water-bodies and ice-caps) and in flora and fauna and the effects of such changes)

Definition

- The **Source-to-Sea (S2S) approach** is a way of managing water and natural resources that looks at the **entire journey of water, from its source in mountains or rivers,** through lakes, land, and cities, all the way to the coast and ocean.
- It recognizes that activities upstream (like pollution, damming, or water use) can have big effects downstream and in the ocean and so it involves various stakeholders and developing innovative solutions to improve or resolve identified problems.
- This approach was proposed as a part of the **Manila Declaration (2012) of the United Nations Environment Programme (UNEP).**
- This declaration focuses on **'Furthering the Implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities'.**

Problems with India's Water management

- **Water Stress:** India faces severe water stress, affecting around 600 million people, with projections of a 6% GDP loss due to water-related issues (NITI Aayog, 2018).
- **Over-extraction of Groundwater:** Around 60.5% of extractable groundwater is used, with states like Punjab, Haryana, and Rajasthan using more than 100%, putting aquifers at risk. Over 25% of groundwater units are in danger zones.
- **Pollution of Water Bodies:** The Central Pollution Control Board (2022) identified 311 polluted river stretches across 279 rivers in 30 states/UTs, caused by untreated sewage, industrial waste, and solid waste.
- **Low Waste Treatment Capacity:** India produces about 1.7 lakh tonnes of solid waste daily, but only 53% is treated. A significant share of untreated waste ends up in rivers and lakes.
- **Unequal Water Access:** Spatial heterogeneity means that while some areas face floods, others suffer from droughts. Access to clean and sufficient water is highly uneven across regions and social groups.
- **Declining Groundwater Quality:** In addition to depletion, groundwater quality is worsening due to contamination from chemicals, heavy metals, and industrial effluents, threatening drinking water and agriculture.
- **Fragmented Governance:** Water bodies often fall under multiple jurisdictions (local, state, national), making coordination and policy implementation weak and inconsistent.
    - Approach India's water management is fragmented, with separate policies for surface water, groundwater, and coastal waters. This results in inefficient and conflicting strategies.

How S2S Approach Can help India

- **Integrated Water Governance:** The S2S approach bridges the gap between surface water, groundwater, rivers, and coastal systems, encouraging coordination across local, state, and national levels, which is essential for managing inter-State water bodies and resolving conflicts.
- **Pollution Control and Waste Management:** By addressing land-based pollution at the source, S2S can help reduce contamination in rivers and lakes, leading to cleaner water reaching coastal areas and improving the health of both freshwater and marine ecosystems.
- **Sustainable Groundwater Use:** The S2S framework encourages ecosystem-based planning, which includes monitoring and regulating groundwater extraction, in overexploited regions like Punjab and Rajasthan. This can help restore sustainable groundwater usage.

- **Water Management and SDGs:** S2S links SDG 6 (Clean Water and Sanitation) and SDG 14 (Life Below Water), providing a unified strategy to tackle issues like water access, quality, and marine pollution, while supporting climate resilience and sustainable development.
- **Science-Policy-Community Collaboration:** The approach connects scientific research, policy-making, and local stakeholders, promoting evidence-based, inclusive solutions that are adapted to India's diverse socio-ecological conditions.

Conclusion

- India's growing water challenges require a more holistic and integrated response.
- The Source-to-Sea (S2S) approach offers a powerful framework to address these issues by recognizing the natural connectivity of water systems from mountains to oceans.
- For India, adopting this approach is not just timely but essential for ensuring long-term water security, ecological health, and sustainable development.

UPSC PYQs:

Why is the world today confronted with a crisis of availability of and access to freshwater resources? (2023)

2) TEXTILE AND APPAREL SECTOR IN INDIA

(GS-III: Indian Economy and issues relating to Planning, Mobilization of Resources, Growth, Development and Employment)

Background

- India has a deep-rooted tradition in textiles and apparel (T&A).
- The sector **employs 45 million people** and contributes 2.3 per cent to overall GDP. But **its share in global trade remains low at 4.2 per cent,** a mere $37.8 billion out of $897.8 billion.
- A closer look at the apparel segment alone shows that India's share in global trade is even lower, at 3 per cent $15.7 billion out of $529.3 billion. This share has remained stagnant for the past two decades.
    - *Textiles are the broader category, including all materials made from fibers (like fabrics for clothing, upholstery, etc.), while **apparel specifically** refers to **clothing and garments worn by individuals.***
- Despite these low numbers, India has set a **target of $40 billion in apparel exports by 2030.** But in the last few years, apparel exports have declined at an average annual growth rate of –2 per cent.
- These numbers make it clear that without a significant shift in policy and strategy, the $40-billion goal will remain only a dream.

Issues in India's Apparel Sector

- **Lack of Scale:** Over 80% of apparel units are Micro, Small and Medium Enterprises (MSMEs), making the sector fragmented and unable to handle large global orders. This negatively affects competitiveness, increases costs, and discourages foreign buyers.
- **High Cost of Capital:** Interest rates **average 9%** in India, compared to 3–4.5% in competing countries like China and Vietnam. High borrowing costs discourage investment in scaling and modernisation.
- **Rigid Labour Laws:** Complex labour
- laws and expensive overtime rules (costlier that International Labour Organisation standards) add to production costs and limit formal hiring and expansion of companies.

- **Misaligned Incentive Structures:** Current Production-Linked Incentives (PLI) focus on production volume, not export competitiveness. The sector needs Export-Linked Incentives (ELI) to reward firms for gaining global market share.

Measures to help the Apparels Sector

- **Promote Large-Scale Manufacturing:** Government support can be given for large enterprises that meet a minimum threshold (e.g., 1,000 machines).
    - The support can be in the form of export subsidy or input subsidy leading to reduction of production cost. This can make these companies attractive to global buyers.
- **Make Capital Affordable:** Capital subsidies (25–30%) and 5–7 year tax holidays can be provided to overcome India's high cost of capital and to boost competitiveness.
- **Reform Labour Policies:** Labour laws and overtime payment norms should be adjusted to meet the international standards.
    - Linking 25–30% of Mahatma Gandhi National Rural Employment Guarantee Act funds to subsidise labour costs in garment units to support formal employment can be an innovative solution.
- **Invest in Skill Development:** Skill development schemes like SAMARTH should give employable skills to the workers in need. The working of these schemes are to be constantly monitored with adequate feedback mechanisms.
    - **SAMARTH** (Scheme For Capacity Building In Textile Sector) is a flagship **skill development scheme** to provide demand-driven, placement oriented skilling programmes to create jobs in the **organized textile and related sectors.**
- **Create Garment-Focused Infrastructure:** Create at least two PM MITRA parks as garment-specific hubs in states like Uttar Pradesh and Madhya Pradesh which are a source of migrant labourers. This can reduce out migration and at the same time reduce the cost of manufacturing.
    - The **PM Mega Integrated Textile Regions and Apparel Parks (MITRAs)** Scheme aims to develop integrated large-scale and modern industrial infrastructure facilities for the total value-chain development of the textile industry.

Conclusion

- The garment industry deserves focused policy attention because it brings together mass employment and economic activity.
- Success in this segment doesn't just lift export numbers, but it creates demand that pulls up the entire textile value chain, from cotton to logistics.
- India must move beyond business as usual and take proactive steps to realise the full potential of this sector.

3) CHALLENGES FACED BY WOMEN IN AGRICULTURE

(GS-I: Role of Women and Women's Organization, Population and Associated Issues, Poverty and Developmental issues, Urbanization, their problems and their remedies)

Background

- The United Nations General Assembly has declared **2026 as the International Year of the Woman Farmer.**
- The resolution **celebrates the essential role of women in global agriculture** while raising awareness of their challenges, which include property rights and market access.
- Nearly half the global food supply is made possible by the contributions of women, who are responsible for 60% to 80% of food production in developing countries and **account for 39% of the agricultural labour in South Asia.**

- These figures highlight the vital role of women in agriculture, who face barriers and inequalities.

Challenges Faced by Women in Agriculture

- **Low Land Ownership**: A very small percentage of women own agricultural land in India, limiting their control over resources and access to formal credit and schemes.
    - According to the latest National Family Health Survey, female land ownership is at 8.3%.
- **Limited Financial Access**: Without land titles, women face difficulties in obtaining loans, insurance, and financial support from formal institutions.
    - Microfinance and self-help groups provide some access, such loans are insufficient for significant investments and come at higher interest rates.
- **Restricted Technology Use**: Women have less access to mobile phones, internet, and agricultural advisories, reducing their ability to adopt modern farming practices.
- **Lack of Mechanisation Support**: Most agricultural tools and machinery are designed for men, making them less suitable for women; subsidies often do not reach them effectively.
- **Climate Vulnerability**: Women are disproportionately affected by climate change due to increased domestic responsibilities and fewer resources to adapt to environmental risks.
    - The time required for women to collect water in rural areas can go up significantly due to climate change related water scarcity.

Government Measures to help Women farmers

- **Mahila Kisan Sashaktikaran Pariyojana** aims to empower women farmers by enhancing their skills, improving resource access, and promoting sustainable agricultural practices.
- **Sub-Mission on Agricultural Mechanisation** provides 50% to 80% subsidies on farm machinery specifically for women to promote mechanisation and reduce drudgery.
- **The National Food Security Mission** allocates at least 30% of its funds for women farmers.

Measures to help Women Farmers

- **Land Rights**: Land policies should be reformed to increase women's ownership and control over agricultural land, thus helping their decision-making power and long-term security in farming.
- **Financial Access**: Inclusive financial services must be developed to enable women to access credit, insurance, and subsidies, even in the absence of land titles.
- **Technology Access**: It is important to ensure that women farmers receive mobile-based advisories, weather updates, and market information to support more informed and effective agricultural practices.
- **Skill Training**: Women should be provided with special training in sustainable farming methods and should be aware of tools designed to meet their specific needs.
- **Market Support**: Access to local and digital markets should be improved, along with transportation and collective platforms, to help women farmers increase income.

Conclusion

- Measures taken to celebrate 2026 as the International Year of the Woman Farmer should promote resilient agricultural development and gender equality by recognising, supporting, and enhancing the role of women in food security, economic prosperity, and sustainability.

4) CRITICAL MINERALS IN INDIA

(GS-I: Distribution of Key Natural Resources across the world (including South Asia and the Indian sub-continent); factors responsible for the location of primary, secondary, and tertiary sector industries in various parts of the world (including India))

Background

- There is no global definition of critical minerals, but essentially, they are mineral deposits with high economic vulnerability and high global supply chain risk.
- Globally, there is a gap between projected supply and projected demand for many critical minerals by the end of this decade, especially in **cobalt and lithium.**
- They are used for making EV batteries and are also critical for making semiconductors and high-end electronics manufacturing.
- These minerals are also used in manufacturing fighter jets, drones, radio sets and other critical equipment, hence it is critical for aerospace, communications and defence industries.
- As India seeks to expand its manufacturing and technological capability, critical minerals will become vital to fulfill this ambition.
- However, **India, a major critical mineral importer**, still depends on other countries, primarily China, for its mineral security, raising a cause of strategic concern.

Challenges in access to Critical Minerals

- **Under-exploration**: India's mineral resources remain under-explored despite being geologically rich. This under-exploration severely limits its ability to secure critical mineral supply chains domestically, which is essential if India is to become a serious player in manufacturing.
- **Global Supply Chain Concentration**: There is a heavy concentration in the supply of critical minerals, far greater than that of oil. For example, cobalt comes almost exclusively from Congo, Indonesia accounts for nearly 50% of nickel supply, and China alone contributes two-thirds of global rare earth mining.
- **Dependence on China**: China dominates mineral processing globally around 66% of critical minerals (including copper and aluminium) are processed there, and for rare earths, it exceeds 90%. This gives China the power to halt global industries, including EVs, by restricting supply.
- **Growing Demand**: The fourth industrial revolution and climate change mitigation technologies are highly mineral-intensive.
    - For instance, electric vehicles require six times the minerals of conventional vehicles, and offshore wind projects consume nine times more minerals than traditional power plants.
- **Inadequate Policy and Fast-track Mechanisms**: Unlike the US, which is cutting mineral exploration approval time from a year to less than a month and opening vast tracts of land, India lacks comparable fast-track policies.

Measures by India to access Critical Minerals

- **Building bilateral ties with resource-rich countries** such as Australia, Argentina, the United States, Russia, and Kazakhstan to secure the supply of lithium and cobalt is an important step by India.
    - India established the **Khanij Bidesh India Ltd. (KABIL)**, a joint venture company with a mandate "to ensure a consistent supply of critical and strategic minerals to the Indian domestic market".
    - The objective was to **achieve mineral security by securing agreements,** and acquisitions through government-to-government, government-to-business, and business-to-business routes.

  - KABIL has set up agreements with Australia, Argentina, Chile, and Bolivia and Kazakhstan to secure supplies of critical minerals.
- **International Engagement** through multilateral or minilateral initiatives are also an important pillar in critical mineral security.
  - India has joined groupings like **Indo-Pacific Economic Framework for Prosperity (IPEF), Mineral Security Partnership (MSP) and the G-7,** for cooperation in the critical mineral supply chain.
  - These cooperative engagements aim to align India with the **global best practices** in the critical mineral sector and also **facilitate knowledge sharing and capacity building,** which is important for coordinating with international partners such as the U.S., the European Union (EU), South Korea, and Australia.
  - To further this collaboration with western partners, India's **Ministry of Mines signed a MoU with the International Energy Agency** to strengthen cooperation on critical minerals.

Measures Needed in Future

- **Enhancing Private Sector Participation:** Develop a clear critical mineral supply chain strategy that aligns with India's growth prospects and national security priorities. A roadmap should be created for private sector engagement across the supply chain, addressing de-risking mechanisms.
- **Strengthening Diplomatic Capacity:** A dedicated Mineral Diplomacy Division within the Ministry of External Affairs can be created with special positions for mineral diplomacy in key diplomatic missions.
  - Expanding diplomatic training programs focussed on critical mineral trade, negotiation, and global collaboration can also be explored.
- **Forging Sustainable and Strategic Partnerships:** Build trusted partnerships with bilateral partners and multilateral forums, emphasizing shared benefits and long-term commitments.
  - Collaboration with key partners such as the EU, South Korea, and Quad members should be prioritized to leverage their expertise, technology, and resources.
- **Developing a Comprehensive Policy Framework:** Integrate critical mineral strategies into India's broader industrial, environmental, and security policies.
- **Focusing on National Security Implications:** Assess vulnerabilities in critical mineral supply chains that could impact national security and economic growth.
  - Diversify sourcing to reduce dependence on any single country or region, particularly addressing risks posed by geopolitical tensions.

Conclusion

- Giving proper focus and support to these measures can help India to gain strength in mineral diplomacy.
- This can enable the country to better address the challenges and improve the domestic critical mineral initiatives.

5) CLIMATE CHANGE IN INDIA- GOALS AND MEASURES

(GS-III: Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment)

Definition and Background

- **Climate Change and Global Warming:** Although people tend to use these terms interchangeably, **global warming is just one aspect of climate change.**
- **"Global warming"** refers to the **rise in global temperatures** due mainly to the increasing concentrations of **greenhouse gases** in the atmosphere.

- **"Climate change"** refers to the increasing **changes in the measures of climate** over a long period of time – including **precipitation, temperature, and wind patterns.**
- **2024 was the warmest year since** global records began in **1850** by a wide margin.
- Earth's temperature has **risen** by an **average of 0.06° Celsius per decade** since 1850.
- The rate of warming since **1982 is more than three times as fast:** 0.20° C per decade.
- The **10 warmest years in the historical record** have all occurred in the **past decade** (2015-2024).

Natural Causes for Climate Change

- **Some amount** of climate change can be attributed to natural phenomena.
- **Volcanic eruptions, fluctuations in solar radiation, tectonic shifts, and even small changes in our orbit** have all had observable effects on planetary warming and cooling patterns.

Man Made Causes for Climate Change

- **Fossil fuel use in Energy and transport:** Burning coal, oil, and natural gas for electricity, heating, and transportation releases large volumes of Carbon-di-oxide (CO_2), the most significant greenhouse gas.
  - The **energy sector alone contributes nearly 80%** of all **GHG emissions.**
- **Industrial processes:** Industry increases emissions through both **fossil fuel combustion and non-energy-related activities.**
  - Cement production, manufacturing of steel, smelting of iron ore, and use of chemical processes release large quantities of **SO_2, CO_2, and synthetic GHGs like CFCs, HFCs,** and **SF_6**- high **global warming potentials** and **damage the ozone layer.**
- **Agriculture and animal husbandry:** Excessive fertilizer use emits significant N_2O, a GHG 300 times more potent than CO_2.
  - **Livestock,** especially ruminants, emit CH_4 during digestion.
  - **Rice cultivation in flooded fields** also produces large amounts of CH_4 due to anaerobic decomposition.
- **Deforestation:** Trees and plants absorb CO_2, but when forests are cut or burned their stored carbon is released as CO_2..
  - It also **alters local climates** by changing rainfall patterns, reducing humidity, and **disrupting natural cooling processes.**
- **Improper Waste Management:** Landfills emit large amounts of CH_4 during decomposition of organic waste.
  - Open burning of waste emits GHGs and dangerous local air pollutants.
- **Oceanic pollution and alteration: Warming of Oceans,** dumping waste into oceans, **overfishing, and disrupting marine ecosystems** can affect ocean currents, sea surface temperatures, and weather systems like monsoons and **El Niño patterns.**

Climate Change impacts specific to India:

- **Extreme Heat**: Unusual and unprecedented spells of hot weather are expected to occur far **more frequently and cover much larger areas.**
  - With a **4°C warming, the west coast and southern India** are projected to shift to new, **high-temperature climatic regimes** with significant impacts on agriculture.
- **Changing Rainfall Patterns:** A 2°C rise in the world's average temperatures will make India's **summer monsoon highly unpredictable.**
  - **Increased frequency of heavy rainfall:** At 4°C warming, an extremely wet monsoon that currently has a chance of occurring only once in 100 years is projected to occur every 10 years by the end of the century.
- **Frequent Droughts:** Droughts are expected to be more frequent in some areas, especially in **north-western India, Jharkhand, Orissa and Chhattisgarh.**

    - Crop yields are expected to fall significantly because of extreme heat by the 2040s.
- **Glacier Melt:** At 2.5°C warming, melting glaciers and the loss of snow cover over the Himalayas are expected to **threaten the stability and reliability of northern India's primarily glacier-fed rivers**.
- **Water Security:** An increase in **variability of monsoon rainfall** is expected to increase water shortages in some areas.
    - Studies have found that the threat to water security is very high over **central India,** along the mountain ranges of the **Western Ghats, and in India's northeastern states.**
- **Sea level rise:** With India close to the equator, the sub-continent would see much higher rises in sea levels than higher latitudes. This can lead to flooding of coastal cities and thus **displacing people.**
    - Sea-level rise and storm surges would lead to **saltwater intrusion i**n the coastal areas, impacting agriculture, degrading groundwater quality and contaminating drinking water.
- **Agriculture and food security:** Seasonal water scarcity, rising temperatures, and intrusion of seawater would threaten crop yields, thus affecting the country's food security.
    - If the current trends of warming continue, substantial yield reductions in both rice and wheat can be expected in the near and medium term.
- **Health:** Increasing **malnutrition** and related health disorders such as **child stunting** and the **poor likely to be affected most severely.**
    - **Child stunting** is projected to **increase by 35% by 2050** compared to a scenario without climate change.
    - **Malaria and other vector-borne diseases,** along with diarrheal infections will be major causes for child mortality.
    - **Heat waves** are likely to result in a very substantial **rise in mortality** and death, and injuries from **extreme weather events** are likely to increase.

India's Goals in Climate Change:

- At the **26th session of the Conference of the Parties (COP26)**, India presented five nectar elements **(Panchamrit)** as its climate action:
    - Reach **500 GW of Non-fossil energy** capacity by 2030.
    - Generate **fifty percent** of India's **energy requirements from renewable energy** by 2030.
    - Reduce total projected carbon emissions by one billion tonnes from now to 2030.
    - Reduce the carbon intensity of the economy by 45 percent by 2030, over 2005 levels.
    - Achieve the target of **net zero emissions by 2070.**

India's Measures:

- **The National Action Plan on Climate Change (NAPCC)** was launched in 2008 and includes eight National Missions on climate change.
    - National Solar Mission
    - National Mission for Enhanced Energy Efficiency
    - National Mission on Sustainable Habitat
    - National Water Mission
    - National Mission for Sustaining the Himalayan Ecosystem
    - National Mission for a Green India
    - National Mission for Sustainable Agriculture
    - National Mission on Strategic Knowledge for Climate Change

- The **Mission LiFE (Lifestyle for Environment)** is a global initiative launched by India in October, 2022 aimed at fostering **sustainable lifestyles** through mindful and **deliberate consumption** to protect the environment.
- The **National Clean Air Programme (NCAP)** launched in 2019 covers 130 cities in 24 States and UTs with an objective to achieve substantial improvement in air quality, up to 40% reduction in particulate matter by 2025-26 from 2017-18. A 'PRANA' portal has been launched to update the air quality data in real time.
- **The Long-Term Low Carbon Development Strategy (LT-LCDS)** was announced at COP27 and it outlines India's roadmap for a low-carbon economy by 2070.
- **National Electric Mobility Mission Plan (NEMMP)** aims to promote electric vehicles and reduce fossil fuel consumption and emissions in the transport sector.
- **Circular Economy & Extended Producer Responsibility (EPR) Framework:** The producers have been mandated to get the end-of-life wastes recycled under extended producer responsibility regime.

Conclusion

- Climate change poses significant and multifaceted risks to the country's economy, agriculture, water resources, health, and overall human security.
- While India's proactive commitments, such as the Panchamrit goals, the NAPCC, and Mission LiFE, reflect its seriousness in combating climate change, the path ahead demands deeper integration of climate resilience into national planning.
- As climate change accelerates, India must ensure its response is not only ambitious but also inclusive, equitable, and adaptive to local realities.

UPSC PYQs:

'Climate Change' is a global problem. How will India be affected by climate change? How Himalayan and coastal states of India are affected by climate change? (2017)

6) QUESTION OF SOUTH ASIAN INTEGRATION

(GS-II: Bilateral, Regional and Global Groupings and Agreements involving India and/or affecting India's interests)

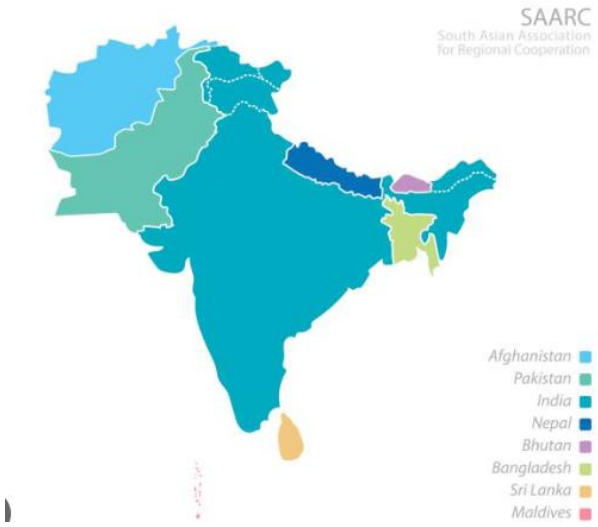
Background

- South Asia is a subregion of Asia consisting of the Indo-Gangetic Plain and peninsular India.
- **Countries:** It includes the countries of
  - **Bangladesh, Bhutan, India, Pakistan, Nepal, and Sri Lanka. Afghanistan and the Maldives** are often considered part of South Asia as well.
- **Boundaries:** The region is bounded to the north by a series of mountain ranges:
  - the **Hindu Kush** to the northwest, the **Karakoram Range** in the central north, and the **Himalayas** to the northeast.
  - To the South, **Indian Ocean, Arabian Sea and Bay of Bengal** form the boundaries.
- The region has been influenced by the hostile relations between India and Pakistan and has become **one of the least integrated regions of the World.**
- South Asia is very important from **geopolitical considerations in the Indo-Pacific,** due to **important sea lines of communication (SLOC)**, maritime potentials and being home to around two billion people with the **most dynamic and fast-growing economies**.
- **India** is the **largest country in South Asia** in most parameters and assumes **a significant position in South Asia** as it shares land or maritime borders with all the countries in the South Asian region, and therefore, assumes a pivotal link in the region.

- **South Asian Association for Regional Cooperation (SAARC)** is the regional organisation dealing with this region.

Least integrated regions but has huge potential

- **Intraregional trade of South Asia (South Asian Free Trade Area or SAFTA)** accounts for barely **5% to 7% of its total international trade,** which is the lowest when compared to other trading blocs.
    - Around **45%** in the **European Union (EU)**,
    - Around **22%** in the **Association of Southeast Asian Nations (ASEAN)**, and
    - Around **25%** in the **North American Free Trade Agreement (NAFTA).**
- **Trade Potential under utilized:** Current trade among South Asian Association for Regional Cooperation (SAARC) countries is **just around $23 billion**, far below the **estimated $67 billion.**
    - According to a **United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) study,** South Asia's **potential trade** could have reached **$172 billion** by 2020, which means over 86% of its capacity remains unexploited.
- South Asia, the most populous region of the world **(25% of the world's population),** represents a combined **market of only $5 trillion in GDP,** on the other hand, the **EU with 5.8%** of the population accounts for **$18.5 trillion in GDP.**



Reasons for low Integration

- **Trust deficits and regional conflicts:** SAARC and SAFTA had the aim of ending distrust and tension but conflicts between India and Pakistan had pushed these organisations into deep limbo.
    - Most SAARC countries are in conflict with each other, preventing effective regional integration.
- **Political diversity, minority issues and terrorism** are major obstacles to regional cooperation.
- **High Intra Regional Trade Costs:** Trading within **South Asia is 114% of the value of goods**, higher than with distant partners like the **U.S. (109%).**
    - It is **more expensive for India to trade with Pakistan than with Brazil,** despite being much closer geographically.
    - In contrast, **intraregional trade costs for ASEAN** are some **40% lower than intra-SAARC trade costs, at 76%,** creating high incentives for interdependence in that bloc.
- **Inefficient Trade Mechanisms and Poor Infrastructure:** South Asia suffers from inefficient trade governance and weak implementation of trade agreements.
    - **Poor logistics** and connectivity further raise costs and reduce competitiveness.

Way Forward:

- **Keeping aside Bilateral Conflicts:** To exploit the full potential of the South Asian region, members must work actively to enhance intra-regional trade, keeping aside their bilateral conflicts.

- **Regional Transportation corridors** like the **BBIN Motor Vehicle Agreement (**BBIN-MVA) should be made to work effectively so that the cost of trade comes down considerably.
- **Integrated Border Checkposts** should be developed to reduce the time of transit trade.
- **Conducive political environment** should be the goal of the regional countries in the view of the **long term well being of the region** rather than short term political goals.

UPSC PYQs:

"Increasing cross-border terrorist attacks in India and growing interference in the internal affairs of several member-states by Pakistan are not conducive for the future of SAARC (South Asian Association for Regional Cooperation)." Explain with suitable examples. (2016)

7) GENDER EQUITY IN INDIA'S BUREAUCRATIC SETUP

(GS-II: Government Policies and Interventions for Development in various sectors and Issues arising out of their Design and Implementation)

Definition and Background

- Gender equity means **respecting all people without discrimination,** regardless of their gender.
    - It also means **addressing gender inequalities** that limit a person's ability to **access opportunities** to achieve better health, education and economic opportunity based on their gender.
- As of 2022, women constituted just 20% of the Indian Administrative Service (IndiaSpend-2022), with even lower representation in urban planning, municipal engineering and transport authorities.
- In **policing, only 11.7% of the national force are women** (Bureau of Police Research and Development-2023), and often confined to desk roles.
- The **73rd and 74th Amendments mandate 33% reservation** for women in Panchayati Raj Institutions (PRIs) and Urban Local Governments (ULGs), further strengthened to 50% by 17 States and a Union Territory.
- Today, **women comprise over 46% of local elected representatives** (Ministry of Panchayati Raj, 2024), as a rising presence of mayors and councillors.
    - However, the **bureaucratic apparatus that implements their decisions remains overwhelmingly male.**
- While women's representation in **grass-root politics has increased, administrative cadres (city managers, planners, engineers, police) exhibit a stark imbalance.**

Significance of Gender Equity in Bureaucracy

- **Inclusive Urban Planning and Service Delivery:** Women bring lived experiences that help design safer, more accessible, and responsive urban services like public transport, lighting, sanitation, and childcare.
- **Public Safety:** A higher presence of women in policing and administration fosters empathetic enforcement and increases community trust, especially among vulnerable groups.
- **Better Governance Outcomes:** Women leaders tend to prioritize basic services such as health, water, and safety, resulting in more human-centered and equitable governance.
- **Gender-Responsive Budgeting:** A gender-diverse bureaucracy ensures GRB is better planned, monitored, and integrated into urban development beyond tokenism.

- **Structural Reforms and Long-Term Equity:** Greater participation of women in technical and decision-making roles helps dismantle institutional barriers and builds inclusive, future-ready cities.

Measures which can help in promoting Gender Equity

- **Affirmative Action:** Introduce quotas and scholarships for women in administrative and technical roles to boost their representation in planning, engineering, and policing.
- **Gender-Responsive Training:** Conduct regular gender-sensitivity training and strengthen institutional capacities to embed gender equity in governance and service delivery.
- **Legal backing for Gender-Responsive Budgeting:** Make GRB mandatory across all Urban Local Governments, linking it with gender audits, participatory planning, and measurable equity outcomes.
- **Local Gender Equity Councils and Oversight Bodies**: Establish councils and monitoring bodies within local governments to ensure gender issues are addressed in policies and infrastructure planning.

Conclusion

- Countries like Rwanda and Tunisia have shown the way to include gender equity measures in a developing country setup.
    - **Rwanda** integrates GRB into national planning with oversight bodies through this it **boosted maternal health and education spending;**
    - **Tunisia's parity laws** gave women more technical roles, improving focus on safety and health.
- India can study and adapt these initiatives to improve gender equity in its bureaucracy.

UPSC PYQs:

In Indian culture and value system, an equal opportunity has been provided irrespective of gender identity. The number of women in public service has been steadily increasing over the years. Examine the gender-specific challenges faced by female public servants and suggest suitable measures to increase their efficiency in discharging their duties and maintaining high standards of probity. (2024)

8) SOCIO-ECONOMIC DEVELOPMENT OF TRIBES IN INDIA

(GS-II: 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)

Background

- India has the second-largest tribal population in the world. As per the **Census 2011,** the tribal population constitutes about **8.7% of the total population in India.**
- In **absolute numbers, Madhya Pradesh** has the highest number of tribal people in India(**Around 15.5 million)**.
- In **percentage, Mizoram** has the highest number of tribal people (Around **94% population of the state are tribal people).**
- Apart from these, Eastern States such as Jharkhand, Chhattisgarh, Odisha and all Northeastern states have considerable tribal populations.
- The **Bhil are the largest tribal group** in India, according to the 2011 Census. They constitute approximately 38% of the total scheduled tribal population in India.
    - Bhil tribes are found in states like **Maharashtra, Chhattisgarh, Gujarat, Rajasthan, and Madhya Pradesh.**

- The Union government has recognized **75 tribal communities** as **Particularly Vulnerable Tribal Groups (PVTGs)** based on the recommendations of the **Dhebar Commission (1960-61)** and other studies conducted during the Fourth Five-Year Plan.
- These communities were placed in a special category due to their **significant development disparities** compared to other tribal groups.
- The identification of such groups was based on one or more of the following characteristics:
    - Preservation of **pre-agricultural practices,**
    - Hunting and **gathering** practices,
    - Decreasing or **stagnant population** growth, and
    - Relatively **low levels of literacy** in contrast to other tribal groups
- The term **'Scheduled Tribes'** first appeared in the Constitution of India.
- **Scheduled Tribes (STs)** are identified based on criteria outlined in **Article 342** of the Constitution, which empowers **the President** to specify which communities are to be considered STs through public notification. These **specifications are done on a state or union territory basis,** not an all-India basis.

Measures by the Government for Socio-economic Development of Tribals

- **Constitutional Measures:**
    - **Article 15** and **Article 16** – Provides for reservation for STs in Govt.institutions and public employment.
    - **Fifth Schedule** – Deals with the administration and control of Scheduled Areas and STs in states other than those in the Sixth Schedule.
    - **Sixth Schedule** – Provides for Autonomous District Councils in certain tribal areas of the Northeast for self-governance and cultural protection.
    - **Article 330 & 332** – Provides for **reservation of seats for STs** in Lok Sabha and State Legislative Assemblies.
    - **Article 338A** – Establishes the **National Commission for Scheduled Tribes (NCST)** to safeguard ST rights.
- **Legislative measures:**
    - **Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, 1989 -** prevent atrocities against STs and provide for their relief and rehabilitation.
    - **The Scheduled Tribes (STs) and Other Traditional Forest Dwellers (OTFDs) (Recognition of Forest Rights) Act, 2006** - recognize and vest the forest rights and occupation in forest land to forest dwelling Scheduled Tribes.
    - **Panchayats (Extension to the Scheduled Areas) Act – PESA, 1996** – Extends provisions of the 73rd Amendment to Scheduled Areas, giving **Gram Sabhas** powers over natural resources, minor forest produce, and local governance.
- **Government Schemes:**
    - **Dharti Aaba Janjatiya Gram Utkarsh Abhiyan** aims to address critical gaps in social infrastructure, health, education, and livelihood development across approximately 63,000 tribal villages.
    - **Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan (PM-JANMAN)** targets the socio-economic development of 75 Particularly Vulnerable Tribal Groups **(PVTGs).**
    - **The Pradhan Mantri Adi Adarsh Gram Yojana (PMAAGY)** aims to provide **basic infrastructure** in villages with a **significant tribal population.**
    - **Eklavya Model Residential Schools (EMRS):** Provides **quality education to tribal children in remote areas** through fully residential schools from Class VI to XII.

- **Tribal Cooperative Marketing Development Federation of India (TRIFED)** promotes tribal products thus providing sustainable livelihood opportunities to tribal artisans.
- **Scholarships** are given by the Union and State Governments for ST students in schools and colleges.
- **National Sickle Cell Elimination Mission** to be implemented jointly by the Ministry of Health and Family Welfare and **Ministry of Tribal Affairs** in collaboration with ICMR and States concerned.
- Under the **Development Action Plan for Scheduled Tribes (DAPST),** besides the Ministry of Tribal Affairs, **41 Ministries/ Departments are allocating funds** in the range of 4.3 to 17.5 per cent of their total scheme allocation every year for tribal development projects.

Factors hindering the Socio-economic Development of tribals

- **Geographical Inaccessibility**: Many tribal communities live in remote and difficult-to-reach areas, making the delivery of welfare schemes and public services a logistical challenge.
- **Landlessness and Displacement:** Displacement due to dams, mining, and development projects has led to loss of traditional lands, especially for PVTGs, causing insecurity and obstructing access to rights and resources.
  - The **Gond** community in **Chhattisgarh** has been resisting coal mining projects like **Parsa East and Kanta Basan (PEKB)** and **Hasdeo Arand mines** since 2021.
- **Lack of Essential Documentation**: Many STs struggle to obtain basic documents like Aadhaar, birth/death certificates, and land titles.
- **Infrastructural Deficits:** Numerous tribal villages still lack basic infrastructure, including roads, healthcare, schools, and banking access.
- **Limited Awareness and Participation:** A lack of awareness about available schemes and insufficient community involvement in governance processes.

Way Forward

- **Gram Sabhas Involvement:** Engaging local communities and gram sabhas in the development process to enhance the rate of success.
- **Training for Frontline Officials:** Training sessions for officials on effective communication and service delivery to STs can help in handling common issues and reduce errors.
- **Regular Feedback Mechanism:** A system for regular feedback from STs of different regions of the country can help in course correction to resolve issues promptly.

UPSC PYQs:

1. What are the two major legal initiatives by the State since Independence addressing discrimination against Scheduled Tribes(STs)? (2017)

2. Why are the tribals in India referred to as 'the Scheduled Tribes? Indicate the major provisions in the Constitution of India for their upliftment. (2016)

9) SUSTAINABLE DEVELOPMENT GOALS AND INDIA

(GS-III: Indian Economy and issues relating to Planning, Mobilization of Resources, Growth, Development and Employment)

Definition and Background

- The Sustainable Development Goals (SDGs) are **a set of 17 interconnected global objectives** aimed at addressing pressing social, economic, and environmental challenges to achieve sustainable development by 2030.

- These goals were **adopted by the United Nations General Assembly in 2015 as part of the 2030 Agenda for Sustainable Development,** the SDGs were built upon the Millennium Development Goals (MDGs) and encompass a broader and more ambitious agenda.
- These goals cover a wide range of issues, including **poverty eradication, quality education, gender equality, clean water and sanitation, affordable and clean energy, sustainable cities and communities, climate action, life below water, and life on land, among others.**
- Each goal is accompanied by **specific targets (a total of 169)** to guide efforts towards its achievement.
- Every year, the **UN Secretary General presents an annual SDG Progress report**, which is developed in cooperation with the UN System, and based on the global framework and **data** from **national statistical systems.**
- While the **SDGs are non-binding,** all countries have committed to working towards their achievement, recognizing that these goals are a path towards sustainable development.

Key Interventions by Government to achieve SDGs

- Over 4 crore houses under the **PM Awas Yojana (PMAY)**.
- 11 crore Toilets & 2.23 lakh **Community Sanitary Complexes** in rural areas.
- 10 crore LPG connections under **PM Ujjwala Yojana.**
- Tap water connections in over 14.9 crore households under **Jal Jeevan Mission.**
- Over 30 crore beneficiaries under **Ayushman Bharat -Pradhan Mantri Jan Arogya Yojana.**
- Coverage of over 80 crore people under the **National Food Security Act (NFSA).**

- Access to 150,000 **Ayushman Arogya Mandir** which offer **primary medical care** and provide affordable generic medicines.
- **Direct Benefit Transfer (DBT)** of ₹34 lakh crore made through **PM-Jan Dhan accounts.**
- The **Skill India Mission** has led to over 1.4 crore youth being trained and upskilled and has reskilled 54 lakh youth.

Hurdles in India's path towards achieving these goals

- **Poverty and Income Inequality**- SDG 1 (No Poverty), SDG 10 (Reduced Inequalities)
  - Despite some progress, India still has **a large population living in poverty.** Added to this is the high inequality in distribution of wealth.
  - According to the NITI Aayog Multidimensional Poverty Index (MPI) 2023, around **15%** of Indians are still **multidimensionally poor.**
  - Income inequality is significant with the **top 1% owning over 40% of the nation's wealth** (Oxfam India, 2023).
- **Hunger and Malnutrition:** SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-being)
  - High malnutrition and food insecurity remain a huge problem throughout the country.
  - India ranked **105 out of 127** countries in the **Global Hunger Index 2024.**
  - **35.5% of children under 5 are stunted and 19.3% are wasted** (NFHS-5, 2019–21).
- **Quality Education Deficit:** SDG 4 (Quality Education)
  - Learning outcomes are poor even though there is high enrollment.
  - The **ASER Report 2023** found that only 42% of Class 5 students can read a Class 2-level text.
  - **Urban-rural and gender gaps** continue to exist in educational quality and access. access.
- **Gender Inequality:** SDG 5 (Gender Equality)
  - Women's participation in the workforce and leadership roles remains low.
  - **Female Labour Force Participation** Rate was just **37%** in 2023 (PLFS).
  - India ranked 131 out of 148 in the Global Gender Gap Report 2025 (WEF).
- **Environmental Degradation and Climate Change:** SDG 13 (Climate Action), SDG 15 (Life on Land), SDG 6 (Clean Water and Sanitation)
  - Air pollution, deforestation, and water stress affect the lives of most of the Indians.
  - India has **9 of the 10 most polluted cities** in the world. (IQAir, 2023).
  - Over 600 million Indians face high to extreme water stress. (NITI Aayog, CWMI Report 2019).
- **Unemployment and Informal Economy:** SDG 8 (Decent Work and Economic Growth)
  - Job creation is not keeping pace with demographic growth. Most of the jobs created are in the **gig economy** with no effective social and economic security for the persons.
  - **Urban unemployment** was **6.7%** in Jan-Mar 2024 (PLFS).

Way Forward

- **Targeted Welfare Schemes** : Expansion and better targeting measures in schemes like **Deendayal Antyodaya Yojana - National Rural Livelihoods Mission (DAY-NRLM)** can help reduce poverty and hunger by ensuring sustainable livelihood support.
- **Taxation Reforms** which reduce the income and wealth inequality in the country by adequate redistribution of wealth.
- **Investments in Health and Education**: India's public expenditure on education typically ranges between 4.1% and 4.6% of its Gross Domestic Product (GDP), which should be increased to reach the 6% goal of **NEP 2020** as early as possible.

  - **Government spending on health** is around **1.9% of the GDP,** short of the 2.5% target. More investments here can reduce the Out-of-Pocket Expenditure of the households.
- **Women Empowerment**: Promote women's employment, safety, financial inclusion, and representation in leadership through schemes like **Stand-Up India**, **Beti Bachao Beti Padhao** and effective enforcement of existing laws.
- **Green Growth and Climate Resilience**: Sustainable farming, water conservation, afforestation, and eco-friendly infrastructure should be promoted with **a bottom-up approach** which takes even the common man in the green development process.

UPSC PYQs:

Access to affordable, reliable, sustainable and modern energy is the sine qua non to achieve Sustainable Development Goals (SDGs)".Comment on the progress made in India in this regard. (2018)

10) OPERATION SINDOOR

(GS-III: Role of External State and Non-state Actors in creating challenges to Internal Security)

Introduction

- On **April 22, 2025**, a **Pakistan-backed terror attack in Pahalgam**, Jammu & Kashmir, led to the death of 26 civilians, targeted on the basis of religion.
- Marked a strategic shift from traditional cross-border infiltration to **internal communal provocation**.
- India launched **Operation SINDOOR**—a calibrated, multi-dimensional counter-terrorism operation combining **military, diplomatic, digital, and economic tools**.

Purpose and Objectives of Operation SINDOOR

- **Punish perpetrators and planners** of the Pahalgam terror attack.
- **Dismantle terror infrastructure** across the Line of Control (LoC) and in Pakistani territory.
- Enforce **zero-tolerance towards terrorism**, while avoiding full-scale escalation.
- Reaffirm India's **strategic doctrine**—terrorism and its sponsors are indistinguishable.

Key Components of the Operation

Military Action

- **Precision strikes** on nine major terror camps in PoJK and Pakistan (Lashkar-e-Taiba, JeM, Hizbul).
- **Radar installations and airbases** in Lahore, Gujranwala, Bahawalpur, Bholari and other regions were destroyed.
- **Use of advanced platforms**: Rafale jets, SCALP missiles, HAMMER bombs, Akashteer air defence system.
- **Neutralisation of top terrorists**: Yusuf Azhar (IC-814 hijack), Mudassir Ahmad (Pulwama), Abdul Malik Rauf.
- **Tri-service coordination** (Army, Navy, Air Force) for operational synergy.
- **Interception of drone swarms** post-ceasefire using indigenous defence systems.

Operational Ethics

- No harm to Pakistani civilians.
- Avoidance of non-terror and purely military installations.
- Maintained **strategic restraint** to limit escalation.

Information and Cyber Warfare

- Faced a **misinformation campaign by Pakistan**, aiming to distort narratives and gain global sympathy.
- India's digital response:
  - Transparent press briefings (May 7–10) by Foreign Secretary.
  - Real-time fact-checking and narrative correction.
  - Exposure of fake social media accounts.
  - **Media literacy campaigns** to counter fake news.

Non-Military Measures

1. **Diplomatic Actions**

- Declared **Pakistani defence advisors persona non grata**, reduced diplomatic strength.
- Isolated Pakistan globally by exposing terror links at international forums.
- Gained **widespread global support**, breaking the past pattern of calls for restraint.

2. Economic Measures

- **Suspension of Indus Waters Treaty (1960)**:
  - Devastating impact on Pakistan's agrarian economy (80% water dependency).
  - Enabled India to exploit western rivers for irrigation and hydropower.
- **Closure of Attari-Wagah border**, cessation of all bilateral trade.
  - Affected Pakistani exports (cement, textiles), and vital imports (onions).
- **Visa cancellation** for all Pakistan nationals in India.
- **Ban on Pakistani artists, media, and cultural exchanges**, including OTT platforms.

Strategic Implications for Pakistan

- **Air Defence Weakness Exposed**: China-supplied systems were bypassed.
- **Military and Civilian Cost**: Airbase losses, economic disruption, and psychological pressure.
- **Internal Crisis Deepened**: Energy insecurity, inflation, and food shortages due to water disruption.
- **Narrative Defeat**: Pakistan's attempt to portray itself as a victim failed.

Strategic Leadership and Doctrinal Shift

- Introduced a **new red line**: Future terror acts = Act of war.
- Asserted:
  - "No distinction between terrorist and their sponsors."
  - "Terror and talks, terror and trade, water and blood—cannot go together."

Achievements of Operation SINDOOR

1. **Destruction of 9 terror camps**, 100+ terrorists neutralised.
2. **Strikes deep into Pakistan's territory**, including Punjab and Bahawalpur.
3. **Unprecedented air raids** on 11 airbases, 20% of Pakistan's air assets destroyed.
4. **Leadership decapitation** of multiple terror modules.
5. **Reframing of Kashmir narrative**: From dispute to counter-terror operation.
6. **Redefined India's deterrence strategy**: Precision without escalation.
7. **India's information war success**: Digital counter-narrative dominance.
8. **International validation and solidarity**, unlike past conflicts.
9. **Total integration of diplomacy, economics, military, and cyber tools.**

Conclusion

Operation SINDOOR signifies a **paradigm shift in India's counter-terror policy**—blending military precision, digital vigilance, and diplomatic assertion. It was not merely a retaliation but a **recalibration of India's national security doctrine**, rooted in justice, resilience, and strategic clarity. Going forward, India has **set a precedent**: Any act of terrorism, state-sponsored or otherwise, will invite a **measured, lawful, and forceful response**.

11) RURAL PROSPERITY THROUGH WAREHOUSING

(GS-III: Food Processing and Related Industries in India- Scope' and Significance, Location, Upstream andDownstream Requirements, Supply Chain Management)

Introduction

India's rural economy is still heavily reliant on agriculture, with **68.85% of the population living in rural areas** (Census 2011) and about **58.4% of rural workers** engaged in agricultural activities. While **agricultural production** has seen remarkable growth — touching **354.64 MMT (2025–26 target) — post-harvest management** remains a weak link, especially in **warehousing and credit**. Warehousing can be a transformative force for **rural prosperity**, helping to reduce post-harvest losses, enable better price realization, and ensure financial stability for farmers.

Significance of Warehousing in Rural Economy

1. **Storage and Post-Harvest Management**
   - Protects produce from spoilage, pest attacks, and climatic damage.
   - Reduces **distress sales** and enables farmers to **defer sales** till better market prices are available.
   - Prevents wastage: India loses nearly **10% of agri produce post-harvest** due to inadequate storage.
2. **Improving Farmer Incomes**
   - Helps in securing **pledge finance** using **Negotiable Warehouse Receipts (e-NWRs)**.
   - Scientific storage reduces price volatility and enables price discovery through platforms like **e-NAM**.
3. **Market Integration and Digital Empowerment**
   - Integration with **electronic markets** enables direct linkage of rural produce to national buyers.
   - Reduces **price spread** between wholesale and retail, benefitting both producers and consumers.

Key Economic Benefits of Warehousing

Parameter	Impact
Price Realization	Deferring sale improves prices (e.g., chilli, turmeric, jeera)
Price Stability	1% increase in warehouse capacity reduces price variability (Wheat: 2%, Masur: 2.7%)
Inflation Control	Steady supply stabilizes **Consumer Price Index (CPI)**; food has **54.18% weight**
Farmer Liquidity	Timely post-harvest loans reduce dependency on informal credit

Existing Gaps and Challenges

1. **Storage Capacity Deficit**
   - **Production (2023–24)**: 328.85 MMT
   - **Installed Warehousing Capacity**: 239.70 MMT
   - Gap of nearly **89 MMT**, especially in foodgrains.
2. **Credit Constraints**

- **Total agri credit**: ₹25 lakh crore (FY 2023–24)
- **Post-harvest credit**: Just ₹0.35 lakh crore (~1.4%)
- Banks reluctant due to **risk of stock misappropriation**, weak regulation.

3. **Skewed Distribution**
   - **68% warehouses** have <500-tonne capacity — limits professionalism.
   - Underserved regions: **Gangetic belt, Southern states**—key production zones with poor warehouse growth.

4. Lack of Awareness
   - Study shows low awareness of **pledge finance**, **price trends**, and **government schemes** among farmers.

5. **Regulatory Gaps**
   - Warehousing (Development and Regulation) Act, 2007 is limited.
   - **Registration with WDRA not mandatory** unless issuing e-NWRs.
   - Leads to **poor fiduciary trust** between banks and warehouse operators.

Government Initiatives and Policy Measures

1. **Agriculture Infrastructure Fund (AIF)**
   - ₹1 lakh crore scheme to build **post-harvest infrastructure**.
   - Encourages **farm-gate level** warehousing through **PACS (Primary Agricultural Credit Societies)**.
2. **Credit Guarantee Scheme – eNWR-based Pledge Finance (CGS-NPF)**
   - ₹1000 crore outlay to provide **credit guarantees** for loans against e-NWRs.
   - Focus on **small and marginal farmers** with low guarantee fees.
3. **e-Kisan Upaj Nidhi Portal**
   - Digital platform integrated with **banks, credit bureaus** to facilitate quick loan approvals.
   - Empowers farmers with choice of banks and speeds up access to credit.
4. **Interest Subvention**
   - **1.5% interest subvention** on post-harvest credit against e-NWRs for **KCC holders**.
   - Reduces financial burden, encourages uptake of warehousing loans.
5. **Private and Cooperative Sector Participation**
   - Promotion of **silos**, **PEG Scheme**, and **PPP projects** for warehouse development.
   - **Largest grain storage plan** via cooperatives under PACS modernization.

Way Forward

1. Universal Warehousing Regulation
   - **Mandatory WDRA registration** for all warehouses.
   - Enhance accountability, reduce risks for banks, and build trust.
2. **Incentivize Post-Harvest Credit**
   - Expand **e-NWR-based finance**.
   - Encourage **private sector lending** with risk mitigation mechanisms.
3. **Digital and Extension Literacy**
   - Create **targeted awareness programs** on post-harvest finance.
   - Use **Krishi Vigyan Kendras (KVKs)**, FPOs, and digital media.
4. **Regional Infrastructure Planning**
   - Priority allocation for **storage-deficit areas** (Gangetic plain, south).
   - Promote construction of **larger, professionally managed warehouses**.

5. Promote e-NAM Integration
   - Link all WDRA-certified warehouses with **e-NAM**.
   - Enable transparent trade, better price discovery, and market access.

Conclusion

Warehousing is **not merely a storage function** but a strategic instrument of **price stability**, **farmer empowerment**, and **rural prosperity**. Despite significant agricultural production and credit availability, **India's post-harvest ecosystem** is underdeveloped. A **multi-pronged policy approach**—combining regulation, digital empowerment, credit access, and infrastructure development—can unleash the transformative potential of agricultural warehousing and contribute substantially to **Doubling Farmers' Income** and **inclusive rural development**.

12) FOOD SAFETY IN INDIA

(GS-III: Science and Technology- Developments and their Applications and Effects in Everyday Life)

Introduction

Food safety refers to the science and regulatory measures that ensure food is free from biological, chemical, and physical hazards, protecting consumer health and maintaining trust in the food system. In India, food safety is intertwined with public health, agricultural practices, export competitiveness, and farmer livelihoods. However, the nation grapples with unsafe food arising from pesticide overuse, poor post-harvest handling, adulteration, and regulatory lapses.

I. Nature and Scope of Food Safety Challenges in India

1. **Contamination Across the Value Chain**
   - **Biological Hazards**: Fungal toxins (like aflatoxins), bacteria (E. coli, Salmonella), and viruses (Hepatitis A) from poor hygiene.
   - **Chemical Hazards**: India ranks 4th in pesticide usage globally. Harmful residues and banned pesticides like monocrotophos persist in food.
   - **Physical Hazards**: Presence of foreign objects (glass, metal, plastic) due to improper processing.

2. Post-Harvest and Storage Deficiencies

- 30% of food lost due to inadequate cold chains and open storage.
- Fungal contamination (especially aflatoxins in grains) caused by poor infrastructure.

3. Adulteration and Fraudulent Practices

- 68% of milk samples (FSSAI 2018) found adulterated with urea, detergents.
- Spices, oils, and sweets contaminated with metanil yellow, argemone oil, etc.

4**. Fragmented Supply Chains**

- Multiple intermediaries and absence of traceability increase contamination risks.
- Lack of direct farm-to-consumer linkages compounds the problem.

5. **Export Rejections and Economic Consequences**

- $15–20 billion annual export losses due to pesticide residue in basmati rice, spices, and seafood.
- Reputational damage and economic strain on small farmers.

Link Between Agriculture and Public Health

1. **Disease Burden**
   - Unsafe food linked to diarrhoea, cancer, liver damage, kidney failure, and neurological disorders.
   - WHO: Globally 600 million illnesses and 420,000 deaths annually from unsafe food.
2. **Antibiotic Resistance**
   - Contaminated meat and poultry contribute to growing antimicrobial resistance (AMR).
3. **Consumer Trust and Awareness**
   - Food scandals and lack of labelling transparency erode public confidence in the food system.

Institutional and Regulatory Framework

1. **Key Regulatory Institutions**
   - **FSSAI**: Sets standards but suffers from weak rural enforcement and manpower shortages (~2,000 inspectors for 1.3 billion people).
   - **APMCs**: Poor monitoring of food safety at market level.
   - **BIS**: Low compliance in informal and rural sectors.
2. **Laws and Gaps**
   - **Food Safety and Standards Act (2006)**: Comprehensive but poorly implemented.
   - **Insecticides Act (1968)**: Ineffective in curbing banned/illegal pesticide sales.
   - **Weak Penalties**: Minimal deterrents for violators; delayed judicial processes.

Case Studies and Best Practices

Case Study	Key Initiative	Outcome	Lesson Learned
FSSAI's Eat Right Movement	Street food vendor training, hygiene enforcement	Improved food safety in 100+ cities	Awareness + regulation can reform informal sectors
Sikkim Organic Mission	Ban on synthetic inputs since 2016	Boosted exports, soil health, incomes	Organic transitions feasible with state support
Maharashtra's Grape Export Model	EU-compliant pesticide-free farming	India as major grape exporter	Global compliance expands market access

Structural and Economic Barriers

1. Small and Marginal Farmers
   - Lack access to safe inputs, storage, or certification.
   - Vulnerable to middlemen who offload contaminated produce into markets.
2. **Infrastructure Gaps**
   - Only ~150 accredited food testing labs against required 500+.
   - <10% perishables have cold storage access.
3. **Lack of Awareness and Hygiene**
   - Vendors and food handlers often unaware of food safety protocols.
   - Informal markets and street food prepared in unsanitary conditions.

Strategic Solutions and the Way Forward

1. **Farmer Education and Good Agricultural Practices (GAP)**
   - Training via KVKs, NGOs on pesticide limits, hygiene, and handling.
   - Knowledge of pre-harvest intervals and safe application can reduce residues.
2. **Promotion of Organic/Natural Farming**
   - Scaling up schemes like **PKVY**, **Bhartiya Prakritik Krishi Paddhati**.
   - Subsidies for organic inputs, certification assistance, and market linkage.
3. **Infrastructure Modernisation**
   - Expansion of food testing labs and cold storage units.
   - Upgradation of APMCs to include food safety checks.

4. Technological Interventions
   - **Blockchain** for traceability and AI-based pesticide advisory tools.
   - Digital supply chains to reduce adulteration and ensure transparency.

5. **Regulatory Reforms**

- Strengthen FSSAI's reach in rural areas.
- Fast-track courts for violators and increased penalties.

6. **Consumer Awareness Campaigns**
   - Expand 'Eat Right India' initiative.
   - Enforce clear, front-of-pack food safety labels and hygiene ratings.

Conclusion

- Food safety in India is not merely a technical or regulatory issue—it is a **national imperative** with implications for public health, economic stability, and global trust. With foodborne diseases on the rise, export rejections mounting, and vulnerable populations at risk, India must embrace a **multi-stakeholder, systems-level approach**.
- This includes robust enforcement of safety laws, massive investment in infrastructure, adoption of sustainable agricultural practices, and widespread awareness-building campaigns. A safe food system is the foundation of a **healthy India, empowered farmers, and a trusted global agricultural brand**.

13) INFRASTRUCTURE DEVELOPMENT AND URBANISATION IN INDIA

(GS-III: Infrastructure: Energy, Ports, Roads, Airports, Railways etc)

Introduction

Infrastructure development and sustainable urbanisation are pivotal for India's transition to becoming the **third-largest global economy by 2027**. In the backdrop of rapid urban growth, climate change, and social inequality, India must recalibrate its urban planning processes. The experience of flagship initiatives like **Smart Cities Mission**, **PM Gati Shakti**, and **PRAGATI** highlights the need to shift focus from technocratic planning to **people-centric, sustainable, and climate-resilient urban growth**.

Transformative Infrastructure Projects: A Catalyst for Growth

1. **Flagship Projects Driving Progress**
   - **Vertical Lift Bridge at Rameshwaram** (New Pamban Railway Bridge, 2025)
   - **Z-Morh Tunnel**, Sonamarg (J&K)
   - **Chenab Railway Bridge**, Jammu and Kashmir
   - **Bogibeel Bridge**, Assam
   - **Atal Setu** (Mumbai Trans Harbour Link), 21.5 km sea link

These projects signify India's transition towards **modern, efficient, and resilient infrastructure**, reducing travel time and boosting regional economies.

2. **Role of PRAGATI Platform**
   - Launched in **2015**, PRAGATI (Pro-Active Governance and Timely Implementation) ensures **real-time monitoring** and **coordination**.
   - Over **340 projects** worth **$205 billion** completed.
   - Leverages **AI, ML, Big Data, Blockchain, GIS**, and **DeepSeek** for predictive and responsive governance.

II. **PM Gati Shakti Master Plan: Paradigm Shift in Infrastructure Governance**

1. **Features and Tools**
   - Integrated **multi-modal logistics** and **spatial planning** using ISRO's satellite data (via **BISAG**).
   - Uses **1200+ GIS-based data layers** from central and **755 from state departments** for land, water, forests, minerals, etc.
   - **Parivesh portal** reduced environmental clearance time from **600 days to 70–75 days**.

2**. Whole of Government Approach**
   - Promotes synergy across departments through a **common digital platform**.
   - Ensures faster execution, cost efficiency, and better ecological safeguards.

- Facilitates **district-level micro-planning**, replacing rigid 20-year master plans with dynamic **5-year Strategic Spatial Development Plans**.

Urban Challenges in India

1. Unplanned Urban Growth

- Over **50% of urban areas** are unplanned; growth led by slums and unauthorised colonies.
- India's urban population to rise from **500 million to 820 million** by **2047**.
- Infrastructure gap equals building **an entirely new urban India** in the next 22 years.

2**. Socio-economic Vulnerabilities**

- Over **80% of the workforce** is informal, with poor access to housing, health, and education.
- **Air pollution**, water contamination, waste generation, and **transport congestion** plague Indian cities.
- Urban heat island effect raises temperature by **3.5°C**, compounded by **loss of green and blue networks**.

3. **Climate and Disaster Risks**

- As per **UN-Habitat World Cities Report 2024**:
  - **2 billion** people may face temperature rise of **0.5°C by 2040**.
  - Over **2000 cities** (5m above sea level) face flood risk.
- UNEP estimates **$2.5–5.5 trillion** needed annually for climate-resilient urban infrastructure.

Reimagining Urban Planning and Governance

1. **Strategic Spatial Development Plans (SSDPs)**

- Replaces outdated **20-year master plans** with **5-year participatory, localised planning**.
- Focus on **people, jobs, green spaces, and mobility**, not just technology.
- Balances the **Four Es**:
  - **Economy**, **Engagement**, **Equality**, and **Environment**.

2. **Sustainable and Circular Urbanism**

- Cities are responsible for **70% of CO_2 emissions**.
- Promote **renewable energy, green roofs, permeable pavements, and urban forests**.
- Implement **circular economy** to manage the $252 billion waste burden (UNEP 2024).

Global Lessons for Urban Sustainability

1. **'15-Minute City' Concept**

- Focus on **walkable neighbourhoods**, reducing dependency on cars and long commutes.
- Enhances urban livability and reduces carbon footprint.

2. Rethinking Mobility

- Move away from **car-centric urban sprawl**.
- Embrace **mass transit, cycling, and walkability** as sustainable urban transport alternatives.

3. **Nature-Based Solutions**

- Protect **local ecosystems**, plant native trees, preserve water bodies.
- Integrate **bio-morphic urbanism** and traditional architecture in urban codes.

Strategic Convergence and Future Roadmap

1**. From Fragmentation to Convergence**

- Urban planning must evolve into a **digitally empowered**, **data-driven**, and **ecosystem-centric** approach.
- Use platforms like **PRAGATI**, **PM Gati Shakti**, and the **Whole of Government Framework** for seamless coordination.

2. **Redefining Priorities**

- **People-centric** cities with jobs, housing, healthcare, and amenities.

- **Environmentally sound** infrastructure using eco-sensitive zoning and resilient materials.

3. **Resilience and Inclusivity as Core Goals**
   - Ensure cities are **inclusive**, climate-resilient, and **socially equitable**.
   - Invest in **greenfield developments**, **retrofitting brownfields**, and **disaster-resilient housing**.

Conclusion

India's urban and infrastructure transformation must be rooted in **strategic planning, digital innovation, and community engagement**. Moving away from static master plans to dynamic spatial development, India has the opportunity to **build resilient, sustainable, and inclusive cities** that serve not just economic growth but also **ecological balance and human well-being**. In this vision, platforms like **PM Gati Shakti and PRAGATI** act as enablers of a **New Urban India**—technologically advanced yet people-centric, efficient yet empathetic.

14) COOPERATIVES AND FOOD SECURITY

(GS-III: 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)

Introduction

Food security, a key pillar of the Sustainable Development Goals (SDGs), is not limited to food availability but encompasses accessibility, affordability, and adequate storage. India faces acute post-harvest losses due to storage deficits and an inefficient distribution system. In this context, **the 2023 initiative of the 'World's Largest Grain Storage Plan in the Cooperative Sector'** positions Primary Agricultural Credit Societies (PACS) as pivotal agents in reshaping the rural storage infrastructure, improving farm incomes, and reducing wastage.

India's Food Security Challenge

- India owns **only 11% of the world's cultivable land** but feeds **18% of the global population**.
- Despite producing over **311 MMT of food grains**, India's storage capacity is just **145 MMT**, reflecting a **47% shortfall**.
- Post-harvest losses cost India **₹90,000 crores annually**, primarily due to poor warehousing, distressed sales, and logistical inefficiencies.

PACS and the Grain Storage Initiative

1. **World's Largest Grain Storage Plan (2023)**
   - Investment: ₹1.25 lakh crore.
   - Target: 700 LMT additional storage in **67,000 PACS** across India in 5 years.
   - Objective: Reduce post-harvest losses, cut transport costs, and ensure **decentralized grain storage** at village level.
2. **Multi-functional Role of PACS**
   - Traditionally limited to credit; now diversified into:
     - Direct procurement at MSP.
     - Agri-input distribution.
     - Local godown management.
     - Running fair price shops.
   - Examples:
     - Tamil Nadu: 94% of ration shops run by cooperatives.
     - AMUL, Mother Dairy: Successful cooperative food chains.
     - NAFED: Maintains buffer stocks of pulses and onions.

Strategic Importance of Cooperatives in Food Security

1. **Strengthening the Buffer Stock System**

- PACS-based decentralized godowns will reinforce local procurement and timely stock management.
- Enhances resilience in the **Public Distribution System (PDS)**.

2. **Empowering Rural Economy**
   - Local employment creation via construction, maintenance, and digital integration.
   - Capacity building leads to skilled rural workforce in inventory and quality management.
3. **Regenerative Food Security Model**
   - Promotes sustainability by reducing food wastage, avoiding distressed sales, and improving storage quality.
   - Encourages **community participation and ownership** of food systems.

Institutional and Policy Convergence

Supporting Schemes and Institutions

- **Agriculture Infrastructure Fund (AIF)**: ₹1 lakh crore corpus with 3% interest subvention.
- **AMI, PMFME, SMAM**: Funding support for mechanization, micro-processing, and storage.
- **NABARD, NCDC**: Credit and technical guidance for PACS infrastructure.
- **e-NAM, PM-KISAN, PMFBY**: Integration with procurement, income support, and insurance systems.

Governance Architecture

- **Inter-Ministerial Committee (IMC)**: Central oversight.
- **State and District Cooperative Development Committees**: Local implementation.
- Use of **digital dashboards and AI** for real-time monitoring, transparency, and performance evaluation.

Key Implementation Challenges

- **Coordination Issues**: Among Ministries, PACS, banks, and implementing agencies.
- **Land Acquisition**: Especially in densely populated regions, needs innovative **land pooling** models.
- **Funding Gaps**: Need for **simplified disbursal**, credit guarantees, and sustainable business models post-subsidy.
- **Capacity Deficits**: Lack of skilled personnel for inventory and infrastructure management.

Way Forward

1. **Capacity Building**
   - Training PACS members in inventory management, digital procurement, and compliance.
   - Develop professional local-level managers for efficient infrastructure handling.
2. **Simplified and Sustainable Financing**
   - Ensure PACS prepare **long-term operational plans** beyond government support.
   - Rationalize funding based on **absorption capacity** and **risk management frameworks**.
3. **Digital Transformation**
   - Computerization of PACS (already completed for 67,930 units).
   - Leverage AI and digital dashboards for real-time data, quality checks, and smart logistics.
4. **Public Engagement and Awareness**
   - Mass campaigns to encourage farmer participation in storage, procurement, and price discovery.

Impact on Sustainable Development Goals (SDGs)

- **SDG 1 & 2**: Poverty and hunger eradication through higher farm incomes and food availability.
- **SDG 8**: Local employment and rural economic growth.
- **SDG 9 & 12**: Infrastructure development and reduced food waste.
- **SDG 17**: Institutional partnerships and cooperative governance.

Conclusion

The **Grain Storage Plan in the Cooperative Sector** represents a bold and necessary step towards ensuring India's food and nutritional security. With PACS at the forefront, it embodies the vision of **'Sahkar se Samriddhi'**, decentralizing storage, empowering farmers, and modernizing agricultural logistics. The success of this initiative hinges on multi-stakeholder coordination, timely execution, digital governance, and community participation. If implemented effectively, it can **revolutionize rural food systems**, mitigate post-harvest losses, and uplift millions of farmers through grassroots cooperative empowerment.

15) INCLUSIVE RURAL GROWTH THROUGH COOPERATIVES

(GS-III: Inclusive Growth and issues arising from it)

Introduction

- India's rural economy remains central to national development, with agriculture being its backbone. However, challenges such as small landholdings, low productivity, limited access to credit and markets, and fragmented supply chains impede rural growth.
- **Cooperatives**, rooted in **empowerment, participation, and inclusion**, present a transformative mechanism for inclusive rural development. The cooperative movement, deeply embedded in India's socio-economic history, is witnessing renewed emphasis as a vehicle for **Atmanirbhar Bharat** and **sustainable agriculture**.

Challenges in Agriculture and Rural Economy

- **Small and Marginal Holdings**: Majority of farmers operate on less than 2 hectares of land, limiting economies of scale.
- **Resource Inaccessibility**: Inequitable access to water, credit, insurance, modern technology, and inputs.
- **Fragmented Institutions**: Lack of effective farmer-owned collectives and cooperatives for coordinated action.
- **Low Productivity and Unfavourable Trade Terms**: Disadvantageous pricing for agricultural produce vis-à-vis industrial goods.
- **Public Burden of Food Security**: Excessive government intervention leads to high costs and inefficiencies in food management.

Role and Potential of Cooperatives in Inclusive Rural Development

1**. Economic Empowerment**

- **Income Enhancement**: Cooperative marketing reduces intermediaries and ensures fair prices.
- **Access to Credit and Inputs**: Cooperatives act as financial intermediaries and input suppliers.
- **Reduction in Production Costs**: Shared infrastructure like farm machinery centers and storage lowers per-unit cost.

2. Social Inclusion and Participation

- **Democratic Governance**: Member-elected leadership fosters local participation and accountability.
- **Women and Marginal Groups**: Platform for involving traditionally excluded groups in economic activities.

3. Sustainable Agriculture

- **Organic and Nature-Based Farming**: Cooperatives can build **organic clusters**, protect biodiversity, and reduce chemical use.
- **Preservation of Natural Resources**: Collective management of land, water, and cattle ensures sustainability.

4**. Efficient Supply Chain and Market Integration**

- **Vertical Integration Model**: From production to packaging, processing, storage, and marketing under one umbrella.
- **Reduced Post-Harvest Losses**: Cooperative-managed logistics and warehousing reduce wastage.
- **Value Addition and Branding**: Facilitates grading, processing, and branding of local produce.

Institutional Innovations and Policy Suggestions

1. **Cooperative-Based Village Economy**
   - Each village should have a **village-level agricultural cooperative**, managing economic activities and pooling local resources.
   - Two or three villages to form **multi-purpose higher-tier cooperatives** with storage, processing, education, health, and credit facilities.
2. **National Cooperative Food Network**
   - A **digitally connected network** of ~7 lakh village cooperatives and 3.5 lakh higher-tier units.
   - Direct procurement, immediate payment, grain stock management, and food security program implementation.
3. **Professionalisation and Democratic Reforms**
   - Cooperatives must combine **professional management** with **democratic functioning**.
   - Members must act both as **users and investors**, promoting accountability and long-term viability.
4. **Ministry of Cooperation (2021)**
   - Creation of a separate ministry signals government commitment.
   - Focus on cooperative-based entrepreneurship, rural employment, and self-reliance.

Opportunities for Cooperatives

- **Food Security Management**: Lower cost, decentralized food procurement and storage.
- **Employment Generation**: Creation of rural jobs in agriculture, processing, logistics, tourism, and services.
- **Social Harmony**: Promotes community-led development, shared prosperity, and reduces migration.
- **Green Energy and Rural Services**: Energy cooperatives, vocational training, and rural health initiatives.
- **Global Competitiveness**: Export potential through value-added produce and branding under cooperative labels.

Global Context and Best Practices

- **Global Impact**: 12% of world population are cooperative members; 10% of workforce employed through cooperatives.
- **Dual Role of Cooperatives**:
  - *Defensive*: Protect small producers from market failures and competition.
  - *Proactive*: Respond to market opportunities and privatization challenges.
- **Examples**:
  - *AMUL*: India's most successful dairy cooperative.
  - *KRIBHCO & IFFCO*: In fertilizer and input supply sectors.
  - *SEWA*: Empowering women through micro-cooperatives.

Conclusion

Cooperatives, being **community-based, democratic, and self-sustaining** institutions, are ideally suited to lead India's journey towards **inclusive, self-reliant and sustainable rural development**. A paradigm shift from government-centric to **people-led cooperative governance** is essential. For India to realize its vision of becoming an inclusive Atmanirbhar

Bharat, it must build on its **cooperative roots**, rejuvenate institutional structures, and leverage the collective strength of its people and villages.

MODEL QUESTIONS

1. Source to Sea (S2S) approach to water management can be an important solution to address problems with India's water management. Examine.

2. The Textile and Apparel sector in India has a huge potential to provide formal employment to a large number of willing workers. Is this potential used to the fullest at present. Analyse.

3. Despite their significant contribution to agriculture, women farmers in India face structural and systemic challenges. Elaborate.

4. In light of emerging technological and geopolitical shifts, critically examine how the mineral intensity of future industries complicates India's quest for self-reliance in critical minerals.

5. India has set ambitious climate goals, but implementation challenges persist. Critically examine India's approach to balancing development and climate resilience.

6. Despite having enormous trade potential, intra regional trade in the South Asian region is minuscule. Critically examine.

7. Bureaucracy in India has given only limited space for women to influence policy making and implementation. Examine critically.

8. Despite numerous government schemes for the socio-economic development of Tribal people in India, most of them are underdeveloped. Analyse this anomaly.

9. Sustainable Development Goals are ambitious goals to ensure not only growth but also development. The path for India in this regard has many hurdles. Examine.

10. Discuss how Operation SINDOOR integrates military, diplomatic, and digital instruments of national power to uphold India's sovereignty.

11. "Warehousing is the missing link between agricultural production and farmer prosperity in India." Discuss in the context of rural development and agri-infrastructure policies.

12. "Food safety is central to public health, economic security, and India's agricultural export potential." Discuss the challenges and suggest a comprehensive roadmap to ensure food safety from farm to fork.

13. Urbanisation in India is both an opportunity and a challenge. Examine how India's urban planning needs to evolve to meet the challenges of climate change and rapid population growth.

14. Discuss the role of Primary Agricultural Credit Societies (PACS) in addressing post-harvest losses and enhancing rural food security. How can they be made more efficient and sustainable?

15. Discuss the role of cooperatives in achieving inclusive rural growth and food security in India. Suggest institutional reforms to strengthen cooperative governance.