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Q1. Examine the pattern and trend of public expenditure on Social Services in the post-reforms period in India. To what extent this has been in consonance with achieving the objective of inclusive growth? (10 M)

FODDER POINTS

Introduction

Article 41 of the Constitution obligates the State to ensure social security. While the 1991 reforms accelerated economic growth, they also posed challenges of **equity and inclusion**. Public spending on social services in **2023–24** stood at **7.8% of GDP**, reflecting sustained efforts toward inclusive development.

Body

Evolving Trends in Social Sector Spending

- **From Subsidies to Direct Support**: Post-liberalisation, the focus shifted from blanket subsidies to **targeted schemes** like **PM Awas Yojana** and **Ayushman Bharat**, aimed at strengthening infrastructure and outcomes.
- **Rising Investment in Human Capital**: Allocations to **education** and **healthcare** have surged, addressing long-standing gaps. For instance, health spending rose 13% in 2023–24.
- **Greater Role for States**: Enhanced tax devolution via the 14th and 15th Finance Commissions enabled **decentralised welfare delivery**, though **regional disparities** persist.
- **Targeted Rural Outreach**: Schemes like **MGNREGA**, **PM-KISAN** and **Jan Dhan** focus on rural employment, income stability and financial inclusion.
- **Growth of Cash Transfers**: Initiatives like **Ladli Behna Yojana** use DBT for efficient, gender-responsive delivery.

Public Spending & Inclusive Growth: A Mixed Record

Progress Made:

- **Education**: Literacy jumped from 20% (1991) to 77.7% (2021), aided by **SSA** and school-focused programs.
- **Health Access**: **Ayushman Bharat** provided cover to over 12 crore families, reducing financial burdens.
- **Food Security**: **NFSA** benefits nearly 800 million people monthly.
- **Transparency**: **RTI Act** improved public scrutiny of welfare funds.
- **Livelihood Security**: **MGNREGA** proved crucial during shocks like COVID-19.

Persistent Gaps:

- **Weak Rural Health Systems** and skewed **education quality** across regions.
- **PDS inefficiencies**, with leakages still affecting distribution.
- **Inter-state disparities**, with poorer states lagging behind in outcomes.
- **Low fund utilisation**, often due to bureaucratic delays and poor execution.

Conclusion

India's social sector spending has supported inclusive growth but remains uneven in impact. Bridging delivery gaps, strengthening accountability and ensuring equitable access will be key to fulfilling the promise of **"growth for all."**

Way Forward

- **Digital Governance**: Expand **DBT** and digital tracking to plug leakages.
- **Public-Private Synergy**: Use **PPPs** in underserved health sectors.
- **Tech Integration**: Boost services through platforms like **e-Sanjeevani**.
- **Smarter Subsidy Design**: Ensure targeted support reaches the right groups.

Q2. What are the causes of persistent high food inflation in India? Comment on the effectiveness of the monetary policy of RBI to control this type of inflation. (10 M)

FODDER POINTS

Introduction

Ensuring affordable food for all is a constitutional directive under **Article 47**, tied closely to the goal of economic well-being. However, **persistent food inflation** in India continues to erode purchasing power, posing a serious policy challenge.

Body

Why Food Inflation Persists in India

- **Disrupted Supply Chains**: Breakdowns in transport and logistics--especially during droughts or extreme weather--limit food availability and raise prices.
- **Costlier Inputs**: Rising fuel, wage and input costs inflate production expenses, pushing retail food prices higher.
- **Import Sensitivity**: India's reliance on global markets for oils and pulses exposes it to **international price shocks**.
- **Price Expectations**: Anticipated inflation influences consumer and trader behaviour, fueling actual price hikes.
- **Fuel Deregulation**: Liberalised diesel pricing has increased farm-to-market costs, aggravating food inflation.
- **Weather Extremes**: Poor monsoons or heatwaves reduce yields, creating supply shortages and price surges.
- **MSP Skew**: Over-support for rice and wheat under MSP policies leads to imbalances in food crop availability.

RBI's Monetary Tools: Strengths and Limits

- **Interest Rate Control**: Repo rate hikes aim to cool demand but are less effective against supply shocks.
- **Inflation Targeting**: The 4% ±2% band gives RBI a framework, though food inflation often escapes its grip.
- **Liquidity Measures**: Tools like CRR and LAF help moderate excess cash in the economy.
- **Forex Interventions**: By stabilising the rupee, RBI indirectly curbs imported food inflation.
- **Coordination with Fiscal Policy**: Schemes like subsidies and duty cuts work better when aligned with RBI's stance.

Key Constraints of Monetary Policy

- **Limited Reach on Supply Issues**: Rate hikes can't fix weather, transport, or global disruptions.
- **Focus on Core Inflation**: Excluding food and fuel narrows RBI's scope in tackling headline inflation.
- **Delayed Impact**: Monetary responses take time, while food prices can spike suddenly.
- **External Vulnerability**: Global oil and commodity prices often overpower domestic policy responses.

Conclusion

Monetary policy alone cannot tame food inflation. **Supply-side reforms**, **resilient agri-infrastructure** and **fiscal coordination** are critical to ensure food price stability. A balanced, multi-pronged approach is the only way to shield the poor and maintain macroeconomic health.

Q3. What were the factors responsible for the successful implementation of land reforms in some parts of the country? Elaborate. (10 M)

FODDER POINTS

Introduction

The phrase **'Land belongs to the farmer'** captured the spirit of India's land reform efforts aimed at reducing inequality and boosting rural prosperity. While some states like West Bengal and Kerala made significant progress, many others faced obstacles that slowed reform implementation. Land reforms remain crucial for fair land distribution and rural development.

Body

Reasons for Success in Some States:

- **Strong Political Will:** States such as West Bengal took bold steps like Operation Barga to protect tenants and redistribute land.
- **Efficient Administration:** Simplified procedures in Tamil Nadu helped speed up land transfers.
- **Local Participation:** Involving local bodies like Panchayats improved transparency and accountability.
- **Expert Recommendations:** Committees provided practical guidance for identifying beneficiaries and ending exploitative practices.
- **Awareness Programs:** Educating farmers about their rights increased demand for reforms.
- **Modern Land Records:** Digitization and GIS mapping reduced disputes and improved accuracy.

Challenges in Other Regions:

- **Political and Elite Resistance:** Lack of commitment and landlord influence hindered reforms in Bihar and Haryana.
- **Corruption and Delays:** Bureaucratic hurdles slowed down implementation.
- **Legal Obstacles:** Landowners used courts to stall reform progress.
- **Poor Record Keeping:** Inaccurate land records made redistribution difficult.
- **Inadequate Compensation:** Weak policies led to opposition in states like Odisha.
- **Low Awareness:** Many beneficiaries, especially tribal communities, remained uninformed.

Path Forward:

- Strengthen laws and enforcement for timely reforms.
- Use technology like GIS and blockchain for transparent land management.
- Develop fair compensation and rehabilitation frameworks.
- Promote community engagement through local governance bodies to increase participation.

Conclusion

Land reforms are key to building a just and prosperous rural India. Achieving success requires political commitment, legal reforms, technological upgrades and strong community involvement. Modernizing land records and empowering local stakeholders can drive equitable land distribution and sustainable rural growth.

Q4. Explain the role of millets for ensuring health and nutritional security in India. (10 M)

FODDER POINTS

Introduction

Millets, often called **"nutri cereals"** or **"Shree Anna,"** are crucial for advancing **health** and **nutritional security** in India. These ancient grains are rich in **essential nutrients** and highly **resilient** to harsh climatic conditions, making them vital for combating **malnutrition** and fostering **sustainable agriculture**.

Nutritional Benefits of Millets

- **High Nutrient Content:** Millets are rich sources of **protein**, **fiber**, **iron**, **calcium** and **magnesium**. For example, **finger millet (ragi)** is abundant in **calcium**, while **pearl millet (bajra)** offers a good amount of **iron**.
- **Low Glycemic Index:** They help maintain **stable blood sugar levels**, beneficial for managing **diabetes**.
- **Gluten-Free:** Naturally **gluten-free**, millets are suitable for those with **gluten intolerance**.
- **Antioxidant Properties:** Contain **antioxidants** that reduce **oxidative stress** and **inflammation**.
- **Low Fat and Cholesterol:** Naturally low in **fat** and **cholesterol**, making them **heart-healthy**.

Role in Health and Food Security

- **Combating Malnutrition:** Millets help address **nutritional deficiencies**, especially in **rural areas**.
- **Sustainable Agriculture:** Being **drought-resistant** and requiring fewer inputs than rice or wheat, millets suit **arid regions** and promote sustainability.
- **Economic Benefits:** Millet cultivation supports **small farmers** by diversifying income and reducing dependence on **water-intensive crops**.
- **Improved Health Outcomes:** Regular millet consumption lowers the risk of chronic diseases such as **heart disease**, **diabetes** and **obesity**.

Government Initiatives

- The **National Millet Mission (NMM)** promotes millet cultivation and consumption across India.
- Millets are included in the **Public Distribution System (PDS)** and various other schemes to increase accessibility.
- Increased **R&D investment** focuses on enhancing millet varieties and their **marketability**.
- India declared **2023 as the International Year of Millets**, along with the **MAHARISHI initiative**, to boost awareness and research globally.
- State-level schemes like **Rani Durgavati Shri Anna Promotion Scheme** in Madhya Pradesh complement central efforts.

Conclusion

Millets possess tremendous potential to ensure **health** and **nutritional security** in India. Their rich nutrition, coupled with **climate resilience** and **sustainability**, make them key to tackling **malnutrition** and enhancing **food security**. Sustained promotion of millet cultivation, better **market access** and increased **public awareness** are essential to unlock their full benefits.

Q5. What is the present world scenario of intellectual property rights with respect to life materials? Although India is second in the world to file patents, still only a few have been commercialized. Explain the reasons behind this less commercialization. (10 M)

FODDER POINTS

Introduction

Intellectual Property Rights (IPRs) play a pivotal role in promoting innovation by legally safeguarding novel ideas and technologies. In sectors like **biotechnology and pharmaceuticals**, where research is capital-intensive and time-consuming, strong IPR protection ensures financial returns and incentivizes cutting-edge innovation. While India ranks among the top nations in patent filings, a major challenge lies in **transforming these patents into commercially viable products**.

Body

Global Landscape of IPRs in Biotechnology and Life Sciences

IPRs related to **living materials and biotechnological inventions** are increasingly shaping global scientific and commercial landscapes.

- **Breakthrough Technologies and Patents**: Innovations such as **CRISPR-Cas9** have revolutionized genetic engineering. Patents in this domain determine who controls access to transformative tools with wide-ranging health and agricultural implications.
- **Legal and Ethical Disputes**: Intellectual property rights over life forms have sparked legal conflicts. The **Myriad Genetics** case over breast cancer gene patents raised fundamental questions about ethics and access.
- **TRIPS Compliance with Public Health Flexibility**: The **WTO's TRIPS Agreement** ensures minimum IPR protection but permits countries like India to grant **compulsory licenses**--as in the case of **Nexavar**, a cancer drug--balancing innovation with affordable access.
- **Preserving Indigenous Knowledge**: Countries are asserting control over traditional knowledge systems to prevent misuse. India's **Traditional Knowledge Digital Library (TKDL)** has thwarted several unjustified patent claims on natural remedies like **turmeric** and **neem**.
- **Patent Law Divergence and Public Opinion**: Regional differences in patent law, shaped by **public attitudes**, influence how life sciences patents are treated. For instance, **Europe's cautious stance on GMOs** has led to tighter IPR regulations, restricting biotech commercialization.
- **Role of Global Institutions**: Bodies like **WIPO** streamline international filings through mechanisms such as the **Patent Cooperation Treaty (PCT)**, helping innovators gain broader patent protection more efficiently.

Why Commercialization of Patents in India Remains Limited

Despite growing patent filings, India faces structural challenges in **commercializing intellectual property**, particularly in high-tech fields like biotechnology.

- **Underdeveloped R&D Infrastructure**: Laboratories and institutions often lack the technological and financial depth to scale inventions for the market.
- **Financial Limitations**: Many inventors, especially **startups**, are unable to afford patent maintenance costs and lack the funding to develop prototypes or market-ready solutions.
- **Regulatory Bottlenecks**: Time-consuming approval processes delay product rollout, diminishing competitiveness and investor interest.
- **Industry-Academia Disconnect**: Weak collaboration between **universities and industry** hinders effective knowledge transfer and commercialization.
- **Lack of IP Enforcement and Market Skills**: Poor enforcement mechanisms and limited business acumen among researchers restrict the commercial potential of patented technologies.
- **Scarcity of Public-Private Partnerships**: Insufficient joint ventures further limit innovation from reaching consumers in the form of usable products.

Conclusion

To unlock the economic value of intellectual property, India must strengthen the **bridge between innovation and market application**. Enhancing government support through funding schemes like **Atal Innovation**

Mission and **BIRAC**, streamlining regulatory approvals and fostering industry-academia synergy are critical steps. Moreover, increasing awareness about IP rights and developing commercialization skills among innovators can catalyze a more dynamic and inclusive innovation ecosystem. Only through such holistic reforms can India convert its growing patent portfolio into real-world progress and global competitiveness.

Q6. What is the technology being employed for electronic toll collection on highways? What are its advantages and limitations? What are the proposed changes that will make this process seamless? Would this transition carry any potential hazard? (10 M)

FODDER POINTS

Introduction

Electronic Toll Collection (ETC) is transforming highway transportation by automating toll payments through advanced technologies. Systems like RFID and DSRC eliminate the need for vehicles to stop at toll plazas, reducing traffic congestion, saving time and improving overall travel efficiency. As digital infrastructure expands, ETC is becoming an essential component of modern road networks.

Body

Technologies Driving ETC Systems

ETC primarily uses **Radio Frequency Identification (RFID)** to enable automatic toll deductions from prepaid accounts linked to vehicles. **GPS-based systems** are being introduced to calculate tolls based on the actual distance traveled. **Automatic Number Plate Recognition (ANPR)** enables camera-based verification of vehicles, facilitating toll collection without physical tags.

Dedicated Short-Range Communication (DSRC) supports real-time data exchange between vehicles and toll systems, ensuring smooth transactions. **Mobile applications and digital wallets** offer easy recharge and account management, enhancing user convenience. **Hybrid systems**, integrating RFID, ANPR and mobile payments, are being explored to increase flexibility and reliability. All transactions are typically managed via **cloud-based platforms**, which provide secure, scalable and real-time data processing.

Advantages of ETC

ETC promotes **uninterrupted travel**, eliminating delays at toll booths. It contributes to **fuel efficiency** and **lower emissions** by reducing vehicle idling. The **digital nature of transactions** enhances transparency, minimizes revenue leakage and curbs manual errors. Additionally, ETC supports **cashless payments**, streamlining user experience and reducing dependence on physical currency.

Challenges in Implementation

Despite its benefits, ETC faces **technical issues** such as inconsistent tag reading. **Lack of infrastructure**, especially in rural regions, limits widespread adoption. Concerns around **data privacy and digital security** are growing as the system becomes more integrated with personal and financial information.

Interoperability issues persist across various highways. Moreover, **limited digital literacy** remains a barrier for large sections of the population.

Suggestions for Improvement

To address these gaps, a **standardised nationwide tolling framework** is needed for seamless access. **Satellite-based tolling systems** can provide more accurate and distance-sensitive charges. Strengthening **cybersecurity frameworks** will help protect user data. Integrating **AI-driven analytics** can assist in traffic prediction and dynamic pricing. ETC systems can also be extended to include additional services like electric vehicle charging, offering a more integrated transport solution.

Risks During Transition

As ETC becomes widespread, **cybersecurity threats**, **system overloads** and **social exclusion** may increase. The shift could also lead to **job displacement** among manual toll operators. Over-reliance on digital platforms may alienate those without access to smartphones or digital banking services.

Conclusion

ETC has the potential to revolutionize India's highway network by offering faster, more transparent and environment-friendly tolling. However, ensuring that the system is inclusive, secure and uniformly accessible across regions is crucial. A balanced approach that combines technological innovation with policy support can pave the way for a seamless and equitable toll collection ecosystem.

Q7. Industrial pollution of river water is a significant environmental issue in India. Discuss the various mitigation measures to deal with this problem and also the government's initiative in this regard. (10 M)

FODDER POINTS

Introduction

India's rivers, once lifelines of civilization, are now bearing the brunt of **unchecked industrialization**. The discharge of untreated **industrial effluents** into river systems has emerged as a major **environmental and public health concern**, deteriorating water quality and threatening ecosystems and livelihoods. The condition of the **Periyar River**, particularly around the **Eloor-Edayar industrial cluster** in Kerala, is emblematic of this crisis, where over 285 industries --many of them highly polluting--have made the river toxic.

Body

Why Industrial Pollution of Rivers Is a Grave Concern

The **pollution of drinking water sources** with heavy metals, chemical residues and toxic effluents has led to a surge in **waterborne illnesses** and **long-term health complications**. The **Yamuna River**, for instance, receives massive volumes of untreated industrial waste from Delhi and surrounding regions, rendering its water unfit even for basic domestic use.

Such pollution also spells disaster for **aquatic biodiversity**. Rivers like the **Chaliyar** in Kerala saw a collapse in fish populations after prolonged discharge from pulp and paper industries, devastating **fishing communities** that rely on these ecosystems for sustenance and income.

Rural communities suffer not just from unsafe water, but also from **contaminated crops**. In **Punjab**, effluents from textile and dyeing industries have polluted the **Sutlej River**, leading to **soil toxicity** and decreased **agricultural yields**, undermining farmer incomes and consumer health.

Furthermore, **skin diseases, respiratory problems** and other chronic conditions have become widespread among populations residing near polluted riverbanks, as prolonged exposure to chemical-laden water and air continues without adequate safeguards.

Strategies to Combat Industrial River Pollution

A **robust legal framework** is indispensable. The **Water (Prevention and Control of Pollution) Act, 1974** empowers regulators to set effluent discharge norms and penalize violations. In regions along the **Ganga**, this framework has begun showing results with improved regulatory compliance.

The installation of **Effluent Treatment Plants (ETPs)** is now mandatory in many sectors. In **Tiruppur, Tamil Nadu**, the textile industry's widespread adoption of ETPs has significantly curbed the pollution load in local rivers.

Promoting **clean technologies** at the source--such as zero liquid discharge systems--helps reduce pollutants before they reach water bodies. Coupled with **financial incentives** like those under the **Perform, Achieve and Trade (PAT)** scheme, industries are encouraged to invest in sustainable practices.

Empowering **local communities** to monitor river health has proved effective in driving transparency and swift action. In the **Sabarmati River** basin, community-led watchdog groups have played a pivotal role in keeping polluters accountable.

Policy Interventions and Government Programs

The **National River Conservation Plan (NRCP)** has focused on improving water quality in polluted stretches across 38 rivers, covering 82 towns. Meanwhile, the **Namami Gange Mission** combines infrastructure, public participation and education to rejuvenate the **Ganga River** ecosystem.

The **National Water Quality Monitoring Programme** provides vital data for tracking river health and guiding enforcement efforts. The **Environment (Protection) Act, 1986** serves as an overarching law to regulate industrial discharges and impose penalties on non-compliant entities.

The **National Water Policy** pushes for **sustainable water resource management**, encouraging wastewater recycling and industry accountability. Institutions like the **Central and State Pollution Control Boards (CPCB & SPCBs)** ensure on-ground monitoring and legal enforcement across the country.

Conclusion

The pollution of rivers by industrial effluents is not just an environmental issue--it strikes at the heart of **public health, food security** and **economic well-being**. As highlighted by the **Mihir Shah Committee**, India needs a **coordinated, multi-stakeholder approach**--one that integrates **technological innovation**, **regulatory vigilance** and **community engagement**. Only then can we restore the health of our rivers and ensure that industrial growth goes hand in hand with **ecological preservation** and **human well-being**.

Q8. What role do environmental NGOs and activists play in influencing Environmental Impact Assessment (EIA) outcomes for major projects in India? Cite four examples with all important details. (10 M)

FODDER POINTS

Introduction

The **Environmental Impact Assessment (EIA)** serves as a key regulatory tool in India, designed to evaluate the potential environmental consequences of developmental projects before they are approved. It ensures that **environmental considerations** are embedded within the decision-making process, aligning economic growth with **sustainable development**. The influence of **environmental NGOs and activists** has been instrumental in making the EIA process more transparent, participatory and accountable.

Body

How NGOs and Activists Influence the EIA Process

Raising Public Awareness and Mobilization
NGOs play a pivotal role in sensitizing the public about the environmental and social repercussions of proposed projects, enabling **informed citizen participation**. Campaigns like the **Narmada Bachao Andolan** mobilized mass resistance against the **Sardar Sarovar Dam**, drawing attention to displacement and ecological damage.

Monitoring and Ensuring Compliance
They act as **watchdogs**, monitoring projects for violations of EIA norms. For instance, the **Centre for Science and Environment (CSE)** critically examined the **Mathurapur Water Supply Project** in West Bengal, exposing gaps related to water resource and biodiversity assessments.

Legal Intervention for Accountability
Activists often pursue **judicial remedies** when EIAs are flawed or statutory procedures are bypassed. In the case of the **Khandadhar Iron Ore Mine** in Odisha, legal petitions led to the **Supreme Court halting the project**, citing deficient EIA documentation.

Independent Research and Evidence Generation
NGOs generate **alternative data and reports**, challenging biased or incomplete project appraisals. This strengthens public scrutiny and equips stakeholders with facts to demand accountability.

Facilitating Public Participation
They bridge the gap between communities and regulatory authorities by enabling **local engagement**. During the **Kochi-Mangaluru Natural Gas Pipeline project**, organizations like the **Kerala Sasthra Sahitya Parishad** organized grassroots consultations, ensuring local voices were heard in the EIA process.

Advocating Policy Reforms
Through sustained pressure, NGOs have influenced the **evolution of stronger EIA guidelines**. The **People's Movement Against Nuclear Energy (PMANE)** raised vital concerns about safety at the **Kudankulam Nuclear Power Plant**, resulting in enhanced oversight and safety modifications.

Capacity Building at the Grassroots
NGOs also invest in **training and community empowerment**, enabling affected populations to engage effectively in environmental decision-making.

Notable Case Studies of NGO and Activist Impact on EIA Outcomes

Niyamgiri Bauxite Mining (Odisha)
Activists like **Survival International** and **Amnesty International**, along with the **Dongria Kondh tribe**, opposed Vedanta's project, citing threats to forests and tribal rights. The **Supreme Court** upheld the community's rights, directing that **Gram Sabhas** decide the project's fate--marking a watershed moment for **environmental justice**.

Mumbai Coastal Road Project (Maharashtra)
Organizations such as **Vanashakti** filed petitions challenging procedural lapses and ecological threats. The **Bombay High Court** suspended construction in 2019, mandating a comprehensive **environmental reassessment**.

POSCO Steel Plant (Odisha)
Groups like the **Posco Pratirodh Sangram Samiti** and **Greenpeace India** highlighted issues of deforestation and displacement. Due to sustained opposition and scrutiny over its EIA, POSCO eventually **withdrew from the $12 billion project** in 2017.

Aarey Forest Metro Car Shed (Mumbai)
The **Save Aarey Movement** and allied activists exposed how flawed EIAs downplayed biodiversity impacts. The **Maharashtra government halted the project** and later shifted the site, preserving over **800 acres of green cover**.

Conclusion

Environmental NGOs and activists have emerged as **custodians of ecological balance**, shaping EIAs to reflect environmental integrity and social equity. Their actions reinforce **public engagement**, **policy accountability** and **legal scrutiny**--all essential for **environmental governance**. As India navigates rapid development, their continued participation will ensure that progress is not achieved at the cost of the planet.

Q9. Explain how narco-terrorism has emerged as a serious threat across the country. Suggest suitable measures to counter narco-terrorism. (10 M)

FODDER POINTS

Narco-terrorism--the convergence of drug trafficking and terrorism--has emerged as a grave challenge to India's internal security. The illicit drug trade not only fuels organized crime but also finances extremist activities, making it a dual threat to national stability and public well-being.

Why Narco-Terrorism is Rising in India

Geographical Vulnerability:
India is strategically located between the two largest illicit opium-producing regions--the **Golden Crescent** (Afghanistan–Pakistan–Iran) and the **Golden Triangle** (Myanmar–Laos–Thailand). This exposes India's porous borders to persistent cross-border narcotic smuggling.

Inadequate Law Enforcement Infrastructure:
Despite the presence of the **Narcotics Control Bureau (NCB)**, the reach and resources in remote or border areas remain limited. This hampers the ability to detect and dismantle trafficking routes effectively.

Institutional Corruption:
Corruption in law enforcement and administrative agencies enables traffickers to operate with impunity. Alleged collusion between certain police personnel and drug cartels in some states has further weakened the fight against narco-networks.

Terror Financing:
The drug trade is a significant source of **funding for terrorist outfits**, especially in conflict-prone regions like **Jammu & Kashmir** and parts of the **northeast**. Insurgent groups use proceeds from drugs to procure arms and sustain operations.

Social Factors and Drug Culture:
There is growing **social tolerance of drug use**, especially among youth. Popular culture and digital media often glamorize drug use, indirectly promoting narcotic consumption and thus demand.

Conflict Zones and Insurgency:
Long-standing insurgencies and porous borders in the **northeast** and **Kashmir** provide fertile ground for drug trafficking to flourish. Armed groups often use narcotics as both a source of revenue and a tool for control.

Government Measures to Combat Narco-Terrorism

Strengthening Border Security:
Modern surveillance systems under the **Comprehensive Integrated Border Management System (CIBMS)** have been deployed, especially along the India-Pakistan border, reducing cross-border smuggling in Punjab and Rajasthan.

Legal and Judicial Reforms:
Fast-track courts under the **NDPS Act (1985)** are being proposed to ensure speedy trials of drug and terror-related offences, curbing delays and increasing deterrence.

Inter-Agency Coordination:
Initiatives like the **Narco Coordination Centre (NCORD)** and **Anti-Narcotics Task Force (ANTF)** facilitate real-time intelligence sharing between central and state agencies, enhancing joint operations.

Community Involvement and Awareness:
The **Nasha Mukt Bharat Abhiyaan** promotes public awareness and mobilizes community participation to reduce drug demand and reporting of illicit activities.

International Cooperation:
India collaborates with agencies such as **INTERPOL** and **UNODC** and has signed multiple **bilateral and multilateral agreements** to curb transnational drug trafficking.

Rehabilitation and De-addiction:
Over **500 Integrated Rehabilitation Centres for Addicts (IRCAs)**, supported by the Ministry of Social Justice, offer counseling, detoxification and reintegration support for drug users.

Conclusion

Narco-terrorism undermines both **national security** and **public health**. Combating it requires a **multi-pronged approach**--blending law enforcement modernization, community engagement, international

cooperation and a strong rehabilitation ecosystem. Only a **coordinated, technology-enabled and citizen-driven response** can dismantle the drug-terror nexus and ensure a secure and resilient India.

Q10. Describe the context and salient features of the Digital Personal Data Protection Act 2023. (10 M)

FODDER POINTS

Introduction

The **Digital Personal Data Protection Act, 2023** marks a pivotal moment in India's journey toward ensuring individual privacy in the digital age. It aims to safeguard personal data by creating a legal framework that balances citizens' rights with the operational requirements of businesses and the State. This Act reinforces the constitutional value of privacy, fosters accountability and promotes confidence in the growing digital ecosystem.

Body

India's swift digital transformation, coupled with increasing incidents of data misuse and surveillance, created an urgent need for a dedicated data protection law. The 2017 Supreme Court judgment recognising privacy as a fundamental right, along with the insights from expert committees, laid the groundwork for this legislation. The Act also reflects India's intent to align with international data governance standards amid rising technological disruption and pandemic-induced data collection practices.

The Act introduces **comprehensive legal definitions** for personal and sensitive personal data, offering clarity for all stakeholders. It **empowers individuals** with rights to access, correct and erase their data, thereby enhancing autonomy and transparency. To ensure accountability, **data fiduciaries** are mandated to adopt strong data security practices and are overseen by **Data Protection Officers**.

A dedicated **Data Protection Board** is set up to enforce the law and address grievances, ensuring institutional support for privacy rights. The Act also prescribes **hefty penalties** for violations to deter negligence and misconduct. Special emphasis is placed on the protection of children's data, recognising their vulnerability in the digital space.

Conclusion

The Digital Personal Data Protection Act, 2023, is a vital step toward safeguarding individual privacy while fostering innovation in the digital economy. By instituting a rights-based, accountable and transparent data governance system, the Act ensures that technological progress does not come at the cost of fundamental freedoms.

Q11. Discuss the merits and demerits of the four Labour Codes in the context of labour market reforms in India. What has been the progress so far in this regard? (15 M)

FODDER POINTS

Introduction

- To enhance ease of doing business and simplify labor regulations, the government consolidated 29 out of 44 central labor laws into **four comprehensive Labour Codes**.
- These include:

  - **Code on Wages (2019)**
  - **Code on Social Security (2020)**
  - **Industrial Relations Code (2020)**
  - **Occupational Safety, Health and Working Conditions Code (2020)**
- These Codes align with **Article 43 of the Constitution**, which advocates fair wages and working conditions, aiming to balance **worker rights** with **industrial flexibility**.

Body

Merits of the Labour Codes

- **Enhanced Worker Rights:**
  - Strengthen worker protections and access to benefits.
  - Example: Online portal for interstate migrant workers ensures registration for social security.
- **Simplified Compliance:**
  - Consolidation reduces bureaucratic complexity for employers.
  - Example: MSMEs face fewer regulations without compromising worker safety.
- **Improved Industrial Relations:**
  - Structured dispute resolution and collective bargaining reduce strikes.
  - Example: Industrial Relations Code regulates strike actions.
- **Expanded Social Security:**
  - Includes gig, platform and migrant workers under coverage.
  - Example: Legal recognition of gig workers under Social Security Code.
- **Better Safety and Health Standards:**
  - Focus on hazardous industries with mandatory safety provisions.
  - Example: Occupational Safety Code mandates safer construction site practices.
- **Employment Flexibility:**
  - Fixed-term contracts with equal benefits promote job security and business adaptability.
  - Example: Fixed-term workers receive parity in wages and benefits.

Demerits of the Labour Codes

- **Ambiguity in Definitions:**
  - Terms like "worker" and "wages" remain unclear, causing legal confusion.
  - Example: Gig worker classification issues similar to those seen in California.
- **Limited Awareness and Implementation:**
  - Informal sector workers lack knowledge of their rights, limiting benefits.
  - Example: Rural informal workers unaware of Social Security Code provisions.
- **Trade Union Resistance:**
  - Opposition due to restrictions on strike rights and fixed-term employment fears.
  - Example: Strikes and protests similar to Brazil's 2017 labor reforms.
- **Impact on Informal Sector:**
  - Informal workers often remain underrepresented despite intended benefits.
  - Example: Migrant workers face difficulties accessing benefits despite registration portals.
- **Phased and Uneven Implementation:**
  - Delays create uncertainty and inconsistent enforcement across states.
  - Example: Some states like Madhya Pradesh have adopted reforms quickly, others lag behind.

Progress and Challenges

- **Rollout:** Uneven adoption across states due to administrative hurdles.
- **Stakeholder Consultations:** Extensive but consensus on contentious issues remains elusive.
- **Awareness Gaps:** Both employers and workers lack full understanding of the Codes.
- **Pandemic and Elections:** COVID-19 and elections delayed full implementation.
- **Enforcement Difficulties:** Informal sector employers struggle with compliance transitions.
- **Digital Initiatives:** Online portals for inclusion are promising but adoption remains slow.

Conclusion

- The Labour Codes are **ambitious reforms** aimed at improving ease of doing business and extending social security.
- Their success hinges on addressing **awareness gaps, swift and uniform implementation** and **responsive adaptations** to stakeholder feedback.
- A **holistic approach** integrating digital literacy and cooperation among government, employers and workers is vital.
- These reforms are crucial to achieving **Sustainable Development Goal 8** -- promoting **Decent Work and Economic Growth** in India.

Q12. What is the need for expanding regional air connectivity in India? In this context, discuss the government's UDAN Scheme and its achievements. (15 M)

FODDER POINTS

Introduction

Expanding regional air connectivity is vital for economic growth, tourism and socio-economic inclusion in remote areas. It bridges geographical gaps, promotes balanced development and integrates diverse regions of India.

Body

Importance of Regional Air Connectivity

- **Balanced Growth:** Connects remote regions with metros, reducing disparities (e.g., Northeast linked to Delhi).
- **Tourism & Trade:** Opens lesser-known destinations to tourists and traders (e.g., Darbhanga).
- **Time Efficiency:** Cuts long travel times drastically (e.g., Guwahati to Pasighat reduced from 12 hours to 1 hour).
- **Employment:** Creates jobs in aviation and related sectors.
- **Strategic Value:** Enhances security by improving access to border areas like Ladakh.

UDAN Scheme Highlights

- Connects underserved airports with affordable fares capped at ₹2500 per hour.
- Provides viability gap funding to airlines for route sustainability.
- Promotes airport infrastructure development in smaller cities.

Achievements

- Over 1 crore passengers benefited from affordable air travel.
- More than 100 airports revived and operationalized.
- 425 subsidized routes awarded to airlines.
- Boosted growth of regional airlines (e.g., Star Air, TruJet).
- Improved connectivity for Tier-2 and Tier-3 cities, aiding local economies.

Areas for Improvement

- Upgrade airport infrastructure (runways, terminals, night landing).
- Enhance last-mile connectivity via roads and rail.
- Increase private sector participation for better investment and management.

Conclusion

UDAN has transformed regional connectivity and made flying accessible. Focused improvements in infrastructure, funding and partnerships are key to unlocking its full potential and driving inclusive grow

Q13. What are the major challenges faced by the Indian irrigation system in recent times? State the measures taken by the government for efficient irrigation management. (15 M)

FODDER POINTS

Introduction

Irrigation serves as the backbone of India's agricultural economy, supporting livelihoods and ensuring national food security. However, the system currently grapples with numerous challenges--ranging from water scarcity and outdated infrastructure to climate-induced uncertainties--that hinder its efficiency and long-term sustainability.

Key Challenges Facing India's Irrigation System

- **Groundwater Overuse:** India leads globally in groundwater extraction. States like Punjab, Haryana and Rajasthan face acute depletion due to unchecked use, often spurred by subsidized electricity and lack of regulation.
- **Low Water-Use Efficiency:** Conventional methods such as flood irrigation result in excessive water loss. A significant share of irrigation water never reaches the crops, reducing overall productivity.
- **Ageing and Inadequate Infrastructure:** Much of the existing irrigation infrastructure--canals, dams and distribution systems--has deteriorated over time, leading to leakage, inefficiencies and poor water delivery, especially in remote areas.
- **Waterlogging and Soil Salinity:** Poor drainage systems, particularly in canal-irrigated areas, lead to stagnation and salinization of soil, affecting crop health and yields.
- **Monsoon Dependency:** A large part of Indian agriculture still depends on unpredictable monsoon rains. Variability in rainfall--delayed or deficient--impacts irrigation availability, especially in drought-prone areas like Marathwada and Bundelkhand.
- **Policy Fragmentation:** Water resource governance is fragmented across multiple agencies and levels of government, leading to overlap, mismanagement and ineffective execution of irrigation schemes.
- **High Cost of Modern Technologies:** Though micro-irrigation systems like drip and sprinkler improve water efficiency, their high upfront costs deter small and marginal farmers from adopting them.
- **Pollution of Water Sources:** Runoff containing pesticides and fertilizers contaminates surface water bodies, diminishing their utility for irrigation.
- **Climate Variability:** Increasing frequency of extreme weather events such as droughts and floods--driven by climate change--adds further unpredictability to water availability and irrigation planning.

Government Initiatives for Better Irrigation Management

- **Pradhan Mantri Krishi Sinchayee Yojana (PMKSY):** Launched in 2015, this flagship scheme aims for "Har Khet Ko Pani" (Water to Every Field) and promotes efficient water use through expansion of irrigation networks and adoption of micro-irrigation.
- **Micro-Irrigation Promotion:** Governments have incentivized the use of drip and sprinkler systems, particularly in arid regions like Gujarat and Telangana, to ensure efficient usage of limited water resources.

- **Command Area Development and Water Management Programme (CADWM):** This programme focuses on improving water conveyance and usage in irrigated areas by strengthening canal systems and on-farm management practices.
- **National Water Mission (NWM):** As part of the National Action Plan on Climate Change, this initiative seeks to improve water-use efficiency by 20% through better practices and public awareness.
- **Watershed Development Projects:** These projects aim to conserve rainwater and promote decentralized water harvesting structures, reducing dependence on centralised irrigation systems. *Example:* Karnataka's watershed models have revived local water availability in drought-affected regions.
- **Jal Jeevan Mission & Mission Bhagiratha:** Though primarily for drinking water, these missions have helped improve rural water access, indirectly supporting irrigation in water-scarce areas.
- **Participatory Irrigation Management (PIM):** Encouraging farmers' participation through Water User Associations (WUAs) ensures better maintenance of irrigation infrastructure and equitable water distribution.
- **Technology-Based Monitoring:** Use of satellite data, GIS mapping and digital tools is being scaled up to monitor irrigation systems and ensure transparency and efficiency.
- **Global Partnerships:** Collaborations with countries like Israel and Australia have introduced India to advanced irrigation technologies like precision farming and drip systems.

Way Forward

- **Integrated Water Governance:** A unified framework is needed to coordinate water management across central, state and local levels, avoiding duplication and inefficiencies.
- **Revamping Infrastructure:** Upgrading irrigation networks with modern, climate-resilient structures, including lined canals and solar-powered pumps, is critical.
- **Financial Incentives for Water-Saving Technologies:** Expanding subsidies and credit access can enable wider adoption of efficient irrigation systems by small farmers.
- **Legal Reforms:** Existing water laws must be updated to regulate overextraction, promote equity and encourage sustainable practices.
- **Water-Smart Farming:** Promoting techniques such as rainwater harvesting, crop rotation and zero tillage can enhance water conservation while maintaining productivity.
- **Real-Time Monitoring Systems:** A national database and digital dashboard for monitoring water use and availability can help tackle regional disparities and prevent misuse.

Conclusion

India's irrigation sector stands at a crossroads. While it remains essential to the country's food security, its resilience is under strain from multiple fronts--environmental, institutional and technological. Moving forward, the focus must shift toward modernization, efficient resource utilization and climate-adaptive strategies. As Leonardo da Vinci aptly said, **"Water is the driving force of all nature"**--managing it wisely is key to securing the future of Indian agriculture.

Q14. Elucidate the importance of buffer stocks for stabilizing agricultural prices in India. What are the challenges associated with the storage of buffer stock? (15 M)

FODDER POINTS

Introduction

Buffer stocks serve as a critical tool in maintaining **food security** and **price stability** during periods of uncertainty such as crop failures, inflationary trends, or natural disasters. India held **113 LMT of wheat** and **236 LMT of rice** in its central pool--well above the buffer norms of **75 LMT** and **136 LMT**, respectively. Effective management of these stocks is essential to insulate both **consumers and farmers** from market fluctuations.

Significance of Buffer Stocks in Stabilizing Agricultural Prices

- **Stabilizing Prices:** Buffer stocks help curb price volatility by releasing grains during supply shocks, thus maintaining affordability and controlling inflation.
    - *Example:* The **Food Corporation of India (FCI)** intervenes during price surges, especially during weak monsoons.
- **Ensuring Food Security:** These reserves are crucial during emergencies such as floods or pandemics, ensuring uninterrupted supply through schemes like the **Public Distribution System (PDS)**.
    - *Example:* During the COVID-19 lockdown, buffer stocks were used to supply free food under **PMGKAY**.
- **Farmer Protection:** Procurement at **Minimum Support Prices (MSP)** safeguards farmers from distress sales and guarantees stable income during years of surplus production.
- **Correcting Market Imbalances:** Buffer stocks allow the government to manage excess or deficit conditions, thus preventing extreme market distortions.
    - *Example:* In 2019, FCI released buffer stocks to contain the spike in wheat prices.
- **Macroeconomic Stability:** By preventing food-led inflation, buffer stocks contribute to broader economic stability and safeguard consumer interests.
- **Support for Welfare Schemes:** Large reserves enable smooth implementation of laws like the **National Food Security Act (NFSA)**, covering the majority of rural and urban poor with subsidized grains.
- **Promoting Exports:** Surplus stocks, when managed efficiently, allow India to export food grains, enhancing global presence and earning foreign exchange.
    - *Example:* In 2021, surplus wheat was exported to several South Asian and African nations.

Challenges in Buffer Stock Management

- **Inadequate Storage Infrastructure:** A heavy reliance on traditional godowns leads to spoilage, inefficiencies and poor inventory handling.
- **High Operational Costs:** The cost of procurement, storage and transportation significantly burdens public finances.
- **Leakages and Pilferage:** Weak monitoring and poor security cause diversion of food grains and loss of public resources.
- **Quality Deterioration:** Improper storage conditions lead to loss of nutritional value and physical damage to grains.
- **Logistical Bottlenecks:** Transportation issues and poor connectivity hinder timely movement and distribution, especially in remote areas.
- **Environmental Footprint:** Large-scale storage and transport contribute to pollution, due to carbon emissions and non-sustainable practices.

Way Forward

- **Modernize Storage Systems:** Invest in climate-controlled silos and scientific warehousing to reduce post-harvest losses and improve quality preservation.
    - *Example:* The government has launched a pilot project under which **11 PACS** are being upgraded, with plans for **700 LMT storage capacity** and an investment of ₹25 lakh crore over five years.
- **Digital and Smart Management:** Adoption of **IoT, blockchain and AI-driven inventory systems** can ensure real-time monitoring and reduce inefficiencies.
    - *Example:* FCI's Smart Warehouse Management System is a step in this direction.
- **Policy Overhaul:** Revise buffer stock norms, promote **decentralized procurement** and improve the PDS framework to enhance targeting and efficiency.

- **Encourage Private Participation: Public-private partnerships (PPPs)** can bridge the infrastructure gap and bring in innovation in storage and logistics.
- **Green and Sustainable Practices:** Incorporate solar energy, biodegradable packaging and low-emission transport to make the process eco-friendly.
- **Address Regional Imbalances:** Establish **regional buffer hubs** and improve rural connectivity to ensure uniform availability and faster distribution across all states.

Conclusion

Efficient buffer stock management is central to India's strategy for **price stabilization**, **food security** and **economic resilience**. By embracing modernization, digital solutions and sustainable practices--alongside policy reforms--the system can be made more robust and future-ready, securing both the agricultural economy and consumer welfare.

Q15. The world is facing an acute shortage of clean and safe alternative freshwater. What are the technologies which can solve this crisis? Briefly discuss any three such technologies, citing their key merits and demerits. (15 M)

FODDER POINTS

Introduction

The world is facing an intensifying crisis of **freshwater scarcity**, driven by a complex interplay of **population growth**, **climate change** and **unsustainable practices**. Recognizing the urgency of the issue, the **United Nations Sustainable Development Goal 6 (SDG-6)** emphasizes universal access to clean water and sanitation. Addressing this challenge demands both **technological innovation** and **policy reform**.

Why Freshwater Scarcity Is Worsening Globally

Rising Population and Food Demand
With the global population projected to rise from 8 to nearly 10.4 billion by the 2080s, the demand for freshwater for drinking, sanitation and agriculture continues to surge. Agriculture alone accounts for about 70% of global freshwater use and by 2050, food production needs to increase by 60%, further stressing water supplies.

Climate Change and Shifting Rainfall Patterns
Erratic weather patterns, prolonged droughts and declining snowfall in some regions reduce natural freshwater availability, affecting both surface and groundwater sources.

Pollution and Overuse of Resources
Industrial effluents, agricultural runoff and untreated sewage contaminate freshwater reserves. In India, about 17% of groundwater blocks are overexploited, while another 19% fall under critical or semi-critical categories, according to the Central Ground Water Board.

Rapid Urbanization and Poor Water Governance
Expanding cities strain existing water infrastructure. Inefficient policies and inequitable distribution further exacerbate the issue, resulting in both physical and economic water scarcity.

Innovative Technologies to Address Freshwater Scarcity

Atmospheric Water Generation
Devices like Watergen extract moisture from humid air to produce drinking water, offering a lifeline in arid regions where conventional water sources are limited.

Desalination
Seawater desalination, as seen in Saudi Arabia's Ras Al Khair plant, converts saline water into potable water at scale. Similarly, Israel's Sorek plant meets a fifth of the nation's water needs through reverse osmosis.

Greywater Recycling
Reusing water from domestic sources such as baths and washing machines can reduce the strain on freshwater systems. In residential complexes, this treated water is often redirected for flushing and irrigation.

Rainwater Harvesting
Traditional systems like *johads* in Rajasthan help recharge groundwater and supply water for agriculture, especially during dry seasons.

Solar Water Purification and Nanofiltration
Solar-powered purifiers and nanotechnology-based filters offer low-cost, decentralized solutions for treating contaminated water, removing pathogens and heavy metals in pollution-prone regions.

Fog Harvesting
In the Atacama Desert of Chile, fog nets trap airborne water droplets, supplying entire villages with clean water in areas where rainfall is minimal.

Biomimicry in Design
Architectural innovations inspired by nature, like buildings designed on termite mound principles in Namibia, regulate temperature and reduce water usage efficiently.

Comparative Analysis of Three Technologies

Desalination
Desalination ensures a steady water supply in coastal regions, yet its high energy demands and disposal of concentrated brine can damage marine ecosystems.

Rainwater Harvesting
A cost-effective and sustainable method, but it requires consistent rainfall and storage infrastructure to function optimally.

Wastewater Recycling and Reuse
Singapore's NEWater initiative demonstrates how treated wastewater can be reused safely for both industrial and potable needs. However, high setup costs and societal hesitation remain hurdles.

Conclusion

Resolving freshwater scarcity calls for an **integrated approach**--leveraging **technological solutions**, **policy innovations** and **community participation**. From **desalination plants** to **rainwater harvesting systems** and **greywater reuse**, these strategies must be supported by **efficient governance and public awareness** to ensure equitable and sustainable access to clean water for future generations.

Q16. What are asteroids? How real is the threat of them causing extinction of life? What strategies have been developed to prevent such a catastrophe? (15 M)

FODDER POINTS

Introduction

Asteroids are rocky or metallic remnants from the early solar system that orbit the Sun, primarily concentrated in the **asteroid belt between Mars and Jupiter**. While most pose no immediate danger, some near-Earth objects (NEOs) could potentially collide with Earth. A large asteroid impact could result in severe environmental consequences, possibly even **triggering extinction events**, as believed to have happened during the **Cretaceous–Paleogene extinction**.

Body

How Asteroids Pose an Existential Threat

- **Historical Evidence of Catastrophic Impacts**
  Geological records confirm that asteroid strikes have previously caused mass extinctions.
  Example: The **Chicxulub impact**, around 66 million years ago, is widely believed to have wiped out the dinosaurs (NASA).
- **Risk of Global Destruction**
  Asteroids over 1 km in diameter could lead to **climate collapse**, tsunamis, firestorms and global food chain disruption.
  Example: Asteroid **1950 DA** is projected to have a small but non-zero chance of colliding with Earth in 2880 (ESA).
- **NEO Tracking and Rising Numbers**
  Thousands of NEOs have been discovered, with several classified as potentially hazardous.
  Example: Over **30,000 NEOs** identified by 2023 (NASA).
- **Localized but Devastating Impacts**
  Smaller asteroids can cause massive regional damage even without global fallout.
  Example: The **Tunguska event** (1908) flattened vast forest areas in Siberia (USGS).
- **Detection Limitations and Surprise Events**
  Despite modern tracking systems, some objects remain undetected until impact.
  Example: The **Chelyabinsk meteor** (2013) went unnoticed and injured over 1,000 people (NASA).

How Humanity is Preparing for Impact Mitigation

- **Early Detection Programs**
  Agencies like **NASA's PDCO** and **ESA's SSA Program** focus on identifying and monitoring space threats.
- **Kinetic Deflection Technology**
  Altering an asteroid's path by crashing a spacecraft into it at high speed.
  Example: NASA's **DART mission** successfully deflected **Dimorphos** in 2022.
- **Nuclear Explosive Approaches**
  Explosions near an asteroid could alter its trajectory, though the risk of fragmentation complicates this method.
  Example: A **2007 NASA study** explored nuclear options for large asteroid deflection.
- **Gravitational Tractor Method**
  A spacecraft could slowly shift an asteroid's course by using its gravitational pull over time.
  Example: ESA's **Hera mission** will study such techniques in the 2030s.
- **Global Coordination and Policy Measures**
  Multilateral cooperation is critical for a planetary defense strategy.
  Example: Forums like the **Planetary Defense Conference** and the **UN COPUOS** aim to strengthen international responses to asteroid threats.

Conclusion

Although the likelihood of a catastrophic asteroid impact is relatively low, the consequences could be irreversible. Thus, **proactive planetary defense**--through detection systems, innovative deflection techniques and global collaboration--is vital. As technological capability grows and international awareness improves, the world is better positioned to **protect life on Earth from celestial hazards**.

Q17. What is disaster resilience? How is it determined? Describe various elements of a resilience framework. Also mention the global targets of Sendai Framework for Disaster Risk Reduction (2015-2030). (15 M)

FODDER POINTS

Introduction

Disaster resilience refers to the capacity of individuals, communities, institutions and systems to **anticipate, absorb, adapt to and recover** from the impacts of hazards without compromising long-term development. In an era marked by **climate change**, **urbanization** and **increasing frequency of disasters**, enhancing resilience is essential for ensuring sustainable and inclusive growth.

How is Disaster Resilience Determined?

Disaster resilience is not a static trait but the result of multiple interacting factors:

- **Risk Assessment**: Identifying the types and magnitude of **hazards** likely to impact a region, whether they be **natural** (earthquakes, floods) or **anthropogenic** (industrial accidents).
- **Vulnerability Analysis**: Examining the **social**, **economic** and **environmental** conditions that make populations more exposed--such as poverty, inadequate infrastructure, or ecosystem degradation.
- **Preparedness Level**: The degree of readiness, including **early warning systems**, **emergency response plans** and **community drills**.
- **Recovery Capacity**: The speed and efficiency with which essential functions--**infrastructure, health, education and services**--can be restored post-disaster.
- **Institutional Strength**: The robustness of **governance mechanisms**, **legal frameworks** and **coordination agencies** in reducing risks and leading recovery efforts.

Core Elements of a Resilience Framework

A comprehensive disaster resilience approach includes:

- **Risk Identification and Mapping**: Recognizing spatial and sectoral vulnerabilities to guide proactive planning.
- **Preparedness and Planning**: Investing in **contingency plans**, **public awareness** and **training** to reduce panic and improve response efficacy.
- **Mitigation Strategies**: Enforcing **disaster-resilient construction norms**, promoting **zoning regulations** and strengthening **natural buffers** like mangroves and wetlands.
- **Efficient Response Mechanisms**: Establishing **rapid-response teams**, **emergency communication lines** and **resource distribution channels**.
- **Sustainable Recovery and Reconstruction**: Emphasizing **"build back better"** principles, integrating **psychosocial support** and improving infrastructure to higher resilience standards.
- **Community Engagement**: Involving **local stakeholders**, promoting **traditional knowledge** and strengthening **social cohesion** to ensure that resilience is locally owned and maintained.

Sendai Framework (2015–2030): Global Targets for Disaster Resilience

The **Sendai Framework** provides a global roadmap to strengthen disaster resilience through **seven targets**:

- **Reduce disaster mortality** through improved **early warning and risk communication**.
- **Reduce the number of people affected**, especially in **developing and vulnerable regions**.
- **Cut economic losses**, linking disaster risk reduction to **economic planning**.
- **Protect critical infrastructure**, including **healthcare, education, transport and utilities**.
- **Adopt national and local DRR strategies**, integrating them into **development policies**.
- **Strengthen international cooperation**, particularly in **technology transfer**, **capacity building** and **financial assistance**.
- **Improve access to multi-hazard early warning systems** and **disaster risk information**, making them inclusive and people-centered.

Conclusion

As disasters become more complex and frequent, **disaster resilience** must be mainstreamed into all development and planning processes. It is not merely about survival but about the **ability to recover stronger**, minimize losses and secure long-term well being. A **resilient society** is one where governance, communities and ecosystems are all aligned toward **anticipating risks and transforming adversity into opportunity**.

Q18. Flooding in urban areas is an emerging climate-induced disaster. Discuss the causes of this disaster. Mention the features of two such major floods in the last two decades in India. Describe the policies and frameworks in India that aim at tackling such floods. (15 M)

FODDER POINTS

Introduction

Urban flooding is increasingly becoming one of the most frequent and disruptive **climate-induced disasters** in India. Unlike riverine or flash floods in rural areas, urban floods are primarily driven by a combination of **intense rainfall events**, **unregulated urban expansion** and **inadequate drainage infrastructure**. As climate change accelerates, cities are struggling to cope with these hydrological shocks, often resulting in human, ecological and economic losses.

Urban Flooding: Causes and Vulnerabilities

India's cities are particularly vulnerable due to the **convergence of multiple risk factors**. The growing **frequency and intensity of rainfall**, attributed to **climate change**, often overwhelms stormwater drains that are either under-designed or poorly maintained. Simultaneously, rapid **urbanization** has led to the disappearance of **natural drainage systems**--**wetlands**, **lakes** and **green cover**--which earlier helped in water percolation and flood mitigation.

For instance, the **Chennai floods of 2015** were not just a result of 300 mm rainfall in a day, but also due to the loss of wetlands like **Pallikaranai**, poor drainage planning and rampant construction over water bodies. Similarly, the **Kerala floods of 2018**, although statewide, underscored the implications of **ecological degradation**, **poor dam management** and **unplanned development** even beyond metropolitan zones.

Another contributing factor is **encroachment on floodplains** and **illegal construction** near water channels, which obstructs the natural flow of rainwater. **Deforestation** and reduced **urban green cover** further diminish the land's capacity to absorb water, intensifying **surface runoff**. **Cities like Mumbai**, which receive

over 900 mm rainfall in a day, suffer from waterlogging due to **choked drains**, **silted nullahs** and absence of **integrated urban planning**.

Impact and Response

Urban floods lead to **loss of lives**, damage to **infrastructure** and **public health crises**. In the Chennai floods, over **500 lives were lost** and economic damage was estimated at ₹20,000 crore. In **Kerala**, more than **5 million people were affected** and the **economic loss** crossed ₹30,000 crore. These events highlighted the absence of **disaster preparedness** and the urgent need for **climate-resilient urban planning**.

Policy Measures and Institutional Framework

To address these challenges, India has adopted multiple **policy frameworks**:

- The **NDMA Urban Flooding Guidelines (2010)** recommend comprehensive **stormwater management**, creation of **Drainage Master Plans** and adoption of **early warning systems**.
- The **National Urban Flood Risk Mitigation Project** supports **flood mapping**, zoning regulations and **community-based preparedness**.
- **AMRUT** and the **Smart Cities Mission** aim to improve **urban resilience** through investment in **sustainable drainage systems**, **water-sensitive urban design** and **green infrastructure**.
- Additionally, laws like the **Environment Protection Act** and regional **river training plans** offer tools for enforcing better land-use planning and ecological restoration.

Conclusion

Urban flooding is not merely a result of heavy rainfall--it is a manifestation of **policy gaps**, **infrastructural neglect** and **ecological disregard**. Tackling it requires a **multi-pronged strategy**: strengthening early warning systems, restoring ecological buffers, enforcing building codes and integrating **climate risk assessments** into all stages of urban planning. India's path to sustainable urbanization must be rooted in understanding that cities can no longer grow at the cost of their **hydrological and ecological stability**.

Q19. India has a long and troubled border with China and Pakistan, fraught with contentious issues. Examine the conflicting issues and security challenges along the border. Also give out the development being undertaken in these areas under the Border Area Development Programme (BADP) and Border Infrastructure and Management (BIM) Scheme. (15 M)

FODDER POINTS

Introduction

India shares extensive borders with China (3,488 km) and Pakistan (3,323 km), both marked by unresolved territorial disputes, frequent military tensions and cross-border threats. These challenges not only compromise national security but also impact the lives of border communities.

Body

Security Challenges on the China and Pakistan Fronts

With China, border tensions stem from ambiguities in the Line of Actual Control (LAC), especially in Aksai Chin and Arunachal Pradesh. Incidents like the **Galwan Valley clash (2020)** and the **Doklam standoff (2017)** underscore the volatile nature of the relationship. China's aggressive infrastructure push in border areas, combined with unpredictable military posturing, necessitates continuous vigilance.

In contrast, the India-Pakistan border, particularly along the **Line of Control (LoC)** in Jammu & Kashmir, is plagued by **frequent ceasefire violations**, **infiltration by terror groups** and **cross-border shelling**, often targeting civilian areas. Moreover, both borders are vulnerable to **drug trafficking**, **arms smuggling** and **counterfeit currency circulation**, severely impacting internal security.

Strategic Role of Developmental Initiatives

To counter these challenges, India has launched several initiatives aimed at improving border infrastructure and uplifting border communities:

- **Border Area Development Programme (BADP):**
  BADP focuses on creating sustainable livelihoods and essential infrastructure in border villages. Over ₹10,000 crores have been invested since its inception, with ₹784 crores allocated in 2023 alone. Projects under BADP include road construction, healthcare, education and skill development to curb outmigration and instill a sense of belonging.
- **Vibrant Villages Programme (VVP):**
  As a part of community-centric development, VVP empowers residents in remote frontier regions through **vocational training**, **digital connectivity** and **self-reliance projects**, particularly in sensitive areas along the India-China border.
- **Border Infrastructure and Management (BIM) Scheme:**
  This scheme supports strategic projects like the **Darbuk–Shyok–Daulat Beg Oldie (DSDBO)** road in Ladakh, enhancing military mobility in high-altitude zones. Additionally, **smart fencing** under the **Comprehensive Integrated Border Management System (CIBMS)** boosts surveillance and real-time threat detection.

Conclusion

India's border security strategy must be multi-pronged--integrating **robust defense preparedness** with **holistic development** of border communities. Initiatives like BADP, VVP and BIM not only strengthen India's ability to respond to external threats but also promote stability, resilience and inclusive growth in the country's most sensitive regions.

Q20. Social media and encrypting messaging services pose a serious security challenge. What measures have been adopted at various levels to address the security implications of social media? Also suggest any other remedies to address the problem. (15 M)

FODDER POINTS

Introduction:
The widespread use of social media and encrypted communication apps has transformed the way people interact and share information. However, these platforms also present new challenges to national security, as they are increasingly misused for spreading extremism, coordinating illegal operations and manipulating public opinion.

Body

How These Platforms Pose Security Risks

Radicalization and Recruitment:
Terrorist organizations and extremist groups take advantage of platforms like Facebook, Twitter, Telegram and WhatsApp to disseminate propaganda and lure vulnerable individuals into their networks.
Example: ISIS has famously exploited Telegram to spread its ideology and recruit members globally.

Concealed Coordination of Criminal Activities:
The encrypted nature of messaging services makes it difficult for law enforcement to track communications between criminal networks, insurgents and terrorist cells.
Example: Encrypted communication has enabled Naxalite groups in India to plan and execute attacks without detection.

Disinformation and Public Manipulation:
False information spread through social media can fuel unrest, incite violence and undermine public trust.
Example: Fake news has triggered communal tensions and riots in several Indian states.

Government Measures to Counteract the Threat

Surveillance and Cyber Monitoring:
Agencies like CERT-In and NATGRID have been established to track digital threats and respond swiftly to suspicious online activities.

Regulatory Frameworks:
The **IT Rules, 2021** mandate social media intermediaries to remove harmful content swiftly and assist law enforcement in specific cases, including decrypting messages when national security is involved.

Public Education Campaigns:
Initiatives like **MyGov** are raising awareness about misinformation and encouraging responsible digital behavior.

Additional Solutions to Strengthen Digital Security

AI and Big Data Surveillance:
Advanced algorithms can analyze communication patterns across platforms to detect emerging threats, including signs of radicalization and organized crime.

Encryption Oversight:
Governments may seek conditional access to encrypted data through legal frameworks to prevent misuse, balancing privacy with national interest.

Government-Tech Collaboration:
Strengthening ties with tech companies like Meta and X (formerly Twitter) ensures prompt action on flagged content, such as terror-linked posts.

De-radicalization and Rehabilitation Programs:
Educational outreach, particularly in sensitive areas, can help dissuade youth from extremist influences. Several Indian states have implemented such proactive programs.

Global Cooperation:
Cybersecurity and counter-terrorism require joint efforts. India actively engages with global partners through platforms like **G20**, **UN** and **BRICS** to address these transnational threats.

Conclusion:

While digital platforms have transformed communication, their misuse poses a serious challenge to national and global security. A mix of technological tools, policy interventions, international collaboration and public awareness is essential to neutralize these threats and promote safer digital spaces.