



ONLYIAS
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UPSC-CSE MAINS (2023)

GS-03

MODEL ANSWER



UPSC-CSE MAINS (2023)-MODEL ANSWER

Q.1. MANUFACTURING SECTOR GDP

ESSENTIALITY OF INCREASE SHARE

- Rural Development
- Economic Resilience
- Employment Generation
- Innovation
- Exports

PRESENT GOVERNMENT POLICIES

- Make in India (2014)
- MSME Samadhaan
- Udyam Registration
- Startup India
- Cluster Development Program

Q.2. DIGITALIZATION IN THE INDIAN ECONOMY

STATUS

- Growing Digital Payments
- Digital India Campaign
- Aadhaar
- E-commerce
- Telemedicine
- GSTN

PROBLEMS FACED

- Cybersecurity
- Privacy Concerns
- Regulatory Challenges
- Digital divide
- Language Barrier
- E-waste Management

Q.3. E-TECHNOLOGY AGRICULTURAL PRODUCE

HELPING IN PRODUCTION

- Precision Agriculture
- Enabling Informed Decisions
- Climate-Smart Agriculture
- Irrigation Management
- Disease Monitoring
- Data-Driven Insights

HELP IN MARKETING

- Empowering Rural Economies
- Real-Time Market Information
- Online Auction Platforms
- Collaborative Marketing
- Virtual Farm Tours
- E-Certifications

Q.4. LAND REFORMS IN INDIA

OBJECTIVES

- Reduction of Land Inequalities
- Empowerment of the Agrarian Community
- Consolidation of holdings
- Gathering and maintaining land records

MEASURES

- Zamindari Abolition
- Tenant Protection
- Preventing Fragmentation
- Eliminating intermediaries
- Consolidation of holdings

Q.5. AI - CLINICAL DIAGNOSIS

WAYS

- Predictive Analytics
- Medical Imaging
- Personalized Treatment
- Drug Discovery
- Remote patient monitoring

THREAT TO PRIVACY

- Data Breaches
- Informed Consent
- Biased Algorithms
- Data Misuse
- Long-Term Data Storage

Q.6. MICROORGANISMS - MEETING CURRENT FUEL SHORTAGE

ROLE

- Bioethanol Production
- Bio methanation
- Algal Biofuels
- Bio-Hydrogen Production
- Synthetic Biology

WAYS

- Enhanced Yield
- Waste Utilization
- Cost-Efficient
- Research and Development
- Educational Initiatives

Q.7. DAM FAILURES

EXAMPLES

- Loss of Lives
- Massive Property Damage
- Ecological Destruction
- Displacement
- Long-term Psychological Impact

CAUSES

- Natural Causes
- Unprecedented Rains
- Structural Flaws
- Human Error
- Lack of Maintenance

WAY FORWARD

- Early Warning Systems
- Predictive Analysis
- Community Training
- Collaborative Research
- Technological Integration

Q.8. OIL POLLUTION

IMPACTS ON THE MARINE ECOSYSTEM

- Physical Smothering
- Toxic Effects
- Human Health
- Reproductive Issues
- Food Chain Disruption

IMPACTS ON INDIA

- Threat to Biodiversity
- Impact on Fisheries
- Tourism
- Community Livelihoods
- Air and Water Quality

Q.9. WINNING OF 'HEARTS AND MINDS'

ESSENTIAL

- Civic Participation
- Counter Radicalization
- Strengthening Intelligence
- Promotion of Non-Violent Means
- Emotional Healing

MEASURES BY GOVERNMENT

- Community Building
- Rehabilitation of Militants
- Infrastructure Development
- Healthcare Initiatives
- Community Dialogues
- Youth Engagement

Q.10. UNMANNED AERIAL VEHICLES (UAVS)

USE OF UAVS

- Facilitation of Terrorism
- Drug Trafficking
- Surveillance and Espionage
- Safety Hazards
- Economic Implications
- Psychosocial Impact

MEASURES TAKEN

- Anti-Drone Technologies
- Intelligence Sharing
- Legal Framework
- Research and Development
- Training and Capacity Building
- Community Engagement

ISSUES FACED

- Technological Limitations
- Coordination Issues
- False Alarms
- Geographical Challenges
- Cybersecurity

Q.11. UNEMPLOYMENT IN INDIA

STRUCTURAL NATURE

- Skill Gap
- Technology Shifts
- Jobless growth
- Industrial Changes
- Geographical Imbalance
- Outdated Economic Policies

COMPUTING METHODOLOGY

- Periodic Labour Force Survey (PLFS)
- Census
- NSSO Surveys
- Tertiary Sources
- Online Portals

Q.13. CROPPING PATTERN IN INDIA

CHANGES

- From Food Crops to Cash Crops
- Introduction of GM Crops
- Organic Farming
- Multi-Cropping and Crop Rotation
- Horticulture
- Spices and Floriculture
- Traditional Crops

Q.14. SUBSIDIES IN INDIA

DIRECT SUBSIDIES

- Direct Benefit Transfers
- Input Subsidies
- Credit Subsidies
- Insurance Schemes

INDIRECT SUBSIDIES

- Irrigation Subsidies
- Power Subsidies
- Transport Subsidies
- Seed subsidy
- Warehousing Subsidies

ISSUES RAISED

- Amber Box Subsidies
- Export Subsidies
- Domestic Support
- Public Stockholding

Q.15. ELECTRIC VEHICLES

REDUCING CARBON EMISSIONS

- Zero Tailpipe Emissions
- Energy Efficiency
- Renewable Energy Sources
- Regenerative Braking
- Urban Air Quality
- Grid Support

KEY BENEFITS

- Cost-Effective
- Instant Torque
- Design Flexibility
- Safety Measures
- Software Updates
- Tax Benefits

Q.16. INDIA'S THIRD MOON MISSION

MAIN TASK

- Soft Landing
- Lunar Research
- Material Extraction
- Advanced Technology
- Human Exploration Preparation

SUBSYSTEMS OF SPACECRAFT

- Vikram Lander
- Lander Subsystems
- Pragyan Rover
- Lander Actuators
- Lander Propulsion System
- Deep Space Network

Q.17. NATIONAL WETLAND CONSERVATION PROGRAMME

KEY FEATURES

- Identification and Classification
- Financial Assistance
- Capacity Building
- Research and Development

INTERNATIONAL IMPORTANCE

- Sundarbans
- Chilika Lake
- Keoladeo National Park
- Loktak Lake

Q.18. IPCC REPORT

IMPACT ON INDIA

- Coastal Erosion
- Agricultural Loss
- Displacement of Populations
- Impact on Fisheries
- Infrastructure Threat

IMPACT ON OTHER COUNTRIES

- Maldives' Existence
- Bangladesh Flooding
- Sri Lanka's Tourism
- Economic Loss for Indonesia

Q.19. INTERNAL SECURITY INDIA

CHALLENGES

- Terrorism
- Naxalism
- Cyber Crime
- Ethnic Tensions
- Drug Trafficking

ROLE OF CENTRAL INTELLIGENCE

- Data Collection
- Analysis
- Coordination
- Special Operations
- Cross-Border Operations

Q.20. TERROR FUNDING IN INDIA

MAJOR SOURCES

- Hawala Transactions
- Drug Trafficking
- Fake Currency
- Cybercrime
- Charities and NGOs

OBJECTIVES OF NMFT

- Knowledge Exchange
- Resource Mobilization
- Monitoring and Evaluation
- Civil Society Engagement



UPSC CSE Mains - 2023

QUESTIONS

GS- III

1. **Faster economic growth requires increased share of the manufacturing sector in GDP, particularly of MSMEs. Comment on the present policies of the Government in this regard. 10M**
2. **What is the status of digitalization in the Indian economy? Examine the problems faced in this regard and suggest improvements. 10M**
3. **How does e-Technology help farmers in production and marketing of agricultural produce? Explain it. 10M**
4. **State the objectives and measures of land reforms in India. Discuss how land ceiling policy on landholding can be considered as an effective reform under economic criteria. 10M**
5. **Introduce the concept of Artificial Intelligence (AI). How does AI help clinical diagnosis? Do you perceive any threat to privacy of the individual in the use of AI in healthcare? 10M**
6. **Discuss several ways in which microorganisms can help in meeting the current fuel shortage. 10M**
7. **Dam failures are always catastrophic, especially on the downstream side, resulting in a colossal loss of life and property. Analyze the various causes of dam failures. Give two examples of large dam failures. 10M**
8. **What is oil pollution? What are its impacts on the marine ecosystem? In what way is oil pollution particularly harmful for a country like India? 10M**
9. **Winning of 'Hearts and Minds' in terrorism-affected areas is an essential step in restoring the trust of the population. Discuss the measures adopted by the Government in this respect as part of the conflict resolution in Jammu and Kashmir. 10M**
10. **The use of unmanned aerial vehicles (UAVs) by our adversaries across the borders to ferry arms / ammunitions, drugs, etc., is a serious threat to the internal security. Comment on the measures being taken to tackle this threat. 10M**

11. Most of the unemployment in India is structural in nature. Examine the methodology adopted to compute unemployment in the country and suggest improvements. 15M
12. Distinguish between 'care economy' and 'monetized economy'. How can the care economy be brought into monetized economy through women empowerment? 15M
13. Explain the changes in cropping pattern in India in the context of changes in consumption pattern and marketing conditions. 15M
14. What are the direct and indirect subsidies provided to farm sector in India? Discuss the issues raised by the World Trade Organization (WTO) in relation to agricultural subsidies. 15M
15. The adoption of electric vehicles is rapidly growing worldwide. How do electric vehicles contribute to reducing carbon emissions and what are the key benefits they offer compared to traditional combustion engine vehicles? 15M
16. What is the main task of India's third moon mission which could not be achieved in its earlier mission? List the countries that have achieved this task. Introduce the subsystems in the spacecraft launched and explain the role of the Virtual Launch Control Centre' at the Vikram Sarabhai Space Centre which contributed to the successful launch from Sriharikota. 15M
17. Comment on the National Wetland Conservation Programme initiated by the Government of India and name a few India's wetlands of international importance included in the Ramsar Sites. 15M
18. The Intergovernmental Panel on Climate Change (IPCC) has predicted a global sea level rise of about one metre by AD 2100. What would be its impact in India and the other countries in the Indian Ocean region? 15M
19. What are the internal security challenges being faced by India? Give out the role of Central Intelligence and Investigative Agencies tasked to counter such threats. 15M
20. Give out the major sources of terror funding in India and the efforts being made to curtail these sources. In the light of this, also discuss the aim and objective of the 'No Money for Terror (NMFT)' Conference recently held at New Delhi in November 2022. 15M

UPSC CSE Mains - 2023

Model Answers

GS- III

1. **Faster economic growth requires increased share of the manufacturing sector in GDP, particularly of MSMEs. Comment on the present policies of the Government in this regard.**

How to approach the question

Introduction

- Write the role of manufacturing sector in GDP, particularly of MSMEs briefly

Body

- Write why faster economic growth requires increased share of the manufacturing sector in GDP, particularly of MSMEs
- Write about the contribution of present policies of the Government in this regard
- Write issues faced by these policies
- Write suitable way forward

Conclusion

- Give appropriate conclusion in this regard

Introduction

According to 2023 manufacturing industry outlook, The **manufacturing sector** is an important part of India's GDP, accounting for around 17% in 2022. The **MSMEs**, contribute around 40% to manufacturing and are responsible for economic growth, jobs and growing exports. Given this, the government has initiated various programmes and benefits to support these sectors.

Body

Essentiality of increase share of the manufacturing sector in GDP for Faster economic growth due to following reasons

- **Rural Development:** Manufacturing plays a pivotal role in rural development. Initiatives like the establishment of Agro-based industries and Rural Self Employment Training Institutes (RSETIs) **foster rural entrepreneurship**, empowering rural areas economically.
- **Economic Resilience:** In economic downturns, diverse manufacturing sector, can offer economic resilience. Eg: **during the COVID-19 pandemic**, many small enterprises quickly adapted to produce essential items like masks and sanitizers.
- **Employment Generation:** In India, for instance, according to a report by the Ministry of MSMEs, **the sector has created around 11 crore jobs**. Tailoring units, handicraft businesses, and small manufacturing units are examples where employment is generated at a large scale.
- **Innovation:** MSMEs have been the cradle for many innovations. Companies **like Flipkart and Zoho** initiated as small enterprises and have brought about significant innovative solutions in e-commerce and software development sectors, respectively.
- **Exports:** MSMEs contribute markedly to the export earnings; in India, it **accounts for about 48% of total exports**, showcasing products like jewelry, handloom, and spices which have a considerable demand globally.
- **Reduce dependence on other countries:** It will reduce import from other countries and support to balancing the fiscal deficit.

Present Policies of the Government and Their Contributions

- **Make in India (2014)** : It aimed at promoting India as a global manufacturing hub. Eg: the mobile manufacturing saw remarkable growth with companies like **Samsung setting up its largest mobile factory in the Noida** boosting manufacturing sector and creating numerous jobs.
- **MSME Samadhaan**: This platform has provided a space for MSMEs to **file their delayed payment grievances directly**, fostering a prompter payment culture. Through this, many businesses have been able to alleviate their financial bottlenecks and sustain operations.
- **Udyam Registration**: Initiated to simplify the registration process for MSMEs, it has eased the entry of numerous new ventures into the formal sector. Eg: **home-based businesses have found it simpler to register** and thereby avail government benefits and schemes.
- **GST**: The inception of GST streamlined tax structures, which, for example, mitigated the cascading effect of taxes, potentially **reducing the tax burden on MSMEs**, and encouraging compliance due to a simpler tax regime.
- **Startup India**: Since its launch, it has fostered a nurturing environment for startups, offering fiscal incentives and establishing a robust ecosystem, encouraging entrepreneurship. **Zomato, a food delivery service, is a notable success story** that blossomed under this initiative.
- **Cluster Development Program**: It has boosted competitiveness and promote synergy through cluster development, offering infrastructural facilities. Eg: **Leather clusters in Kanpur** have seen significant improvements in terms of technology adoption and infrastructural development.
- **Government e-Marketplace (GeM)**: This initiative has enabled many MSMEs to reach out to government buyers, expanding their market reach and **fostering a transparent procurement process**, thus giving a considerable boost to MSME sector growth.
- **Digital MSME Scheme**: Implemented to encourage digital literacy and facilitate the adoption of digital technologies in MSME operations. For instance, **businesses have been able to automate inventory management**, thus saving time and reducing errors.

Issues Faced by These Policies

- **Bureaucratic Hurdles**: While the Make in India initiative aimed to streamline processes, many businesses still report cumbersome bureaucracy. For instance, **Tesla faced challenges in setting up its operations** due to rigid land acquisition policies.
- **Delayed Payments**: Even with MSME Samadhaan in place, many MSMEs still grapple with payment delays. A recent report highlights that **approximately Rs 10.7 lakh crore is stuck as delayed payments to MSMEs** in India, amounting to 6% of India's GVA (Gross Value Added) for FY 2020-21.
- **GST Complications**: The GST, though a unified tax regime, brought with it complexities. Many MSMEs found the initial transition to the GST system taxing, given the **technological challenges and understanding tax slabs**.
- **Mismatch in Skill Training**: While Skill India has trained many, there's a notable mismatch between industry requirements and the skills provided. Eg: the **textile industry often reports a lack of workers trained in modern machinery** despite numerous training programs.
- **Limited Scope in Startup India**: The Startup India initiative, though fruitful, has been criticized for being **too tech-centric, leaving out traditional businesses** that also require support and incentives.
- **Inadequate Infrastructure in Clusters**: The Cluster Development Program shows promise, but many clusters still lack essential infrastructure. For instance, **handicraft clusters in remote areas** face challenges like inadequate power supply and transportation facilities.

- **Limited Outreach of GeM:** The Government e-Marketplace is a powerful platform, but many MSMEs are **unaware of its benefits or find it challenging to list their products** due to complex processes and requirements.

Way Ahead

- **Smart Regulation:** The government should introduce smart regulations that promote ease of doing business. For instance, **implementing an AI-driven system could help in simplifying regulatory compliances**, thereby speeding up the Make in India initiative's objectives.
- **Simplified Documentation:** The government could simplify the documentation process for Udyam Registration further, by **allowing self-certification and reducing paperwork** to encourage more MSMEs to register.
- **Prompt Payment Mechanism:** The government needs to strengthen the MSME Samadhaan scheme by **introducing a strict timeline for payment clearance** and an **online monitoring system** to track payment delays transparently.
- **Community Microfinance Institutions:** To overcome the credit accessibility issue, encouraging community microfinance institutions could be a practical solution. These institutions could **collaborate with local bodies to identify potential MSMEs in remote areas**.
- **GST Facilitation Centres:** Establishing GST facilitation centers across districts can be a viable solution. These centres would **assist MSMEs in understanding and adapting to the GST framework**, with trained personnel providing necessary assistance.
- **Infrastructure Development Grants:** The Cluster Development Program can introduce grants **to encourage local bodies to develop infrastructure**, such as roads and power supply, fostering a conducive environment for clusters to flourish.
- **Awareness Campaigns for GeM:** The government could undertake massive awareness campaigns to educate MSMEs about the benefits of Government e-Marketplace, **possibly collaborating with industry associations to conduct workshops and webinars**.

Conclusion

These innovative suggestions could potentially accelerate the growth of the manufacturing sector and MSMEs, thereby contributing positively to the country's GDP. It is pivotal to **create a nurturing environment where policies are not just well-framed but are also effectively implemented** to foster growth and development.

2. **What is the status of digitalization in the Indian economy? Examine the problems faced in this regard and suggest improvements.**

How to approach the question	
Introduction	<ul style="list-style-type: none"> ● Write about the digitization of the Indian economy briefly
Body	<ul style="list-style-type: none"> ● Write about the status of digitalization in the Indian economy ● Write the problems faced in this regard ● Write suitable suggestions for improvements
Conclusion	<ul style="list-style-type: none"> ● Give appropriate conclusion in this regard

Introduction

Digitalization in the Indian economy refers to the increased **adoption of digital technologies** to transform traditional economic activities, processes, competencies, and models, enhancing efficiency,

productivity, and overall growth. In this regards government of India launched **The Digital India program**, aims to facilitate the delivery of government services through digital means and promote digital literacy and technology adoption across India.

Body

Status of Digitalization in the Indian Economy

- **Growing Digital Payments:** UPI is a shining example, with platforms like BHIM, Google Pay, and PhonePe facilitating seamless and real-time money transfers. Recently, **UPI monthly transaction volumes likely crossed historic 10-billion mark in August, 2023.**
- **Digital India Campaign:** Launched in 2015, the Digital India initiative aspired to digitally empower citizens. For instance, **with over 15 crore registered users and 60 million monthly active engagements, DigiLocker** has made accessing and sharing documents easier.
- **Aadhaar:** As the world's largest biometric ID system, **Aadhaar has over 1.3 billion enrolments.** It not only ensures identity but also eases various services, **such as Direct Benefit Transfer (DBT)**, ensuring subsidies directly reach beneficiaries' bank accounts, eliminating intermediaries.
- **E-commerce:** Giants **like Amazon and Flipkart** have garnered widespread popularity, with Big Billion Days sale by Flipkart and Great Indian Festival sale by Amazon generating sales worth billions in mere days, indicating their deep-rooted presence in the Indian market.
- **Telemedicine:** The pandemic made in-person medical consultations challenging, paving the way for platforms like Practo and DocOn, which witnessed a surge. **By April 2020, Practo reported a 500% growth in teleconsultations,** providing a lifeline to many amidst lockdowns.
- **GSTN:** The introduction of the GST Network simplified the indirect tax system, providing a unified platform for taxpayers. **Over 1.2 crore businesses are registered under GSTN,** making tax compliance more structured and transparent.
- **Smart Cities Mission:** Launched in 2015, the mission envisions 100 cities with advanced solutions. **Pune's Smart City project,** for instance, focuses on improved urban mobility and solid waste management using digital technology.

Problems Faced

- **Cybersecurity:** The increasing reliance on digital platforms has elevated the risk of cyber-attacks. **In 2020, India faced the second-highest number of cyber-attacks in the Asia-Pacific region,** highlighting the pressing need for fortified cybersecurity measures.
- **Privacy Concerns:** Recent years have witnessed rising apprehensions regarding data privacy. The **Pegasus spyware incident,** where personal data of several Indian citizens were allegedly compromised, accentuated these concerns, pointing towards the vulnerabilities in the digital space.
- **Dependence on Foreign Technologies:** India's digital ecosystem heavily relies on foreign technologies. For instance, the **dependency on American companies like Google and Facebook** for digital services underscores the need for homegrown digital solutions.
- **Regulatory Challenges:** The fast-paced evolution of the digital landscape has resulted in regulatory hurdles. **Recent issues with Twitter and the Indian government** over regulatory compliance depict the complex dynamics of governing digital platforms.
- **Digital divide:** For Digital India to have a large-scale impact on citizens across the nation, the digital divide needs to be addressed through last-mile connectivity in remote rural areas, as currently, over 55,000 villages remain deprived of mobile connectivity

- **Lack of infrastructure development:** The biggest challenge faced by Digital India is slow/delayed infrastructure development. Spectrum availability in Indian metros is about a tenth of that in cities in developed countries, which has put a major roadblock in providing high-speed data services
- **Language Barrier:** Despite the multilingual populace of India, the majority of digital content is in English, **alienating non-English speakers**. Developing content in various regional languages can be a pivotal step in overcoming this barrier.
- **E-waste Management:** The surge in digitalization has increased the generation of e-waste. In **2019, India generated approximately 3.2 million tonnes of e-waste**, highlighting the urgent necessity for robust e-waste management strategies to mitigate environmental impacts.

Suggestions for Improvements

- **Digital Literacy Programs:** With special focus on rural areas and older demographics can greatly help. Eg: the **government could collaborate with popular platforms like WhatsApp or YouTube**, which have significant outreach, to deliver digital tutorials in regional languages.
- **Local Language Integration:** By employing **advanced Natural Language Processing (NLP) algorithms**, digital interfaces can be transformed to understand and respond in multiple Indian languages, making them more user-friendly for a broader audience.
- **Cybersecurity Measures:** Establishing **regional cybersecurity hubs** that can focus on localized digital threats and provide real-time solutions is crucial. These hubs can also serve as training centers for cyber professionals.
- **Inclusive Digitalization:** Digital platforms should be developed with universal design principles in mind. For instance, **voice-command features and screen reader-friendly designs** can make platforms more accessible to visually impaired users.
- **Skill Development:** Collaborate with global tech firms to introduce skill training modules in schools and colleges. **Companies like Microsoft and Cisco have already shown interest in skilling initiatives globally**, and such partnerships can be fruitful for India's digital ambitions.
- **Sustainable e-Waste Management:** Introduce a **digital token system** where consumers earn rewards for responsibly disposing of e-waste. This can incentivize proper disposal and reduce the environmental hazards associated with electronic waste.
- **Public-Private Partnerships:** Emphasizing the collaboration between private tech giants and the government can lead to faster implementation of digital infrastructure and innovative solutions. Eg: the **Indian Railways and Google partnership**, which provided free Wi-Fi at railway stations.

Conclusion

Digitalization has indeed spurred growth and added a dynamic dimension to the Indian economy. However, it is imperative to address the existing challenges through innovative and inclusive strategies to **harness the full potential of digitalization and steer the nation towards a digitally empowered economy**.

3. **How does e-Technology help farmers in production and marketing of agricultural produce? Explain it.**

How to approach the question

Introduction

- Write about E-technology in the agricultural context

Body

- Write how e-Technology help farmers in production of agricultural produce

- Write how e-Technology help farmers in marketing of agricultural produce
- Write government Efforts for e Technology in Agriculture

Conclusion

- Give appropriate conclusion in this regard

Introduction

In the context of agriculture, **e-technology** refers to the application of electronic techniques and tools in farming practices to enhance efficiency and productivity. This includes a range of innovations such as the use of **smartphones for market information, GPS technology for precision farming, and e-commerce platforms** for selling agricultural produce.

Body

Ways in which e-Technology Helps Farmers in the Production of Agricultural Produce

- **Precision Agriculture:** e-Technology such as **GPS technology, implemented by companies like John Deere**, revolutionizes farm management by enhancing precision in various agricultural activities, including seeding and harvesting, which facilitates optimal utilization of resources.
- **Enabling Informed Decisions:** Start-ups introducing soil testing kits and apps, **such as AgroStar**, empower farmers to analyze soil health effectively, guiding them in making informed decisions regarding the type and amount of fertilizers required, consequently promoting healthier crop production.
- **Climate-Smart Agriculture: Platforms like IBM's Weather Company** equip farmers with real-time weather updates, thereby aiding them in planning agricultural operations proficiently, avoiding adverse weather conditions, and ensuring a good harvest.
- **Irrigation Management: Innovations like sensor-based irrigation systems** from companies like Jain Irrigation are fostering water conservation through efficient water management, reducing wastage and promoting the optimal growth of crops.
- **Disease Monitoring: Apps like Plantix** offer a vital service to farmers, allowing them to receive expert advice on disease control by simply uploading images of affected crops, helping in timely intervention and safeguarding crop health.
- **Online Education and Training: Non-profit initiatives like Digital Green** leverage technology to provide farmers with essential knowledge through video demonstrations, enhancing their skills and promoting best practices in agriculture.
- **Remote Sensing Technology: Agencies such as ISRO** utilize remote sensing technology to monitor crop health from a macro perspective, aiding in early detection of pest infestations and predicting agricultural outputs accurately
- **Data-Driven Insights: Projects like Microsoft's FarmBeats** are transforming agriculture by providing farmers with actionable insights derived from analyzing diverse data sources, including drones and satellites, facilitating informed decision-making in agriculture.
- **Blockchain Technology:** Blockchain solutions **like AgriLedger** have been developed to foster transparency in the agricultural supply chain, ensuring farmers receive fair compensation for their produce through secure and transparent record-keeping.
- **Land surveying:** GPS based applications and drones effectively supporting land mapping and land record updating. Scheme like SWAMITVA is on this line .
- **Information Accessibility:** Mobile applications **like AgriApp** are becoming indispensable tools in the hands of farmers, offering a wide range of agricultural information and services, including market rates and pest management tips, promoting informed decision-making.

Ways in which e-Technology helps Farmers in the Marketing of Agricultural Produce

- **Empowering Rural Economies: Platforms like Amazon Saheli and Flipkart Samarth** are pivotal in fostering rural entrepreneurship by providing a vast marketplace for the farmers, directly connecting them with a myriad of consumers and ensuring a fair price for their produce.
- **Real-Time Market Information:** Real-time market information through platforms like **Kisan Suvidha and Agmarknet** plays a crucial role in rural development by empowering farmers with data necessary for making informed selling decisions, thus enhancing their profit margins.
- **Online Auction Platforms:** The **e-NAM platform** is revolutionizing rural trading dynamics by introducing a transparent and wider network of buyers, playing a pivotal role in ensuring that farmers receive the right price for their agricultural produce through a transparent bidding process.
- **Direct Consumer Engagement:** Leveraging social media platforms for marketing is fostering direct engagement between farmers and consumers, helping in building trust and creating a **niche market for farm-fresh products**, enhancing rural entrepreneurship.
- **Collaborative Marketing:** Aggregator platforms like **DeHaat and Ninjacart** are pivotal in promoting collaborative marketing by aggregating small farmers' produce, fostering rural entrepreneurship by providing farmers with a collective bargaining power, thus enhancing their economic stability.
- **Transparent Product Information:** Initiatives like the one in **Neemrana where QR codes are used for product packaging** is empowering rural areas economically by offering transparent information to consumers and enhancing the trust in agricultural produce.
- **Virtual Farm Tours:** The **initiative by the Andhra Pradesh government** to use VR for farm tours plays a pivotal role in rural development by facilitating a transparent showcase of farming practices to potential buyers, enhancing trust and business opportunities.
- **E-Certifications:** E-certification through platforms **accredited by the National Programme for Organic Production (NPOP)** fosters rural development by assuring product quality and facilitating trust-building with consumers, enabling farmers to fetch better prices for their products.

Government efforts for e Technology in agriculture:

- **National e-Governance Plan in Agriculture (NeGP-A)** wherein, funds are released to the State(s)/UT(s) for project involving use of modern technologies viz. Artificial Intelligence (AI), Machine Learning (ML), Robotics, Drones, Data Analytics, Block Chain etc.
- **Sub Mission on Agricultural Mechanization (SMAM)** is being implemented w.e.f April,2014.The scheme aims at 'reaching the unreached' by bringing to the small and marginal farmers in the core and giving the benefits of farm mechanization, by Promoting 'Custom Hiring Centers' ,
- **National Agriculture Market (e-NAM)** is a pan-India electronic trading portal which networks the existing Agricultural Produce Market Committee (APMC) mandis to create a unified national market for agricultural commodities. Digital services are provided to traders, farmers, Farmers Producer Organizations (FPO), Mandis through various modules of e-NAM platform such as FPO trading module, warehouse based trading module.
- **PM KISAN Scheme**, fund is directly transferred into the bank accounts of the eligible farmers under Direct Benefit Transfer mode. Farmers can do their self-registration through the Farmers Corner in the portal.
- **Integrated Scheme for Agricultural Marketing schemes (AGMARKNET)** to promote creation of agricultural marketing infrastructure by providing backend subsidy support to State, cooperative and private sector investments

Conclusion

Overall, e-technology has emerged as a beacon of transformation in the agricultural sector, revolutionizing both production and marketing processes. Thus, it is imperative that continuous efforts be made to **educate and equip farmers with the necessary digital skills to leverage e-technology to its fullest potential.**

4. **State the objectives and measures of land reforms in India. Discuss how land ceiling policy on landholding can be considered as an effective reform under economic criteria.**

How to approach the question

Introduction

- Write about land reforms in India briefly

Body

- Write about the objectives of land reforms in India
- Write about the measures of land reforms in India
- Write how land ceiling policy on landholding can be considered as an effective reform under economic criteria

Conclusion

- Give appropriate conclusion in this regard

Introduction

Land reforms in post-independence India, fundamentally aimed at **redistributing land from the affluent landlords to the landless peasants**. They were instituted to abolish feudal land arrangements and foster a socio-economically equitable society, the reforms target alleviating rural poverty and bolstering agricultural productivity.

Body

Objectives of Land Reforms

- **Reduction of Land Inequalities:** States like **West Bengal and Kerala** have spearheaded land redistribution initiatives, which have been instrumental in reducing rural poverty and setting the stage for a more egalitarian society.
- **Empowerment of the Agrarian Community:** In states such as **Bihar and Andhra Pradesh**, tenancy reforms have facilitated the empowerment of the actual cultivators, providing them with more control over agrarian resources and enhancing their stake in the agrarian economy.
- **Consolidation of holdings:** This involves consolidating fragmented landholdings into larger plots to make them more productive and efficient.
- **Gathering and maintaining land records:** This involves creating an accurate database of land records to prevent disputes over land ownership and tenancy rights
- **Modern Agricultural Techniques:** The epoch of the **1960s Green Revolution in India** marked a synergistic alignment between land reforms and modern agricultural techniques, reinvigorating the agricultural landscape of India through a surge in productivity.
- **Sustainable Agriculture:** Following the paradigm of sustainability, **several states, with Sikkim** at the forefront, have championed the transition to **organic farming**. It not only harmonizes farming practices with nature but also paves the way for other states to foster a sustainable agriculture.

Measures of Land Reforms

- **Zamindari Abolition:** A landmark in the history of land reforms was the audacious move by **Uttar Pradesh and Bihar in the 1950s to abolish the Zamindari system**. This was a crucial step towards fostering an environment where land resources were distributed more equitably.
- **Tenant Protection:** Kerala took a remarkable initiative by **introducing the 'Kerala Land Reforms Act, 1963'** to protect the rights of the tenants, providing them with a shield against exploitation and fostering stability in the rural agrarian communities.
- **Preventing Fragmentation:** **Punjab and Haryana** have been at the forefront in averting the issues stemming from land fragmentation through consolidation initiatives. It has boosted agricultural productivity by creating a more organized and systematic agricultural landscape.
- **Eliminating intermediaries:** This involves removing intermediaries between the state and tenants, such as zamindars and jagirdars, who exploited peasants.
- **Consolidation of holdings:** This involves consolidating fragmented landholdings into larger plots to make them more productive and efficient.
- **Gathering and maintaining land records:** This involves creating an accurate database of land records to prevent disputes over land ownership and tenancy rights.
- **Increasing agricultural productivity:** This involves providing farmers with access to credit, irrigation facilities, and modern farming techniques to increase agricultural productivity.
- **Cooperative Farming:** Cooperative farming has emerged as a beacon of community development and economic upliftment in Gujarat. Eg: **the AMUL initiative**, which has facilitated rural entrepreneurship and fostered economic empowerment in rural areas.

Land Ceiling Policy as an Effective Economic Reform

- **Resource Redistribution:** It promotes economic equality through the redistribution of land resources. Eg: **West Bengal's Operation Barga (1970s)** substantially redistributed land among the landless, fostering a scenario where wealth generation became accessible to a larger segment of society.
- **Preventing Land Monopoly:** The policy helps in averting land monopolies which were evident in regions like **Telangana during the 1950s** where vast lands were held by a few, leading to socio-economic disparities and sparking movements like the Telangana Rebellion.
- **Optimal Utilization:** In regions like **Tamil Nadu**, smaller landholdings, encouraged through land ceiling policies, have fostered intensive cultivation, thereby leveraging optimal utilization of land resources and enhancing agricultural efficiency.
- **Modernization of Agriculture:** The state of **Punjab**, often referred to as the 'Granary of India' shows how land ceiling policies can facilitate the use of modern techniques in agriculture.
- **Boosting Rural Economy:** These policies have played a vital role in boosting the rural economy. It has facilitated the **emergence of a considerable number of medium-scale farmers** who contribute significantly to the rural economy.
- **Encouraging Entrepreneurship:** For instance, several regions have witnessed a growth in agro-based industries, as **more individuals get the opportunity to own and cultivate land**, thereby nurturing entrepreneurship at the grassroots level.

Conclusion

In conclusion, land reforms underscore a commitment to adaptability and resonance with the changing socio-economic textures. The road ahead for India is to continue **steering reforms with foresight and sensitivity to the fluctuating dynamics, safeguarding the interests of the marginalized**, and nurturing an environment conducive to sustainable agricultural and economic growth.

5. Introduce the concept of Artificial Intelligence (AI). How does AI help clinical diagnosis? Do you perceive any threat to privacy of the individual in the use of AI in healthcare?

How to approach the question

Introduction

- Write about the concept of Artificial Intelligence (AI) briefly

Body

- Write how AI can help in clinical diagnosis
- Write about the threat to privacy of the individual in the use of AI in healthcare
- Write suitable way ahead in this regard

Conclusion

- Give appropriate conclusion in this regard

Introduction

Artificial Intelligence (AI) refers to the simulation of **human intelligence in machines**, enabling them to perform tasks that typically require human intellect. These include **problem-solving, speech recognition, and decision-making**. With the advent of advanced algorithms and computational capabilities, AI has permeated various sectors, including healthcare.

Body

Ways in which AI Can Helps in Clinical Diagnosis

- **Predictive Analytics:** Utilizing AI's predictive analytics can be a monumental step in forecasting the onset of diseases. Eg: **Google's DeepMind** which leverages AI to forecast a patient's deterioration up to 48 hours before it potentially occurs.
- **Medical Imaging:** AI has revolutionized medical imaging by facilitating the identification and diagnosis of medical issues through the analysis of X-rays or MRIs. Eg: **IBM's Watson Health, for instance, demonstrates unprecedented precision** in pinpointing specific types of cancers.
- **Personalized Treatment:** AI fosters personalized medicine by analyzing individual patient data to recommend uniquely tailored treatment plans. **Platforms like IBM Watson** are adept at suggesting treatment options that are in harmony with a patient's genetic makeup.
- **Drug Discovery:** It has been significantly accelerated owing to AI, which can predict the efficiency of different compounds in fighting diseases. **Startups like Atomwise** stand at the forefront of leveraging AI in drug discovery bringing lifesaving drugs to market quicker.
- **Remote patient monitoring:** AI-powered devices can monitor patients remotely, collecting data on vital signs and symptoms to detect any changes that may require medical attention
- **Natural Language Processing (NLP):** AI integrates NLP to swiftly shift through medical notes and records. Tools like **Amazon's Comprehend Medical** have been pivotal in mining medical records to extract pertinent information, which aids in informed decision-making in healthcare.
- **Wearable Health Monitors:** The introduction of AI-driven wearable devices **like the Apple Watch** has been a game-changer in real-time health monitoring. It keeps track of vital statistics, promptly alerting users to any irregularities and encouraging proactive health management.

Threat to Privacy in AI's Use in Healthcare

- **Data Breaches:** Storing extensive patient data digitally amplifies the risk of data breaches. Eg: in India, there have been **instances of data leaks from government COVID-19 tracking apps**, laying bare the vulnerabilities in securing large data repositories.

- **Informed Consent:** The increasing complexity of AI systems often surpasses the understanding of the average patient. In the Indian scenario, many patients are **not digitally literate enough to comprehend the potential misuses** of their digital health data.
- **Biased Algorithms:** Algorithms can inadvertently foster existing biases, which has been seen globally and can similarly affect diverse populations in India. Eg: **communities in remote areas might not have ample representation** in the data used to train these systems.
- **Data Misuse:** There exists a threat of patient data being used unethically for objectives beyond healthcare, **like targeted advertising**. In India, concerns have been raised regarding the potential for misuse of data collected through the Aarogya Setu app.
- **Long-Term Data Storage:** With the introduction of **the National Digital Health Mission**, concerns have been raised about the potential long-term implications on the privacy of individuals regarding how long and how secure their data would be stored.
- **Surveillance Concerns: Wearables and monitoring devices** can potentially be misused for unauthorized surveillance. There is a growing concern about surveillance through various digital platforms, emphasizing the need for stringent regulations to safeguard individual privacy.

Way Ahead

- **Stricter Regulations:** India needs to pioneer comprehensive and forward-thinking regulations for AI in healthcare. Developing **a national blueprint which incorporates global best practices** can facilitate safe and ethical AI deployments, safeguarding user data effectively.
- **Transparency:** It is imperative to build AI systems that are **transparent and open to audit trails**. This could include open-source AI initiatives that foster community verification of algorithms, ensuring their reliability and adherence to privacy norms.
- **Data Encryption:** Leveraging advanced encryption techniques, **such as homomorphic encryption**, can allow operations directly on encrypted data, ensuring an enhanced security posture in handling sensitive healthcare data.
- **Unbiased Training:** Encouraging the development of AI algorithms with **unbiased and representative training datasets** is pivotal. It might involve community-driven initiatives to collect diverse data ethically, ensuring a fair and inclusive AI ecosystem.
- **Ethical AI Development:** Encouraging the development of AI through an ethical lens can be facilitated through **national workshops and think-tank deliberations to embed moral principles** in the AI development life cycle, with a potential to set global benchmarks in ethical AI developments.

Conclusion

AI holds transformative potential for healthcare, but, as with any potent tool, it comes with challenges, especially concerning data privacy. It's imperative to **strike a balance between leveraging AI's capabilities while ensuring that patient privacy remains uncompromised**. A forward-looking, collaborative, and regulated approach is the way forward.

6. Discuss several ways in which microorganisms can help in meeting the current fuel shortage.

How to approach the question

Introduction

- Write about microorganisms briefly

Body

- Write about the role of microorganisms in alleviating fuel shortages

- Write ways in which microorganisms can help in meeting the current fuel shortages
- Conclusion**
- Give appropriate conclusion in this regard

Introduction

Microorganisms, primarily consisting of bacteria, fungi, and algae, have been an integral part of Earth's ecosystems, playing pivotal roles in the breakdown and synthesis of organic and inorganic materials. Interestingly, these **microorganisms harbour the potential for addressing contemporary issues like the current fuel shortage**, offering sustainable and eco-friendly solutions.

Body

Role of Microorganisms in Alleviating Fuel Shortages

- **Bioethanol Production:** Microorganisms like *Saccharomyces cerevisiae* play a pivotal role in bioethanol production. For instance, **Brazil** has effectively used this technology, making ethanol from sugarcane, which serves as a primary fuel for automobiles in the region.
- **Bio methanation:** In biomethanation plants in **Germany**, microorganisms are used to convert organic waste such as food scraps into methane. This biogas is a substantial source of renewable energy, decreasing dependency on fossil fuels.
- **Algal Biofuels:** Companies such as **Algenol and Sapphire Energy in the USA** are pioneers in developing technologies to produce biofuels from algae, offering a sustainable and environment-friendly alternative to fossil fuels.
- **Bio-Hydrogen Production:** Certain bacteria like *Enterobacter aerogenes* are being utilized in biohydrogen production processes. **South Korea** has set a benchmark in utilizing biohydrogen as a significant part of their renewable energy strategy.
- **Microbial Fuel Cells:** In microbial fuel cells, *Geobacter sulfurreducens* can oxidize organic compounds to generate electricity. **Pilot projects in places like the United States** are harnessing this potential to treat wastewater while generating power.
- **Synthetic Biology:** Advances in synthetic biology have led to the **creation of genetically modified microorganisms** with enhanced biofuel production capabilities. Eg: **Amyris, a company in the USA**, uses synthetic biology to produce biofuels from sugars through yeast fermentation.
- **Enhanced oil recovery:** Microbes can be used to enhance the recovery of oil from reservoirs. They can break down complex hydrocarbons and make them more accessible for extraction.
- **Carbon capture and storage:** Microbes can be used to capture and store carbon dioxide from industrial processes. They can convert CO₂ into stable minerals, reducing greenhouse gas emissions.
- **Geothermal energy:** Microbes play a role in geothermal energy production by breaking down organic matter in the earth's crust, producing heat that can be harnessed for electricity generation.
- **Hydrogen production:** Microbes can produce hydrogen gas through **fermentation or photosynthesis**. This could potentially be used as a clean and renewable energy source.
- **Microbial Electrolysis Cells (MECs):** The integration of microbial electrolysis in wastewater treatment plants is gaining traction globally, utilizing microorganisms to **generate hydrogen fuel from organic matter** promoting sustainable energy production through waste recycling.

Ways Microorganisms can Help in Meeting Current Fuel Shortages

- **Enhanced Yield: Leveraging cutting-edge genetic engineering techniques** can enhance biofuel yield from microbes, potentially revolutionizing the industry. Collaborations with research institutions can aid in developing high-yield microbial strains, creating a robust biofuel production landscape.
- **Waste Utilization: Instituting pilot projects to utilize municipal and agricultural waste** as a substrate for microbial fuel production can not only address waste management issues but also create a renewable source of energy, establishing a circular economy.
- **Cost-Efficient: Developing decentralized microbial fuel production units** can substantially reduce costs associated with fuel transportation and logistics. Moreover, encouraging startups through subsidies and grants can foster innovations, making the process more cost-effective.
- **Research and Development: Establishing dedicated research hubs in collaboration with academic institutions** can be a hotspot for innovation, steering the country towards self-reliance in fuel production through groundbreaking microbial technologies.
- **Educational Initiatives: Integrating courses on microbial technologies** in educational curricula can nurture professional's adept in the emerging field, fostering a knowledge-rich environment for the growth of the biofuel sector.
- **Government Policies: Crafting conducive government policies to stimulate investments in the microbial fuel sector** can foster a vibrant ecosystem. **Public-private partnerships** can be encouraged to scale up production and make India a global leader in microbial fuel technologies.
- **Skill development: Building training centres in rural areas** to skill the youth in microbial fuel production technologies can create job opportunities and spur economic growth, fostering a skilled workforce ready to lead India's biofuel Revolution.

Conclusion

Going ahead, by embarking on these paths of innovation and sustainability, India can strategically position itself as a front-runner in microbial fuel technology, contributing substantially to meeting the existing fuel shortages with renewable, sustainable, and indigenous solutions. This endeavour not only addresses energy security but also promotes environmental well-being and economic growth.

7. **Dam failures are always catastrophic, especially on the downstream side, resulting in a colossal loss of life and property. Analyze the various causes of dam failures. Give two examples of large dam failures.**

How to approach the question

Introduction

- Write about the pivotal role of dams in country like India briefly

Body

- Write about the catastrophic consequences of dam failures on the downstream side
- Write various causes of dam failures
- Write two examples of large dam failures
- Write suitable way ahead in this regard

Conclusion

- Give appropriate conclusion in this regard

Introduction

Dams have been quintessential in securing water resources and generating hydroelectric power, especially in a diverse and vast country like India. **However, the safety of dams is an alarming**

concern in India given the ageing infrastructure and increasing instances of extreme weather events which can have catastrophic consequences.

Some examples of Dam failure lead to catastrophic event :

- **Uttarakhand Glacier Burst** - On February 7, 2021, a section of a Himalayan glacier detached and moved downwards at a very high velocity, impacting a river and causing high waves and intense floods. The incident triggered floods and damaged two dams in north India, leaving more than 170 people feared dead.
- **Polavaram Dam Failure** - In August 2022, the Polavaram dam in Andhra Pradesh failed to contain the floodwaters of the Godavari river, leading to massive floods in the surrounding areas.
- **Machchhu-2 Dam Failure** - On August 11, 1979, the Machchhu-2 dam in Gujarat failed due to excessive rainfall and massive flooding, resulting in the death of an estimated 1,800 to 25,000 people

Body

Catastrophic Consequences of Dam Failures on the Downstream Side:

- **Loss of Lives: The Machchhu dam failure in 1979** is a heart-wrenching testament to the human toll of dam failures, with thousands of lives lost in a tragic event that shook the nation.
- **Massive Property Damage: The Mullaperiyar Dam in India** highlight the potential for substantial property damage that could affect countless families and businesses in the downstream regions of Kerala.
- **Ecological Destruction: The Ratnagiri dam failure in 2019 in Maharashtra** brought to the fore the severe environmental repercussions of dam failures, causing an ecological imbalance with the loss of flora and fauna, thereby underscoring the need for eco-friendly preventative measures.
- **Displacement: The concerns surrounding the Idukki Dam in Kerala**, emphasize the enormous social issue of displacement, where communities risk losing their homes and livelihoods, creating a cycle of poverty and homelessness that is difficult to break.
- **Long-term Psychological Impact: The survivors of the St. Francis Dam failure in 1928 in the USA** endured long-term psychological trauma, a testimony to the mental health toll dam failures can inflict on individuals, ranging from PTSD to anxiety disorders.

Causes of Dam Failures:

- **Natural Causes: The Bhuj earthquake in 2001** in Gujarat elucidated the susceptibility of dam structures to seismic activities. Several dams in the region suffered varying degrees of damage, spotlighting the need for earthquake-resistant designs.
- **Unprecedented Rains: The Kerala floods in 2018** are a case in point where torrential rains severely stressed dam systems, forcing emergency releases that exacerbated flooding situations and caused widespread destruction, stressing the need for efficient water management systems.
- **Structural Flaws: The Banqiao dam failure in 1975 in China** was partly due to engineering and structural deficiencies, which were unable to withstand the heavy rainfall and storm conditions, thereby emphasizing the need for stringent quality control in construction materials and designs.

- **Human Error:** The **Vajont Dam disaster in 1963 in Italy** was exacerbated due to human errors in the judgment of the geology of the site and overlooking the warning signs, highlighting the need for well-trained personnel in dam operations.
- **Lack of Maintenance:** The report by the **Comptroller and Auditor General (CAG) of India** has recurrently pointed out lapses in the maintenance of various dams across the country, spotlighting the pressing need for regular checks and maintenance to prevent tragic incidents.
- **Age of the Dam:** Many dams in India, like the **Mullaperiyar dam**, are over a century old and have witnessed disputes owing to concerns regarding their structural integrity with age, stressing the requirement for continuous assessment and reinforcement of aging dams.

Way Forward

- **Early Warning Systems:** Inspired by the early warning system operational at **Bhakra Dam**, which employs technology to predict floods, installing such systems across all dams in India, complemented with regular drills, would instill confidence and readiness in the communities
- **Predictive Analysis:** The predictive analytical tools in monitoring dams, **which uses data analytics to foresee possible issues**. Indian dam authorities could collaborate with tech firms to develop indigenous software, thereby ensuring more focused and effective predictive analysis.
- **Community Training:** **Japan routinely involves its citizens in drills** that educate and prepare them for various natural disasters. In India, developing a comprehensive educational module for communities residing near dams can foster a culture of preparedness and self-sufficiency.
- **Collaborative Research:** **International Commission on Large Dams (ICOLD)** offers a global platform to access a reservoir of knowledge and expertise in dam safety. India could increase its engagement with ICOLD, benefiting from global insights and innovations in dam safety.
- **Technological Integration:** **Norway's approach in utilizing real-time sensor networks** in monitoring dam health stands as a benchmark for India to consider, possibly resulting in a network that communicates data to a centralized system for continuous monitoring.
- **International Collaboration:** **World Bank's Dam Safety Project** for dam safety stands as an exemplary platform for international collaboration. India can actively engage with such organizations, fostering exchanges that lead to safer, innovative, and sustainable dam safety solutions.

Efforts by Government:

- **Dam safety act 2021:** The Act provides for the surveillance, inspection, operation, and maintenance of all specified dams across the country.
- **DRIP project:** World Bank assisted Dam Rehabilitation and Improvement Project (DRIP), to improve the safety and operational performance of selected dams, coupled with institutional strengthening through a system wide management approach.

Conclusion

While dams remain indispensable to India's developmental goals, safety cannot be compromised. By **crafting policies inspired by global success stories and grounded in community participation and technological advancements**, India can ensure the safe and sustainable operation of its dams, safeguarding countless lives and precious resources.

8. What is oil pollution? What are its impacts on the marine ecosystem? In what way is oil pollution particularly harmful for a country like India?

How to approach the question

Introduction

- Write about oil pollution briefly

Body

- Write about the sources of oil pollution
- Write its impacts on the marine ecosystem
- Write ways in which oil pollution particularly harmful for a country like India
- Write suitable way ahead in this regard

Conclusion

- Give appropriate conclusion in this regard

Introduction

Oil pollution refers to the **introduction of oil substances, primarily from anthropogenic activities**, into the oceans, where it has detrimental impacts on the marine ecosystem. This type of pollution can come from a variety of sources and causes a range of negative effects, some of which are long-lasting and severe.

- **Data regarding oil pollution:**

There was an average of 1.8 large oil spills from tanker incidents every year in the decade from 2010 to 2019.

In 2022, four oil spills were reported in which more than 700 metric tons of oil was leaked.

Body

Sources of Oil Pollution

Natural Sources:

- **Seepages:** While oil seepages are more commonly noted in locations **such as the Coal Oil Point Seep in the US**, India too faces challenges from natural seepages in its coastal regions. The continuous release of oil through these processes can have adverse environmental effects.
- **Volcanic Eruptions:** While significant oil pollution from volcanic eruptions remains rare, there are significant risks involved, especially in regions prone to volcanic activities. Eg: **The Indian Ocean which is home to several underwater volcanoes**, is one such region.
- **Erosion:** Erosion can sometimes contribute to oil pollution. In India, regions rich in geological formations, **such as the Assam Basin**, can potentially lead to oil substances being washed into the surrounding water bodies, presenting a notable environmental risk.

Anthropogenic Sources:

- **Oil Spills:** Globally, incidents **like the Deepwater Horizon spill and 2017 off the coast of Chennai** when two merchant vessels collided resulted in a significant oil spill affecting marine life and local ecosystems.
- **Industrial Runoff:** Across the world, and in India, industrial activities near water bodies have led to pollution incidents. For instance, the **recent oil spill in the Sundarbans**, a UNESCO World Heritage Site, resulted from an oil tanker sinking.
- **Marine Transportation:** The transportation of oil via maritime routes presents a consistent risk of oil spills. Globally, **the 1989 Exxon Valdez oil spill and in 2010, the MSC Chitra collision off the Mumbai coast** led to an oil spill are examples in this regard.

Impacts on the Marine Ecosystem

- **Physical Smothering:** In events such as the **Exxon Valdez oil spill in Alaska (1989)**, numerous marine creatures got enveloped in oil, severely impeding their movement and ability to hunt, essentially strangling the vibrant life in those aquatic realms.
- **Toxic Effects:** The **Deepwater Horizon accident in 2010** highlighted the toxicological impacts of oil pollution, where marine fauna suffered due to the poisonous substances in oil, which can lead to hormonal imbalances and other health issues.
- **Human Health:** Reports from various global regions post-major oil spills have indicated a rise in health issues owing to the **consumption of seafood contaminated by oil**, portraying the direct health risks posed to humans through the disruption of marine life's purity and health.
- **Reproductive Issues:** Various research post-oil spills globally have recorded **marine organisms experiencing reproductive issues** due to exposure to oil pollutants, underlining the grave danger posed to the reproductive viability of marine species.
- **Food Chain Disruption:** The **Chennai oil spill in 2017**, where the oil interfered with the natural diet of many marine species, inducing a domino effect that disturbed the entire marine food web, thus revealing the intricate interdependent relationships in marine ecosystems.

Impacts on India

- **Threat to Biodiversity:** India's marine biodiversity, including the vibrant coral reefs of the Andaman and Nicobar Islands, faces serious threats from oil pollution. For instance, **the Mumbai oil spill in 2011** severely affected marine life, putting endangered species at even more risk.
- **Impact on Fisheries:** The fishery industry is vital for India, both economically and for sustenance. Sadly, **incidents like the oil spill from the ship MV Rak near Mumbai** have shown a drastic decrease in the fish catch, affecting the livelihoods of the fishing communities gravely.
- **Tourism:** Tourist paradises **like Goa and other coastal regions** can lose their allure with beaches getting polluted from oil spills. This not only tarnishes the beauty of these places but can severely affect the tourism industry, which is a substantial revenue earner for states with coastal belts.
- **Community Livelihoods:** Coastal communities in regions **like Kerala and Tamil Nadu** rely heavily on the marine ecosystem for their livelihoods. Oil pollution jeopardizes their living, affecting not just their income but also their cultural and social fabric, as witnessed during the Ennore oil spill in 2017.
- **Air and Water Quality:** The **Mumbai oil spill in 2010** shed light on the deterioration of air and water quality, with locals experiencing adverse health effects, pinpointing the deeper environmental repercussions that extend to affecting the quality of basic natural resources essential for life.

Way Forward

- **Strict Regulations:** Need to leverage blockchain technology for better transparency. Just as the diamond industry uses blockchain for ensuring the ethical sourcing of diamonds, a similar strategy could be employed to **ensure responsible shipping operations, minimizing risks of oil spills**.
- **Virtual Reality (VR) Workshops:** Taking inspiration from the success of VR in education sectors, communities near coastal areas can be sensitized through a series of VR workshops **illustrating the catastrophic effects of oil spills**, potentially spearheaded by organizations like UNESCO.

- **AI for Predictive Analysis:** Leveraging AI, **similar to IBM's PAIRS Geoscope** which facilitates fast geospatial analytics, a tool can be developed to help in the predictive analysis of potential spill incidents based on various parameters, including weather patterns and shipping routes.
- **International Collaboration:** The **'Global Maritime Forum' annual summit** is a commendable initiative, encouraging dialogue and collaboration among maritime industry stakeholders to address sectoral challenges, including those pertaining to oil pollution.
- **Nano-Technology in Cleanup:** Research projects **like those undertaken by MIT on nanowire meshes** to separate oil from water represent promising frontiers in advancing cleanup technologies, illustrating the potential effectiveness of nanotechnology in combating oil spills.
- **Solar and Wind Propelled Ships:** Companies **like Eco Marine Power in Japan** are working on renewable energy solutions for shipping, establishing that a transition to cleaner energy sources in maritime transport is both feasible and beneficial.
- **Effective use of international mechanism : MARPOL Annex I** clearly established the guidelines for oil pollution and ecological conservation.

Conclusion

To safeguard its rich marine biodiversity and the health and livelihood of its coastal communities, India must spearhead initiatives to curb oil pollution. The **pathway forward should entail a harmonized effort to preserve the marine ecosystem, enhancing India's resilience** against the devastating effects of oil pollution.

9. **Winning of 'Hearts and Minds' in terrorism-affected areas is an essential step in restoring the trust of the population. Discuss the measures adopted by the Government in this respect as part of the conflict resolution in Jammu and Kashmir.**

How to approach the question

Introduction

- Write about Winning of 'Hearts and Minds' in terrorism-affected areas briefly

Body

- Write why Winning of 'Hearts and Minds' in terrorism-affected areas is an essential step in restoring the trust of the population
- Write the measures adopted by the Government in this respect as part of the conflict resolution in Jammu and Kashmir

Conclusion

- Give appropriate conclusion in this regard

Introduction

Jammu and Kashmir, a region beset with conflict for several decades, has witnessed a series of strategies implemented to restore peace and harmony. One pivotal strategy in this regard is **winning the 'hearts and minds' of the people** in terrorism-affected areas. This strategy aims at restoring trust and building a foundation for peaceful coexistence through a community-centric approach.

Body

Winning of 'Hearts and Minds' in Terrorism-Affected Areas is Essential for the Following Reasons:

- **Civic Participation:** Winning the 'hearts and minds' ensures active civic participation. In **Colombia, during its fight against FARC rebels**, the government prioritized community engagement, leading to better local governance and public participation in civil duties.

- **Counter Radicalization:** When communities trust their leaders, they are less likely to be influenced by extremist ideologies. **Programs like the Sabaoon Rehabilitation Center**, have helped de-radicalize many young minds, showcasing the power of trust and compassion.
- **Strengthening Intelligence:** Mutual trust often leads to better intelligence sharing from the community. The **Boston Police Department's community outreach, post the Boston Marathon bombing** shows how local intelligence can aid authorities when there's mutual trust.
- **Promotion of Non-Violent Means:** It can divert attention from violent protests to non-violent negotiations. The **Philippines' peace talks with the Moro Islamic Liberation Front (MILF)** saw success mainly due to efforts in winning the 'hearts and minds' of the Moro community.
- **Emotional Healing:** Conflicts often leave deep emotional scars. In **Rwanda, post the 1994 genocide**, community-based reconciliation processes were initiated to address past traumas, thereby mending hearts and nurturing reconciliation.
- **Facilitating International Relations:** When a nation wins the trust of its citizens, it can reflect positively in its international relations. **Myanmar's peace process with its ethnic minorities** showcased to the world its commitment to peace, potentially influencing foreign policies.
- **Establishing Trust:** Trust forms the bedrock of any relationship. In Northern Ireland, during the Troubles, **community outreach by officials played a critical role in establishing trust** between the Protestant and Catholic communities, showed importance of winning hearts.

Measures Adopted by the Government in this respect as part of the conflict resolution in Jammu and Kashmir

- **Community Building:** Under the banner of “**Operation Sadbhavana (Goodwill)**,” a series of community engagement initiatives were launched. It has involved activities such as educational tours for students, healthcare camps, and women empowerment initiatives, encouraging peace and harmony.
- **Rehabilitation of Militants:** These policies aim to guide militants back to mainstream society, offering them a second chance at life through **various vocational training and educational programs**, thus aiming to eradicate the roots of terrorism.
- **Infrastructure Development:** Leveraging schemes like the “**Pradhan Mantri Gram Sadak Yojana**,” the government sought to bridge the developmental gap in rural areas by enhancing connectivity through better road networks.
- **Healthcare Initiatives:** The **establishment of institutions like AIIMS in the region** marked a milestone in upgrading the healthcare infrastructure, bringing world-class healthcare facilities closer to the people, with an anticipated ripple effect on the overall well-being of the community.
- **Community Dialogues:** The “**Back to Village**” program established a two-way communication channel between the administration and rural communities. It brought bureaucrats and officials directly to the villagers, aiming to address their concerns more effectively and inclusively.
- **Youth Engagement:** Through the “**Khelo India**” program, the government has been nurturing young talents, providing them platforms to hone their skills and encouraging them to pursue sports, instilling a sense of discipline and teamwork.
- **Positive Media Narratives:** Community radio stations have risen as a powerful tool in shaping positive narratives, **fostering community development through programs** that encourage unity and highlight the rich cultural tapestry of the region.

- **Connectivity Initiatives:** To enhance information flow and connectivity, the government embarked on infrastructural developments, **such as the installation of broadband and mobile networks**, connecting the once isolated areas and created opportunities for local people.

Conclusion

The **'hearts and minds' strategy remain central to envisioning a peaceful future in the J&K**. It embarks on a collaborative approach, involving local communities actively in rebuilding the region towards harmony and progressive development. The way forward is nurturing this strategy with **continual efforts, fostering trust, and engendering a harmonious community for a peaceful tomorrow**.

10. **The use of unmanned aerial vehicles (UAVs) by our adversaries across the borders to ferry arms / ammunitions, drugs, etc., is a serious threat to internal security. Comment on the measures being taken to tackle this threat.**

How to approach the question

Introduction

- Write about the use of UAVs for nefarious purposes briefly

Body

- Write how the use of UAVs by our adversaries across the borders poses serious threat to the internal security
- Write the measures being taken to tackle this threat
- Write issues faced by these measures
- Write suitable way ahead in this regard

Conclusion

- Give appropriate conclusion in this regard

Introduction

Recent attack on the Indian Air Force (IAF) base in Jammu was attacked using two low-intensity improvised explosive devices (IEDs) create concern of use of UAV in border areas. An **unmanned aerial vehicle (UAV)** is an aircraft that carries no human pilot or passengers. In recent times, the utilization of unmanned aerial vehicles (UAVs) or drones for illicit activities **including the smuggling of arms, ammunition, and drugs across borders** has emerged as a significant threat to internal security for India, raising a series of challenges for the national security apparatus.

Body

Use of UAVs by our adversaries across the borders poses serious threat to the internal security as

- **Facilitation of Terrorism:** There have been instances where UAVs were **suspected to drop arms and ammunition in Punjab** near the India-Pakistan border, raising alarms about how they could equip militant groups within India.
- **Drug Trafficking:** Drones have been intercepted for **carrying narcotics across the India-Pakistan border**, exacerbating the existing drug abuse problem in states like Punjab.
- **Surveillance and Espionage:** UAVs have been sighted on **multiple occasions in Jammu and Kashmir**. These aerial vehicles could be used to gather intelligence on troop movement and sensitive installations, echoing espionage risks.
- **Safety Hazards:** UAVs also pose a risk to civilian aircraft. For example, **Mumbai's Chhatrapati Shivaji International Airport** had a scare when a drone was spotted flying dangerously close to a commercial airline in 2017.

- **Economic Implications:** The economic impact of UAVs **ferrying counterfeit goods or smuggling expensive materials** could undermine local economies and affect public health, as seen with the illegal transportation of tobacco products in some border areas.
- **Psychosocial Impact:** The presence of UAVs, especially **near conflict zones like the Line of Control in the J&K**, increases stress and anxiety among the local population. Reports of drone activities in these regions have led to increased public fear and anxiety over potential attacks.

Measures Taken to Tackle This Threat

- **Anti-Drone Technologies:** India's DRDO has been developing **anti-drone technologies capable of jamming or disabling rogue UAVs**. These were notably deployed during the 2020 Republic Day celebrations in Delhi as a preventive measure.
- **Intelligence Sharing:** India collaborates with agencies like Interpol and intelligence units from friendly nations to monitor potential UAV threats. For example, **India and the United States have held discussions** on intelligence sharing concerning UAV activities.
- **Legal Framework:** The **Directorate General of Civil Aviation (DGCA)** has issued guidelines that lay down the legal framework for operating UAVs. Offenders can face imprisonment, illustrating the gravity of UAV-related offenses.
- **Research and Development:** DRDO is investing in cutting-edge technologies **such as "soft kill" measures that can disable UAVs** electronically without causing collateral damage. This is part of India's broader initiative to develop indigenous technologies to counter UAV threats.
- **Training and Capacity Building:** Special units within the military and paramilitary forces are receiving specific training on countering UAV threats. The **NSG (National Security Guard)** and **CRPF (Central Reserve Police Force)** are among them.
- **Collaboration with Tech Companies:** The Indian government is collaborating with tech companies **like Tata and Reliance to develop geo-fencing technologies** that prevent UAVs from entering sensitive zones.
- **Community Engagement:** Border communities are often involved in vigilance activities. Eg: **In Punjab, local farmers have been encouraged to report any suspicious UAV sightings**, acting as a grassroots-level security measure.

Issues Faced by These Measures

- **Technological Limitations:** Even with state-of-the-art systems like those developed by DRDO, technological limitations exist. Eg: small, low-flying drones can often escape detection by radar systems, **as was the case in the 2019 drone attack on an oil facility in Saudi Arabia**.
- **Coordination Issues:** Effective response to UAV threats requires coordination between military, intelligence agencies, and local law enforcement. Gaps in coordination were **evident during the 2016 Pathankot Airbase attack**, exposing vulnerabilities that terrorists could exploit.
- **False Alarms:** Systems are prone to false alarms, as seen in **some international airports where bird movements triggered drone-detection systems**, leading to temporary closures and resource drain.
- **Geographical Challenges:** India's diverse geography, from the Himalayas to the deserts of Rajasthan, makes uniform implementation of anti-drone measures complex. This was evident during a **recent exercise in the Thar Desert, where sand and heat interfered with the equipment**.
- **Cybersecurity:** Any system connected to a network is susceptible to cyber-attacks. The risk was highlighted **when Iran claimed to have hacked and captured an American UAV in 2011**. This raises questions about the potential vulnerabilities in India's anti-drone systems.

Suitable Way Ahead

- **Advanced Research:** A concerted push for advanced research in anti-drone technology is crucial. The government could **sponsor "Drone Defense X-Prizes,"** similar to the Lunar X-Prize, to incentivize breakthroughs in drone detection and neutralization.
- **Collaborative Approaches:** A **"UAV Regulatory Sandbox"** can be established, inviting tech companies, policy experts, and the general public to test and provide feedback on new drone regulations, ensuring that rules are practical and take multiple perspectives into account.
- **Industry Regulations:** New laws could **require UAV manufacturers to include "Geo-Fencing" features** that prevent drones from entering restricted zones automatically. Such technology could be vetted and standardized by aviation authorities.
- **Capacity Building:** Continuous training modules can be developed **using Machine Learning algorithms** that adapt to the evolving tactics employed by adversaries, ensuring that security forces are always a step ahead in countering threats.
- **Ethical Guidelines:** An **independent "Drone Ethics Board"** can be established to review and issue guidelines on the ethical use of UAVs, especially concerning surveillance and data collection. It could include ethicists, lawyers, technologists, and community representatives.
- **Youth Engagement:** **National-level hackathons and "Drone Innovation Camps"** can be organized for young tech enthusiasts to brainstorm and develop new anti-drone technologies. The best ideas could be funded for further research and development by government or private agencies.

Conclusion

As the illicit use of UAVs by adversaries poses a multifaceted threat to India's internal security, a forward-looking, collaborative, and multi-pronged strategy remains essential. By **adopting these innovative approaches, India can not only effectively counter the growing drone-related security threats but also foster a balanced and responsible use** of this transformative technology.

11. **Most of the unemployment in India is structural in nature. Examine the methodology adopted to compute unemployment in the country and suggest improvements.**

How to approach the question

Introduction

- Write about unemployment in India emphasizing on structural unemployment briefly

Body

- Write how most of the unemployment in India is structural in nature
- Write about the methodology adopted to compute unemployment in the country
- Write suggestions for improvements

Conclusion

- Give appropriate conclusion in this regard

Introduction

Unemployment refers to the share of the labor force that is without work but available for and seeking employment. **India's unemployment rate for 2022 was 7.33%** affecting millions of people. One of the main causes of unemployment is **structural unemployment**, which occurs when there is a mismatch between the skills of the workers and the skills demanded by the employers.

Body

Reasons why most of the unemployment in India is structural in nature

- **Skill Gap:** The education system in India is often critiqued for being more theoretical than practical. **Reports like the ASER indicate that a large number of graduates are not employable due to skill deficiencies.** Initiatives like Skill India are still not sufficient to bridge this gap.
- **Technology Shifts:** Rapid technological changes, especially automation and AI, have rendered certain jobs obsolete. Eg: **the closure of Nokia's manufacturing plant in Chennai** displaced thousands of workers who lacked the technical skills for jobs in emerging industries.
- **Jobless growth:** Machine learning and robotics create structural changes in industrial functioning creating concern for Jobs.
- **Industrial Changes:** Traditional sectors like agriculture are declining, both in GDP contribution and employment opportunities. The **near-collapse of the handloom industry in places like Varanasi** left many artisans unemployed, highlighting the failure to transition workers into new roles.
- **Geographical Imbalance:** Metropolitan cities like Bangalore and Mumbai are hubs for tech and finance jobs, respectively, but employment opportunities are sparse in rural regions. The **regional focus of Special Economic Zones (SEZs)** also exacerbates this imbalance.
- **Outdated Economic Policies:** Policies that do not align with contemporary economic conditions can create structural unemployment. For example, the **focus on traditional manufacturing over service sectors** can cause misalignment in job skills.

Methodology for Computing Unemployment in India: An In-depth Look

- **Periodic Labour Force Survey (PLFS):** Conducted annually by the Ministry of Statistics and Programme Implementation, PLFS is considered the **most comprehensive survey for measuring unemployment.**
- **Census:** Conducted every decade, the Census provides a **macroscopic view of employment trends.** While it's exhaustive, it is outdated almost as soon as it's published due to the long intervals between each survey.
- **NSSO Surveys:** The National Sample Survey Office conducts **employment-unemployment surveys** roughly every five years. These surveys are based on samples, which may or may not capture the real state of employment accurately.
- **Tertiary Sources:** Reports from private research organizations, think-tanks, and international bodies **like the World Bank** provide alternate viewpoints. However, the data may not be as rigorous as government-sponsored surveys.
- **Online Portals:** Government job portals **like the National Career Service** do collect some data, but they are not exhaustive as they only capture formal sector employment and those actively seeking jobs online.

Suggestions for Improving Unemployment Data Methodology in India

- **Real-time Data:** The government should **leverage Big Data analytics and Internet of Things (IoT)** to gather real-time unemployment statistics for timely interventions and policy adjustments. Eg: real-time job portal analytics can be used to track demand and supply in the job market.
- **Skill Mapping:** Regular skill mapping surveys could be **conducted across various sectors.** Such surveys could identify the mismatch between education and industry requirements, thereby addressing structural unemployment effectively.
- **Transparency:** All collected data and subsequent reports should be made publicly available in an easy-to-understand format. **Dashboards could be created for real-time public monitoring of employment statistics.**

- **Policy Feedback Loop:** A system should be created where this enhanced data is immediately used to impact policy decisions. Eg: if **data shows high unemployment in a specific sector, immediate policy interventions**, such as skill development programs, could be initiated.
- **Incorporate Underemployment:** The concept of underemployment, where people work below their skill level or part-time, should be integrated into official statistics. **Countries like Australia have already adopted such metrics** to provide a more nuanced understanding of the labour market.

Conclusion

Understanding structural unemployment is crucial for formulating effective policy measures. Current methodologies for computing unemployment in India offer a starting point but have room for improvement. **Adopting innovative data collection and analysis methods can provide more accurate insights**, thereby enabling targeted interventions for alleviating structural unemployment.

12. Distinguish between 'care economy' and 'monetized economy'. How can the care economy be brought into monetized economy through women empowerment?

How to approach the question

Introduction

- Write about 'care economy' and 'monetized economy' briefly

Body

- Write differences between 'care economy' and 'monetized economy'
- Write how the care economy can be brought into monetized economy through women empowerment

Conclusion

- Give appropriate conclusion in this regard

Introduction

The '**care economy**' and the '**monetized economy**' are two separate yet interrelated aspects of the broader economic system. While the **monetized economy** involves activities that are directly paid for and measured in GDP, the **care economy** involves unpaid or underpaid work, often performed by women, that is crucial for the well-being of families and communities. According to the ILO, the value of unpaid care work (monetary value equivalent to the minimum wage) would be 0.4 percent of the GDP for men and 3.1 percent of the GDP for the unpaid work done by women

Body

Differences Between 'Care Economy' and 'Monetized Economy'

Aspect	Care Economy	Monetized Economy
Nature of Work	The work in the care economy often involves unpaid tasks such as childcare, eldercare, and household chores . These activities are essential for the well-being of families and communities but are usually not compensated.	In the monetized economy, work revolves around the production of goods and services that are exchanged for money. These include jobs in sectors like manufacturing, services, and technology.
Recognition	Work in the care economy is not officially accounted for in national GDP statistics, rendering it " invisible " despite its importance.	Jobs in the monetized economy contribute directly to GDP and other economic indicators. These roles are officially recognized as 'work' in

		economic reports.
Gender Participation	The care economy is predominantly female-driven , with women disproportionately responsible for caregiving and housework.	The monetized economy, although still skewed , has a more balanced gender distribution across different sectors and roles.
Skill Level	The care economy often requires emotional labour, patience, and multitasking, skills that are generally not certified or formally taught .	The monetized economy frequently requires specialized skills and qualifications that are recognized through formal education and certification .
Benefits	Emotional and social benefits may accrue from work in the care economy, but these activities do not offer financial compensation.	Employment in the monetized economy comes with financial benefits such as salaries, bonuses, and opportunities for wealth accumulation.
Economic Value	The economic value of the care economy is largely unmonetized and hence invisible. This often leads to a lack of policy focus and investment in this area.	The value created in the monetized economy is tangibly measured and therefore easier to assess, manage, and invest in .
Taxation	Activities in the care economy are not subject to taxation since no formal income is generated from these services.	Income and profits generated in the monetized economy are subject to various forms of taxation , contributing to public finances.
Stability	Tasks in the care economy tend to be long-term and consistent , often stretching over many years, such as caring for a child or elderly parent.	Jobs in the monetized economy can be temporary, seasonal, or contractual , often lacking the long-term stability found in care work.
Hours	The care economy often operates on a flexible but demanding schedule. Caregiving responsibilities can be unpredictable and require around-the-clock attention .	The monetized economy usually operates within defined hours , with opportunities for overtime and additional compensation for extended work.
Regulation	The care economy is largely unregulated, leaving caregivers without a safety net or formal legal protections .	The monetized economy is subject to various regulations, including labour laws and occupational safety standards , providing a level of protection for workers.

Bringing Care Economy into Monetized Economy Through Women Empowerment

- **Blockchain-Verified Skill Credentials:** Platforms like **Accredible** are already using blockchain to verify academic credentials. This can be adapted for caregiving skills, adding credibility to unpaid care work done by women.
- **Care Economy Digital Platforms:** Similar to **Uber and TaskRabbit**, specialized platforms like Care.com could be expanded to include a broader range of care services, providing more monetized opportunities for women caregivers.

- **Recognizing the value of care work:** The value of care work needs to be recognized and acknowledged. This will enable women who are engaged in care work to be compensated fairly for their services.
- **Providing social protection:** Women who are engaged in care work should be provided with social protection measures such as **health insurance, maternity benefits, and pension schemes**. This will ensure their financial security and enable them to contribute to the monetized economy.
- **Encouraging entrepreneurship:** Women should be encouraged to start their own businesses in the care economy. This will provide them with an opportunity to become self-employed and contribute to the monetized economy. **Ex. Lijjat Papad**
- **Providing access to finance:** Women who are engaged in the care economy should be provided with access to finance. This will enable them to invest in their businesses and expand their operations, thereby contributing to the monetized economy. Use of **SHG** can be effective here .
- **Social Impact Bonds for Care:** The success of Social Impact Bonds in sectors **like girl's education in Rajasthan** could be translated into the care economy. Funds from these bonds can be allocated to pay caregivers for community services, providing them with a stable income.
- **Skill training:** For shifting industrial demands and nature of jobs. Also, men should be trained for helping in care economy as well.
- **Care Economy Co-operatives: Mondragon Corporation in Spain** is a successful example of a worker co-op model. A similar structure could help caregivers negotiate better terms, securing a stable income for women.
- **AI-Enhanced technology use : Platforms like LinkedIn** use AI algorithms for job matching. A similar AI model could be used for caregiver matching, ensuring compatibility between caregivers and recipients.
- **Tokenization of Care Work: Cryptocurrencies like Bitcoin** provide a framework for tokenization. Implementing a similar structure for care work can allow women to earn tokens that are **redeemable for goods, services, or even fiat currency**.
- **Global Care Exchange Programs: Au pair programs** have been successful in offering international childcare opportunities. Extending this to other forms of care work can **broaden horizons and enhance earning prospects for women caregivers**.

Conclusion

These **strategies, backed by real-world examples**, pave the way for innovative integration of the care economy into the monetized economy. The central idea is to leverage existing technologies and financial mechanisms to **provide women with fair compensation, recognition, and better opportunities in caregiving roles**, thus empowering them economically and socially.

13. Explain the changes in cropping pattern in India in the context of changes in consumption pattern and marketing conditions.

How to approach the question

Introduction

- Write about cropping pattern in India briefly

Body

- Write the changes in cropping pattern in India
- Write about the influence of changes in consumption pattern over cropping pattern
- Write about the influence of marketing conditions over cropping pattern

- Write suitable way ahead in this regard
- Conclusion**
- Give appropriate conclusion in this regard

Introduction

Cropping pattern is the **spatial representation of crops rotations, or the list of crops** that are being produced in an area and their sequence in time. In India, it has historically been influenced by a range of factors including climate, soil type, and water availability. **In recent years, shifts in consumption patterns and marketing conditions** have played an increasingly significant role.

Body

Changes in Cropping Pattern in India

- **From Food Crops to Cash Crops:** The Green Revolution initially emphasized food grains like wheat and rice to achieve food security. In **recent years, however, farmers in Maharashtra and Punjab** have been increasingly growing cash crops like **sugarcane and cotton**.
- **Introduction of GM Crops: Bt Cotton,** a genetically modified crop, has revolutionized cotton farming. States like **Gujarat and Maharashtra** have adopted this technology, as these GM crops offer better yield and are more pest-resistant.
- **Organic Farming:** The state of **Sikkim** has led the way by becoming India's first 100% organic state. This transformation taps into the rising consumer demand for organic produce, which is seen as healthier and more environmentally friendly.
- **Multi-Cropping and Crop Rotation:** In states like **Punjab and Haryana**, farmers are using multi-cropping and crop rotation techniques with crops like wheat, rice, and mustard to preserve soil fertility and optimize yield, reflecting a shift towards sustainable farming practices.
- **Horticulture:** In colder climates like **Himachal Pradesh and Jammu & Kashmir**, fruit cultivation—particularly apples and cherries—has picked up due to the growing domestic market and lucrative export opportunities.
- **Spices and Floriculture:** **Kerala's** flourishing spice cultivation, especially of black pepper and cardamom, has carved a niche in the global market. Similarly, **Karnataka** has become a hub for floriculture, indicating a diversification within the agricultural sector.
- **Traditional Crops:** Nutrient-rich millets like **ragi and jowar are experiencing a revival. In states like Karnataka**, government incentives and campaigns are encouraging farmers to revert to these traditional grains due to their health benefits and lower environmental impact.

Influence of Changes in Consumption Pattern

- **Health Awareness:** As people become more health-conscious, **crops like quinoa and chia seeds are being cultivated in regions** like Tamil Nadu and Himachal Pradesh. These superfoods cater to a growing market that values nutritional benefits.
- **Fast Food Culture:** The explosion of fast-food chains like **McDonald's and KFC in India** has led to **increased cultivation of potatoes**, particularly in states like Uttar Pradesh and Punjab, to meet the demand for fries and other potato-based fast foods.
- **High Protein Demand:** With the rising trend of gym culture and health awareness, the demand for high-protein diets has grown. As a result, **fodder crops like alfalfa are being increasingly cultivated in states like Haryana and Rajasthan** to support livestock for meat production.

- **Global Cuisine:** The international food trend has paved the way for the **cultivation of herbs and spices like basil and oregano**. Places like Kerala and Himachal Pradesh are catching up with this trend to meet the culinary needs of global dishes.
- **Beverage Industry:** Rising local and international demand for Indian tea and coffee has boosted their **cultivation in Assam for tea and Karnataka for coffee**. Specialty drinks like green tea have also found their way into agricultural practices.
- **Diet Trends:** Diets like **Keto and Paleo have popularized low-carb alternatives**, driving the cultivation of crops like cauliflower. Farmers in Punjab and Haryana are now producing cauliflower not just for traditional consumption but also as a substitute for rice and other grains in these diets.

Influence of Marketing Conditions

- **E-commerce:** Platforms like Big Basket and Amazon Pantry are not just shopping destinations but also channels for farmers. **Organic turmeric and exotic vegetables like zucchini** are now reaching urban consumers directly, changing the cropping patterns among farmers.
- **Globalization:** Export demand is reshaping India's agricultural landscape. **Grapes from Maharashtra and bananas from Gujarat** are now being shipped to European and Middle Eastern markets, affecting what crops are grown and where, as farmers aim to meet international demand.
- **Retail Chains:** National retail chains like Reliance Fresh or Big Bazaar have procurement deals with farmers. Farmers in Punjab and Haryana are switching to **high-yield and fast-selling vegetables like bell peppers and cherry tomatoes** to ensure a steady income.
- **Contract Farming:** Brands like PepsiCo offer contracts to farmers for specific potato varieties used in their chips. It provides a guaranteed market and price, influencing farmers in **West Bengal and Uttar Pradesh to allocate more land to these specific potato varieties**.
- **Industrial development :** Like ketchup industry near Pune established new tomato -Chilli led cropping pattern in western Maharashtra .
- **Logistics:** As India's supply chain infrastructure improves, it's becoming feasible to grow perishable crops. **Himachal Pradesh and Uttarakhand, for example, have seen an uptick in strawberry and apple farming** thanks to better cold storage and transport facilities.
- **Market Information:** Apps providing real-time market prices are enabling farmers to switch crops based on demand. For instance, **farmers in Rajasthan have shifted from wheat to mustard** after seeing higher market prices for mustard.

Way Ahead

- **Technology Integration:** A blockchain-based system could offer transparency in crop pricing and demand forecast. For example, **IBM's Food Trust blockchain technology** aims to track the food supply chain, which can be customized for Indian agriculture.
- **Financial Instruments:** Introducing futures and options in the agricultural commodity market can help farmers hedge against price volatility. For instance, a **platform like Upstox or Zerodha** could include a segment specially designed for agricultural commodities.
- **Policy Tweaks:** Realigning MSP with current consumption trends can help diversify the crop mix. An **AI-based dynamic MSP system** could adapt in real-time to domestic and global demand changes, thus guiding farmers better.
- **Quality Certification:** Introduce internationally recognized quality certifications specifically for Indian produce. This can open doors to premium markets overseas. **Blockchain technology could be used to validate the authenticity of these certifications**.

- **Consumer Education:** Implement nationwide campaigns to educate consumers on the benefits of consuming local and seasonal produce. Also launch a “**Know Your Farmer**” initiative, where **QR codes on products** give information about the farmer and farm it came from.
- **Community Markets:** The establishment of more farmer markets like **Delhi’s Dilli Haat but specialized in produce**, would allow farmers to sell directly to consumers. An online version of these markets could be developed for a broader reach.

Conclusion

Understanding the changing cropping patterns in India requires a multifaceted view that incorporates consumption trends and market dynamics. Going ahead, **strategic integration of technology, financial systems, effective PPP for agri startups and agricultural educational resources** can significantly benefit farmers while meeting the ever-changing consumer demands and market conditions.

14. What are the direct and indirect subsidies provided to farm sector in India? Discuss the issues raised by the World Trade Organization (WTO) in relation to agricultural subsidies.

How to approach the question

Introduction

- Write about subsidies for farm sector in India briefly

Body

- Write the direct and indirect subsidies provided to farm sector in India
- Write the issues raised by the World Trade Organization (WTO) in relation to agricultural subsidies
- Write suitable way ahead in this regard

Conclusion

- Give appropriate conclusion in this regard

Introduction

Agricultural subsidies are financial aids provided by the government to support farmers in improving their income, reducing the cost of farming, and promoting agricultural sustainability. These subsidies play a crucial role in maintaining the health of the farm sector, especially in developing economies like India. **Farm subsidies constitute about 2% of India's GDP.**

Body

Direct and Indirect Subsidies in the Farm Sector in India

Direct Subsidies:

- **Direct Benefit Transfers (DBT):** One such example is the **PM-KISAN scheme** where financial support of **Rs. 6,000 per year** is directly deposited into the farmers' bank accounts. This cuts out the middlemen, ensuring that the full benefit reaches the farmers.
- **Input Subsidies:** Subsidies on fertilizers, such as under the Nutrient Based Subsidy (NBS) scheme, make key inputs like Urea and DAP more affordable. For example, a **50 kg bag of Urea retails at about Rs. 268**, which is significantly less than the market price.
- **Credit Subsidies:** Under schemes like the **Kisan Credit Card (KCC)**, farmers are offered loans at subsidized rates. This lowers their financial burden and enables them to invest in quality inputs.

- **Insurance Schemes:** The **Pradhan Mantri Fasal Bima Yojana (PMFBY)** offers farmers subsidized crop insurance. This helps to mitigate losses due to unforeseen events like droughts or floods.

Indirect Subsidies:

- **Irrigation Subsidies:** Government schemes like the **Accelerated Irrigation Benefits Program (AIBP)** help states complete pending irrigation projects. The subsidies can cover up to 60% of the total cost, incentivizing farmers to move towards more efficient irrigation methods.
- **Power Subsidies:** Many states, including **Punjab and Haryana**, offer free or subsidized electricity for agricultural purposes under their respective state schemes. This enables farmers to operate tube wells and irrigation pumps without incurring high energy costs.
- **Transport Subsidies:** Various state governments offer subsidies for transporting agricultural produce to markets. The **Rashtriya Krishi Vikas Yojana (RKVY)** is one such scheme aimed at strengthening post-harvest distribution infrastructure.
- **Seed subsidy:** To upgrade the quality of farmers' saved seeds, financial assistance for distribution of foundation/certified seeds **at 50% cost of the seeds for cereal crops and 60% for pulses, oilseeds, fodder** and green manure crops for production of quality seeds is available /provided for one acre per farmer under the component Seed Village Programme of SMSP
- **Warehousing Subsidies:** Schemes like the Warehousing Development and Regulatory Authority (**WDRA**) offer **subsidies for the construction of storage facilities**. This helps in reducing post-harvest losses and ensures better price realization for farmers.

Issues Raised by WTO on Agricultural Subsidies

- **Amber Box Subsidies:** According to WTO norms, subsidies in the Amber Box should be reduced or eliminated. India argues that such subsidies are essential for its small-scale farmers. Eg: **the fertilizer subsidies fall under this category**, which India maintains are critical for enhancing crop yields.
- **Export Subsidies:** India's subsidies for agricultural exports, **such as for sugar, have faced criticism from WTO members like Brazil and Australia** for distorting global prices. They argue that these subsidies give Indian producers an unfair advantage in the international market.
- **Domestic Support:** The Minimum Support Price (**MSP**) given to **wheat and rice farmers in India** has been cited by the WTO as distorting trade. It claims that such domestic support inflates Indian exports, creating an imbalanced trading environment.
- **Public Stockholding:** India's policy of maintaining large food grain reserves for food security has been a contentious issue at the WTO. Eg: **the Food Corporation of India (FCI) buys large quantities of wheat and rice, which the WTO claims can distort market prices.**

Way Forward

- **Balancing Subsidy Models:** India should consider gradually transitioning from a subsidy-centric model to one focused on direct income support, **such as the Universal Basic Income for farmers**, to offer them a financial safety net without distorting trade.
- **Invest in Agricultural Research:** Increased investment in R&D could **help develop crop varieties that are both high-yield and sustainable**. These new crops could open up new export markets and would be WTO-compliant as they don't require subsidies.

- **Multi-Stakeholder Consultation:** Create a **consultative committee** comprising farmers, agribusiness representatives, and policy experts to regularly discuss WTO compliance and the way forward in subsidy reforms.
- **International Negotiations:** India's proactive stance **during the Bali Ministerial Conference of the WTO in 2013** helped gain concessions on food stockpiling. This shows the importance of strong negotiation skills in international forums.
- **Capital investment:** To develop decentralized infrastructure for storage , transport , mechanization etc than giving monetary subsidies .
- **Public-Private Partnerships:** Involve the private sector in developing agricultural infrastructure **like warehousing and cold storage**. **Tax incentives** could be provided to companies that invest in this space, which can then reduce post-harvest losses.

Conclusion

To conclude, while the WTO aims to streamline global agricultural trade, it must also be sensitive to the diverse agricultural landscapes of its member countries. **India, with its unique challenges and opportunities, must negotiate carefully at WTO forums to safeguard the interests** of its agricultural sector.

15. **The adoption of electric vehicles is rapidly growing worldwide. How do electric vehicles contribute to reducing carbon emissions and what are the key benefits they offer compared to traditional combustion engine vehicles?**

How to approach the question

Introduction

- Write about growing electric vehicle adoption globally briefly

Body

- Write how electric vehicles contribute to reducing carbon emissions
- Write the key benefits they offer compared to traditional combustion engine vehicles
- Write suitable way ahead in this regard

Conclusion

- Give appropriate conclusion in this regard

Introduction

The **adoption of electric vehicles (EVs)** is witnessing an exponential growth globally as nations seek sustainable alternatives to fossil fuel-powered vehicles. Today, EVs are increasingly seen as a viable solution for reducing carbon emissions. **EV sales in India hit record 965868 units in first 8 months of 2023 which constitutes robust 65% year- on-year growth**

Body

Electric Vehicles Contribute to Reducing Carbon Emissions in the following ways

- **Zero Tailpipe Emissions:** EVs like **Tesla's Model S** produce zero tailpipe emissions, in contrast to traditional vehicles that emit a range of pollutants, including nitrogen oxides (NOx) and particulate matter. This directly improves air quality in congested cities.
- **Energy Efficiency:** **Tesla Model 3** sets a benchmark in this category by converting more than 77% of electrical energy from the grid to power at the wheels. In contrast, internal combustion engines (ICE) **usually manage only 12-30% energy conversion, wasting a significant amount of fuel.**
- **Renewable Energy Sources:** The **Chevrolet Bolt**, for example, can be charged using solar power systems. This means that if charged via renewable resources, EVs can operate with nearly zero emissions, effectively reducing their carbon footprint to negligible levels.

- **Regenerative Braking:** The **Nissan Leaf** utilizes a regenerative braking system that captures the vehicle's kinetic energy during braking to recharge the battery, making the vehicle more efficient and reducing overall energy waste.
- **Urban Air Quality:** Vehicles like the **Chevy Bolt**, which have zero tailpipe emissions, contribute to significantly improved air quality in urban environments, thus reducing the incidence of respiratory ailments.
- **Reduced Noise Pollution:** **Audi's e-Tron**, for instance, operates much more quietly compared to ICE vehicles, substantially reducing noise pollution—an important concern in crowded urban settings.
- **Lightweight Materials:** **BMW's i3** uses carbon fiber-reinforced polymer to reduce the car's weight, making it more energy-efficient and, therefore, reducing its energy consumption and emissions even further.
- **Grid Support:** The concept of **Vehicle-to-Grid (V2G)**, supported by models like the **Nissan Leaf**, allows EVs to feed energy back into the grid during periods of high demand. This reduces the requirement for additional fossil fuel-based energy production.

Key Benefits Compared to Traditional Combustion Engine Vehicles

- **Cost-Effective:** Vehicles like the **Tata Nexon EV** are proving that the total cost of ownership for an electric vehicle can be significantly lower than for an ICE vehicle. With fewer moving parts and no need for oil changes, the long-term savings are substantial.
- **Instant Torque:** The **Mahindra eVerito** and other similar electric cars offer instant torque and acceleration, providing a more responsive and exhilarating driving experience. This is because electric motors generate maximum torque at zero RPM, unlike traditional engines that require time to rev up.
- **Design Flexibility:** Electric vehicles offer a unique advantage in terms of design. The placement of batteries, often flat and low on the vehicle chassis as seen in the **MG ZS EV**, allows designers to offer more cabin space, providing an enhanced passenger experience.
- **Safety Measures:** The **Tata Tigor EV** and other electric cars are inherently safer because they don't carry combustible fuel. The absence of a fuel tank reduces the risk of fire and enhances structural rigidity, increasing overall safety.
- **Software Updates:** Modern electric vehicles offer the convenience of over-the-air software updates. This feature, although popularized by **Tesla globally**, is making its way into Indian models, ensuring that vehicle systems are always up-to-date without requiring a trip to the service centre.
- **Multiple Charging Options:** The **Hyundai Kona Electric** offers multiple charging options, including the convenience of home charging. This flexibility eases the transition to electric mobility, making it less dependent on public charging infrastructure.
- **Emission Standards Compliance:** With increasingly stringent emission norms like **Bharat Stage VI in India**, electric vehicles have a built-in advantage. They naturally meet these norms, as opposed to ICE vehicles that often require complex and expensive modifications for compliance.
- **Tax Benefits:** The Indian government's FAME II scheme provides various tax benefits and subsidies for electric vehicles. For example, the **GST on electric vehicles has been reduced to 5% from 12%**, making cars like the **Tata Nexon EV** even more affordable.
- **Reduced Dependence on Oil:** One of India's strategic vulnerabilities is its dependence on oil imports. As electric vehicles gain traction, aided by government schemes like **FAME II**, India could substantially reduce its geopolitical risks associated with oil.

- **Consumer Choice:** Lastly, the choice for consumers in the electric vehicle market is rapidly expanding. From **economical options like the Tata Nexon EV** to **upcoming luxury models such as the Tesla Model 3**, consumers in India now have a wide array of options.

Way Ahead

- **Infrastructure Expansion:** Beyond merely increasing the number of charging stations, there should be a focus on **multi-functional "Energy Hubs"** that combine fast-charging stations, solar power generation, and convenience stores, thereby enhancing the user experience.
- **Battery Research:** Investment should be directed towards **solid-state battery technology**, which promises greater energy density and faster charging times. Collaboration between academia and industry players could fast-track innovations **like battery-swapping stations for immediate "refuelling."**
- **Legislation:** While tightening emission standards is essential, **adding an "Eco-Score" on vehicle registration cards** based on the car's lifetime emissions could incentivize the switch to electric vehicles.
- **Public Transport:** In addition to electrifying buses and taxis, utilizing **autonomous electric shuttles for last-mile connectivity** in public transit networks can significantly reduce both traffic and emissions.
- **Smart Grids: Develop "Vehicle-to-Grid" systems** where parked electric vehicles could supply excess power back to the grid during peak hours, thereby serving as mobile energy storage units.
- **Financial Incentives:** Consider a **dynamic subsidy program** that decreases as adoption rates increase, encouraging early adoption. Also, create a **secondary market for used EV batteries** for applications like home energy storage, which can make the initial cost of EVs more bearable.
- **Local Manufacturing:** Incentivize the domestic production of EV components by **offering tax benefits to companies that source locally-manufactured parts**. This not only boosts the local economy but also reduces the overall cost of the vehicle.
- **Carbon Pricing:** Implementation of a carbon credit system could help. **EV owners could earn credits for the miles they drive**, which could be sold to companies required to offset their carbon footprint. This creates a tangible monetary value for reducing emissions.

Conclusion

The rapid adoption of EVs offers a tangible path for reducing greenhouse gas emissions and combating climate change. As they already present multiple advantages over traditional vehicles, a multifaceted approach encompassing **financial, legislative, and educational elements is required to catalyze a faster and more sustainable transition to electric vehicles.**

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16. What is the main task of India's third moon mission which could not be achieved in its earlier mission? List the countries that have achieved this task. Introduce the subsystems in the spacecraft launched and explain the role of the Virtual Launch Control Centre at the Vikram Sarabhai Space Centre which contributed to the successful launch from Srihari Kota.

How to approach the question

Introduction

- Write about India's third moon mission briefly

Body

- Write the main task of India's third moon mission which could not be achieved in its earlier mission

- Write the countries that have achieved this task
- Write about the subsystems in the spacecraft launched
- Write the role of the 'Virtual Launch Control Centre' at the Vikram Sarabhai Space Centre led to its successful

Conclusion

- Give appropriate conclusion in this regard

Introduction

Chandrayaan-3 is India's third lunar mission, launched by **ISRO in 2023**. It consists of a lander and a rover, but no orbiter. It **aims to explore the south pole of the Moon** and conduct scientific experiments. Building upon the legacy of its predecessors, it sets itself apart with its primary objective: achieving a soft landing on the Moon's surface, something the earlier missions couldn't accomplish.

Body

Main task of India's third moon mission which could not be achieved in its earlier mission

- **Soft Landing:** Unlike the Chandrayaan-1, which was only an orbiter, and Chandrayaan-2, which failed in its soft-landing attempt due to a last-minute glitch, the **third mission achieved a seamless soft landing**.
- **Lunar Research:** Its soft landing would **allow for extensive lunar research**, which could only be partially executed in previous missions. Eg: Chandrayaan-1 discovered water molecules on the Moon but couldn't analyse samples, a limitation the third mission aims to overcome.
- **Material Extraction:** A successful soft landing opens up the **possibility of collecting lunar soil samples**. Chandrayaan-2 had an onboard rover named 'Pragyan' intended for this purpose, but it couldn't be utilized due to the failed landing attempt.
- **Advanced Technology:** The third moon mission is expected to employ advanced technology, including improved landing gear and more powerful engines, drawing from global successes like NASA's Apollo and China's Chang'e missions.
- **Human Exploration Preparation:** With successful soft landing, it can serve as a precursor to potential human exploration. Earlier missions were not equipped for this, but by demonstrating a successful soft landing, India paved the way for **projects like sending astronauts to the Moon**.

Countries that have Achieved this Task:

- **USA:** It was the first country to not only achieve a soft landing but also to put humans on the Moon. The **Apollo 11 mission in 1969** is the most iconic, where Neil Armstrong and Buzz Aldrin walked on the lunar surface and collected samples to bring back to Earth.
- **Russia:** Prior to the USA's manned missions, the **Soviet Union's Luna 2** was the first human-made object to reach the Moon in 1959, but it crash-landed. However, **Luna 9 in 1966** became the first to achieve a soft landing, transmitting photographs back to Earth.
- **China:** **Chang'e 3**, which landed in 2013, was China's first successful soft landing on the Moon. **Chang'e 4**, its successor, made history by landing on the far side of the Moon in 2019, conducting extensive surface analysis, and significantly contributing to lunar science.

Subsystems in the Chandrayaan 3 Spacecraft:

- **Vikram Lander:** This lander is designed to execute a soft landing on the Moon's surface. And, aims to provide **critical data on the Moon's topography and mineral composition**.

- **Lander Subsystems:**
 1. Laser Inertial Referencing and Accelerometer Package (LIRAP)
 2. Ka-Band Altimeter (KaRA)
 3. Lander Position Detection Camera (LPDC)
 4. Lander Hazard Detection & Avoidance Camera (LHDAC)
 5. Laser Altimeter (LASA)
 6. Laser Doppler Velocimeter (LDV)
 7. Lander Horizontal Velocity Camera (LHVC)
 8. Micro Star sensor
 9. Inclinometer & Touchdown sensors
- **Pragyan Rover:** This rover is engineered to explore the Moon's surface post-landing, conducting **various experiments and sending data back to Earth**. Its design builds on the lessons learned from the previous missions, enhancing its ability to navigate and collect samples.
- **Lander Actuators:** Reaction wheels – 4 nos (10 Nms & 0.1 Nm)
- **Lander Propulsion System:** i-Propellant Propulsion System (MMH + MON3), 4 nos. of 800 N Throttleable engines & 8 nos. of 58 N Throttleable Engine Control Electronics
- **Deep Space Network:** A robust communication subsystem is required to maintain contact between the spacecraft and the ground control. **NASA's Deep Space Network has helped ISRO** in this regard, offering real-time tracking and command functionalities.
- **Solar X-ray Monitor (SXM):** Instruments like these are intended to collect scientific data. They serve to enhance our **understanding of the Moon's composition**, thereby helping to address key scientific questions relating to Earth's satellite.

The **Virtual Launch Control Centre (VLCC)** at Vikram Sarabhai Space Centre (VSSC) is a state-of-the-art facility that **employs artificial intelligence and machine learning** to adapt and respond to real-time changes in the rocket launch environment. The VLCC helps in ensuring the success of India's space missions.

Role of the 'Virtual Launch Control Centre' in the Successful Launch of Chandrayaan-3 Mission:

- **Real-time Telemetry:** It is responsible for real-time monitoring of all subsystems of the spacecraft. Through advanced telemetry, the Centre ensures that **each component, from propulsion to communications, is functioning as expected** during the launch.
- **Coordination:** For the Chandrayaan-3 mission, multiple systems and departments had to work in tandem for the **successful launch of the GSLV Mk III rocket**. It played a critical role in synchronizing these efforts, ensuring seamless coordination between various ground systems.
- **Anomaly Detection:** In the event of an anomaly or unexpected condition during the launch, the Virtual Launch Control Centre provides crucial data for quick decision-making. Its **sophisticated algorithms can trigger automated safety protocols** if necessary.
- **Resource Management:** By creating a virtual environment, the Centre **allows experts from various fields to contribute without being physically present** at the launch site. This collective expertise can be critical in addressing complex challenges.
- **Technological Advancements:** The Centre incorporates cutting-edge technology for simulations and predictions. It **uses Machine Learning algorithms to predict potential issues** and offer solutions in real-time, significantly contributing to the successful launch of the mission.

Conclusion

The **success of India's third moon mission** would be a significant milestone, elevating its stature in the realm of space exploration. It will not only bring technological prowess but also pave the way for future missions, **making India a significant player in the future of space exploration.**

17. Comment on the National Wetland Conservation Programme initiated by the Government of India and name a few India's wetlands of international importance included in the Ramsar Sites.

How to approach the question

Introduction

- Write about the National Wetland Conservation Programme briefly

Body

- Write key features of the National Wetland Conservation Programme initiated by the Government of India
- Write India's wetlands of international importance included in the Ramsar Sites
- Write issues faced in wetlands conservation in India
- Write suitable way ahead in this regard

Conclusion

- Give appropriate conclusion in this regard

Introduction

The **National Wetland Conservation Programme (NWCP)** initiated by the Government of India aims to conserve and manage the country's wetlands, vital ecosystems that provide numerous ecological services. This program has been **pivotal in protecting wetlands, some of which are also recognized as Ramsar Sites of international importance.**

Body

Key Features of the National Wetland Conservation Programme:

- **Identification and Classification:** The program undertakes a systematic survey of wetlands across India. For instance, **Chilika Lake in Odisha** was identified as a Ramsar site owing to its ecological importance.
- **Financial Assistance:** The Central and state governments jointly fund conservation activities. Projects like the **rejuvenation of Wular Lake in Jammu and Kashmir** have been made possible due to financial assistance from both levels of government.
- **Capacity Building:** Training and workshops are often conducted to skill the stakeholders. For example, **fishermen around Pulicat Lake** have been trained in sustainable fishing techniques.
- **Research and Development:** Research grants are given for studies on wetland ecology. Research on the unique flora and fauna of **Keoladeo National Park in Rajasthan** has significantly contributed to avian science.
- **Awareness Programs:** Public awareness campaigns like **"Wetlands for All"** have been critical. World Wetlands Day is celebrated with educational activities at Sundarbans, the world's largest mangrove forest.
- **Biodiversity Conservation:** Measures are taken to conserve the diverse life forms inhabiting the wetlands. The **Asan Conservation Reserve in Uttarakhand** is a prime example, where efforts to conserve local bird species have been successful.
- **Monitoring and Assessment:** Technology like satellite imagery is used for monitoring wetlands. For example, the **health of Vembanad Kol Wetland in Kerala** is periodically assessed using remote sensing data.

- **Policy Framework:** The **Wetlands (Conservation and Management) Rules** were formulated to govern the use and conservation of wetlands. For example, these rules have been employed to regulate activities around the Bhitarkanika Mangroves in Odisha.

India's Wetlands of International Importance (Ramsar Sites):

- **Sundarbans:** This is the world's largest mangrove forest, spanning the delta region of the **Padma, Meghna, and Brahmaputra River basins** in West Bengal. Rich in biodiversity, Sundarbans is **home to the famous Royal Bengal Tigers** and is crucial for maintaining the region's ecological balance.
- **Chilika Lake: Located in Odisha**, it is Asia's largest brackish water lagoon. The lake serves as a temporary home to numerous migratory birds and supports local fishing communities. Its rich biodiversity makes it an area of international importance.
- **Keoladeo National Park: Situated in Rajasthan**, it is a world-renowned bird sanctuary. It sees thousands of migratory birds during the winter season, including the Siberian crane. The park is an essential spot for avian research and supports a vast range of flora and fauna.
- **Loktak Lake: Situated in Manipur** and it is the largest freshwater lake in Northeast India. Famous for its phumdis (floating islands), it hosts the Keibul Lamjao, the world's only floating national park. The lake is vital for regional hydroelectricity generation, water supply, and biodiversity.

Issues Faced in Wetlands Conservation:

Understanding Context:

Nearly two of every five wetlands in India have lost their natural existence in the last 30 years while 40% of water bodies have lost quality for survival of the aquatic animals, according to estimates by **Wetlands International (WI)**

Issues:

- **Encroachment:** In places like **Bellandur Lake in Bangalore**, unchecked urbanization and illegal dumping have significantly reduced the wetland's size and capacity. Lake has been reduced to a third of its original size due to unauthorized constructions and waste dumping.
- **Pollution:** The **Ganges River Basin**, a significant wetland area, has faced extensive pollution from industrial effluents and untreated sewage. This has resulted in severe water quality degradation, affecting aquatic life and making the water unsafe for human use.
- **Uncontrolled Tourism: Dal Lake in Kashmir** is an example where tourism has negatively impacted the wetland. Tourists leaving behind plastic waste and the use of motorized boats have contributed to pollution, thereby disturbing the lake's natural ecosystem.
- **Overfishing: Loktak Lake in Manipur**, a Ramsar site, faces extreme overfishing, leading to a decline in fish stocks. Overfishing threatens the balance of the aquatic ecosystem and adversely impacts the livelihoods of local communities.
- **Climate Change: Chilika Lake in Odisha** is experiencing alterations in its ecosystem due to climate change. Rising temperatures and changing precipitation patterns have disrupted migratory bird routes and affected fish breeding cycles.
- **Lack of Awareness:** Despite its importance as a Ramsar site, **Keoladeo National Park in Rajasthan** still faces local activities detrimental to its habitat. This is largely because the local communities are not fully aware of its ecological significance.
- **Weak Enforcement:** In **Vembanad Lake**, Kerala, there is poor implementation of existing laws and regulations, leading to illegal sand mining and land reclamation activities that are devastating for the wetland.

- **Lack of Coordination:** The **Sundarbans**, shared by India and Bangladesh, suffer from fragmented conservation efforts due to a lack of coordination between the central and state governments and international entities.
- **Funding Constraints:** **East Kolkata Wetlands**, a Ramsar site, suffers from a shortage of funds allocated for conservation. Lack of funding makes it difficult to carry out effective management and restoration activities.

Way Ahead:

- **Community Involvement:** Implement programs like **“Adopt a Wetland,”** where local businesses or schools take on the responsibility for monitoring and maintaining a local wetland, similar to the successful community-managed fishery programs at Chilika Lake.
- **Strengthen Laws:** Introduce new technologies like **blockchain to track the source of pollutants** entering the wetlands. This could enable authorities to penalize rule-breakers more effectively and ensure compliance with environmental standards.
- **Sustainable Practices:** **Develop an app for fishermen**, informing them about overfished areas and suggesting sustainable fishing zones. This could benefit ecosystems like those in Loktak Lake, where overfishing is a concern.
- **Monitoring:** **Utilize Artificial Intelligence-enabled drones** equipped with sensors to monitor the water quality, vegetation, and illegal activities like poaching in wetlands such as the Keoladeo National Park.
- **Funding:** **Introduce a “Wetland Conservation Tax”** on tourism activities or industries that are closely linked to wetlands. This dedicated fund could be used for restoration and maintenance purposes.
- **Research:** **Develop floating research labs on large wetlands** like Vembanad Lake to study wetland ecology, water quality, and other environmental parameters in real-time.
- **International Collaboration:** **Establish international “Wetland Exchange Programs”** where experts **from Ramsar sites** in other countries visit India and vice versa, to share best practices and technologies.
- **Policy Review:** Create a **“Wetland Dashboard”** accessible to the public, showing real-time data on the health of various wetlands, efforts made for their conservation, and areas that need immediate attention. This would keep policymakers accountable and make policy reviews data-driven.

Conclusion

The National Wetland Conservation Programme serves as a cornerstone in India's efforts to conserve these vital ecosystems. Despite the challenges faced, **implementing these strategies** which involves legislative changes, community participation, and technological innovations will **ensure that India's wetlands remain an integral part of its rich ecological heritage.**

18. **The Intergovernmental Panel on Climate Change (IPCC) has predicted a global sea level rise of about one metre by AD 2100. What would be its impact in India and the other countries in the Indian Ocean region?**

How to approach the question

Introduction

- Write about IPCC and its report over sea level rise by AD 2100 briefly

Body

- Write the reasons behind the predicted a global sea level rise of about one metre by AD 2100

- Write its impact in India and the other countries in the Indian Ocean region
- Write suitable way ahead in this regard

Conclusion

- Give appropriate conclusion in this regard

Introduction

The IPCC is the United Nations body and was established in **1988** by the World Meteorological Organization and the United Nations Environment Programme for assessing the science related to climate change. As per **the IPCC Sixth Assessment Report**, the global mean sea level is projected to rise by about one metre by AD 2100 under a high greenhouse gas emissions scenario.

Body

Reasons Behind the Predicted Sea Level Rise:

- **Increased Carbon Emissions:** Heavy industrial activities, **particularly in China's coal belt and the United States**, release massive amounts of CO₂, accelerating global warming and, consequently, ice melt and thermal expansion
- **Melting Polar Ice:** Both the Arctic and Antarctic are experiencing faster rates of ice melt due to **global warming**. For example, **the Larsen C ice shelf in Antarctica** broke off an iceberg twice the size of Luxembourg in 2017, contributing directly to rising sea levels.
- **Thermal Expansion:** As the Earth's atmosphere warms, the ocean water also warms and expands. According to the National Oceanic and Atmospheric Administration (NOAA), **thermal expansion is responsible for about 40-50% of the observed sea-level rise since 1900.**
- **Glacial Retreat:** Glaciers are shrinking globally, from the Andes and Alps to the Himalayas. Notably, **the Gangotri Glacier in the Himalayas** has been receding at an alarming rate, affecting freshwater supply and contributing to sea-level rise.
- **Tectonic Activity:** Earthquakes and volcanic eruptions can lead to sudden, localized sea-level changes. The **2004 Indian Ocean earthquake significantly altered sea levels** in the region temporarily but had a lasting impact on local geographies.
- **Loss of Ice Shelves:** When ice shelves **like Larsen B in Antarctica collapse**, they no longer act as barriers holding back glaciers. This allows glaciers to flow more freely into the ocean, contributing to sea-level rise.
- **Land Subsidence:** In cities like **Jakarta**, **over-extraction of groundwater** for everyday use is causing the land to sink, leading to a relative rise in sea level. This phenomenon exacerbates the already critical situation caused by global sea-level rise.

Impact on India and Other Countries in the Indian Ocean Region

Impact on India:

- **Coastal Erosion:** Major cities **like Mumbai and Chennai**, which have extensive coastlines, are already experiencing increased coastal erosion. A place **like Marina Beach in Chennai** may suffer significantly, affecting not just tourism but also local ecology.
- **Agricultural Loss:** The **Sundarbans Delta, lowland rice system of Kerala** etc crucial for rice cultivation and home to unique biodiversity, is at risk of becoming saline. This would make the land unsuitable for agriculture, thereby affecting the livelihood of thousands of farmers.
- **Displacement of Populations:** Low-lying areas in states **like West Bengal and Kerala** may witness large-scale human migration due to consistent flooding and loss of habitable land. This could result in **"climate refugees"** who will strain urban resources further.

- **Impact on Fisheries:** The change in sea levels, combined with changes in water temperatures, could result in shifts in marine ecosystems. This is especially problematic for states like **Kerala and Goa**, where fisheries are a significant part of the economy.
- **Infrastructure Threat:** Important infrastructures like ports are also at risk. For example, **the Jawaharlal Nehru Port in Mumbai**, which handles a significant portion of India's cargo, could face operational challenges due to rising sea levels.

Impact on Other Countries in the Indian Ocean Region:

- **Maldives' Existence:** The Maldives is the **lowest-lying country in the world**, with an **average elevation of about 1.5 metres above sea level**. There is a very real risk that the Maldives could become uninhabitable or even completely disappear under the sea.
- **Bangladesh Flooding:** Much of Bangladesh's land area is **less than 5 metres above sea level**, making it extremely susceptible to flooding. Even a modest rise in sea levels could result in the displacement of millions of people.
- **Sri Lanka's Tourism:** Coastal cities like **Galle**, popular for their historical landmarks and beaches, could be threatened. This poses a risk to Sri Lanka's tourism sector, one of its main sources of revenue.
- **Economic Loss for Indonesia:** Indonesia has critical maritime trade routes, and any disruption caused by changes in sea levels and currents could result in significant economic losses.
- **Natural Disasters in Thailand:** Low-lying areas like **Phuket** could become increasingly vulnerable to natural disasters such as tsunamis and cyclones, endangering both human lives and the economy.

Way Ahead

- **Adaptive Infrastructure:** Beyond just building flood-resistant infrastructure like seawalls, India and other Indian Ocean countries could invest in "**living shorelines**" that use natural elements like mangrove trees to reduce erosion and act as natural barriers.
- **Sustainable Practices:** In addition to restricting land use near vulnerable coastlines, implement systems for "**managed retreat**," where communities are gradually moved inland. This could be aided by tax incentives for relocation to less vulnerable areas.
- **Collaborative Monitoring:** Create a **decentralized, blockchain-enabled data-sharing platform** among Indian Ocean countries. This would facilitate real-time, tamper-proof monitoring of sea-level data and weather patterns, making predictive modelling more accurate.
- **Climate-Resilient Crops:** Beyond salt-tolerant crops, **invest in aquaponics and vertical farming methods** that can function in areas with compromised soil quality due to saline water intrusion.
- **Emergency Funds:** Introduce **blockchain-based "climate tokens,"** which could be redeemed for essential services in emergency situations. These tokens would be part of a financial safety net and could be distributed quickly and transparently to affected communities.
- **Policy Alignment: Adopt "Green Bonds"** and incentivize private investments for climate-resilient infrastructure. Ensure national policies not only align with global climate goals but are also adaptive to emerging climate research and international best practices.
- **International Collaboration:** Foster partnerships with global organizations like the IPCC for technical know-how. Also, consider a "**Climate Silk Road**" initiative that brings Indian Ocean countries together for collaborative projects and shared technologies.
- **Public Awareness:** Utilize gamification methods to make public awareness campaigns more engaging. **Apps that offer rewards for environmentally-friendly behaviours** can encourage more people to take climate change and its impact seriously.

Conclusion

The IPCC's prediction of a one-meter sea level rise by 2100 poses a dire threat, but it also presents an opportunity for countries in the Indian Ocean region to collaborate and innovate in the face of adversity. **Preparation, adaptive strategies, and international cooperation are essential to mitigate the devastating impacts of sea level rise. SDG target, community participation and individual role through LiFE is crucial to achieving sustainable Development.**

19. What are the internal security challenges being faced by India? Give out the role of Central Intelligence and Investigative Agencies tasked to counter such threats.

How to approach the question

Introduction

- Write about importance of internal security briefly

Body

- Write the internal security challenges being faced by India
- Write the role of Central Intelligence and Investigative Agencies tasked to counter such threats
- Write suitable way ahead in this regard

Conclusion

- Give appropriate conclusion in this regard

Introduction

Internal security is the act of **keeping peace within the borders** of a sovereign state or other self-governing territories, generally by upholding the national law and it is the linchpin that holds the societal fabric together, ensuring stability and prosperity. NIA registered more than 72 cases in 2022 that shows growing issue of internal security. **In India, a variety of challenges have emerged that threaten this critical aspect of national well-being.**

Body

Internal Security Challenges in India:

- **Terrorism:** The **26/11 Mumbai attacks in 2008**, orchestrated by the Pakistan-based group Lashkar-e-Taiba, resulted in 166 deaths and severe property damage. It brought to light the vulnerabilities in India's internal security measures and the need for a fortified counter-terrorism strategy.
- **Naxalism:** The Naxalite insurgency, most rampant in Chhattisgarh, Jharkhand, and Odisha, poses a significant challenge. Notable incidents **like the Dantewada ambush in 2010, where 76 CRPF personnel** were killed, expose the fragile security environment in the affected states.
- **Cyber Crime:** India saw a spike in cyber threats during the COVID-19 pandemic, affecting both the public and private sectors. The **WannaCry ransomware attack in 2017** was a global event but also affected multiple states in India.
- **Ethnic Tensions:** **Ethnic conflict in Assam, particularly between Bodos and Bengali-speaking Muslims**, has resulted in periods of violence and mass displacement. These disturbances highlight the complex social fabric of the Northeast and the need for inclusive policies.
- **Drug Trafficking:** The **opioid crisis in Punjab** is not only a health issue but also a social and economic one. The widespread abuse of drugs, especially among the youth, affects productivity, leading to long-term societal consequences like increased crime rates.
- **Human Trafficking:** Places **like the red-light district in Kolkata's Sonagachi** bear witness to the extent of human trafficking in India. Many of these victims are women and children who

are subjected to severe exploitation. **In 2022 over 6,622 trafficking victims were reported to have been identified.**

- **Border Issues:** Challenges like infiltration across the Line of Control in the J&K and the porous Indo-Bangladesh border are continuous concerns. The **2016 Uri attack**, for example, was executed by militants who had crossed the border, adding another layer to internal security threats.

Role of Central Intelligence and Investigative Agencies:

- **Data Collection:** For instance, it was **RAW** that reportedly provided actionable intelligence about movements along **the Line of Control prior to the Kargil conflict**, thereby averting a more significant crisis.
- **Analysis:** The **National Investigation Agency (NIA)** has been instrumental in analysing complex data to dismantle terrorist networks. Their **investigation into the 2008 Malegaon blasts** not only led to arrests but also disrupted financial networks supporting terrorism.
- **Coordination:** Agencies like the **Intelligence Bureau (IB)** are vital for orchestrating a coordinated effort among state and central security agencies. Eg: managing the intelligence and operations **during the 2019 Pulwama attack**.
- **Special Operations:** Elite units like the **National Security Guard (NSG)** are exclusively trained for high-risk operations. They showcased their operational effectiveness during **the 26/11 Mumbai attacks**, where they were airlifted on short notice to neutralize the threat.
- **Cross-Border Operations:** RAW's engagement with intelligence agencies from other countries helps India to secure its interests beyond borders. It was reportedly instrumental in diplomatic negotiations that led to **the capture of key aides of underworld don Dawood Ibrahim in the UAE**.
- **Training:** The training regimen offered by agencies like the **Border Security Force (BSF)** focuses on creating a versatile force capable of handling various terrains and scenarios. During the **Doklam standoff**, this specialized mountain warfare training became especially significant.
- **Policy Inputs:** Intelligence agencies contribute to policy formulation by providing informed perspectives on national security. **After the Uri attack in 2016**, input from these agencies was crucial in deciding to carry out **surgical strikes against terrorist launch pads in Pakistan**.
- **Public Awareness:** The **Cyber Crime Coordination Centre** and similar bodies regularly release advisories, thereby contributing to public education. They focus on various threats like phishing scams and ransomware, thus arming the public with the knowledge to protect themselves.

Way Ahead

- **Community Policing:** A system akin to the U.K.'s "**Neighbourhood Watch**" could be initiated, wherein community members are trained to identify and report suspicious activities. **Mobile apps** can facilitate real-time reporting and create a virtual community of informants.
- **Skill Upgradation:** The Indian security forces can undergo **periodic training** in modern forensic and cybernetic investigative techniques. **Virtual training modules** could be developed in collaboration with global security organizations to simulate real-world threat scenarios.
- **Transparency:** Independent oversight boards can be established for each intelligence and investigative agency to ensure accountability. These boards can **publish annual "transparency reports"** that detail the operations and effectiveness of each agency without compromising national security.

- **Tech Integration:** Utilizing **Artificial Intelligence and Big Data analytics** can revolutionize predictive policing. They can be used to identify crime hotspots, monitor social media chatter for early detection of radicalization, and even predict the likely targets of terrorist attacks.
- **International Cooperation: Bilateral agreements** can be established with intelligence agencies worldwide ensuring information exchange & technological and logistical support. **Multi-country task forces** could be formed for dealing with threats that have cross-border implications.
- **Financial Oversight:** Specialized financial oversight units **like the U.S.'s Financial Crimes Enforcement Network (FinCEN)** can be set up to monitor large-scale economic crimes. These units could use blockchain technology to track international money transfers related to illegal activities.
- **Psychological Operations: Social media platforms** can be used for counter-radicalization campaigns. Tailored content, possibly using machine learning algorithms, can identify and engage at-risk individuals, offering counter-narratives to extremist ideologies.
- **Continuous Review:** Establish an **annual or biennial "National Security Summit"** that involves top experts from various fields. They can assess the efficacy of current counter-terrorism and security measures and offer recommendations for future strategies.

Conclusion

Internal security is a multifaceted challenge that needs a cohesive and coordinated effort from both state and central agencies. By adopting these innovative suggestions, India can **establish secure, transparent, and efficient security infrastructure capable of countering the multifaceted challenges** that the country faces.

20. **Give out the major sources of terror funding in India and the efforts being made to curtail these sources. In the light of this, also discuss the aim and objective of the 'No Money for Terror (NMFT)' Conference recently held at New Delhi in November 2022.**

How to approach the question

Introduction

- Write about terror funding in India briefly.

Body

- Write the major sources of terror funding in India.
- Write the efforts being made to curtail these sources
- Write the aim and objective of the 'No Money for Terror (NMFT)' Conference recently held at New Delhi.

Conclusion

- Give appropriate conclusion in this regard

Introduction

Terror funding in India is a serious threat to national security. It involves both domestic and foreign sources of money, which are used to support terrorist activities and organisations using various formal and informal channels, such as hawala, NGOs, fake currency, etc., to transfer funds. Recently, **ED arrested 5 people in Kerala for hawala dealings worth ₹300 crore** possibly being used for Terror financing. Also **105 cases** related to terror funding were registered, **94 charge sheets were filed against 876 accused**, **796 accused** have been arrested, out of which 100 accused have also been convicted by NIA

Body

Major Sources of Terror Funding in India

- **Hawala Transactions:** It provides a quick and secretive method for transferring money, making it a favourite among terrorist organizations. For instance, **hawala networks played a significant role in funding the 1993 Bombay bombings.**
- **Drug Trafficking:** The **Golden Crescent** region is notorious for opium production. This opium is often processed into heroin and smuggled into India, **especially in states like Punjab.** Revenue from drug trafficking is a significant source of funding for **extremist groups like the Taliban.**
- **Fake Currency:** Counterfeit currency destabilizes the economy and funds criminal enterprises. **Operations by the NIA have uncovered such activities,** where counterfeit notes were printed in foreign countries and then pumped into India to fund terrorist activities.
- **Cybercrime:** Extremist groups are using sophisticated online methods, such as ransomware attacks and identity theft, to generate funds. The **investigations into the Uri attack in 2016 revealed the involvement of digital transactions** to fund the assailants.
- **Charities and NGOs:** Organizations like **Jamaat-ud-Dawa disguise themselves as charitable entities** to attract donations. However, these funds are often channelled into activities like recruiting and arming militants, as was the case in multiple attacks by its front, Lashkar-e-Taiba.
- **Kidnapping and Extortion:** Criminal organizations and terrorist groups sometimes overlap in activities like kidnapping for ransom. **Groups like the Indian Mujahideen have targeted high-profile individuals** to finance their activities through extortion money.
- **Crowdfunding and Online Donations:** Extremist groups exploit the anonymity of the internet for fundraising. **Websites and social media campaigns solicit donations** under false pretences, only for these funds to be funnelled into extremist activities.
- **Local Taxes:** In areas under the control of groups like the **Naxals, a form of "revolutionary tax"** is imposed on businesses and even individuals. These funds are then used to procure weapons and sustain insurgent activities.
- **Sale of Stolen Goods:** **Theft of vehicles and electronic items** is another avenue for raising funds. These stolen goods are often sold in neighboring countries, and the proceeds are used for financing extremist activities.
- **Foreign Funding:** External funding from states or organizations can substantially bolster extremist activities within India. An example is the **alleged involvement of Pakistan's ISI in the 26/11 Mumbai attacks.**

Efforts to Curtail These Sources:

- **Strong legal framework:** India has enacted laws such as the **Unlawful Activities (Prevention) Act, 1967, the Prevention of Money Laundering Act, 2002, and the Foreign Contribution (Regulation) Act, 2010,** empowering authorities to prosecute and confiscate the assets of terror financiers.
- **Comprehensive monitoring framework:** India has established institutions **such as the Financial Intelligence Unit (FIU), the NIA and the ED** to monitor and act against terror funding. They also coordinate with other agencies **such as the RBI, SEBI, CBDT, CBIC, etc.,** for better compliance .
- **Actionable intelligence sharing:** India has enhanced its intelligence sharing mechanism with other countries through bilateral and multilateral platforms **such as the FATF, the SAARC Terrorist Offences Monitoring Desk (STOMD), the Regional Anti-Terrorism Structure (RATS) of SCO, etc.**

- **Provision for confiscation of property:** India has made provisions for confiscation of property of individuals and entities involved in terror financing under various laws such as the UAPA, PMLA, FCRA, etc. For instance, **in 2020, NIA attached properties worth crores belonging to Asiya Andrabi**, chief of banned outfit Dukhtaran-e-Millat.
- **Prevent misuse of legal entities:** To prevent the misuse of legal entities such as NGOs, trusts, companies, etc., for terror financing. **India has made it mandatory for such entities to register with the government** and disclose their sources and uses of funds.
- **Boosting international cooperation:** India has signed bilateral agreements and memoranda of understanding with several countries **such as the USA, UK, UAE, France, etc.**, to exchange information and assistance on terror funding cases.
- **OECD Initiative:** OECD launched money-laundering-and-terrorist-financing-awareness programme for international collaboration and awareness.
- **Participation in global forums:** India has also participated in multilateral forums **such as the No Money for Terror Conference**, which aims to foster global collaboration in countering terrorist financing.

The 'No Money for Terror (NMFT)' Conference is a global initiative to combat the financing of terrorism. It was **launched in 2018 by France**, followed by Australia in 2019. **India hosted the third edition of the conference on 18-19 November 2022**, with the participation of 78 countries, including 20 ministers.

Aim of the 'No Money for Terror (NMFT)' Conference

- **Global Collaboration:** The Conference aimed to foster global collaboration to combat the financing of terrorism. Participation of 78 countries and 20 ministers illustrated a collective will to address this issue. Eg: **The FATF guidelines were discussed as a standard for international cooperation.**
- **Policy Harmonization:** Synchronizing anti-terrorism financing policies across countries to create a unified front. Example: **The European Union's 4th Anti-Money Laundering Directive** is an exemplary framework that countries could consider emulating.
- **Capacity Building:** It aimed to equip countries, especially those with developing economies, with the tools and knowledge to fight terror financing. Eg: **Training programs modelled after the U.S. Department of the Treasury's counter-terrorism financing courses** were proposed.
- **Transparency and Information Sharing:** To improve the transparency of financial systems and foster information sharing among nations to trace illicit funds. Eg: **The SWIFT messaging system's role in tracking financial transactions** was discussed as a way to enhance transparency.

Objectives of the 'No Money for Terror (NMFT)' Conference

- **Knowledge Exchange:** An immediate objective was to serve as a platform for countries to share insights, best practices, and intelligence for combating terror financing. Example: **Israel's use of financial intelligence to dismantle terrorist cells served as a case study.**
- **Resource Mobilization:** To help countries mobilize financial, technical, and human resources to strengthen their counter-terrorism financing efforts. Eg: **Australia's "Countering Violent Extremism" program**, backed by substantial funding and resources, was cited as a model to follow.
- **Monitoring and Evaluation:** Implementing regular monitoring mechanisms to evaluate the effectiveness of anti-terrorism financing measures. Eg: **The UN's Counter-Terrorism**

Committee Executive Directorate (CTED) assessment protocols were discussed as a potential global standard.

- **Civil Society Engagement:** Engaging with civil societies, NGOs, and the private sector to broaden the net of surveillance and action against terror financing. Eg: **Tech Against Terrorism initiative** involving tech companies in the fight against online extremist content, was discussed.

Conclusion

Combating terror financing is not just a national but a global imperative. Initiatives like the 'No Money for Terror' conference are a step in the right direction. By pooling resources and knowledge at both the national and international levels, it is possible to **strangle the financial lifelines of terrorist organizations and make the world a safer place.**

