



Q. 1 Explain intra-generational and inter-generational issues of equity from the perspective of inclusive growth and sustainable development. (150 words)

Approach

- Introduce the concept
- Explain the details and issues associated with inter and intra generation equity.
- Conclude with the way forward.

ANS-

Intergenerational and intra-generational equity is the doctrine of equity-based on sustainable development.

Intergenerational Equity & Issues

- Intergenerational equity is the development of resources by one generation to enhance economic sustainability for the future generation.
- The growing imbalance in the distribution of resources, the ongoing degradation of the environment, and the depletion of resources have made Intergenerational equity crucial.
- This imbalance is more profound between the developed & developing nations or between the Global North and the Global South.
- Moreover, the developed countries are today unwilling to help developing countries adapt and mitigate climate change, which is a result of their ruthless pursuit of economic growth at the cost of the environment.
- The concept of sustainable development has been introduced, which refers to the use of resources that should be done in such a manner that those resources shall also be available to meet future needs.

Intra-generational Equity & Issues

- The concept of intra-generational equity provides rights and duties to every person of a single generation to use and take care of the resources moderately among the members of the generation.
- To promote intra-generational equity, the concept of social justice is propagated. Welfare schemes like subsidies, reservations, etc., are provided by the governments to help the vulnerable section of society.
- Sometimes measures taken under the narrative of social justice interfere with the free market principle.
- The free market demands rollback of the state and propagates the market as the solution to every problem.
- Following this, India conducted LPG reforms in 1991. However, the pro-market reforms have failed to trickle-down effect and resulted in jobless growth & increasing inequalities as per Oxfam Report.
- Inclusive Growth advances equitable opportunities for economic participants during economic growth with benefits incurred by every section of society.

The concept of inclusive growth and sustainable development are the key pillars of the global welfare narrative, which can be prompted by ensuring intra-generational and inter-generational equity.



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In a developing country like India, intra-generational & inter-generational equity are more important as resources are required for ensuring the development of all, including the future generation to distribute the fruits of rapid economic growth.

Q2) Define potential GDP and explain its determinants. What are the factors that have been inhibiting India from realizing its potential GDP?

Approach

- Define Potential GDP in Introduction.
- Determinates of potential GDP
- Write Factors that inhibiting potential GDP of India
- Conclude with measure needed for achieving the Potential GDP.

ANS-

The highest market value of goods and services that can be produced in an economy over a period of time is known as potential GDP. Unlike normal GDP that estimates during the current duration, potential GDP seeks to find the highest value that can be obtained.

Determinants of potential GDP

- **Inflation-**

The inflation rate in the country in a year influences the GDP growth. Higher inflation can boost the potential GDP rate.

- **Recession-**

Recession is the slowdown in growth rate for two consecutive quarters. A recession can significantly reduce the GDP.

- Continuous growth will be suitable for high GDP.

Factors inhibiting potential GDP of India

- **Low productivity-**

Low productivity of employment generation, especially in manufacturing and agriculture sector.

- **Currency depreciation-**

The depreciation of Indian rupees Visa Vis American dollar will reduce GDP value.

- **A decrease in foreign capital-**

The inflow of foreign capital may decrease over a period of time due to some factors. This will result in the economy not being able to emulate the potential numbers.

- **Lack of Infrastructure**

The infrastructure growth in the domestic economy may not be in predicted lines. This will hamper the final contribution to GDP output.

Thus, potential GDP is a theoretical prediction that may not always be equal to the final output. Various external factors may also be responsible for altering the prediction.



Q3) what are the main constraints in the transport and marketing of agricultural produce in India? (150 words)

Approach

- Introduce about Contribution of agriculture to GDP.
- Explain in detail about Main constraints and measures in transport and marketing of agricultural produce.
- Conclude with government steps.

ANS-

The agriculture sector is one of the dominant sectors of the Indian economy. It contributes about 14% of the total GDP of India and employs over 60% of the population. The problem of agriculture marketing and logistics are stopping to realize the potential of agriculture produce.

Main constraints in transport and marketing of agricultural produce –

- In the majority of the states, under the APMC acts, farmers are required to sell a large number of commodities in a local mandi where intermediaries often manipulate the price. Hence, APMC markets have become with high intermediation costs.
- There is a wide gap between the cost of production and the MSPs announced for the year. MSP is not available to Dairy products, vegetables, fruits, etc.
- Unable to get better prices due to lack of investment in necessary infrastructure such as Warehouse, Cold Storage, etc. Almost 40 percent produce of all fruits and vegetable production lost annually in India due to fewer cold storages, warehouses, etc.
- The imposition of the curbs on stocking of farm produce and regulation of the prices of commodities, etc. under the Essential Commodities Act (ECA) lead to less investment in the farm sector.
- Lack of easy movement of Agri produce due to delay in shipments.
- Barriers exist in the free flow of agricultural produce between various States owing to the prevalence of various APMC legislation enacted by the State Governments.

Measures

- National Agricultural Cooperative Marketing Federation of India Ltd (NAFED) is the nodal agency to implement price stabilization measures under "Operation Greens".
- Kisan Rails are multi-commodity trains consisting of refrigerated coaches to swiftly transport perishable agriculture products from supply centers to demand centers.
- Pradhan Mantri Annadata Aay Sanrakshana Abhiyan (PM-AASHA) to ensure adequate prices to farm produce.
- E-NAM is a pan-India electronic trading portal linking existing APMC mandis to create a unified national market for agricultural commodities.
- Recent initiatives like contract farming and Rationalizing ECA.

India is one of the largest markets for agricultural produce and markets need to function as a unified platform to make all consumers access to all the farmers in the country. The recent measures are taken by the government in this light will be helpful to create an efficient nation-



wide market and will also ensure a rise in income of farmers in turn contributing to achieving the target to double farmer's income by 2022.

Q4) what are the challenges and opportunities of the food processing sector in the country? How can the income of the farmers be substantially increased by encouraging food processing?

Approach

- Introduce about food processing sector.
- Explain Challenges and opportunities in food processing industries.
- Conclude with the way forward or step taken by the government.

ANS- Food processing generally includes the basic preparation of foods, the alteration of a food product into another form, and preservation and packaging techniques.

India, as an agrarian economy, has a natural advantage in terms of food processing industries (FPI). With the rise in demand for Agri-products, there will be a commensurate rise in the price paid to the farmer, thereby increasing the income.

Challenges Faced by Food Processing Industry in India

- Supply Side Bottlenecks: Fragmented holdings result in low farm productivity, due to this farmer are left with a small and dispersed marketable surplus.
- Demand Side Bottlenecks: The demand for processed food is mainly restricted to urban areas of India.
- Infrastructure Bottlenecks: Lack of mechanization, high seasonality, perish-ability, and lack of proper intermediation (supply chain) results in a lack of availability of raw material.
- Further, the lack of all-weather roads and connectivity make supply erratic.
- Due to inadequate infrastructure, more than 30% of the produce from the farm gate is lost.
- In formalization in Food Processing Industry: The food processing industry has a high concentration of unorganized segments, representing almost 75% across all product categories. Thus, causes inefficiencies in the existing production system.
- These factors, in turn, impede food processing and its exports.
- Deficiencies in the Regulatory Environment: There are numerous laws, under the jurisdiction of different ministries and departments, which govern food safety and packaging.
- The multiplicity of legislation and administrative delays leads to contradictions in food safety specifications and guidelines.
- Sanitary and Phytosanitary (SPS) Measure: The stringent (SPS) measures applied by developed countries also impede the exports of processed foods.

Opportunities Associated with Food Processing Industries

- Employment Generating Sector: The Food Processing Industry (FPI) is of enormous significance as it provides synergies between the two pillars of the economy, i.e. agriculture and industry for direct and indirect employment opportunities.



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- Ensuring Nutritional Security: Processed foods when fortified with vitamins and minerals can reduce the nutritional gap in the population.
- Boosts Trade and Earns Foreign exchange: It is an important source of foreign exchange.
- Curbing Food Inflation: Processing increases the shelf life of the food thus keeping supplies in tune with the demand thereby controlling food-inflation.
- Increasing Demand for Agro-Products: Urbanization is increasing at a rapid pace in India, which subsequently, increases the demand for processed food.
- Curbing Rural Unemployment as per FPI links agriculture and industry, it will help in addressing the problem of disguised unemployment that affects the productivity of Indian agriculture.
- Food Processing being a labor-intensive industry will provide localized employment opportunities and thus will reduce the push factor in source regions of migration.

Food processing provides an opportunity to harness excess production efficiently, ensuring food & nutritional security and supporting farmers. Thus, food processing has become an integral part of the food supply chain in the global economy. India, as an agrarian country, must utilize its potential in the Food Processing Industry

Q5) what do you understand about nanotechnology and how it is helping in the health sector?

Approach

- Define nanotechnology.
- Importance of nanotechnology
- Conclude with suggestion

ANS-Nanotechnology is the development and the use of techniques to study physical phenomena and develop new devices and material structures in the physical size range from 1 to 100 nanometers (nm), where 1 nanometer is equal to one billionth of a meter.

IMPORTANCE

- Integration of Nano-materials with biology has led to the development of diagnostic devices, analytical tools, drug delivery vehicles, and physical therapy applications.
- Nanotechnology has led to the possibility of delivering drugs to precise cells, ensuring greater efficiency and lesser side effects.
- Nano-materials have also given the scope for repairing damaged tissues since the cells can be artificially produced using this technology.
- Nano this technology has currently become an important diagnostic tool since it can sense and label specific molecules, structures, or microorganisms.
- Use in Drug Delivery: Nano-micelles can easily escape the circulation and enter the tumors where the blood vessels are found to be leaky. These leaky blood vessels are absent in healthy organs.
- Other use like Nanotech detectors for heart attack, Nano chips to check plaque in arteries, Nano-carriers for eye surgery, Nano-sponges are polymer Nano-particles coated with a red blood cell membrane and can be used for absorbing toxins and removing them from the bloodstream.



- Nano-Flares are used for the detection of cancer cells in the bloodstream and, Nano pores are used in making DNA sequencing.

Nanotechnology provides a bright future for humankind. Hence, Government must invest more in the basic research to understand this field with the initiatives like National Nanotechnology mission.

6) How is science interwoven deeply with our lives? What are the striking changes in agriculture triggered off by science-based technologies?

Approach

- Introduce the role of science during Covid-19.
- Write the Impact of science on our life.
- Explain how technologies are helping in agriculture.
- Conclude with a way forward.

ANS-

During the Covid-19 outbreaks and nationwide lockdowns, Science has made the life of the people with the help of technologies.

Impact of Science

- **Computers:** Computers are the driver of the digital revolution and industry 4.0.
- **Medical Science:** Scientists have invented vaccines and drugs to eliminate the deadly disease and pandemics.
- **Distant images:** Television photographs about the movement of astronauts on the moon were seen on earth. By the device of electromagnetic waves, photographs of Venus and Mars, millions of miles away, were transmitted by spacecraft to the earth.

Striking changes in Agriculture due to Science-based technologies are-

- **Remote sensing (via satellites), GIS, crop and soil health monitoring, and technologies for livestock and farm management** are helping to improve agricultural efficiency.
- **Seed quality enhancing:** The quality enhancement can be done with advanced techniques, adopting seed management strategies resulted in creating high yield seed varieties.
- **Solar-powered water pumps:** These pumps use the abundant solar power available to pump water from the ground. These provide an energy-efficient way. Hence, reduce the cost of production and increase profits for the farmer.



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- Adoption of cold storage chain technology for perishable and other perishable allied Agri – commodities has helped to reduce wastages and improve the gains to farmers and consumers substantially.
- ICT sectors such as e-choupal are an example of an efficient supply chain system empowering the farmers with timely and relevant information enabling them to get better returns on their investment.
- E-governance in the areas like- maintenance of land records is a great step in removing the malpractices and creating assurance of rightful ownership.
- Aadhaar linked bank accounts provide access to monetary benefits for access to credit.
- Direct farm-to-door connectivity through e-commerce and m-commerce platforms has facilitated a large number of artisans to cut the middleman share and get a fair price for their produce.
- Agro-based small enterprises such as providing tractor & other farm types of equipment on rents at reasonable rates in rural areas helped to reduce the cost of production.
- Better access to information through the KisanSuvidha app and DD Kisan Channel helped to improve efficiency in agriculture.
- GPS mapping, which helps the farmer in accessing the need i.e. where they need to put more fertilizer or less, as per the requirement of the soil. GPS-enabled services are also helping in the field of documentation about yield, moisture, etc.

Science and technology are double edge sword to humanity. We must harness the positive effects to get maximum human welfare.

Q7)how does the draft Environment Impact Assessment (EIA) Notification, 2020 differ from the existing EIA Notification, 2006.

Approach

- Brief about the EIA notification, 2020.
- Explain the difference between EIA,2020 and EIA,2006
- Conclude with the positive part of the EIA, 2020.

ANS-Recently, the Ministry of Environment, Forest, and Climate Change (MoEFCC) has proposed a draft Environmental Impact Assessment (EIA) notification 2020 that seeks to replace the current EIA notification which goes back to 2006.

Major Differences:

- **Approval:** New draft allows for post-facto approval for projects. Now clearances for projects can be awarded even if they have started construction without securing environmental clearances. Post facto approval is the violation of the fundamental principles of environmental justice and principle of environmental sustainability.
- **Public Consultation:** The draft notification provides for a reduction of the time from 30 days to 20 days for the public to submit their responses during a public hearing seeking



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environmental clearance. Public hearings would not be meaningful if enough time is not given for meaningful deliberation and discussion.

- **Compliance Report:** The 2006 notification required that the project proponent submit a report every six months. However, the new draft requires the promoter to submit a report only once every year.
- **Diluting Process:** The central government gets the power to categorize projects as "strategic." Once a project is considered strategic, the draft notification states that no information related to such projects shall be placed in the public domain. Further, the new construction projects do not need "detailed scrutiny" by the Expert Committee, nor do public consultation.

The draft EIA rule 2020 envisages consolidating the existing EIA rules and has the potential of alleviating some ambiguity in the present law. However, it must not compromise the existing principles of environmental sustainability.

8) What are the salient features of the Jal Shakti Abhiyan launched by the Government of India for water conservation and water security?

Approach

- Introduce a brief about Jal Shakti Abhiyan.
- Write Salient features of Jal Shakti Abhiyan
- Conclude with some facts or data.
- **ANS-** The **Jal Shakti Abhiyan** aims at making water conservation a Jan Andolan through asset creation and extensive communication. The Jal Shakti Ministry has formed to provide clean and piped drinking water to every household in the country.

Salient features of the Jal Shakti Abhiyan are-

- Water conservation and rainwater harvesting
- Renovation of traditional and other water bodies/tanks
- Reuse and recharge structures
- Watershed development
- Intensive forestation
- Development of Block and District Water Conservation Plans (To be integrated with the District Irrigation Plans)
- Krishi Vigyan Kendra Melas to promote efficient water use for irrigation (Per Drop More Crop), and a better choice of crops for water conservation
- Urban Waste Water Reuse: In urban areas, plans/approvals with time-bound targets to be developed for wastewater reuse for industrial and agriculture purposes.
- Every urban local body has been asked to first constitute a rainwater harvesting cell that would monitor groundwater extraction, water harvesting potential of the city, and oversee projects on rainwater harvesting.
- 3D Village Contour Mapping: 3D Village Contour Maps may be created and made accessible for efficient planning of interventions



The government has also identified 1,592 blocks that are critical and overexploited, spread across 256 districts for the Jal Shakti Abhiyan.

9) Discuss the different types of cybercrimes and measures required to be taken to fight the menace.

Approach

- Define Cybercrimes.
- Explain types and measures of cybercrimes.
- Conclude with suggestions.

ANS-

Cyber Crime is an unlawful act where the computer is used as a tool or target or both. The digital revolution and industry 4.0 are facing challenged with cyber threats.

Types of cybercrime

- **Hacking – Hacking** is an act committed by an intruder by accessing the computer system without your permission.
- **Virus dissemination-** Viruses are computer programs that attach themselves to or infect a system or files and have a tendency to circulate to other computers on a network. They disrupt the computer operation and affect the data stored- either by modifying it or by deleting it altogether.
- **Phishing-**This technique of extracting confidential information such as credit card numbers and usernames password combos by masquerading as a legitimate enterprise. Phishing is typically out by email spoofing. You've probably received an email containing links to legitimate appearing websites.
- **Cyber stalking-** Cyber stalking is a new form of internet crime in our society when a person pursued or followed online.

The government of India has taken the following steps to deal with cyber crimes-

- Establishment of National Critical Information Infrastructure Protection Centre (NCIIPC) for protection of critical information infrastructure in the country
- All organizations providing digital services have been mandated to report cyber security incidents to CERT-In expeditiously.
- Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) has been launched for providing detection of malicious programs and free tools to remove such programs.
- Issue of guidelines for Chief Information Security Officers (CISOs) regarding their key roles and responsibilities for securing applications/infrastructure and compliance.
- Formulation of Crisis Management Plan for countering cyber attacks and cyber terrorism



Therefore, conducting regular training programs for networks regarding securing the IT systems and critical digital infrastructure can be protected in times of digital warfare.

10) For effective border area management, discuss the step required to be taken to deny local support to militants and also suggest ways to manage favorable perception among locals.

Approach

- Give a Brief Account of the International border of India.
- Reasons for people support militants.
- Measure to eliminate the people support militants
- Conclude with the suggestions.

ANS- India's land border covers around 15,106 km sharing boundaries with Pakistan, Afghanistan, China, Nepal, Bhutan, Bangladesh, and Myanmar. Varied terrains, climatic conditions, and hostile neighbors make its borders complex and border management an important part of its security.

Reasons -

- Widespread poverty and lack of employment, unequal regional development, inequality in society.
- Less involvement of local people in decision making and political processes.
- Weak integration, feeling of deprivation and isolation with mainstream India ex-North East Insurgency
- Inefficient Governance and administration at local level.
- Over centralization and lack of devolution of powers.

Measure-

- Development of communication and transportation for well integration to society.
- Involving locals to decision making.
- Giving jobs and narrowing the developmental gap in the region.
- Persuasion by local leaders about the good intentions of government and administration machinery.

Managing locals will go a long way in managing border areas as intelligence networks will be strengthened and issues of militancy will be nipped in the beginning stage itself by community support.

11) Explain the meaning of investment in an economy in terms of capital formation. Discuss the factors to be considered while designing a concession agreement between a public entity and a private entity.

Approach

- Define Investment in terms of capital formation.



- Components of Capital formation.
- Factors of the concession agreement between a public entity and a private entity.
- Conclude with a way forward.

ANS

-Investment is also called Gross fixed capital formation (GFCF). It refers to the acquisition of new or existing fixed assets that are intended for use in the production of other goods and services for a period of over one year.

Components of Capital formation

- **Creation of Savings** for purposes of capital formation.
- **Mobilization of Savings:** A finance and credit mechanism, so that the available resources are obtained by private investors or government for capital formation.
- **Investment of Savings:** The act of investment itself so that resources are used for the production of capital goods.

A concession agreement is an agreement between a Government Authority and a Private entity, through which the Government grants certain rights to the Private entity for a limited time. These agreements are common in the development of infrastructural projects under the Public-Private Partnership (PPP) model.

The factors to be considered while designing a concession agreement between a public entity and a private entity are-

- PPP models offer the greatest benefits with some pros and cons. The final decision must be taken after systematic and thoughtful analysis by the public sector, taking into account the project's specific goals, objectives, financing requirements, and risk thresholds.
- Uses of Public-private partnerships (P3s) and typical structures "Design-Build-Operate-Maintain"(DBOM) structure employed by various public authorities has allowed the public sector to tap into the innovation and efficiencies of the private sector more successfully.
- **Evaluate financing needs and resources-** Financing is always a key consideration on every P3 project and establishing a supportable plan of finance that optimizes cost and effectively allocates risks and rewards between the parties is of paramount importance. Many key considerations must be addressed in determining the plan of finance.
- Viability gap funding, User charges, Contract enforcement and Risk sharing can be done.

These agreements should be based on best international practices, and make certain that policies and regulatory frameworks would address the complexities and balance the diverse interests of all stakeholders in various sectors.



12) explain the rationale behind the Goods and Services Tax (Compensation to States) Act of 2017. How has COVID-19 impacted the GST compensation fund and created new federal tensions? (Answer in 250 words) 15

Approach

- Brief introduction of GST
- Reason of Rationalization of GST.
- Conclude with the suggestion that how government can eliminate federal tension.

Ans-

The Goods and Service Tax Act of 2017 took away the taxation powers of the state government. Indirect sources of the tax such as VAT, service tax, etc were subsumed under the GST, and the state needed assurances for a continuous source of revenue.

The Goods and Services Tax (Compensation to states) Act of 2017 was a legal assurance given by the union government to compensate states for loss of revenue for a period of five years.

The rationale behind the Act

- **Fixed revenue growth**-The center assured a 14% year to year growth on GST revenues for a period of five years. If such amount was not available, the center assured to compensate states for such deficiency.
- **Raising new revenue Sources**-State governments lost their power to raise revenue from alternative indirect sources after GST. This deficiency was fulfilled by the union government by compensating them with a fixed amount regardless of the situation.
- **Create constitutional liability**-The Act created a constitutionally binding agreement between center and state regarding GST compensation. It prevented states from being a victim to the center's high handedness.

Impact of covid-19 on GST compensation and creation of federal tension

- Decreases in GST revenues have impacted the government's ability to compensate the state as they simply don't have the money to fulfill their obligation. The shortfall is about 1.75 lakh crore.
- Compensating for the state's loss has to be done through the raising of alternate sources, which is difficult in times of the pandemic.
- The state needed the money to fight the pandemic but the center was reluctant to perform its obligation. It invoked force majeure to escape from the binding clause.
- The state cited the constitutional safeguard and demanded their legal share, causing a conflict between federal ideas under the constitution.



- The matter has reached the Supreme Court, where opposing states have questioned the center's move to break its federal agreement.

The center should give the state government their due by borrowing from the market. The shortfall can be covered by imposing cess on certain products. **Thus**, the covid-19 has created a federal economic crisis. To prevent such a situation in the future, the center must allow states to raise money through cess in their respective domain.

13) What are the major factors responsible for making the rice-wheat system a success? Despite this success, how has this system become a bane in India? (Answer in 250 words)

Approach

- Brief about the Rice-Wheat system.
- Reason for the success of the rice-wheat system India.
- Problem with the rice-wheat system.
- Conclude with government initiatives to tackle the problems related to the rice-wheat system.

ANS-The Rice-wheat cropping system is India's most widely adopted cropping system practiced on an estimated area of around 11 million hectares. This system is prevalent in Indo-Gangetic plains (IGP) and is predominant in Uttar Pradesh, Punjab, Haryana, Bihar, West Bengal, Madhya Pradesh, etc.

Major factors responsible for making the rice-wheat system successful are-

- The usage and optimization of different techniques like surface seeding, the zero-till system, reduced-till system, and bed-planting technology;
- Adoption of new technologies on cropping pattern; the intervention of crop diversification under the aegis of AICRP-Integrated Farming Systems (AICRP-IFS)
- Effective use of agricultural machinery to increase productivity and production of farm output
- Inducement of new crop varieties having specific traits to improve yield and nutritional quality ensuring tolerance and resistance to various biotic and abiotic stresses;
- Adopting improved methods of irrigation and irrigation technologies.
- Usage of optimal dose based on soil health status
- Promotion of neem coated urea.
- Bio-fortification to improve the nutritional quality of food crops, promotion of organic fertilizers and water-soluble fertilizers

Problems related to Rice –Wheat System in India

- Declining underground water table since a lot of groundwater is extracted for irrigation.
- Consume the maximum percentage of irrigation water considering any other cropping pattern.



- Excessive use of fertilizers and insecticides promotes land degradation and desertification.
- Lots of fertilizers required subsidies and government expenditure.
- Soil physical quality undergoes degradation.
- These crops produce a huge surplus of residues that burns and create air pollution.
- Their crops lack high protein and nutrition.

The government of India has launched a crop diversification scheme in the original green revolution areas of Punjab, Haryana, and Western Uttar Pradesh. Under the Crop Diversification Programme, assistance is provided to states for conducting cluster demonstrations on alternate crops, promotion of water-saving technologies, distribution of farm machinery, and awareness through training

14) Suggest measures to improve water storage and irrigation system to make its judicious use under the depleting scenario.

Approach

- **Introduce about irrigation system.**
- **Explain measures and government initiatives to improve irrigation systems and the water storage system.**
- **Conclude with World Banks' report on "India's Water Economy"**

ANS- Irrigation is the prime most component in the agriculture sector in India. As more than three-quarters of the annual rainfall occurs during the four months of the summer monsoon season, decentralized irrigation techniques play a pivotal role to ensure water supply for agriculture & household needs around the year.

Some measures to improve water storage and irrigation system to make its judicious use under depleting scenario are:

- Micro Irrigation encompassing drip and sprinkler irrigation results in the efficient deployment of inputs like water, electricity, fertilizers, labor; increase in crop



productivity; irrigation of additional area under crop; and bringing under cultivation water deficient, cultivable wasteland and undulating land areas due to ease of irrigation.

- Special emphasis on watershed management programs to address the issues related to wild runoff, conservation of soil and water, employing the runoff water, the percolation of rainwater, and rehabilitation of the wasteland is imperative.
- Rainwater harvesting to collect and store rainwater at the surface or in sub-surface aquifers so that it can't be lost as surface run-off.
- There is a need to adopt methods like "Dong Bundh System" deploying conventional methods. It is a traditional water conservation and management system in which construction is done by locally available material and the channelized water is directed to the villages and agricultural field to ensure the availability of drinking and irrigation water.
- Transfer of water from water surplus basins to water-deficit basins through interlinking of rivers is envisaged.
- Canals, infiltration basins, water bodies, irrigation furrows, sprinkler systems, injection wells should be used to redirect water across the land surface to recharge groundwater artificially.
- Rehabilitation of dams based on their assessed needs to ensure water security.

Government initiatives to improve the water storage and irrigation system:

- Mission Kakatiya is a flagship program under the Telangana government aimed at restoring minor irrigation sources of water like ponds and tanks.
- JalyuktShivaryojan in Maharashtra has played a prominent role in providing farm ponds to every farmer in her/his agriculture field.



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- In Gujarat 'Bhungroo' a water management system that injects and stores excess rainfall water underground. This water is then used for irrigation during summers.

World Bank report on "India's Water Economy: Bracing for a Turbulent Future" (2006), stated that dams in India can store only about 30 days of rainfall, compared with 900 days in major river basins in arid areas of developed countries. Hence, it becomes important to focus more on decentralized irrigation as it will help the agriculture sector to be self-reliant (Aatmnirbhar) in irrigation.

15) COVID-19 pandemic has caused unprecedented devastation worldwide. However, technological advancements are being availed readily to win over the crisis. Give an account of how technology was sought to aid the management of the pandemic

Approach

- Introduce how digital technology helped during Covid- 19.
- Explain in detail the various technologies interventions to deal with a pandemic.
- Conclude with some new initiatives like potential metabolite biomarkers.

ANS- This pandemic has triggered an unprecedented demand for digital health technology solutions and has revealed successful solutions such as population screening, tracking the infection, prioritizing the use and allocation of resources, and designing targeted responses

The management of the pandemic pays particular attention to the processes of dealing with and controlling it. Various technological interventions in this regard are:

- The Access to COVID-19 Tools (ACT) Accelerator is pioneering international teamwork to fast-track development, production, and equitable access to COVID-19 tests, treatments, and vaccines.



- 'AarogyaSetu', a mobile app utilizing Bluetooth technology, algorithms, and artificial intelligence, was developed to bring the people of India together in a determined fight against COVID-19 and for tracking COVID-19 patients.
- Co-VIN or the Covid-19 Vaccine Intelligence Network, which is an extension of electronic Vaccine Intelligence Network (e-VIN), is a digitalized tech platform for effectively rolling out and scaling up the COVID Vaccine Distribution System mechanism at a national level to reduce wastage and make the most effective use of vaccine supply and cold chain network.
- The Tata CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) test is considered the world's first diagnostic test to bring into effective action a specially adapted Cas9 protein to successfully identify the virus causing Covid-19.
- The Centre for Augmenting WAR with COVID-19 Health Crisis (CAWACH) encouraged Bangalore based start-up to bring out a mobile app for detection of possible infection in an asymptomatic individual and risk assessment of COVID 19 infected individuals. It is called the Lyfas COVID score.

The technology used in the following way to manage the pandemic-

- Finding Drugs with the help of AI-based Technology. AI is playing important role in suggesting components of a vaccine by understanding viral protein structures and helping medical researchers.\
- Increasing traceability and transparency by sharing data.



- Tracking people with facial recognition and big data technologies can accurately identify people even if they are masked. Such technologies can help in monitoring movement and tracking of people who are quarantined.
- Contact-less movement and deliveries through autonomous vehicles, drones, and robots- Self-driving cars, drones, robots can all help at a time when the need is to avoid human contact. Robots can be used for delivering groceries, cooking means, sterilizing hospitals, and patrolling the streets. Drones can be used for food deliveries, tracking population, carrying test kits and medicines to quarantine locations, thermal imaging to identify infected people, spraying disinfectant, and more
- Remote working technologies to support social distancing and maintain business continuity- As Working from home, technologies enable us to secure access to data, enterprise applications, virtual meetings, cloud conferencing, and virtual/mixed/augmented reality that helps us in social distancing.

Besides, implementable technologies related to searching for potential metabolite biomarker signature for COVID infection, developing antiviral surface coatings to prevent the spread of infections, and the development of antibody-based capturing of COVID-19 were other sought-after initiatives.



16) Describe the benefits of deriving electric energy from sunlight in contrast to conventional energy generation. What are the initiatives offered by our Government for this purpose?

Approach

- Mention commitment of Paris agreement 2015 regarding electric power generation.
- Explain the benefits of electric energy.
- Write government initiatives related to electric energy.
- Way forward.

ANS-

To fulfill India's commitments under the 2015 Paris Agreement, the government wants to achieve 40% of installed electric power capacity from non-fossil sources by 2030. Solar energy is the most important driver to achieve this target.

Benefits of deriving electric energy from sunlight-

- **Environmental Sustainability:** India's large part of energy demand is fulfilled by thermal energy largely dependent on fossil fuels which causes pollution. Solar energy is a clean form of energy resource, which can be a substitute.
- It is one of the clean energy and sustainable alternatives to fossil fuels.
- Solar energy can be harvested directly for use in homes, schools, and hospitals by many technologies.



- This is crucial for agribusiness in farms for running irrigation, greenhouses, and crop and hay dryers, making agriculture risk – free. Solar cells don't require any water for generating electricity.
- It can reduce the electric bill burden from the consumers.

Initiatives offered by our Government are-

- National Solar Mission (NSM) launched in 2010 is one of the efforts in this direction to harness the country's estimated solar energy potential of about 750 GW solar power
- Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) provides water and energy security to farmers and enhances their income.
- Atal Jyoti Yojana (AJAY)' is meant to install solar street lights.
- The other initiatives include 'Roof Top Solar program' accelerating the deployment of solar rooftop systems, 'Development of Solar Parks and Ultra Mega Solar Power Projects'

Way Forward

- Strong financial measures are required to finance the solar projects, innovative steps like green bonds, institutional loans, and clean energy funds.
- Promotion of research and development in the renewable energy sector, especially in storage technology.
- A framework to avoid unnecessary delays in policy decision making and implementation.
- India needs a Solar Waste Management and Manufacturing Standards Policy.

India is all set to cross the 100GW renewable energy capacity mark in 2020 and can make rapid strides towards the ambitious 175GW clean energy target by 2022 provided the government keeps a close eye on key issues and deals with those well in time.



17) What are the key features of the National Clean Air Programme (NCAP) initiated by the Government of India?

Approach

- Brief about the NCAP initiative in introduction.
- Objectives and features of the NCAP.
- Conclude with an overall objective of NCAP or any government initiative related to air pollution.

ANS-The Central Government launched National Clean Air Programme (NCAP) as a long-term, time-bound, national-level strategy to tackle the air pollution problem across the country in a comprehensive manner with targets to achieve a 20% to 30% reduction in Particulate Matter concentrations by 2024 keeping 2017 as the base year for the comparison of concentration

Objective of NACP

- To augment the capacity of air quality monitoring networks across the country to provide reliable data on the state of air pollution.
- To solicit public participation in planning and mitigation of air quality issues through public outreach, transparency by disseminating data in the public domain.
- To have realistic and measurable goals for prevention, mitigation, and abatement of air pollution in a time-bound manner.

Features –

- Preparation of the city-specific action plans including measures to strengthen the monitoring network, reduce vehicular/industrial emissions, increase public awareness, etc.
- implementation of the city-specific action plans to be regularly monitored by Committees at Central and State level namely Steering Committee, Monitoring Committee and Implementation Committee;



- facilitating collaborative, multi-scale, and cross-sectoral coordination between the relevant central ministries, state governments, and local bodies;
- establishing a right mix with the existing policies and programs which include the National Action Plan on Climate Change (NAPCC) and other government initiatives related to climate change;
- Constant change, activity, and progress to get evolved based on the additional scientific and technical information as they emerge.
- An increasing number of monitoring stations and emphasis on awareness and capacity building initiatives.
- Setting up of certification agencies for monitoring equipment, source apportionment studies, emphasis on enforcement, specific sectoral interventions, etc.

The overall objective of the NCAP is comprehensive mitigation actions for prevention, control, and abatement of air pollution so that climate change and urban pollution can be reduced

18) Discuss the recent measures initiated in disaster management by the Government of India departing from the earlier reactive approach.

Approach

- Introduce brief about Disaster management.
- Explain pre-emptive-cum-proactive approach to deal with disasters.
- Conclude with some measures.

ANS-

A recent outbreak of Covid-19 has shifted the focus on disaster management. Disaster management in India has been an important point of discussion owing to frequent natural disasters ranging from earthquakes, floods, drought, etc.



Following recent measures related to disaster management show that the government now deals with the disasters in a pre-emptive-cum-proactive way rather than a reactive way in following ways:

- Practical approach and roadmap with the launch of a global Coalition for Disaster Resilient Infrastructure (CDRI) to make the infrastructure resilient in the face of disasters. It provides technical support and capacity development, research and knowledge management, and advocacy and partnerships to facilitate and encourage investment in disaster-resilient infrastructure systems to member states.
- Indian Coast Guard with the assistance of ICG Remote Operating Centres and Stations, Navigational Text Message activated one week in advance prevented the loss of fishermen's lives and reduced impact from Cyclone Amphan and Nisarga.
- IMD is to launch a dynamic, impact-based cyclone warning system aiming at minimizing economic losses.
- Field training exercises are conducted to improve existing emergency preparedness and strengthen regional response mechanism.
- Building dedicated institutions like the National Fire Service College (NFSC) and the National Disaster Response Force (NDRF).
- NDRF has achieved benchmarks under Sendai Framework for Disaster Risk Reduction.

With such new measures, India will be able to comprehensively fight the disasters to minimize the post effects.



19) What are the determinants of left-wing extremism in the Eastern part of India?

What strategy should the Government of India, civil administration, and security forces adopt to counter the threat in the affected areas?

Approach-

- Define LWE in the introduction.
- Determinants and government initiatives to tackle the LWE in the Eastern part of India.
- Conclude with a way forward.

ANS- LWE organizations are the groups that try to **bring** change through a violent revolution. They use violence to subvert the democratic processes at the ground level. These groups try to misguide the people by keeping them ignorant of current happenings.

Determinants of left-wing extremism in Eastern part of India-

- Lack of development of these regions due to geographical and economic factors.
- Ineffectiveness and mismanagement in the administrative machinery as well as corruption lead to breaking trust in government.
- The alienation and social exclusion of people led to sections of them feeling disconnect with the mainstream population.
- Support by external and non-state actors across the border nations to incite violence and insurgency.
- Unchecked use of AFSPA.



Government, Civil administration, and security strategy to tackle the LWE in the eastern part of India are -

- The Ministry of Home Affairs has created a division for capacity building in LWE affected states.
- SAMADHAN strategy of the government to frame short term and long term policies to tackle LWE. SAMADHAN stands for Smart leadership, Aggressive strategy, Motivation and training, Actionable Intelligence, Dashboard Based KPIs (key performance indicators), and KRAs (key result areas), Harnessing technology, an Action plan for each theatre, and No access to financing.
- National Policy and Action Plan adopting a multi-pronged strategy in the areas of security, development, ensuring rights & entitlement of local communities. The modernization of the police force aims at narrowing the gap between Police and locals through personal interaction.
- Institutional measures like Blank Panther Combat Force, Bastariya battalion (locals joining as police, who are well informed of the terrain).
- Infrastructure development like constructing roads, mobile tower project to bring the locals into the mainstream.
- Capacity building and skill development of the locals with schemes like ROSHNI that aims at providing jobs to the locals, the Ekalavya model residency schools for an educational facility to tribal children.
- Economic Inclusion like providing support prices for Minor forest produce (MFP), establishing Van DhanKendras to aid tribal income.
- The Surrender and Rehabilitation policy for the holistic last-mile development of “**New India**”.

The action through security forces and developmental action should aim at integrating the locals with the outside world with preserving distinct cultural elements.

20) Analyze internal security threats and trans-border crimes along Myanmar, Bangladesh, and Pakistan borders including Line of Control (LoC). Also, discuss the role played by various security forces in this regard.

Approach

- Introduce a brief about internal security and trans-border crimes.
- Explain detail about the Trans-border crimes in Pakistan, Bangladesh, and Myanmar more bored.



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- Write about the role played by security forces to tackle trans-border crimes.
- Conclude with a comprehensive approach to tackle the issue.

ANS-

There has been high evidence of internal security threats and trans-border crimes along the borders with Pakistan, Bangladesh, and Myanmar due to large open and porous borders.

Trans-border crimes along Myanmar-

- **Gunrunning and drug trafficking-** The Indian insurgent groups have been procuring arms from the black markets of Southeast Asia as well as from Myanmar-based rebel groups such as the United Wa State Army (UWSA).
- **Narcotics and the 'Golden Triangle'**- Proximity to Myanmar in the 'Golden Triangle' makes the India-Myanmar border vulnerable to the trafficking of heroin and amphetamine-type stimulants (ATS) produced in Myanmar.

Trans-border crimes along Bangladesh

- **Cattle and other Smuggling:** Cattle from as far as Haryana, UP, Bihar is taken to borders for grazing and then smuggled to Bangladesh.
- Smuggling of arms and other essential items such as sugar, salt, and diesel, human and narcotics trafficking, counterfeit Indian currency, kidnapping, and thefts are quite rampant along the India–Bangladesh border

Trans-border crimes along Pakistan

- Despite fencing smuggling of drugs, mainly heroin is rampant at the border of Punjab. Illegal arms trading, fake currency notes have been a recurring problem along this border contributing majorly to the instability of this region.

The role played by various security forces

- The BSF is the world's largest border guarding force. It secures the 6,386.36 km long international borders with Pakistan and Bangladesh.
- NSG is a world-class force. It can counter any kind of attack in minimum response time and has multi-dimensional responsibility of countering terrorist attacks and providing proximate security.
- The border with Myanmar is guarded by the Assam Rifles to protect the security of the Northeast Region.



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A comprehensive and integrative Border Management for the socio-economic development and promotion of well-being in the security environment is an immediate need to be addressed by the government. Bringing all stakeholders and responsible implementation will strengthen to eliminate these threats.

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