

Environment FOR You 2021



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GOOD MORNING TIMES

Environment (JUNE -2021)

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TOPIC GENERAL STUDIES 3: CONSERVATION, ENVIRONMENTAL POLLUTION AND DEGRADATION, ENVIRONMENTAL IMPACT ASSESSMENT

June -2021

1) GROSS ENVIRONMENT PRODUCT

On **World Environment Day (June 5)**, Uttarakhand became the first state in India to take into account Gross Environment Product (GEP) while calculating its Gross Domestic Product (GDP).

- Four critical natural resources- Air, Water, Forest and Soil- will be assigned monetary values. The quality and quantity of these natural resources would determine the GEP of Uttarakhand. Environmentalists estimate that Uttarakhand through its biodiversity gives services to the tune of Rs 95,112 crore per year to the nation.
- Discussions on having a GEP in the state came after the Kedarnath disaster (2013) and were further accentuated by the acute water shortage in the state during summers.

What is GEP?

- It is the total value of final ecosystem services supplied to human well-being in a region annually and can be measured in terms of biophysical value and monetary value.
- It indicates the overall health of the environment as GEP measures prime indicators such as forest cover, soil erosion, air quality and dissolved oxygen in river water.
- Unlike Green GDP which is obtained after deducting the damage to the environment from the total production of the state, GEP will assess the improvement in the environment components in a year. Further it will tell how much work the state has done in reducing the loss of the ecosystem in environmental protection and resource use.

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Need for GEP

- Economic growth alone cannot represent true economic development: and may lower human well-being if it is accompanied by growing inequity and environmental degradation.
 - Resource depletion during industrial growth impacts rural growth disproportionately as the rural economy depends on such natural resources only. GEP thus forms a balanced development approach where ecology is given equal space.
 - Accounting GEP into GDP will give a true measure of the nation's growth towards sustainable development.
- Shortcomings of traditional systems: The Traditional System of National Accounts (SNA) like GDP/GNP neither accounts for the value of natural resources and ecosystem services nor the value of environmental/resource degradation taking place during the developmental process.
 - Ecosystem Services are “benefits people derive from ecosystems” like provisioning services (food, wood etc.) and regulating services (water purification, carbon sequestration etc.)
- Framing adequate policies: GEP helps in understanding the impact of anthropological pressure on our ecosystem and natural resources. This will enable us to make policies that will balance ecology and economy.

Issues in capturing GEP into GDP

- Knowledge gap: There is lack of data and an existent challenge to assign a monetary value to ecosystem services. Assigning monetary value to ecosystem services is possible only to a limited extent.
 - For example, the pipal tree in India is revered as a holy tree and religious ceremonies are conducted under its shade. Here economic valuation of the tree cannot encompass the complexity and the ecological, socio-cultural and institutional heterogeneity of a particular area.
- Policy gap: There is lack of recognition of ecosystem services in economic decision-making, development planning and resource allocation. Value of ecosystem services is either ignored or inadequately understood.

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- Institutional failure: Insufficient 'Compensation for ecosystem services' (CES) provided by the government to stakeholders.
 - CES involves recognising and compensating people who manage the land that contribute to the long term security of ecosystem functions. It is a new financial resource for funding conservation measures to ensure a vital ecosystem. Prominent CES mechanism is 'Payments for Ecosystem Services' (PES).

Way forward

- Incorporate environmental assets accounts: This approach collects data on various types of natural capitals like forests, groundwater etc. and convert them into monetary terms.
- Biophysical and spatio-temporal dynamics of the region needs to be kept in mind while quantifying and valuing ecosystem services
- Develop frameworks to incorporate impacts of climate change on ecosystem services.
- Develop alternative or complementary non-market methods to evaluate ecosystem services with focus on intangible assets, skills and knowledge and cultural values.
- Factors like social disparities should be accounted for in evaluating ecosystem services. Conclusion GEP can become an environmental indicator that measures the value of natural resources along with improvements done in the ecosystem to truly assess national wellbeing. If Uttarakhand successfully implements GEP, pressure will be on other states to do the same.

Other global standards /initiatives

- System of Environmental and Economic Accounts (SEEA): guidebook developed by the United Nations to provide standards for incorporating natural capital and environmental quality into national accounting systems.
- China (since 2004) has been undertaking studies to estimate the cost of various types of environmental damage which offsets its economic growth. China's investment in pollution control and renewable energy has been growing rapidly since then.
- The Happy Planet Index (HPI) created by the British New Economics Foundation (NEF) measures national welfare in the context of

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environmental sustainability.

- Bhutan's Gross National Happiness (GNH) has environmental preservation as one of the four policy objectives.
- Sweden (since 2003) has brought in various environmental indicators (like air emissions , waste etc.) as part of the government policy of achieving sustainable development.

2) ETHANOL BLENDING IN INDIA

Recently, the central government has advanced the target of 20% ethanol blending in petrol (also called as E20), by five years to 2025, from 2030.

More in News

- The Government has also released an expert committee report on the 'Roadmap for Ethanol Blending in India by 2025'.
 - o It proposes a gradual rollout of ethanol-blended fuel to achieve E10 fuel supply by April 2022 and phased rollout of E20 from April 2023 to April 2025.
 - o Earlier, National Biofuel Policy 2018 had envisaged an indicative target of 20% blending of ethanol in petrol and 5% blending of biodiesel in diesel by 2030. o In 2020, India had set a target of 10% ethanol-blending in petrol by 2022, 20% ethanol-blending in petrol by 2030 and 10% ethanol-blending in diesel by 2030.
- It also recommends introducing vehicles that are compatible by rolling out of E20 material-compliant and E10 engine-tuned vehicles from April 2023 and production of E20-tuned engine vehicles from April 2025.
 - o These efforts will facilitate setting up of additional ethanol distillation capacities and will provide timelines for making blended fuel available across the country.
 - o It will also help increase consumption of ethanol in the ethanol producing states and the adjoining regions before the year 2025.

What is ethanol blending?

- An ethanol blend is defined as a blended motor fuel containing ethyl alcohol that is at least 99% pure, derived from agricultural products, and blended exclusively with gasoline.
 - o Since it is plantbased, it is considered to be a renewable fuel.

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- Government has allowed ethanol production/ procurement from sugarcane-based raw materials viz. C & B heavy molasses, sugarcane juice / sugar / sugar syrup, surplus rice with Food Corporation of India (FCI) and Maize.
- The Oil Marketing Companies are to procure ethanol from domestic sources and blends ethanol at its terminals.
 - o Government has been notifying administered price of ethanol since 2014.
- Department of Food and Public Distribution (DFPD) is the nodal department for promotion of fuel grade ethanol producing distilleries in the country.

Significance of ethanol blending

- **Reduce Pollution:** By blending ethanol with petrol, fuel mixture is oxygenated so it burns more completely and reduces polluting emissions. It also offers higher octane number in comparison to petrol.
 - o Using bioethanol in older engines can help reduce the amount of carbon monoxide produced by the vehicle thus improving air quality.
- **Carbon Neutral:** Combustion of ethanol made from biomass (such as corn and sugarcane) is considered atmospheric carbon neutral because as the biomass grows, it absorbs CO₂, which may offset the CO₂ produced when the ethanol is burned.
- **Economic Benefits:** It will help lower India's energy import dependency and thus, lowering the crude oil import bill. India's net import cost stands at \$551 billion in 2020-21. It is estimated that the E20 program can save the country \$4 billion i.e Rs 30,000 crore per annum.
- **Farmer's Income:** About 10 billion litres of ethanol will be required each year to meet the 20% ethanolblended fuel standard by 2025. Hence it is benefitting the sugarcane farmers.
 - o Last year, oil companies procured ethanol worth about Rs 21,000 crore.
- **International commitment:** It helps India to fulfil its pledge to reduce its carbon footprint from the 2005 levels by 33-35% by 2030, as part of its commitments to the United Nations Framework Convention on Climate Change adopted under the Paris Agreement. **Challenges**
- **Vehicle Modifications:** The use of E20 will require new engine specifications and changes to the fuel lines, as well as some plastic and rubber parts due to the fuel's corrosive nature.

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- o The engines will need to be recalibrated to achieve the required power, efficiency and emission level balance due to the lower energy density of the fuel.
- Pricing of E20 vehicles: The cost of E20 compatible vehicles is expected to be higher in the range of Rs 3000 to Rs 5000 for four-wheelers and Rs 1000 to Rs 2000 for two-wheelers, above the cost of ordinary vehicles tailored to run on 100% gasoline.
- Water Footprint: Sugarcane is a water intensive crop and continues to be the most lucrative food crop for ethanol even though it has highest water consumption per acre.
- o One litre of ethanol from sugar requires about 2860 litres of water.
- Ethanol production facilities: India has an ethanol production capacity of 684 crore litre. For the targeted 20% blending of ethanol in petrol by 2030, the country will need a 1,000-crore litre capacity.
- Pricing: The prices of ethanol produced in India are higher in comparison to global players, since the cost of raw materials like sugarcane and food grains are fixed by the government to support the farming community.
- Inter-state movement of ethanol: Restrictions on inter-state movement of ethanol due to nonimplementation of the amended provisions of Industries (Development & Regulation) Act, 1951 by all the States. As on date only 14 states have implemented the amended provisions.
- Availability of ethanol across the country: Ethanol is not produced or available in some states for blending and about 50% of total pump nozzles in India are supplying only E0.
- o Also, blending has not been taken up in North-East states due to non-availability of feedstock or industries.
- Logistics: Transport of ethanol to different places for blending will increase the cost of logistics and transport related emissions.

Way forward

- Pricing of Ethanol blended fuel: For better acceptability of higher ethanol blends in the country, retail price of such fuels should be lower than normal petrol to compensate for the reduction in calorific value.
- Diversify Crops: There is need to explore the feasibility of other grains which can supplement sugar in ethanol production to meet the 2025 targets.

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- Incentives for EBP vehicles: Globally, vehicles compliant with higher ethanol blends are provided with tax benefits.
- Technology Upgradation: Technology for production of ethanol from non-food feedstock should be promoted so as to tap abundantly available resource without causing any tradeoff with the food production system.
- Ensure timely availability: OMCs need to set up ethanol distillation facilities and need to provide timelines for making blended fuel available across the country.
 - o The blending percentage of ethanol with petrol has gone up from 1.53% in 2013-14 to 8.5% in 2020-21.
- Government support to enhance production: Experts point out that many sugar mills which are best placed to produce bioethanol do not have the financial stability to invest in biofuel plants.

Recent Initiatives to promote bioethanol

- Under PM-JIVAN (Jaiv Indhan- Vatavaran Anukool fasal awashesh Nivaran) Yojana, 12 commercial plants and 10 demonstration plants of Second Generation (2G) Bio-Refineries are envisaged to be set up in areas having sufficient availability of biomass so that ethanol is available for blending throughout the country.
- 2G plants utilise surplus biomass and agricultural waste to produce bioethanol.
- Cabinet Committee on Economic Affairs (CCEA) approved ₹8,460 crore Modified scheme for extending interest subvention for those setting up standalone ethanol distilleries using grain, molasses, dual feed, sugar beet, sweet sorghum and cereals as a feedstock.
 - o The focus is on increasing India's ethanol production capacity.
- Prime Minister has launched a Pilot Project of E 100 dispensing stations at three locations in Pune.

Ethanol-based 'flex-fuel' vehicles

- An FFV is a modified version of vehicles that could run both on gasoline and doped petrol with different levels of ethanol blends.
 - o These are currently being used successfully in Brazil, giving people the option

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to switch fuel (gasoline and ethanol).

- Government plans to issue guidelines for 'flex-fuel' vehicles (FFV) by October.
 - o The government is also working on an incentive scheme to promote manufacture and use of flex engines in vehicles.
- For auto companies, introduction of FFVs will pose another challenge that they are already facing with the fast adoption of electric vehicles. If standards on FFVs are made mandatory, it would require additional investment in production lines and technology transfers to change the character of the vehicles.

3) GLACIAL LAKE ATLAS OF GANGA RIVER BASIN

Recently, Ministry of Jal Shakti (MoJS) released an atlas of glacial lakes that are part of the Ganga River basin.

- Atlas is brought out under National Hydrology Project (NHP).
- In the present study, glacial lakes with water spread area ≥ 0.25 ha have been mapped using Resourcesat-2 satellite data.

About Ganga River Basin

- The Ganga River basin extends over Central Himalayas in India, Nepal, Tibet (China), and Bangladesh.
- It contains 9 of the 14 highest peaks in the world over 8,000 m in height, including Mt. Everest.
 - o Other peaks over 8,000 m in the basin are Kanchenjunga, Lhotse, Makalu, Cho Oyu, Dhaulagiri, Manaslu, Annapurna, and Shishapangma.
- In this atlas, Ganga River basin has been divided into 11 subbasins (refer infographic) on the basis of confluence of major rivers contributing into the system viz., Yamuna joining on the right, whereas rivers like Sarda, Ghaghara, Gandak, and Kosi joining on the left.
- Climate over the Ganga River basin is mainly tropical and subtropical to temperate subhumid on the plains.
- Ganga River basin carries average annual water potential of about 525 billion Cubic Metre (BCM), of which total utilizable surface water resource in the basin is 250 BCM.

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Key Findings of the Atlas

- Based on its process of lake formation, location, and type of damming material, glacial lakes are identified in nine different types, majorly grouped into four categories viz.,
 - o Moraine-dammed (form during periods of glacier retreat from a moraine),
 - o Ice-dammed (when drainage is blocked by a glacier that advances or becomes thicker),
 - o Glacier Erosion, and
 - o Other Glacial lakes.

- A total of 4,707 glacial lakes have been mapped.
 - o Lakes with ≥ 5 ha in size are 672 (14.28%) contributing to 76.87% of total lake area in the basin.
 - o More than half (i.e., 59.25%) of the lakes are situated in the very high-altitude range of greater than 5,000 m and dominated by Other Moraine Dammed Lake type.
 - o Out of 11 subbasins, only 6 subbasins contain glacial lakes, which are predominantly distributed in Kosi subbasin (51.77%) followed by Ghaghara subbasin (26.77%).
 - o Minimum number of glacial lakes are present in Yamuna subbasin and then in Sarda subbasin.
 - o Glacier Ice-dammed Lake is only one in the entire Ganga River basin and is located in Gandak subbasin.
- Uttarakhand shares 93.50% of lake count, followed by 6.50% in Himachal Pradesh.
- Each glacial lake has been given a 12 alphanumeric unique glacial lake ID, along with several attributes that include hydrological, geometrical, geographical, and topographical characteristics.

About National Hydrology Project (NHP)

- NHP, under MoJS, aims to improve the extent, quality and accessibility of water resources information and to strengthen the capacity of targeted water resources management institutions in India.
- Under NHP, National Remote Sensing Centre (NRSC), ISRO, is carrying out hydrological studies using satellite data and geo-spatial techniques.
 - o As part of this, detailed glacial lake inventory, prioritization for GLOF risk, and simulation of GLOF for selected lakes are taken up for entire

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catchment of Indian Himalayan Rivers covering Indus, Ganga, and Brahmaputra River basin. About Glacial Lake

- It is defined as water mass existing in a sufficient amount and extending with a free surface in, under, beside, and/or in front of a glacier and originating from glacier activities and/or retreating processes of a glacier.
- As glaciers retreat, the formation of glacial lakes takes place behind moraine or ice 'dam'.
- These damming materials are generally weak and can breach suddenly due to various triggering factors, leading to catastrophic floods. Such outburst floods are known as GLOF.

4) **ORGANIC FARMING**

About 14,491 hectare area in Andaman and Nicobar has been certified as organic under the Large Area Certification (LAC) Scheme of the PGS-India (Participatory Guarantee System) certification programme (the first large contiguous territory to be certified).

About LAC

- It is a unique quick certification programme to harness the potential areas of Organic farming in India.
- It was launched by the Department of Agriculture and Farmers Welfare under its flagship scheme of Paramparagat Krishi Vikas Yojana (PKVY).
- Under LAC, each village in the area is considered as one cluster or group and simple documentations are maintained village-wise.
- All farmers with their farmland and livestock need to adhere to the standard requirements and on being verified get certified en-mass without the need to go under conversion period.
- Certification is renewed on annual basis through annual verification by a process of peer appraisals as per the process of PGS-India.

About Organic farming

- As per Food and Agriculture Organisation "Organic agriculture is a unique production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity, and this is

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accomplished by using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm inputs”.

- Organic products are grown under a system of agriculture without the use of chemical fertilizers and pesticides with an environmentally and socially responsible approach.

Benefits

- **Healthy Foods:** Many studies reveal that organic food is higher in certain key areas such as total antioxidant capacity, total polyphenols, etc which are nutritionally significant.

- o Studies have also shown that dairy products from organically raised animals are healthier than conventionally produced dairy products.

- **Ecological benefits:**

- o **Improvement in Soil Quality:** It sustains healthy soils by maintaining and building a fertile living soil through the application of organic matter inputs like green manures and by implementing low soil disturbance tillage.

- o **Reduced Pollution:** Due to healthier soil and absence of harmful pesticide and fertilizer, organic farming reduces water and air pollutants.
- o **Low Incidence of Pests:** It has been observed that if the soil is healthy, the pest problem is negligible as compared to soil where agrochemicals are used or where there is low organic matter in the soil.

- **Efficient use of resources:**

- o **Improved water management:** Improving water infiltration and retention capacity through high levels of organic matter reduce the amount of water needed for irrigation.

- o **Lower Energy Use:** Many popular crops such as corn require nitrogen rich soil which is a high energy use. Organic farming achieves the nitrogen rich soil, instead, by using composted manure and the use of cover crops.

- **Economic benefits:**

- o **Increased income:** In the long run the input cost decreases significantly and the yield of organic crops improves which provides income security to the farmers.

- o **Employment Opportunities:** According to many studies, organic farming requires more labour input than the conventional farming system. Thus, it will provide employment opportunities especially for countries like India.

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o Eco-tourism: Organic farms have turned into major attraction in terms of Eco-tourism in countries like Italy.

Government Initiatives to promote Organic Farming in India

- Paramparagat Krishi Vikas Yojana (PKVY): It is a part of National Mission of Sustainable Agriculture (NMSA).

o Under the scheme, Organic farming is promoted through adoption of organic villages by cluster approach and Participatory Guarantee System (PGS) certification.

- Mission Organic Value Chain Development for North East Region (MOVCD): It is a Central Sector Scheme which aims to develop certified organic production in a value chain mode to link growers with consumers and to support the development of the entire value chain.

- Soil Health Card: The scheme aims to improve Soil Health by providing nutrients information to the farmers. It has led to a decline of 8-10% in the use of chemical fertilizers and raised productivity by 5-6%.

- Agri-export Policy 2018: It focuses on marketing and promotion of organic agriculture products foods to aid organic farming in India.

- Zero Budget Natural Farming: Government is actively promoting Zero budget natural farming. It is a method of chemical-free agriculture drawing from traditional Indian practices.

Challenges faced by Organic sector in India

- Low Coverage: About 2.78 million hectares of farmland was under organic cultivation as of March 2020, which is only two per cent of the 140.1 million ha net sown area in the country.

- Reluctancy of the Farmers: Due to high initial cost and potential impact on immediate income, most of the farmers are reluctant to undertake organic farming.

o Also, in many cases the farmers experience some loss in yields on discarding synthetic inputs on conversion of their farming method from conventional to organic.

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- **Disparity of Supply and Demand:** The major demand of perishable items comes from metros where there are no farmlands to produce organic fruits and vegetables.
- **Lack of support for inputs:** The government provide subsidies for chemical fertilisers and pesticides but there is no such provision for organic inputs. Also, organic seeds and inputs are highly regulated and governed by government policies.
- **Confused Certification Framework:** There is a lack of unique, well known and third party certified policy or framework for selling organic food products in India, which creates trust issues among the customers. (see infographic)
- **The High Price of Organic Produce:** The final prices of organic produce are mostly higher than conventional products which impact the organic produce market in India.
- **Lack of Quality Standards for Biomanures:** There are no fixed standards and quality parameters for biofertilizers and bio manures.

Conclusion

- **Awareness campaigns:** There is a need of holistic and community-driven approach, similar to the “Swachh Bharat” for “Swachh Food” needs to be undertaken. o A vigorous campaign to highlight the benefits of organic farming against the conventional system is essential to increase the awareness of the farmers and consumers.
- **Smart transport and dedicated channels of supply** can help bridge the demand-supply gap.
- **Policy initiatives for organic input management:** The government should implement a separate policy framework for organic farming which covers seeds production and input supplies.
- **Transparent regulatory framework for compliance of organic standards** to develop trust among customers.
 - o FSSAI’s Jaivik Bharat logo for Organic Food that enables consumers to distinguish organic food products from other non-organic products is a step in the right direction.

Status of Organic Farming in India

- India's rank 8th in terms of World's Organic Agricultural land and 1st

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in terms of total number of producers as per 2020 data.

- It produced around 2.75 million MT (2019-20) of certified organic products which includes all varieties of food products namely Sugarcane, Oil Seeds, Cereals & Millets, Cotton, etc.
- The export of organic food products rose by 51 per cent in terms of value to reach \$1,040 million (Rs 7078 crores) in financial year 2021.
- Among different states Madhya Pradesh is the largest producer followed by Maharashtra, Karnataka, Uttar Pradesh, and Rajasthan.
- Sikkim became the first State in the world to become fully organic in 2016.

5) DROUGHTS IN INDIA

Recently, Global Assessment Report on Disaster Risk Reduction (GAR) was released by UN Office for Disaster Risk Reduction (UNDRR).

More on News

- GAR Special Report on Drought 2021 explores the systemic nature of drought and its impacts on achievement of Sendai Framework for Disaster Risk Reduction, SDGs and human and ecosystems health and wellbeing.
- o Sendai Framework for Disaster Risk Reduction 2015-2030 aims to achieve the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.

Drought differs from other natural hazards such as cyclones, floods, earthquakes, volcanic eruptions, and tsunamis in that:

- There is no universally accepted definition that can encapsulate its complexity.
- It is difficult to determine the beginning and end of a drought episode because of the slow onset, silent spread and gradual withdrawal. In India, it is generally considered to be coterminous with the monsoons.
- There is no indicator or index which can precisely forecast the advent and severity of a drought event, nor project its possible impacts.
- Spatial expanse tends to be far greater than in the case of other natural calamities which make effective response highly challenging.
- Impacts are generally non-structural and difficult to quantify e.g. the

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damage to the ecology, the disruption of socio-economic fabric of communities, the long term effects of mal-nutrition on health and morbidity etc.

India specific classification of drought

- A drought year as a whole is defined by the IMD as a year in which, the overall deficiency is more than 10% of Long Period Average (LPA) value and more than 20% of its area is affected by drought conditions, either moderate or severe or combined moderate and severe.
- IMD has officially expunged the word “drought” from its vocabulary as part of a decision to do away with or redefine terms that are not scientifically precise.
- Instead of using terms like “All India Drought Year” or “All India Severe Drought Year”, the IMD has adopted “deficient” year or “large deficient” year.

What is drought?

- Drought is characterized by a lack of precipitation—such as rain, snow, or sleet—for a protracted period of time, resulting in a water shortage.
- While droughts occur naturally, human activity, such as water use and management, can exacerbate dry conditions.

Droughts in India

- Over 68% of India is vulnerable to drought. The 'chronically drought-prone areas' – around 33% – receive less than 750 mm of rainfall, while 35%, classified as 'droughtprone' receive rainfall of 750-1,125 mm.
- o The major drought years in India were 1877, 1899, 1918, 1972, 1987 and 2002.
- NITI Aayog, under the Composite Water Management Index report, highlighted that about two lakh people die in India every year due to inadequate water and sanitation. It states that the 6% of GDP will be lost by 2050 due to water crisis.
- On the basis of severity of droughts, India can be divided into the 3 regions:

Extreme Drought Affected Areas

- Most parts of Rajasthan, particularly areas to the west of the Aravali hills, i.e. Marusthali and

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	Kachchh regions of Gujarat fall in this category.
Severe Drought Affected Areas	<ul style="list-style-type: none"> • Parts of eastern Rajasthan, most parts of Madhya Pradesh, eastern parts of Maharashtra, interior parts of Andhra Pradesh and Karnataka Plateau, northern parts of interior Tamil Nadu and southern parts of Jharkhand and interior Odisha.
Moderate Drought Affected Areas	<ul style="list-style-type: none"> • Northern parts of Rajasthan, Haryana, southern districts of Uttar Pradesh, the remaining parts of Gujarat, Maharashtra except Konkan, Jharkhand and Coimbatore plateau of Tamil Nadu and interior Karnataka.

Causes of recurring drought in India:

- Considerable seasonal/regional variations: in spite of a high average annual rainfall of around 1,150 mm.
 - o There is a relatively short window of less than 100 days during the South-West Monsoon season (June to September) when about 73% of the total annual rainfall of the country is received.
 - o Uneven distribution of rainfall over different parts of the country in that some parts bear an inordinately high risk of shortfalls, while others tend to receive excessive rainfall.
 - o Low average annual rainfall of 750mm over 33% of cropped area heightens susceptibility to drought.
- Over-exploitation: of ground water and sub-optimum conservation of surface water leading to inadequate water availability for irrigation. Traditional water harvesting systems have been largely abandoned.
- Limited irrigation coverage and poor irrigation techniques: (net irrigated area in the country is less than 50%) exacerbates the impact of drought on account of complete dependence of agriculture in such areas on rainfall. India's farm water efficiency is presently amongst the lowest in the world.

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Current challenges in drought management

- Reactive and relief centric approach: There is a need to shift from relief-centric approach to integrated management emphasising on prevention, mitigation and preparedness, to minimise losses.
- Issues in Assessment and Early Warning: Forecasts are general in terms of space and time, timing does not match user needs, information received from different sources sometimes has conflicting messages etc.
- Lack of proper, reliable data on water: Data in the water sector exists in silos, with very little horizontal and vertical data sharing across the value chain of water thereby reducing efficiency.

NDMA Guidelines on Drought Management

<p>Institutional framework and financial arrangements</p>	<ul style="list-style-type: none"> • Separate Drought Monitoring Cells (DMCs) will be created at the state level with adequate staff under the control of State Disaster Management Authorities (SDMA's). • State DMCs will undertake the preparation of vulnerability maps for their respective States. • Watershed development approach is an important facet of drought management initiatives, taken up through the programmes of the Government of India.
<p>Assessment and Early Warning</p>	<ul style="list-style-type: none"> • Integrate ground-based information with space-based information for comprehensive reporting. • Automatic weather stations will also include moisture sensors for obtaining information about the soil moisture levels under natural

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	<p>environment.</p> <ul style="list-style-type: none"> • Unit of deceleration of drought should be standardised and alternative methods of quicker assessment of crop yield need to be evolved so as to mitigate the impact of drought in time.
<p>Prevention, Preparedness and Mitigation</p>	<ul style="list-style-type: none"> • Automatic weather station and rain-gauges will be put in place at appropriate spacing to enable micro level analysis and forecasting. • Mitigation measures to be taken will include: <ul style="list-style-type: none"> o Conduct of pilot studies in all categories of drought prone areas for suggesting long term mitigation measures. o Cloud-seeding as a possible measure of mitigation will be considered. • Promote crop diversification and utilization of sprinklers/Drip irrigation systems. • Promote protective irrigation through micro irrigation systems through incentives. • Afforestation with subabul, seamaruba, casurina, eucalyptus and bio diesel plantation like jetropha and pongomia will be encouraged. • Insurance products will be developed for different agro-climatic zones providing coverage

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	against drought.
Capacity Development	<ul style="list-style-type: none"> • A national training and capacity building programme for drought management will be formulated and implemented. • The agricultural universities and National Research Centres of ICAR will be encouraged to undertake contractual research for industries/farmers as a means of revenue generation and providing solutions to immediate problems. • Panchayati Raj Institutions (PRIs) and Urban Local Bodies (ULBs) will ensure capacity building of their officers and employees to carry out relief, rehabilitation and reconstruction activities.
Relief and Response	<ul style="list-style-type: none"> • Agencies will be sensitized regarding their value in generating employment in the droughtaffected areas and building assets such as tanks and wells which reduce the impact of drought. • Provision of consumption loan will also be encouraged in drought prone areas and efforts will be made to bring agricultural labours into the net of social security.
Preparation of Drought Management Plans (DMP)	<ul style="list-style-type: none"> • National Executive Committee (NEC) will prepare a National DMP, incorporating plans prepared by central ministries and state

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	<p>governments for drought affected States and districts.</p> <ul style="list-style-type: none"> • States are requested to modify the existing plans according to GoI-United Nations Development Programme (UNDP) Programme on Disaster Risk Management.
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6) WORLD ENERGY INVESTMENT REPORT 2021

- It was released by International Energy Agency (IEA). IEA was created in 1974 to help co-ordinate a collective response to major disruptions in the supply of oil.
- Key findings
 - o In 2021, annual global energy investment is set to rise to USD 1.9 trillion, rebounding nearly 10% from 2020.
 - o Renewables will dominate investment in new power generation and are expected to account for 70% of 2021's total of USD 530 billion spent on all new generation capacity.
 - o Upstream investment in oil and gas is expected to grow 10 percent.
 - o Global emission is set to grow by 1.5 billion tones.

7) DIHING PATKAI NATIONAL PARK

- The Assam government has notified Dihing Patkai as the 7th National Park (NP) of the state.
 - o Under the Wildlife Protection Act 1972, both the State (section 35) and Central (section 38) government can declare an area as National Park.
- The Dihing Patkai NP forms the “last remaining stretches” of the Assam Valley tropical wet evergreen forests.
 - o It is located across eastern Assam's Dibrugarh and Tinsukia districts.
 - o It encompasses erstwhile Dehing Patkai Wildlife Sanctuary, the Jeypore Reserve Forest and the western block of the Upper Dihing Reserve Forest including stretches of the Dirak and Buri Dihing rivers.
 - o Besides being part of the Dehing Patkai Elephant Reserve, the park is home to important species like Tiger, Chinese pangolin, Slow loris, Clouded leopard etc.
 - o It also has the highest concentration of the rare endangered White Winged Wood Duck.

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- Earlier, the State government has also notified Raimona Reserve Forest (422-sq. km) as the 6th National Park in western Assam's Kokrajhar district.
- With Phipsoo wildlife sanctuary in Bhutan to its north, Buxa tiger reserve in West Bengal to its west and Manas national park in Assam to its east. It is home to the Golden langur, Clouded leopard and Indian gaur.
- Assam has five older National Parks- Kaziranga, Manas, Nameri, Orang and Dibru-Saikhowa. ○ Kaziranga and Manas are UNESCO World Heritage Sites. They are also tiger reserves along with Nameri and Orang.
- Assam (7) now has the third most National Parks after Madhya Pradesh (12) and Andaman and Nicobar Islands (9).

8) THE LEAF COALITION

- The LEAF Coalition was launched by an initial group of governments (Norway, UK, US) and leading companies (like Amazon, Nestle etc.) to mobilise finance for protection of tropical forest.
- The LEAF (Lowering Emissions by Accelerating Forest finance) coalition aims to mobilize at least \$1 billion in finance to support tropical and subtropical forest countries to move rapidly towards reducing emissions from deforestation.
- It is expected to become one of the largest publicprivate efforts that support countries in achieving their Nationally Determined Contributions (NDCs) under the Paris Agreement and the Reducing Emissions from Deforestation and Forest Degradation (REDD+) mechanism.
- Reductions in emissions are to be made through programs that involve all key stakeholders, including Indigenous peoples and local communities.

9) FOREST CARBON CREDIT STAMPS

- China has issued its first batch of forest carbon credit stamps to use market mechanisms to reduce carbon emissions.
- Forest carbon credits stamps are permits for companies to emit a certain amount of carbon dioxide. They are converted from added forest areas and the amount of carbon they can capture.
- These credits can also serve as collateral for bank credit and loans.
- The forest carbon credit system harbors great potential amid China's pursuit of peaking carbon emissions by 2030 and achieving carbon neutrality by 2060.

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10) GENETICALLY MODIFIED (GM) RUBBER

- Recently, world's first GM rubber plant was planted in Assam.
- GM rubber plant, which is the first of its kind developed specifically for the northeast and is expected to flourish in the region's climatic conditions.
- With additional copies of the gene MnSOD (manganese-containing superoxide dismutase) inserted in it, GM rubber plant is expected to tide over the severe cold conditions during winter which is a major factor affecting the growth of young rubber plants.
- o Natural rubber is a native of warm humid Amazon forests and is not naturally suited for the colder conditions.
- It is developed by the Kerala-based Rubber Research Institute of India.

11) INDIA PLASTIC CHALLENGE – HACKATHON 2021 ANNOUNCED BY ENVIRONMENT MINISTRY

- It is a unique competition calling upon start-ups /entrepreneurs and students of Higher Education Institutions (HEIs) to develop innovative solutions to mitigate plastic pollution and develop alternatives to single use plastics.
- o Plastics that are thrown away after their first use are known as single-use plastics.
- o According to the United Nations, much of the plastics produced today are designed to be thrown away after first use.
- The Environment ministry had first notified Plastic Waste Management Rules, 2016 with new provisions for effective and improved collection, segregation, processing, treatment and disposal of the plastic waste.
- In March this year, MoEF&CC has unveiled the draft Plastic Waste Management (Amendment) Rules, 2021 that proposes to ban several categories of single-use plastic items in three stages.
- o Increasing the thickness of carry bags made of virgin plastic from 50 microns to 120 microns from 30 September 2021.
- o Ban on the manufacture, import, stocking, distribution, sale and use of specific singleuse plastic from January 1, 2022.
- o Ban on single use plastic items from July 1, 2022, increases which includes plates, cups, plastic/PVC banners less than 100 micron etc.

12) STATE OF FINANCE FOR NATURE REPORT

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- It is a report jointly produced by the United Nations Environment Programme, the World Economic Forum and the Economics of Land Degradation (ELD).
 - ELD, a global strategy for sustainable land management, is a global initiative established in 2011 by United Nations Convention to Combat Desertification supported by a broad network of partners across diverse fields of knowledge.
- Report highlights importance of investing in naturebased solutions (NBS) to meet global biodiversity and land degradation targets.
 - NBS are actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human wellbeing and biodiversity benefits.
- **Key findings of the report**
 - More than half of the world's total GDP is moderately/highly dependent on nature. Agriculture, food and beverages and construction are the largest sectors dependent on nature.
 - Approximately USD 133 billion per year currently flows into NBS (using 2020 as base year), with public funds making up 86% and private finance 14%.
 - Global biodiversity and land degradation targets can be met only if annual investments in NBS are tripled by 2030 and increased fourfold by 2050 from the current level of investments.
 - Currently, Public sector spending for NBS is dominated by the United States and China, followed by Japan, Germany and Australia.
- **Suggestions provided by the report**
 - Reforming taxes, repurposed agricultural policies, trade-related tariffs and harnessing the potential of carbon markets could be used to create economic incentives to invest in NBS.
 - Economic recovery post-Covid-19 should be aligned with the Paris Agreement, to be consistent with 1.5°C warming above preindustrial levels as well as halting and reversing the loss of biodiversity.
 - Number of commercially viable projects and businesses that incorporate NBS. into their business model should be increased through technical support, economic and regulatory incentives.

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o Availability of concessional finance needs to be scaled up to accelerate the transition to “net zero, nature positive” sustainable agriculture, forestry and other forms of NBS.

13) UNITED NATIONS GLOBAL COMPACT'S CEO WATER MANDATE

- NTPC Ltd has become a signatory to the prestigious United Nations Global Compact's CEO Water Mandate.

o The Mandate was formed in 2007 to mobilize business leaders to advance water stewardship, sanitation, and the Sustainable Development Goals in partnership with United Nations, governments, peers, civil society, and others.

o The Mandate develops tools and resources, convenes stakeholders, and facilitates meaningful partnerships and on-the-ground collective actions that improve conditions in at-risk river basins around the world.

14) HEAT DOME IN NORTHERN AMERICA

- Heat dome is an area of high pressure that parks over a region like a lid on a pot, trapping heat.

o They are more likely to form during La Niña years like 2021, when waters are cool in the eastern Pacific and warm in the western Pacific.

o That temperature difference creates winds that blow dense, tropical, western air eastward.

o Warm air gets trapped in the jet stream—a current of air spinning counter-clockwise around the globe—and ends up on the U.S. West Coast.

15) MAHSEER

The Blue-Finned Mahseer, which was on the International Union for Conservation of Nature's (IUCN) red list as ‘critically endangered’, has now moved to the ‘least concern’ status.

- The Mahseer (roughly translates as mahi – fish and sher – tiger, is also referred as “tiger among fish”). It is important indicator of freshwater ecosystems.

- Out of 47 subspecies of Mahseer 15 are found in India and rest in other range countries in South Asia.

- Mahseer prefers clean, fast flowing and well oxygenated waters for breeding and migration.

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- They are omnivorous.
- Threats faced:
 - o Sensitive to dissolved oxygen levels, water temperature and sudden climatic changes
 - o Pollution, habitat loss, over-fishing, construction of dams (impacting migration patterns) etc.
 - o Wildlife (Protection) Act 1972 does not explicitly draw attention to fish under the definition of 'wild animal'.

• Major Types of Mahseer

Golden Mahseer	Found in the Himalayan streams and rivers. Its IUCN status is 'Endangered'.
Blue Fin / Deccan Mahseer	Found in rivers of Deccan Plateau and South India.
Red Finned Mahseer	Found in the rivers of central India.
Chocolate Mahseer	Found in the North Eastern region
Orange-Finned Mahseer /Humpback Mahseer	Found in Cauvery River and its tributaries. IUCN status is 'Critically endangered'

Project Mahseer

- It was started in 1971 as a collaborative effort between Tata Power and Central Institute of Fisheries Education.
- Around 5 lakh mahseer are bred at the Walvan Hatchery in Lonavala, Maharashtra. An artificial lake has been created for the purpose by the Walvan Dam project under Tata Power.
- The project has finally borne fruit after an effort spanning 50 years by getting the fish de-listed from Red list of IUCN.

16) BHARITALASUCHUS TAPANI

- It is a carnivorous reptile species that lived 240 million years ago and it might have been the largest predators in that ecosystems.

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- It belongs to a genus and species previously unknown called *Bharitalasuchustapani*.
- In Telugu, Bhari means huge, Tala means head, and Suchus is the name of the Egyptian crocodile-headed deity.
- Fossils have been found on the rocks of the Yerrapalli Formation (Rock formation in the Pranhita–Godavari Basin in Telangana).

17) *Litoria Mira*

- A species of frog lives in the rainforests of New Guinea that appears to be made from chocolate.
- The cocoa-coloured frogs have turned out to be a new species.
- Large size, webbing on hand, short limbs, and small violet patch of skin on the edge of its eyes.
- The island of New Guinea is separated from the 'horn' of Queensland by the Torres Strait.

18) *Gharials*

- Recently, Odisha announced a cash award of Rs. 1,000 to conserve gharials in Mahanadi River Basin.

About Gharials

- Gharials (or gavials) are a type of Asian crocodylian distinguished by their long, thin snouts.
- Crocodylians are a group of reptiles that includes crocodiles, alligators, caimans, and more.
- India has three species of Crocodylians namely:
 - Gharial: IUCN Red List- Critically Endangered
 - Mugger crocodile: IUCN- Vulnerable.
 - Saltwater crocodile: IUCN- Least Concern.
- All the three are listed on Appendix I of CITES and Schedule I of the Wild Life (Protection) Act, 1972.
- However, Saltwater Crocodile populations of Australia, Indonesia and Papua New Guinea are included in Appendix II of CITES.

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- Habitats include: Fresh waters of the northern India - Chambal river, Ghagra, Gandak river and the Sone river (Bihar).
- Population of Gharials is a good indicator of clean river water.
- Conservation Efforts:
 - Breeding Centres of Kukrail Gharial Rehabilitation Centre in Lucknow, Uttar Pradesh, National Chambal Sanctuary (Gharial Eco Park, Madhya Pradesh).

19) Heritage Trees

- The Maharashtra Cabinet has passed an action plan to protect and preserve trees older than 50 years in urban areas by terming them heritage trees
- Few important criteria for considering a tree as a "heritage tree" are: size, shape, rarity, aesthetical/historical values, association with historic person, place or even myths.
- A certain species need not be native to an area for this tag.

20) Operation Oliva for Olive Ridley Turtles

- Recently, the Indian Coast Guard has pressed into service an aircraft for 'Operation Oliva' to protect Olive Ridley turtles.

What is Operation Oliva?

- It was initiated in the early 1980s
- Every year, Operation Olivia helps protect Olive Ridley turtles as they congregate along the Odisha coast for breeding and nesting from November to December. Olive Ridley Turtles
 - These are the smallest and most abundant of all sea turtles found in the world.
 - They are carnivores
 - They migrate thousands of kilometers between feeding and mating grounds in the course of a year.
 - They are best known for their unique mass nesting called Arribada, where thousands of females come together on the same beach to lay eggs.
- Habitat:
 - They are found in warm waters of the Pacific, Atlantic and Indian oceans.
 - The Odisha's Gahirmatha Marine Sanctuary is known as the world's largest rookery of sea turtles.

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- IUCN Red List: Vulnerable
- CITES: Appendix I
- Wildlife (Protection) Act, 1972: Schedule I Other Initiatives
- To reduce accidental killing in India, the Odisha government has made it mandatory for trawls to use Turtle Excluder Devices (TEDs), a net specially designed with an exit cover which allows the turtles to escape while retaining the catch.

About Black Softshell Turtle

- Scientific Name: Nilssononia nigricans
- Habitat:
 - o They are found in ponds of temples in northeastern India and Bangladesh.
 - o Its distribution range also includes the Brahmaputra River and its tributaries.
- Protection Status:
 - o IUCN Red List: Critically Endangered
 - o CITES: Appendix I
 - o Wildlife (Protection) Act, 1972: No legal protection
- Threats:
 - o Consumption of turtle meat and eggs,
 - o Silt mining
 - o Encroachment of wetlands
 - o Change in flooding pattern.

Turtle Conservation

- National Marine Turtle Action Plan:
 - o It contains ways and means to not only promote inter-sectoral action for conservation but also guide improved coordination amongst the government, civil society and all relevant stakeholders.
- Indian Ocean Sea Turtle Agreement (IOSEA)
 - o India is a signatory to the Indian Ocean Sea Turtle Agreement (IOSEA) of the Convention on Migratory Species (CMS).

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o It puts in place a framework through which States of the Indian Ocean and South-East Asian region and other concerned States can work together to conserve and replenish depleted marine turtle populations for which they share responsibility.

- **KURMA App:**

o It has a built-in digital field guide covering 29 species of freshwater turtles and tortoises of India.

o Developed by: Indian Turtle Conservation Action Network (ITCAN) in collaboration with the Turtle Survival Alliance-India and Wildlife Conservation Society-India.

21) **Barnadi Wildlife Sanctuary: Assam**

- Recently, the World Wide Fund for Nature-India (WWF) found a few tigers inhabiting the Barnadi Wildlife Sanctuary in Assam.

- It is one of the smallest WS (Wildlife Sanctuary) of Assam

About the Sanctuary

- It is located in northern Assam's Baksa and Udalguri districts bordering Bhutan.

- It is bordered by the Barnadi river and Nalapara river to the west and east respectively.

- Barnadi was established specifically to protect the Pygmy Hog (*Sus salvanius*) and Hispid Hare (*Caprolagus hispidus*).

- About 60% of the BWS is reported to be grassland, most of it is now grassy woodland.

- The main Forest types: Tropical Moist Deciduous (northern edge of the Sanctuary) and mixed scrub and grassland (southern part).

- Most of the natural vegetation has been replaced by commercial plantations of *Bombax ceiba*, *Tectona grandis* and *Eucalyptus* and by thatch grasses Other Protected Areas in Assam:

- Dibru-Saikhowa National Park
- Manas National Park
- Nameri National Park
- Rajiv Gandhi Orang National Park
- Kaziranga National Park.

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