CURRENT AFFAIRS WEEKLY

WEEK: 5
AUGUST
2021

MAINS

GS-I India to Add 100 more Earthquake Observatories by 2026

GS-II Income can't be sole basis to decide 'creamy layer': SC

GS-III India's northeastern states desertifying most rapidly

GS-III Tightening the Net: Oxfam's Report on Implications of Net Zero Climate Targets for Land and Food Equity

GS-IV Ethics of Sending Human to Mars

PRELIMS

HISTORY & CULTURE
- Sree Guru Narayana Jayanthi 2021

INTERNATIONAL RELATIONS
- Exercise Konkan-2021
- India signs pact with Maldives for Greater Male Connectivity Project

POLITY
- India's New Drone Rules

ECONOMY
- National Monetisation Pipeline

ENVIRONMENT
- Climate crisis is child's right crisis: UNICEF
- Land degradation, desertification increasing: ISRO atlas

SCIENCE & TECHNOLOGY
- Chikungunya Vaccine
- Human trials for the first mRNA HIV vaccine will begin this week.
- New portal under Bhuvan "Yuktdhara" launched

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— Disclaimer —

The current affairs articles are segregated from prelims and mains perspective, such separation is maintained in terms of structure of articles. Mains articles have more focus on analysis and prelims articles have more focus on facts.

However, this doesn't mean that Mains articles don't cover facts and PT articles can't have analysis. You are suggested to read all of them for all stages of examination.

CURRENT AFFAIRS ANALYST

WEEK- 5 (AUGUST, 2021)

CONTENTS

SECTION: A

(MAINS)

CURRENT AFFAIRS

INDIA TO ADD 100 MORE EARTHQUAKE OBSERVATORIES BY 2026

CONTEXT

The Government has announced that India is going to open 35 earthquake observatories by the end of 2021 and is aiming to increase the number by adding 100 more earthquake observatories by the year 2026.

⦿ BACKGROUND:

- In the last 65 years since Independence, the country had only 115 Earthquake Observatories.
- But now India is going to make a quantum leap in the number of Earthquake Observatories it has.
- The announcement was made in the inaugural function of the Joint Scientific Assembly of the **International Association of Geomagnetism and Aeronomy (IAGA) and International Association of Seismology and Physics of the Earth Interior (IASPEI).**
  - **IASPEI:** It promotes the study of earthquakes and other seismic sources, the propagation of seismic waves, and the Earth's internal structure, properties, and processes.
  - **IAGA:** It is an international scientific association that focuses on the study of **terrestrial and planetary magnetism and space physics.**
- Both of them are semi-autonomous associations under the aegis International Union of Geodesy and Geophysics (IUGG).

International Union of Geodesy and Geophysics (IUGG)

- IUGG is a non-governmental, association of semi-autonomous associations, established in 1919.
- Its Secretariat is based in Potsdam, Germany.
- It's objectives are:
  - Promotion and coordination of physical
  - Chemical and mathematical studies of the Earth and its environment in space

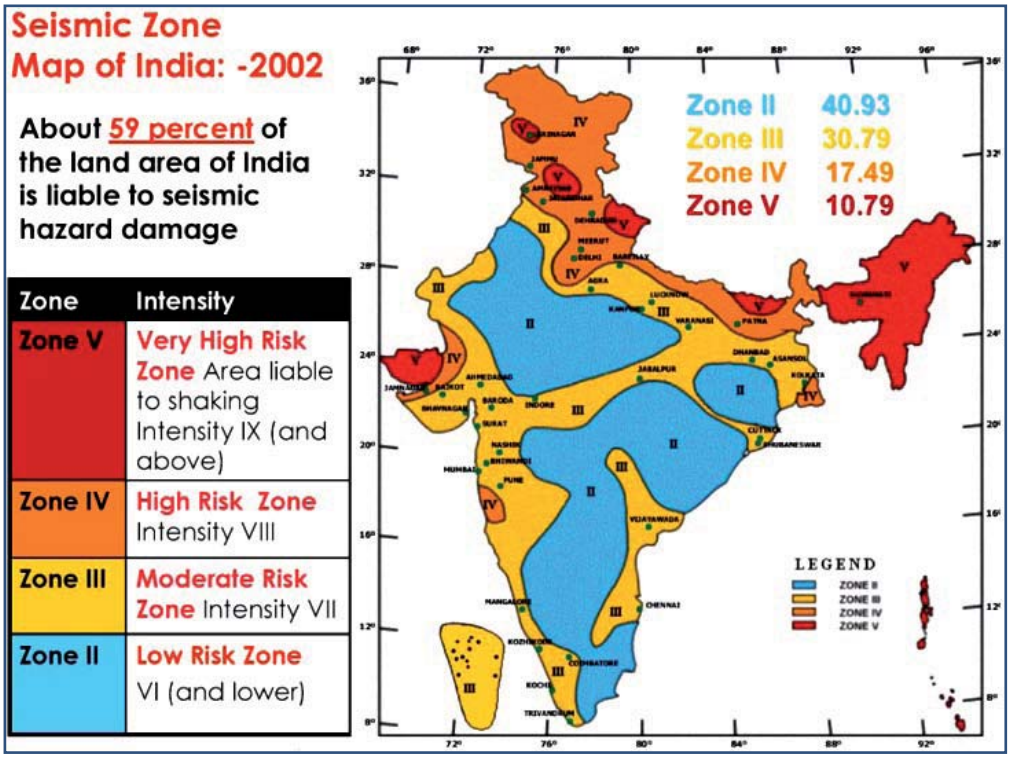
About National Centre for Seismology

- National Centre for Seismology (NCS) is the nodal agency for monitoring seismological activity in the country.
- NCS network comprises 115 monitoring stations spreading all across the country.
- The major activities currently being pursued by the NCS are:
  - Earthquake monitoring on a 24X7 basis
  - Operation and maintenance of national seismological network comprising of 115 Stations
  - Maintenance of Seismological data centre and information services.
  - Seismic hazard micro-zonation related studies
  - Aftershock/Earthquake swarm monitoring/ survey
  - Understanding of Earthquake processes
  - Public outreach
- The network can record any event of:
  - magnitude five and above for the New Delhi region
  - magnitude three and above for northeast region
  - magnitude 3.5 in and above in peninsular
  - magnitude four and above in the Andaman region
  - magnitude 4.5 and above in border regions

⦿ ANALYSIS:

Seismic Zones in India:

- The **Bureau of Indian Standards** has classified regions in India into four seismic zones on the basis of historical seismic activity and strong ground motions. They are namely: Zones II, III, IV and V.
- **Seismic zone** intensity classification as (according to the **Modified Mercalli scale**):
  - **Zone II** (low-intensity zone)
  - **Zone III** (moderate intensity zone)
  - **Zone IV** (severe intensity zone)
  - **Zone V** (very severe intensity zone)
- **Zone V** is considered as the most seismically active region whereas **zone II** is the least active.
  - **Zone V** includes the north-eastern part of India, parts of J&K and Himachal Pradesh, Uttaranchal, Rann of Kutch, parts of North Bihar and Andaman & Nicobar Islands.



Important Terms in Seismology:

- **Richter's scale**
  - It is a mathematical formulation (not a physical device), developed by Charles Richter in 1935, to measure the strength (Magnitude) of local earthquakes is measured.
- **Body wave**
  - They propagate through the interior of a body. There are two types of seismic body waves, namely:
    - **Compressional or longitudinal (P wave):** P-waves are the fastest body waves and are first to arrive at a station, that is to say, before the arrival of the S waves.
    - **Shear or Transverse (S wave):** S-waves are the type of body waves, which move slowly in comparison to P waves (another type of body wave).
- **Surface Waves:**
  - Surface waves propagate along the surface of a body or along with the interface between differing media. The two common types of seismic surface waves are:
    - **Rayleigh waves:** A type of surface wave which causes the ground to shake in an elliptical motion. These are the slowest ones, but often the most destructive ones too, of the wave types caused by an earthquake.
    - **Love waves:** It is a kind of a surface wave having a horizontal motion. It's the fastest surface wave and shows side-to-side movement.

The Earthquake Risk in India

- During the last 15 years, 10 major earthquakes have been reported, resulting in over 20,000 deaths.
- Based on the **current seismic zone map of the country**, over 59% of India's land area is under threat of moderate to severe seismic activity.
- The entire Himalayan belt is considered vulnerable to major earthquakes of magnitude exceeding 8.0.
- Scientific publications have talked about the likelihood of the occurrence of very severe earthquakes in the Himalayan region.
- The North-Eastern part of India experiences moderate to large earthquakes. The region experiences an earthquake with a magnitude greater than 6.0 every year.
- The Andaman & Nicobar Islands often experiences earthquakes because it is situated on an inter-plate boundary.

Occurrence of earthquake

- The earthquake is characterized by severe shaking of the ground and severe shaking of structures above the ground.

- This happens due to the release of the transmitted pressure of moving **lithospheric or crustal plates.**
- The Earth's crust is divided into 7 large plates, which are 50 miles thick.
- It moves slowly and steadily over the Earth's interior and many smaller plates.
- Earthquakes are basically tectonic, that is, moving plates are mainly responsible for the shaking in the ground.

Why more earthquake Observatories are required?

- The Indian subcontinent is undoubtedly one of the **world's most disaster-prone areas** in terms of natural calamities like, earthquakes, landslides, cyclones, floods, and tsunamis.
- **Under-sea earthquakes,** capable of generating tsunamis on the Indian coastal regions are also a point of concern.
- Thus, it becomes important to put in place a robust warning system to equip ourselves to make timely predictions.
- In order to do so, a network of **well-distributed observatories** all across the country is required.
- It will increase the **detection capability of an earthquake** up to magnitude 2.5 throughout the country, which is around the magnitude of 3.5 on the **Richter scale**.
- It can also capture small seismic activity that went undetected earlier.

Can we make predictions for future earthquakes?

- So far, there is not any proven scientific technique, anywhere in the world, to predict the occurrence of earthquakes with a reasonable degree of accuracy with regard to space, time and magnitude.
- The warning time, however, is getting much shorter and of the order of a few seconds if a well-established spatial network of observatories is in place.
- The success rate of a warning system should be assessed thoroughly before the system can be considered for real-time operations.

What are the other methods available for earthquake detection?

- **Artificial Intelligence** (Machine learning techniques) gives us options to takes on Earthquake Prediction. But it's a long way to cover before it can reliably bring to use to predict catastrophic earthquakes.
- **Geodetic observations**—especially interferometric synthetic aperture radar (InSAR) and satellite optical imagery have shown promising results.
- **Laser beams** can be deployed to detect plate movement by directing the beam across the fault line.
- Abnormal exhalation of Radon gas is observed from the interior of the earth. So, the levels of it can be monitored - a sudden increase may suggest an earthquake.

⊙ CONCLUSION:

Science and Technology must be used to help and Protect Communities to lead us towards building a safe and sustainable society. Biodiversity of the Planet Earth requires to be protected. Himalayan belt fragile soil and rocks are saying something to us, the Landslides have killed Several People in the past several years. We need to learn more about the science behind earthquakes, so as to build an early warning system.

India is committed to working towards creating a seismic resilient society. Understanding the earthquake source processes and their effects through earthquake monitoring and seismological research for an earthquake-safe society.

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INCOME CAN'T BE SOLE BASIS TO DECIDE 'CREAMY LAYER': SC

CONTEXT

The Supreme Court has stood firmly by its principle that economic criterion alone cannot be the sole basis for identifying a Backward Class member as "creamy layer". Other factors like social advancement, education, employment too.

⊙ BACKGROUND

- The top court passed its judgement while striking down a 2016 notification of the Haryana government to deny benefits of reservation to those among the backward classes with an annual earning of Rs 6 lakh and above.
- It directed the Haryana government to bring about out a fresh notification to determine 'creamy layer' among the other backward classes (OBCs) within three months by considering social backwardness and other factors, in addition to the economic criterion.
- It pointed out that the Supreme Court's judgment in **Indra Sawhney case (Mandal Commission case) (1992)** has clearly laid down that social, economic and other factors have to be taken into account for the purpose of determining the 'creamy layer' within a backward class and then exclude them from quota benefits.

⊙ ANALYSIS

Key-highlights of the SC Verdict

- Haryana's notifications have violated the law declared in the **Indra Sawhney judgment** by identifying creamy layer only on the basis of income.
  - The Supreme Court has set aside the notification specifying the criteria for exclusion of 'Creamy Layer' within the backward classes issued by the State of Haryana.
- The SC held that the government cannot deny reservation to a person belonging to a backward community solely on the ground that he or she is rich.
- The court went to the extent of determining "creamy layer" among Backward Classes.
- The judgment held that persons from the classes who occupied posts in higher services like IAS, IPS and All India Services had reached a higher level of social advancement and economic status, and therefore, were not entitled to be treated as backward. Such persons were to be treated as "creamy layer" without any further inquiry.
  - People with sufficient income who were in a position to provide employment to others should also be taken to have reached a higher social status and therefore, should be treated as outside the backward class.

Understanding India's reservation Policy

- The reservation policy is an age-old policy being practiced in India.
- Its origin has its roots scattered from the ancient times when the practice of 'untouchability', caste system and Varna system was dominant in the society.
- Deprivation is only one measure of caste discrimination in India.
- Reservations for the SCs and STs were put in place in the Indian constitution, immediately after independence, as a means to recognise the historical injustice meted out to these groups and to implement provisions by which groups would have better access to resources and opportunities that were hitherto denied to them.

Current scenario of Reservation

- The Supreme Court ruling that reservations cannot exceed 50% (which it judged would violate equal access guaranteed by the Constitution) has put a cap on reservations.
- The current scenario of Reservation in India is:
  - 15% seats are reserved for Scheduled Castes (SC).
  - 5% seats are reserved for Scheduled tribes (ST).
  - 27% seats are reserved for Other backward classes (OBC).

Brief history about reservations:

- **Reservation Policy in Pre- Independence Era:**
  - Government India Act, 1919: The Government India Act, 1919 not only introduced several reforms for the Indian Governmental institutions but also addressed many issues of minorities including the formation of communal electorates.

- Government of India Act, 1935: The stamping of the provisions of the Poona Pact, 1932 were done in the Government of India Act of 1935 where reservation of seats for depressed classes was allotted.

- **Post- Independence Era:**
  - First **Commission:**
    - In January 1953, the government had set up the First Backward Class Commission, which submitted its report in March 1955.
    - It listed 2,399 backward castes or communities, with 837 of them classified as 'most backwards'.
    - The report was never implemented.
  - **Second Commission or Mandal Commission:**
    - Mandal Commission was set up in 1978 (Chairman being B.P. Mandal) to assess the situation of the socially and educationally backward Classes (SEBC).
    - It recommended-
      - 27% reservation for OBC candidates at all levels of its services. With the implementation of the report, OBC or Other Backward Classes made its way into the lexicon of India's social justice movement.

Criteria to identify OBC:

- The Mandal Commission adopted various methods and techniques to collect the necessary data and evidence.
  - The commission adopted 11 criteria which could be grouped under three major headings : social, educational and economic in order to identify OBCs.
    - All the Social indicators were given a weightage of 3 points each.
    - Educational indicators were given a weightage of 2 points each.
    - Economic indicators were given a weightage of 1 point each.
  - It will be seen from the values given to each indicator, the total score adds up to 22. All these 11 indicators were applied to all the castes.
  - All castes which had a score of 50 % (i.e. 11 points) were listed as socially and educationally backward and the rest were treated as 'advanced'.

What is the creamy layer concept?

- The term 'creamy layer' is used to refer to some members of a backward class who are highly advanced socially as well as economically and educationally.
- They constitute the forward section of that particular backward class – as forward as any other forward class member.
- Currently, annual family income above ₹8 lakh are considered the 'creamy layer' and excluded from reservation benefits given to OBCs.

Important Committees and Commissions:

- Hunter Commissions(1882)
- Kelkar Commission(1953)
- Sachar Committee (2003)

CONCLUSION

Reservation aims to see that backward classes of citizen move forward to bring equality in the country. However, this cannot be possible if only the creamy layer gets all the benefits and bag all the coveted jobs themselves, leaving the rest of the class as backward as they always were.

Therefore, there is need for revision of the income criteria for determining the creamy layer" among the OBCs "is under consideration".

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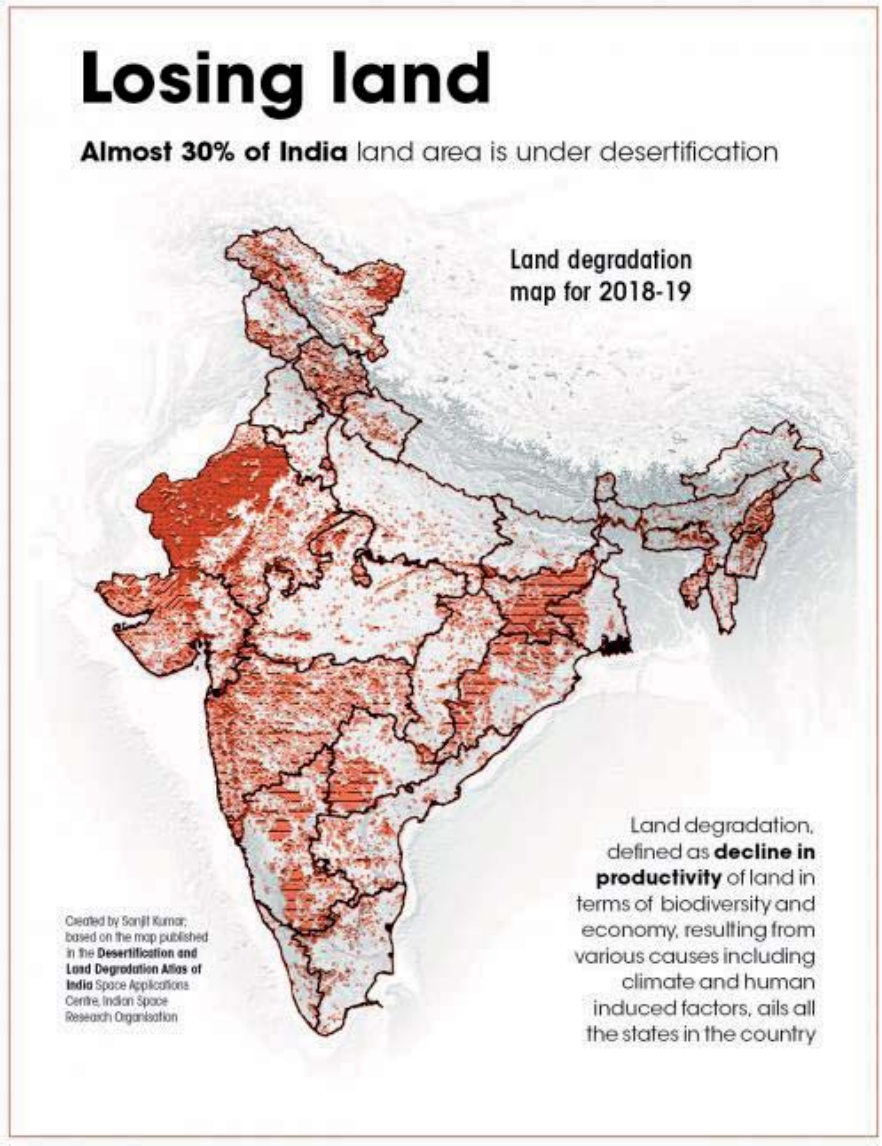
INDIA'S NORTHEASTERN STATES DESERTIFYING MOST RAPIDLY

CONTEXT

The Indian Space Research Organization (ISRO) released the Desertification and Land Degradation Atlas of India, which shows a worrisome picture of land degradation in India's north-east.

⊙ BACKGROUND

- With close to 30 per cent of its geographical area already affected, land degradation is definitely among India's most pressing environmental problems.
- In the last 15 years, almost all Indian states have recorded an increase in degraded land, with the most rapid increase being noted in the biodiversity-rich northeastern states.
- The scientists at ISRO compared the data collected between 2003 and 2005 with that gathered in 2018-19.
- Currently, 97.85 million hectares (mha) of land has already been degraded.
- Of this, 3.32 mha has been added in the 15 years between 2003-05 and 2018-19.
- **Silver lining:** Rajasthan, the most degraded state, along with Uttar Pradesh and Telangana, have seen a reduction in their degraded land in the last 15 years.



- Rajasthan, which accounts for almost 22 per cent of the degraded land in the country, reclaimed almost 388,000 ha, an area roughly 2.6 times the size of Delhi.
- Uttar Pradesh (285,665 ha) and Telangana (19,974 ha) together reclaimed degraded land twice the size of Delhi during the period.

Forestland degradation

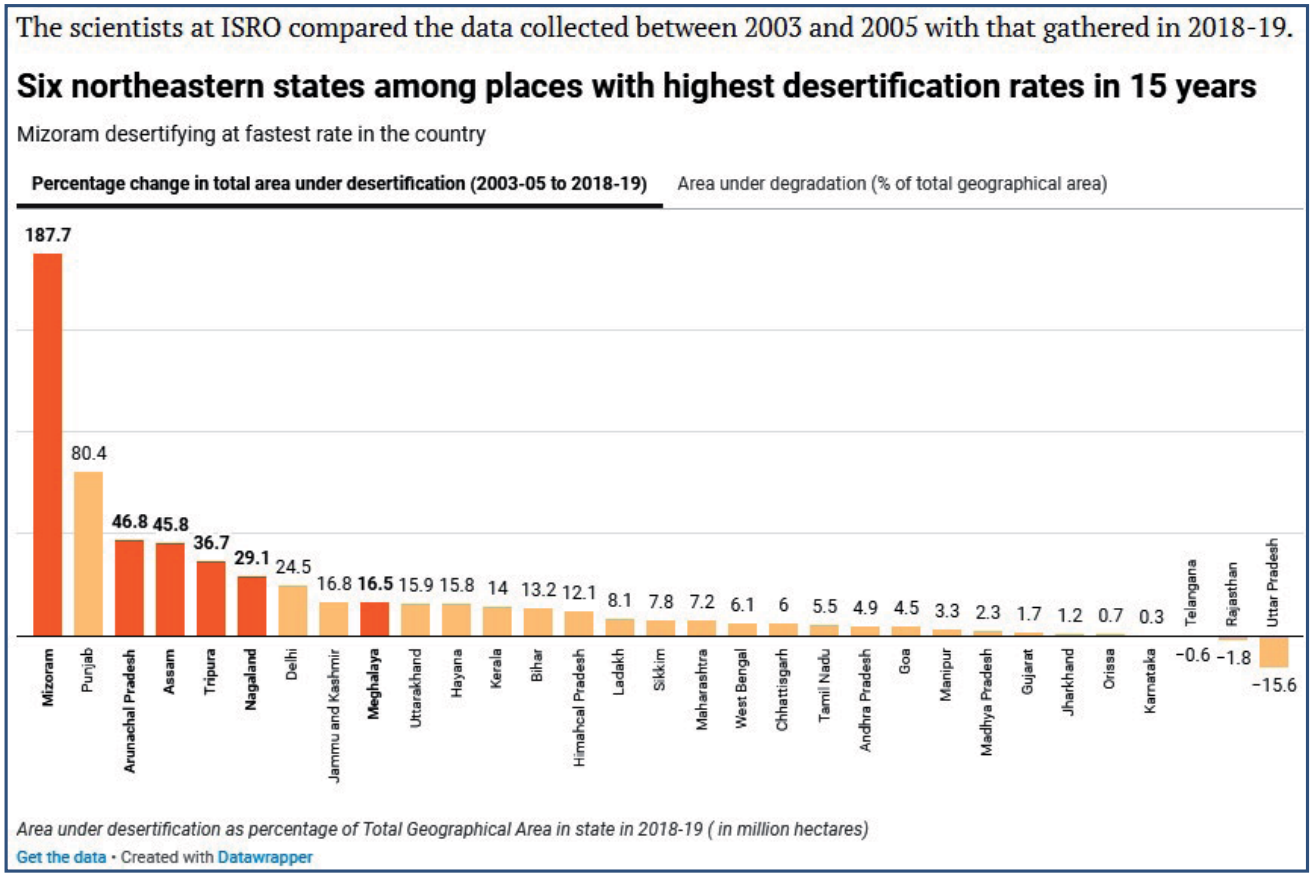
- India has a little over 71 mha of forestland, according to the India State of Forest Report 2019, released by the Union Ministry of Environment, Forest and Climate Change.
- Of this, 30 per cent or a little more than 21 mha of forestland is degraded.

Key-findings of the Report-cum-Atlas

- Six states in northeastern India were among the top 10 places in the country with the highest rates of desertification between 2003 and 2018, according to a recent report.
- These are Mizoram, Arunachal Pradesh, Assam, Tripura, Nagaland and Meghalaya.
- Punjab, Delhi, Jammu and Kashmir and Uttarakhand in northern India also witnessed some of the highest rates of desertification.

The most vulnerable areas

- **Mizoram desertifying fastest**
  - Mizoram has been desertifying at the fastest rate in the country.
  - Land degradation and desertification increased 2.8 times in the state in the 15-year period studied.
  - A total of 0.18 million hectares (mha) underwent degradation/desertification in those years — an increase of over 188 per cent.
- **Rapid degradation in Arunachal, Nagaland**
  - **Arunachal Pradesh:** In Arunachal Pradesh, 2.4 per cent of the area or 0.2 mha underwent degradation / desertification in 2018-19. Between 2003-05 and 2018-19, degradation / desertication increased 46 per cent in the state.
  - **Nagaland:** Over half the 200,683 ha geographical area of the state was found to be degraded / desertified in 2018-19, whereas, the share of degraded land was 38.74 per cent in 2003-05.



- Land in India's northeast is **naturally acidic** because of the heavy rainfall it receives every year but climate change induced high frequency of heavy rainfall events will further exacerbate the acidification.
- This acidification decreases the quality of soil and reduces their productivity significantly.

Understanding Land degradation & Desertification

- Land degradation is defined as decline in productivity of land in terms of biodiversity and economy, resulting from various causes, including climate and human dominance, leading to loss of ecosystem.

As a signatory to the **United Nations Convention to Combat Desertification**, India is committed to reducing its land degradation and desertification. In fact, India's goal is to achieve land degradation neutral status by 2030 whereby increases in land degradation would be offset by gains in land reclamation.

- Desertification is a type of land degradation in which a relatively dry region becomes increasingly arid, typically losing its water bodies as well as vegetation and wildlife.

Main causes of land degradation and desertification

- Deforestation and loss of green cover
- Human settlements and water erosion
- Water logging
- Vegetation degradation (96 per cent) is the major reason for forest degradation.
  - **Vegetation degradation** is referred to as reduction in the biomass and / or decline in the vegetative ground cover, as a result of deforestation and / or overgrazing.
- A lot of erosion happens because the top soil remains exposed and got washed away easily with rains.
  - The US, after a major dust storm event in the 1930s, brought a legislation that says the top soil of any land should not remain exposed.

It is surprising that 66 per cent of the farmland in the country remains rainfed, according to the **Pocket Book of Agricultural Statistics 2020**, released by the **Union Agriculture and Farmers' Welfare** in May 2021.

Why land degradation is a concern?

- **Carbon:** Land degradation reduces the soil's ability to absorb carbon.
- **Worsened climate change:** Land degradation and climate change fuel each other.
- **Threat to food security:** Degraded land in the country is either rainfed farmland, responsible for the food security of the country, or forest land that offers the best defence against climate change.
- **Economic loss**: Lost productivity can weigh heavily on the economy.

⊙ WAY FORWARD

Land degradation can exacerbate climate change and threaten agricultural productivity, water quality, biodiversity, sustainable development, and the living conditions of humans and wildlife, among other effects. Reclaiming degraded lands will require a **strict land-use policy** and **better watershed management initiatives.**

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TIGHTENING THE NET: OXFAM'S REPORT ON IMPLICATIONS OF NET ZERO CLIMATE TARGETS FOR LAND AND FOOD EQUITY

CONTEXT

The Oxfam report titled 'Tightening the Net' states that the 'net zero' carbon targets that many nations have proclaimed may be a "dangerous distraction" from the precedence of curbing carbon emissions. It warns that "land-hungry" practices to achieve net zero carbon targets would cause disproportionately adverse effects like higher food prices and more hunger around the world.

Highlights of the Report:

Oxfam International

- The name "Oxfam" comes from the Oxford Committee for Famine Relief, founded in Britain in 1942. It campaigned for food supplies to be sent through an allied naval blockade to starving women and children in enemy-occupied Greece during the Second World War.
- After the War, the group continued their work of sending aid across Europe.
- Oxfam International was formed in 1995 by a group of independent NGOs. They joined together as a confederation to maximize efficiency and achieve greater impact to reduce global poverty and injustice.

- Net-zero is a state in which a country's emissions are compensated by absorption and removal of greenhouse gases (GHGs) from the atmosphere. This means that the country is not aiming for zero emissions, but only carbon-neutrality
- 'Net zero emissions' and 'zero emissions' do not mean the same thing. Instead, in many cases, net zero targets are a greenwashing exercise that enable business as usual.
- The most recent estimates from the UN suggest that by 2030, emissions are currently likely to be just 0.5% below 2010 levels, compared with the 45% needed to achieve net zero emissions by 2050
- About 1.6 billion hectares of new forests would be required to remove world's excess carbon emissions by 2050, if the climate change challenge is tackled only by planting more trees. This amounts to the land as five times the size of India, or the equivalent of all the farmland on the planet.
- Citing data from the IPCC, Oxfam argues that if the current land-based carbon emission removal schemes continue, it could see global food prices up by about 80 percent by 2050.

Problem with the Net Zero Targets/ Technologies

Land Based Carbon Removal Methods

- Enhancing carbon sequestration in forests
- Afforestation/reforestation
- Enhancing soil carbon
- Bioenergy with carbon capture and storage (BECCS)
- Biochar

- Shift focus away from cutting carbon emissions, for example by rapidly ending the use of coal, oil and gas for electricity and oil for cars
- Net Zero targets rely on removal of carbon via virtually unproven new, non-scalable technologies and methods
- These envisage a level of land use that is completely impossible and would lead to mass hunger and displacement of people across the world, as the demand for land, particularly in low- and middle-income countries will surge

Net Zero Commitments Made so Far:

- Currently more than 120 countries, includingthose in the EU, the USA, China and Japan, have pledged to reach net zeroby mid-century.
- There has also been a wave of corporate net zero climatecommitments from a range of companies and investors, including BritishAirways, Mars, Unilever, Citigroup, BlackRock, Shell and BP.
- European Union has a plan called 'Fit for 55', and has asked all of its 27 member countries to cut emissions by 55 per cent below 1990 levels by 2030.

Policy Recommendations:

- Net zero targets must prioritize ambitious emissions reductions to align with the goal of limiting warming to below 1.5°C and ensure rapid decarbonisation by 2030.

- Companies should disclose and commit to reducing emissions in accordance with the Science Based Targets initiative (SBTi). SBTi requires that companies set targets based on emission reductions through direct action within their own operations and/or their value chains

Science Based Target Initiative (SBTi)

- It is a partnership between CDP, the United Nations Global Compact, the World Resources Institute (WRI) and the World Wide Fund for Nature (WWF) that sets standards for climate action in the private sector by enabling companies to set science-based emissions reduction targets.

- Net zero commitments must be backed by meaningful transparency and disclosure. Reducing emissions cannot be considered a substitute for cutting emissions, and these should be counted separately
- Land-based climate action must be anchored in food first, rights-based approaches that help to achieve zero hunger and zero emissions. Land rights of communities and Indigenous Peoples should be protected as part of land-based mitigation efforts

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ETHICS OF SENDING HUMAN TO MARS

CONTEXT

From Elon Musk's vision to build a human city on Mars to the recent pioneering space flight by Jeff Bezos and Richard Branson. It appears to be setting the stage for the future of space tourism. All these developments raise concerns about the ethics of sending a human to Mars.

⊙ BACKGROUND:

- The idea of going to Mars seems new but actually, it's not. In 1966 Gordon R. Woodcock from the George C. Marshall Space Flight Centre had come up with the idea of using Saturn V launch vehicle from the Apollo Mission could be used for Mars exploration.
- The two competing ideas –**"duty to maintain the light of consciousness–via space colonization"** and the duty to make the world, where we live a **"just and equitable place"** opens a pandora of ethical issues which need a deeper introspection.

⊙ ANALYSIS:

Space exploration has resulted in many extraordinary discoveries, but it has also led inevitable exploitation of natural as well as human resources. Why are we so much inclined towards going to Mars? There are many answers to it, a few of them are mentioned below:

- To conquer an uncharted territory.
- We have exhausted the resources that Earth has to offer, so we need more.
- Quest to look for the possibility of finding life.

Keeping the reasons aside, what come forefront is the Ethical question of sending humans to Mars. The space environment is not viable to support human life, so newethical issues concerning the value of human life may appear. We need to look into the possible ethical challenges and issues, which may appear during a human mission to Mars and moreover the ethics of sendinghumans to Mars at the first instance.

Claim for Ownership:

- The whole exercise of sending humans to Mars surfaces the issues about the ownership claims. Does the first country that puts its foot on the surface of another world get to claim ownership? All of this shall not do any better for the future of space exploration than it had for human history on Earth. If we want to settle on another planet, it is probably going to be an outcome of multinational efforts in harmony, else it may lead to a conflict among the competing nations who are striving to make it a reality.
- Capitalism and consumerism have adversely turned our species into a parasitic one. Increased consumption has increased the area of our landfills while the ethical standards that we expect from businesses are declining. The cocktail of Industry and mindless consumerism has created our current state. Thoughtful consumerism can possibly save us from the race of capturingother planets to fulfil our ever-growing needs.

Possible Harm to Martian life forms

- One of the strongest ethical argumentsthat are not in resonance with the idea ofsending humans to Mars and colonizing it,is the possibility of causing a potential to harm any indigenous life forms that might be existing there.
- Surelyanything can't be said firmlyabout such life forms at the moment. The discovery of liquid water (and evidencethat indicates that Mars may once have had it in relative abundance) strengthen the possibility of Mars having life forms on it in the past.
- The possibilities of processes happening right now through which life on Mars could emerge cannot be ruled out. Sending humanswould disrupt these processes. Our sense of moral community is inclusive and extends to life forms that sufficiently resemble Earth life forms and otherwise.

Potential harmful impacts on Earth

- It is not a narrative but a fact that space travel uses depleting natural resources and generates waste products. It can't be denied that it shifts funds away from other projects or purposes. **The ethical issue here is not confined to the amplitude of the costs involved for sending human missionsrelative to the benefits. It also raises a question, how those costs and benefits are distributed — of whether the people who bear the costs will also be experiencing the benefits.**
- We mustalso weigh the impacts of shifting scientific and engineering human resources to the task of sendinghumans to Mars instead of addressing other human aspirations and needs, few of them are quite pressing. For example, to address diseases, climate change, war, social and economic inequality.

Potential long-term impacts on Human life

- We are wonderfully fit for Earth, but the same is not true with other planets. They are cold, empty, without or with a thin atmosphere. Especially the exposure to radiation, for which space suits and ships provide little protection are few of exhaustive list of threats.
- Earth's magnetic fields and atmosphere shelter us from the ionizing radiation from outer space. On the surface of Mars (which lacks a magnetic field or much atmosphere) or aboard a spaceship, exposure to cosmic radiationwould kill cells and make them malfunction. The affected cells cause heart disease or might result in cognitive decline. DNA damage is even worse,leading to mutations that cause cancer and heritable diseases.

Risks with longhuman space flight:

- Health hazards from space radiation; the possibility of a mission getting sabotaged by the crew itself – based on studies of isolated communities, psycho-social issues; physiological risk– including bone and muscle loss due to the near absence of gravity; and medical risk – difficulties of treating injuries and illness. Space provides the harshest possible human environment, exceeding conditions that cannot be experienced on Earth. It is important to note that, more is unknown about the physical and mental challenges of space travel than is known.
- So, what makes risk ethical? The answer has been one thing: "**consent".** The ethical considerations take a different path if we think of the crew as military personnel. We anticipate soldiers to encountersubstantial risk. And think of the explorers who travelled to distant and secluded places with no thought of return. The mission if done must be done publicly for peaceful purposes, by free people, with the results considered common stock.

To answerethical questions related to sending humans to Mars or the colonisation of Mars, we usually resort to the three important ethical theories:

- Consequentialism
- Deontology and
- Virtue ethics

- **Consequentialism Theory:** It focuses on judging the moral worth of the results of the actions. Actions are determined to be right or wrong based on consequences. **The rightness or wrongness of an action is determined by its consequences.**
- **Deontological Theory:** It focuses on judging the actions themselves. How we are to act in a given situation and comes bundled with the concept of duty. **The rightness or wrongness of an action is determined by moral duties.**
- **Virtue Ethics:** This differs from both deontology and consequentialism as it focuses on being overdoing. It tells us primarily about what kind of person we are and should be. **The rightness or wrongness of an action is determined by the reasons (motives) one has for acting and these motives flow from one's character.**

- **Space ethics** is no different and it is meaningful enough to find the answer to the above questions by examining how they each fit into our available ethical frameworks. The development and nurturing of **virtuous characteristics** that make us ready to act in an **ethical way**is the best approach **when the moral landscape is uncertain and unpredictable.**
- Owing to the unpredictability aspects of human activity in space, we should ask the meta-ethical question of whether these normative theories and frameworks, which were constructed to guide human action and interaction on earth, are relevant to the space outside. Or do we require new space ethics?
- The story is not complete without looking at the other side. The human expansion of space is regarded not only as an obvious phenomenon but also as a natural process of human evolution. Colonization of space objects is sometimes being seen as to become a common practice in the short term. Lately, we are experiencing the formation of a sequence of actions that, at the first stage, will lead to the colonization of Mars. And it is difficult to side with anyone possibility.

⊙ CONCLUSION:

- Ahigher sensibility of consciousness, rationality, ethics and values is required to build the future generations. Mere having the technical expertise to do something doesn't mean that we should do it. Sending humans to Mars is going to be an expensive and risky venture if the goal just amounts to having Mars for our own.To sum up, Bravery is not enough: Realistic preparation is crucial.
- At the same time, we need to consider how best to engage with radically different life forms, cultures and environments. We may be capable of scripting a new constitution and givingit to ourselves fora completely new form of engagement with other planets but we should begin with the presumption that we need to counter our invasive impact on another planet that may be completely defenceless—**before we embark on a new era of galactic exploration and imperial conquest.**

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SREE GURU NARAYANA JAYANTHI 2021

⊙ CONTEXT: **Recently, the Prime Minister of India has paid tributes to Sree Narayana Guru on his Jayanti.**

Who was Sree Narayna Guru?

- Sree Narayana Guru was a catalyst and leader who reformed the oppressive caste system that prevailed in society at the time.
- His philosophy always advocated social equality, education for all, and spiritual enlightenment. The caste system was rampant in Kerala at that time.
- **Caste:** Born in the Ezhava caste.
- Narayan Guru had experienced discrimination from the upper caste of society.
- One of his famous sayings in Malayalam was 'One caste, one religion, one god for all.'

Contribution in anti-caste revolution

- Narayana Guru consecrated the first temple of Lord Shiva in 1888 where an idol was ordinated by a non-brahmin in Aruvippuram village of Kerala.
- His step sparked off the anti-caste revolution against the upper-caste Brahmin communities.
- In 1903, he established the SreeNarayana Dharma ParipalanaYogam (SNDP) as the founder and president.
  - The organization continues to mark its strong presence to this day.

Contribution to National Movement:

- He was in the forefront of the **movement for universal temple entry** and against the societal ills like the social discrimination of untouchables.
- He provided the **impetus for Vaikom agitation**, which was aimed at temple entry in Travancore for the lower castes.
- He captured the **essence of Indianness in his poems**, which highlighted the unity that lies beneath the world's apparent diversity.

Literary Works:

- He wrote various books in different languages. Few of them are: AdvaithaDeepika, Asrama, Thevarappathinkangal, Brahmavidya Panchakam etc.

Philosophy of Sree Narayana Guru:

- SreeNarayana Guru became one of the greatest proponents and re-evaluators of **Advaita Vedanta,** the principle of non-duality put forward by AdiShankara.
- In 1913, he **founded the Advaita Ashram** at Aluva. This was an important event in his spiritual quest.
- This Ashram was dedicated to a great principle – **Om Sahodaryam Sarvatra** (all men are equal in the eyes of God).

EXERCISE KONKAN-2021

⊙ CONTEXT: **Indo-UK Naval Exercise, 'Konkan 2021' was recently held between INS Tabar and HMS Westminster in the English Channel.The English Channel is located between the Isle of Great Britain's southern coast and France's northern coast and separated from the North Sea on the north by the Strait of Dover.**

Key-highlights of Konkan-2021

- The naval exercise Konkan is held between the navies of India and the United Kingdom.
- It is based on the long-term strategic relationship between them.
- The bilateral Konkan exercise started in 2004 and has now grown in scale.
- A wide range of exercises were conduced including-
  - Co-ordinated anti-submarine procedures
  - Firing drills
  - Combined maritime picture compilation
  - Combat formation maneuvering
  - Replenishment at sea was conducted

Other Exercises between India and UK:

- Exercise 'Indradhanush' (Air Force Exercise)
- Ajeya Warrior (Joint Military Exercise)

About INS Tabar

- INS Tabar is the third Talwar-class frigate in the Indian Navy.
- **Commissioned on:** April 19, 2004 in Kaliningrad, Russia.
- It reached the homeport of Mumbai on July 31, 2004.
- INS Tabar is assigned to Western Naval Command of the Indian Navy, which is headquartered in Mumbai.
- This warship can handle air or surface or subsurface missions and defend herself.

MS Westminster

- It is a **Type 23 frigate** of the **Royal Navy**.
- **Launched on**: February 4, 1992
- It has been named after the **Dukedom of Westminster.**

INDIA SIGNS PACT WITH MALDIVES FOR GREATER MALE CONNECTIVITY PROJECT

⊙ CONTEXT: **Recently, India signs pact with Maldives for $500 million Greater Male Connectivity Project.**

About the Project

- GMCP will include the construction of a 6.74 km long bridge and causeway link, which will connect the capital city Male with adjoining islands of **Villingli, Gulhifalhu and Thilafushi.**
- **Funding:** This project is funded under a grant of USD 100 million and a Line of Credit of USD 400 million from India.
- This will be the largest infrastructure project in the Maldives.
- **Signing authority:** The contract for the implementation of the project was signed between the Ministry of National Planning, Housing and Infrastructure of the Maldives and Afcons Infrastructure Ltd.
- **Significance:** The Greater Male Connectivity Project (GMCP) is one of India's biggest new development projects in the Maldives. The project is being considered as the economic lifeline for the people of Maldives and is expected to provide a major boost to the Maldivian economy.

Background

- The project has been undertaken upon the request of Maldives President Ibrahim Mohamed Solih and foreign minister Abdulla Shahid during Union external affairs minister Dr. S Jaishankar's visit to the Maldives in September 2019..

INDIA'S NEW DRONE RULES

⊙ CONTEXT: **The central government has notified the Drone Rules 2021, a much more liberalized regime for unmanned aircraft systems than what existed previously.**

What is in the new rules?

- Several requirements and approvals have been abolished and this isexpected to make drone operations simpler for civilian drone operators.
- The total number of forms that were to be filled has been reducedfrom 25 to five.
- The total number of fees that are to be paid before being able tooperate drones has been reduced from 72to just four.
- The various approvals that were required, such as
  - Unique authorization number
  - Unique prototype identification number
  - Certificate of manufacturing
- Airworthiness, certificate of conformance, certificate ofmaintenance, import clearance, acceptance of existing drones, operator permit,authorization of R&D organization, student remote pilot licence, remotepilot instructor authorisation, and drone port authorization etc have been abolished.
- The quantum of fees, which was earlier linked to the size ofdrones, has been reduced and delinked from the size.

- **For example**, the remote pilot license fee, which was Rs 3,000 for a large sizedrone, has been reduced to Rs 100 — which is the fee for all categories ofdrones.

Other various relaxations

- The yellow zone, which was earlier a 45 km zone from the airport perimeter, has now been reduced to a 12 km zone, meaning that outside of a 12 km radius of an airport perimeter, it would be a green zone, where drone operators no longer need permission to fly.
- It has been specified that coverage of drones has increased from 300 kilograms to 500 kilograms to include heavy payload-carrying drones and drone taxis.

Significance of the new rules:

- It highlights the government's intent to allow the use of drones while at the same time ensuring security from rogue drones through the anti-rogue drone framework that was announced in 2019.
- The rules are based on the premise of trust and self-certification.
- The Rules will tremendously help start-ups and our youth working in this sector. It will open up new possibilities for innovation & business.
- It will help leverage India's strengths in innovation, technology & engineering to make India a drone hub.

NATIONAL MONETISATION PIPELINE

CONTEXT: **The Centre launched the National Monetisation pipeline (NMP) in an effort to list out the government's infrastructure assets to be sold over the next four-years.**

Key Features

- NMP aims to unlock value in Brownfield projects by engaging the private sector, transferring to them revenue rights and not ownership in the projects.
- Ownership of the Brownfield assets to remain with the government.
- The generated funds will be used for infrastructure creation across the country.

What is brownfield project India?

- A brownfield is an investment when a company or government entity purchases or leases existing production facilities to launch a new production activity.

Objective of the programme:

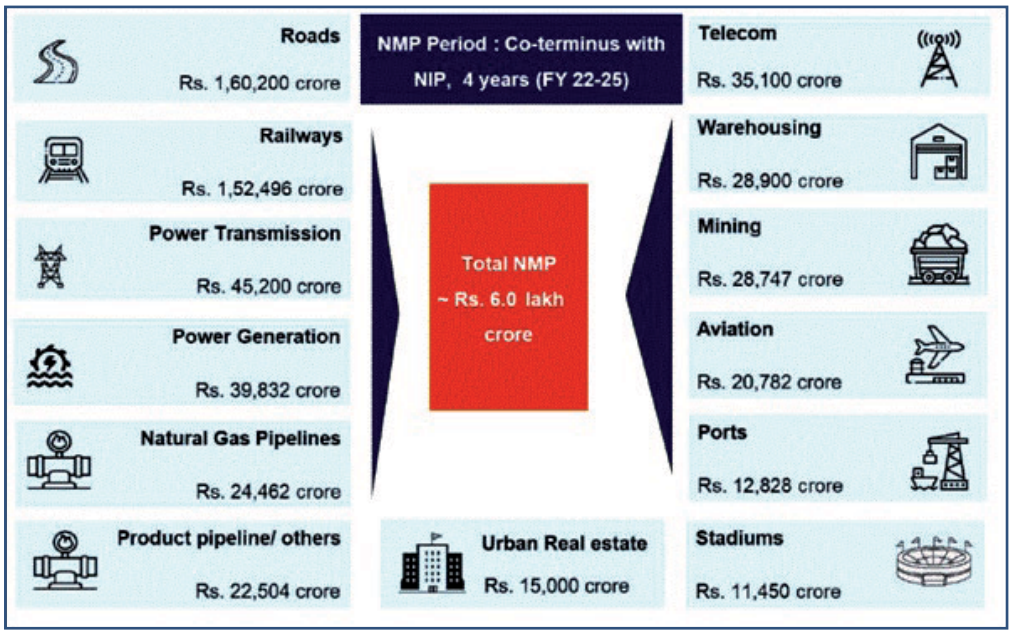
- To unlock the value of investments in Brownfield public sector assets by tapping institutional and long-term capital, which can thereafter be leveraged for public investments.
- To enable 'Infrastructure Creation through Monetization' wherein the public and private sector collaborate, each excelling in their core areas of competence, so as to deliver socio-economic growth.

Major sectors

- Roads, railways and power to be priority sectors.
- Roads, railways and power sector assets will comprise over 66% of the total estimated value of the assets to be monetised, with the remaining upcoming sectors including
  - telecom
  - mining

- aviation
- ports
- natural gas and petroleum product pipelines
- warehouses
- stadiums

Estimated fund allocation



- NMP is indicatively valued at Rs 6.0 lakhcrore for 4 years for FY 2022-2025.

Significance of the scheme

- The NMP document is a critical step towards making India's Infrastructure truly world class.
- Assets monetisation needs to be viewed not just as a funding mechanism, but as an overall paradigm shift in infrastructure operations, augmentation and maintenance considering the private sector's resource efficiencies and its ability to dynamically adapt to the evolving global and economic reality.
- Such new models will enable not just financial and strategic investors but also common people to participate in this asset class thereby opening new avenues for investment.

Challenges to National Monetisation pipeline (NMP)

- Lack of identifiable revenue streams in various assets
- Level of capacity utilisation in gas and petroleum pipeline networks
- Regulated tariffs in power sector assets
- Low interest among investors in national highways below four lanes

CLIMATE CRISIS IS CHILD'S RIGHT CRISIS: UNICEF

⊙ CONTEXT: **Recently, the United Nations Children's Fund (UNICEF) in collaboration with Fridays for Future launched a report named 'The Climate Crisis Is a Child Rights Crisis: Introducing the Children's Climate Risk Index'.**

About the Index

- The report introduces the new Children's Climate Risk Index (CCRI).
- It is a composite index that ranks nations based on children's exposure to climate shocks, providing
  - The first comprehensive look at how exactly children are affected by the climate crisis
  - Offering a road map for policymakers seeking to prioritize action based on those who are most at risk

Key-highlights of the Findings

- Approximately 1 billion children — nearly half the world's child population — live in countries that are at an "extremely high risk" from climate impacts.
- Almost every single child on the planet has been exposed to at least one climate or environmental stressor, such as air pollution, flooding, heat waves, tropical storms, flooding or drought.
- 850 million children — approximately one-third of the world's child population — are expo**se**d to four or more stressors.
- The 33 extremely high-risk countries for children: including the Central African Republic, Chad, Nigeria, Guinea and Guinea-Bissau.
  - These countries collectively are responsible for a mere nine percent of global carbon dioxide emissions.

Findings for India

- India is one of four South Asian nations where children are most vulnerable to the effects of climate change, which jeopardise their health, education, and protection.
- Pakistan, Bangladesh, Afghanistan and India are among four South Asian countries where children are at extremely high risk of the impacts of the climate crisis, with a ranking of 14th, 15th, 25th and 26th respectively.

Mapping exposure of children to different type of pollution

- 1 billion children are "highly exposed" to "exceedingly high levels of air pollution
- 920 million to **water scarcity**
- 820 million to **heat waves**
- 815 million to **lead pollution**
- 600 million to **vector-borne diseases**
- 400 million to **tropical storms**
- 330 million to **riverine flooding**
- 240 million to **coastal flooding**

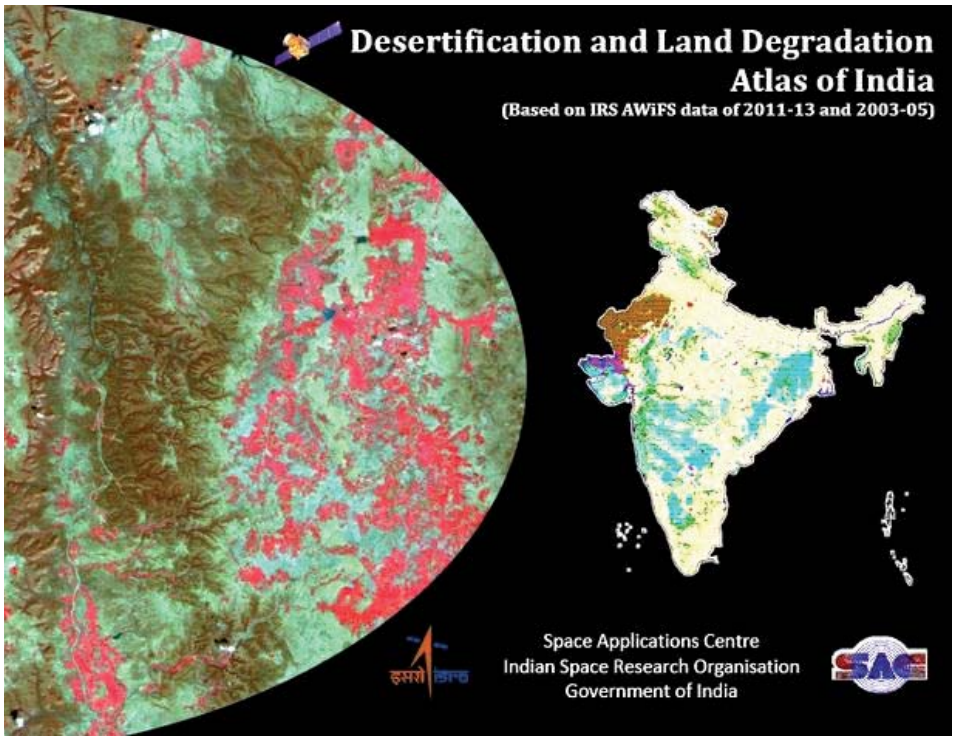
Recommendations:

- Increase **investment in climate adaptation and resilience** in key services for children.
- Countries must cut their emissions **by at least 45% (compared to 2010 levels) by 2030 to keep warming to no more than 1.5 degrees Celsius.**
- Provide children with **climate education and greens skills,** critical for their adaptation to and preparation for the effects of climate change.
- Ensure the **recovery from the Covid-19 pandemic is green,** low-carbon and inclusive, so that the capacity of future generations to address and respond to the climate crisis is not compromised.

LAND DEGRADATION, DESERTIFICATION INCREASING: ISRO ATLAS

⊙ CONTEXT: **The Union Minister for Agriculture and Farmers Welfare has provided useful information about land degradation in India citing the Desertification and Land Degradation Atlas.**

Mapping land degradation



As per data given, land degradation year-wise

- In 2003-05, 94.53 mha (28.76 per cent of the total geographical area (TGA) underwent land degradation.
- In 2011-13, the number increased to 96.40 mha (29.32 percent of the TGA).
- **Desertification and Land Degradation Atlas of India**: During 2018-19, 97.85 million hectares (mha) of India's total geographical area (TGA) of 328.72 mha underwent land degradation.
- **Space Applications Centre (SAC)'s Atlas (June 2021):** 29.7 percent of the country's land in this year became degraded.
  - SAC comes under ISRO.

- PM Modi claimed that India is working to restore 26 mha of degraded land by 2030 while speaking at the ***UN High-Level Dialogue on Desertification, Land Degradation and Drought.***
- India is a signatory to the **United Nations Convention to Combat Desertification in Paris** signed on June 17, 1994.

What is Land Degradation?

- Land degradation is the deterioration or loss of the productive capacity of the soils for present and future.

- It is caused by multiple forces, including extreme weather conditions, particularly drought.
- It is also caused by human activities that pollute or degrade the quality of soils and land utility.

Land desertification

- Besides land degradation, desertification had also increased.
- Land degradation within dry land regions (arid, semi-arid and dry sub-humid regions) is termed as 'desertification'.
- Desertification is a form of land degradation by which fertile land becomes desert.
- Besides land degradation, desertification had also increased.

Causes of land desertification

- Loss of soil cover, mainly due to rainfall and surface runoff
- Water erosion
- Vegetation degradation
- Wind erosion

Various institutions for land conservation

- **Indian Institute of Soil and Water Conservation (IISWC):** Bio-engineering measures to check soil erosion due to run-off of rain water
- **CentralArid Zone Research Institute (CAZRI), Jodhpur**: Sand dune stabilization and shelter belt technology to check wind erosion
- **Council through Central Soil Salinity Research Institute, Karnal**: Reclamation technology, sub-surface drainage, bio-drainage, agro forestry interventions and salt tolerant crop varieties to improve the productivity of saline, sodic and waterlogged soils in the country.

CHIKUNGUNYA VACCINE

⊙ CONTEXT: **A multi-country Phase II / III clinical trial of a vaccine led by the International Vaccine Institute (IVI) in partnership with Bharat Biotech International Ltd (BBIL) has begun in Costa Rica.**

About vaccine

- It is funded by the **Coalition for Epidemic Preparedness Innovations (CEPI)** with support from the **Ind-CEPI mission of the Department of Biotechnology (DBT),** India.
- The development of the Chikungunya Vaccine is an initiative of the **United Nations Development Programme (UNDP)**, as part of the **Global Chikungunya Vaccine Clinical Development Program (GCCDP).**
- The vaccine is named BBV87 and going through a controlled trial to evaluate the safety and immunogenicity of a 2-dose regimen in healthy adults across five countries with endemic Chikungunya.
- **Inactivated whole virion:**
  - **BBV87 vaccine** is an inactivated **whole virion vaccine** based on a strain derived from an East, Central and South African genotype.
    - Inactivated vaccines contain viruses whose genetic material has been destroyed by heat, chemicals or radiation so they cannot infect cells and replicate.

- Inactivated virions technology has a safety profile that potentially makes this vaccine accessible to special populations, such as the immuno compromised and pregnant women that some other technologies cannot reach.

International Vaccine Institute (IVI)

- IVI is an international non-profit organization devoted to developing and introducing new and improved vaccines to protect the people, especially children, against deadly infectious diseases.
- It was established in 1997 on the initiatives of the **United Nations Development Programme (UNDP).**
- Its work is exclusively on vaccine development and introduction specifically for people in developing countries, with a focus on neglected diseases affecting these regions.
- Currently, IVI has 40 countries and the **World Health Organization (WHO)** as signatories to its Establishment Agreement.
- India has become a full-time member of IVI.

About Chikungunya disease

- Chikungunya is a viral illness transmitted by mosquitoes that causes the sudden onset of fever and severe joint pain.
- **Spready by:** Chikungunya virus is most often spread to people by Aedesaegypti and Aedesalbopictus mosquitoes. These are the same mosquitoes that transmit dengue virus.
- **Symptoms:** fatigue, muscle pain, headache and rash. Signs and symptoms usually appear within two to seven days after being bitten by an infected mosquito.
- Chikungunya virus was first identified in Tanzania in 1952, with sporadic outbreaks of the disease reported subsequently across Africa and Asia.

HUMAN TRIALS FOR THE FIRST MRNA HIV VACCINE WILL BEGIN THIS WEEK.

⊙ CONTEXT: **Recently, Moderna, the Massachusetts-based American biotechnology company, indicated to begin human trials for a vaccine for HIV (human immunodeficiency virus) in September.**

What is mRNA, and how do mRNA vaccines work?

- Messenger RNA (mRNA)is expected to work similar to the Covid-19 vaccine — by getting the body's cells to produce the **HIV virus's spike protein** triggering an **immune response.**
- mRNA provides a recipe that human cells can use to make proteins.
- After injection, the cells in arm muscles pick up the mRNA, make the protein, and display it on the cell's surface.
- Human's immune system sees the protein and learns how to make an immune response against it.

The Study

- The study will enroll 56 participants uninfected with HIV.
- They will be divided into four groups to test the combinations of two versions of the vaccine, called-
  - eOD-GT8 60mer mRNA Vaccine (mRNA-1644)
  - Core-g28v2 60mer mRNA Vaccine (mRNA-1644v2-Core)
- The participants will receive the doses and will be monitored for adverse effects and signs of immune response after ten months or immunogenicity.

Key-Points

- mRNA-1644 will be the first HIV mRNA vaccine to be trialled in humans.
- mRNA vaccines tricks the body into producing some of the viral proteins itself.
- They work by using mRNA, or messenger RNA, which is the molecule that essentially puts DNA instructions into action. Inside a cell, mRNA is used as a template to build a protein.
- mRNA-1644, is based on the same mRNA platform as Moderna's highly effective Covid-19 jab, which is one of two of the only mRNA vaccines to be authorized anywhere in the world.
- The other is Pfizer-BioNTech's Covid-19 vaccine.

Collaboration

- The vaccine is collaboration between Moderna, the **International AIDS Vaccine Initiative (IAVI)** and the **Bill and Melinda Gates Foundation (BMGF).**

What are the advantages over other vaccine strategies?

- **Safety:** Unlike live-attenuated or viral-vectored vaccines, mRNA is non-infectious and poses no concern for DNA integration—mainly because it cannot enter the nucleus, which contains DNA.
- **Production:** mRNA can be quickly designed and scaled up, if necessary.

Significance

- The quest to develop an HIV vaccine is considered very important for scientific research.
  - While treatment with **Antiretroviral Therapy** has significantly improved the **longevity of those with AIDS**.
- According to the World Health Organization, there are around 37.7 million living with HIV as of 2020.
- Traditional vaccine approaches have not worked for HIV, and in fact, some of them have gone on to worsen the infection.
- RNA-based immunogens are believed to be a **promising alternative** because they **do not involve the use of a live virus,** can be made relatively easily, can be **quickly deployed and safely administered.**

Challenges

- Of the people living with HIV, **over two-thirds are in Africa.** Any success in containing the **HIV pandemic would mean drastically** cutting the rates of transmission there.
- However, as the experience with the Moderna and Pfizer vaccines shows, getting essential jabs to the regions where they are most needed is the biggest stumbling block.

- Another challenge with mRNA vaccines is that they are sensitive to **temperature** in **storage, and is a challenge for developing countries**.

NEW PORTAL UNDER BHUVAN "YUKTDHARA" LAUNCHED

⊙ CONTEXT: **Recently, the Ministry of Rural development has launched a new geospatial planning portal, 'Yuktdhara' to help in facilitating the new MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) assets with the use of remote sensing and GIS (Geographic Information System) based information.**

About the Yuktdhara

- **Developed by:** Jointly developed by ISRO and the Ministry of Rural Development
- Yuktdhara will serve as a **repository of assets (Geotags)** created under various national rural development programmes such as
  - Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
  - Integrated Watershed Management Programme
  - Per Drop More Crop
  - Rashtriya Krishi Vikas Yojana etc.
- The new portal under Bhuvan 'Yuktdhara' will facilitate planning of new MGNREGA assets using **remote sensing** and **GIS (geographic information system)-based information.**
- Yuktdhara portal would ensure-
  - The quality of the plan
  - Enable a long term monitoring of the assets created over the years for relevance
  - Facilitate identification of new works for resource allocation

Bhuvan Portal

- Previously launched, ISRO'sGeoportalBhuvan is presently a de-facto geospatial platform for several developmental planning activities across India.
- Bhuvan, is the national Geo-portal developed and hosted by ISRO comprising Geo Spatial Data, Services and Tools for Analysis. It has many versatile features
  - Visualization of Satellite Imagery and Maps
  - Analysis
  - Free Data Download
  - Download Reports to name a few
- A citizen-centric mobile application **JANMANREGA** has helped the rural population by providing feedback using Bhuvan services.

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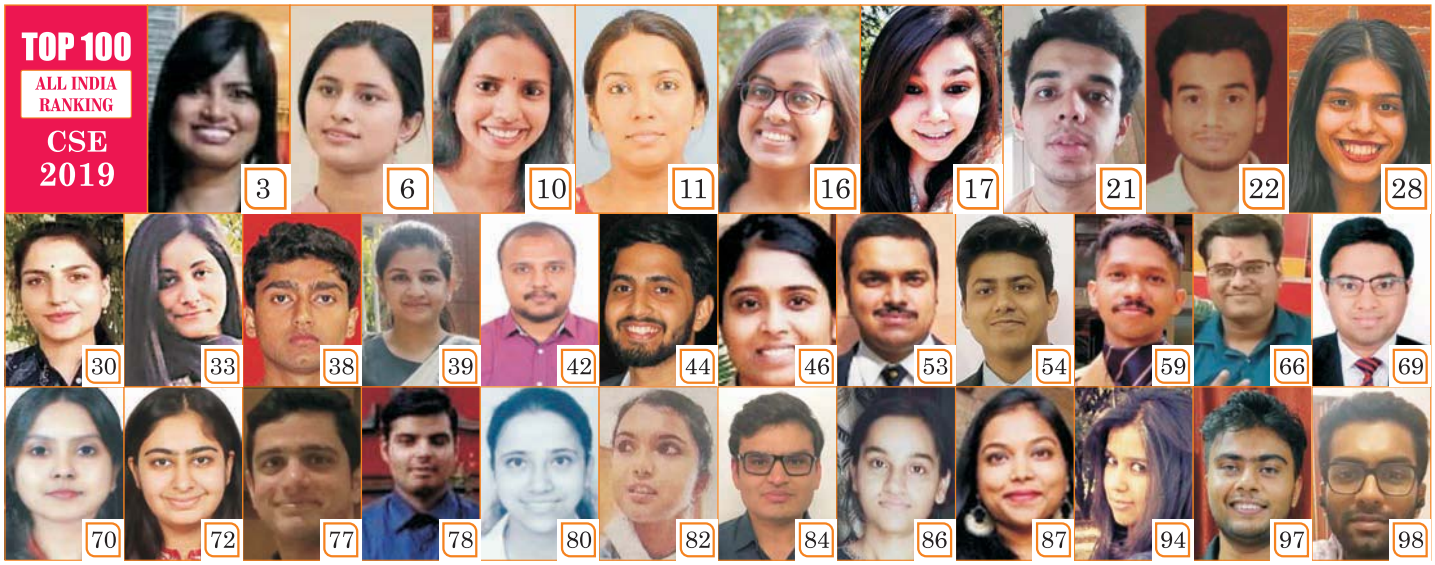

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