

ENVIRONMENT AND BIODIVERSITY

Context: The effects of coastal erosion on the coastal ecosystem.

In News, why?

- In a written response to the Lok Sabha, the Union Minister of State for Environment, Forests, and Climate Change provided insights on shoreline changes throughout the entire Indian coastline based on data from field surveys conducted by the National Centre for Coastal Research (NCCR) between 1990 and 2016. The surveys used multispectral satellite images.
- Coastal habitats and ecosystems, marine pollution, coastal processes and hazards, capacity building and training, and coastal habitats and ecosystems are the central domains under which all interdisciplinary research is to be conducted. NCCR is an attached office of the Ministry of Earth Sciences, Government of India.

What are the NCCR's Principal Findings about Coastal Erosion?

- Due to human activity or natural processes, some parts of India's coastline are eroding to differing degrees.
- According to the coastline analysis, 28% of the coast is accreting, 38% is stable, and 34% of the coast is eroding.
- According to the state-by-state analysis, erosion surpasses 50% along the coasts of West Bengal (63%) and Pondicherry (57%), Kerala (45%) and Tamil Nadu (41%).
- The only state along the coast with more than 50% accretion is Odisha (51%).
- The coastline's retreat will result in the loss of land and wildlife, as well as the means of subsistence for fishermen who depend on it for boat parking, net repair, and fishing operations.

What actions has the government taken to combat erosion along the coast?

Hazard Line:

- For the entire nation's coast, the Ministry of Environment, Forests, and Climate Change (MoEFCC) has established the hazard line.
- The hazard line shows how the coastline is changing, particularly how the sea level is rising as a result of climate change.
- Agencies in Coastal States are to use this line as a tool for disaster management, which includes planning for mitigation and adaptability measures.
- Plans for Coastal Zone Management: The MoEFCC-approved new Coastal Zone Management Plans for the coastal States and Union territories include the hazard line.

Coastal Zone Management Plans:

- Hazard lines are included in the recently authorized Coastal Zone Management Plans by the MoEFCC for the coastal States and Union territories.

Coastal Regulation Zone Notification, 2019:

- The MoEFCC has notified the Coastal Regulation Zone Notification, 2019 in an effort to preserve and safeguard coastal regions and marine areas, as well as to guarantee the security of the fisherman's and other local residents' livelihoods.
- However, the establishment of erosion control measures along the coast is permitted by the coastal regulations.
- Zones de No Development (NDZ): In order to prevent erosion and encroachment on India's coastline, the announcement also establishes NDZs along a number of different coastal region classifications.

Flood Management Scheme:

- This program is run by the Ministry of Jal Shakti and includes state-level anti-sea erosion initiatives that are funded and carried out by the respective state governments in accordance with state priorities.
- The Union Government provides technical, consultative, catalytic, and promotional aid to the states.

The CMIS, or Coastal Management Information System,

- It was started under the "Development of Water Resources Information System" Central Sector Plan Scheme.
- In order to plan, develop, build, and maintain site-specific coastal protection structures along vulnerable coastal segments, CMIS is a data gathering activity that gathers near-shore coastal data.

Coastal Erosion Mitigation:

- By implementing these techniques in Kerala's Pudukherry and Chellanam, the coastal areas that were lost to flooding in Chellanam Fishing Village and destruction in Pudukherry have been restored and protected.
- The coastal states have received technical assistance in creating Shoreline Management Plans and designing coastal protection measures at sensitive points.

Conclusion

Coastal erosion will continue to be a major hazard on coastlines into the future and in the face of projected climate change and increasing population pressure on coastal resources it is likely to become an even more important hazard for coastal managers.

SCIENCE & TECHNOLOGY

Context: India and geopolitics of AI

Introduction:

Every conversation that takes place right now about the geopolitics of AI invariably returns to the experience of nuclear weapons. India could gain from thinking back on its complicated nuclear past as the world looks to the nuclear era for guidance in addressing the issues and opportunities brought out by artificial intelligence.

Comparisons between the possible applications and abuses of AI and nuclear technology

- There are parallels between AI and nuclear power despite their stark differences.
- The August 1945 use of atomic bombs against Hiroshima and Nagasaki exposed the world to the nuclear revolution. Its immense devastation potential and terrible aftermath forced policymakers and scientists to think of solutions to reduce the risks to human survival in the nuclear era.
- An even greater calamity—machines taking over and enslaving humans—is threatened by the AI revolution. The AI revolution will probably have a significantly wider range of effects.
- While nuclear technology never lived up to its economic promise of “delivering electricity too cheap to meter”, AI promises to transform the economy, society and polity in fundamental ways

The same difficulties in regulating AI and nuclear technologies

- There are many similarities between the problems the world faced at the beginning of the nuclear age and the concerns that drive AI governance today.
- Among these issues are regulating how this new technology affects the major countries' geopolitical rivalry, building a barrier between the proper and improper use of these technologies, and developing international institutions and standards to control their usage.
- Similar to the nuclear era, many now call for a "freeze" on research and development until a more thorough evaluation of the technology is available, or at the very least, a prohibition on its use in military applications.
- These worries, like in the past, haven't stopped AI's relentless advancement.
- Similar to the nuclear age, there is growing interest in promoting “arms control” agreements between the great powers.
- If the US and the USSR, the post-World War II superpowers, dominated the conversation about nuclear weapons, Beijing and Washington currently control the conversation about AI.
- It should come as no surprise that agreements between the US and China over AI are seen as essential to managing the next technology revolution.
- US President Joe Biden and Chinese Leader Xi Jinping decided to start long-term talks on military AI regulation during their summit in San Francisco last month.
- They are not stagnating in their efforts to control the US-China rivalry in the application of AI for military purposes. Both parties are working hard to advance AI's military applications.

The AI race between the USA and China

- Washington is limiting Beijing's access to cutting-edge semiconductors and equipment used in chip production, among other measures, to impede Beijing's advancement in artificial intelligence.
- Beijing is, nevertheless, coming up with inventive techniques to get around these limitations and quicken the creation of advanced processors, which are essential to the advancement of artificial intelligence.

International regulation of artificial intelligence

- Talk of international regulations to control the possible unfavourable effects of the AI revolution has moved beyond the bilateral.
- An "International Agency for Artificial Intelligence" (IAAI), modelled after the International Atomic Energy Agency (IAEA), which was established in 1957 to control the use of nuclear energy, has been suggested by some.
- The US is concentrating on forming "like-minded coalitions" to talk about the development of AI and control its impacts, even though an IAAI may not happen anytime soon.
- The Global Partnership for Artificial Intelligence (GPAI), which has 28 members, is one such endeavor.
- In an effort to strengthen military deterrence against China and Russia, it is also uniting its partners and friends.
- India is prepared to serve as the next GPAI summit soon.

What India can learn from its nuclear technology journey that can help in AI technology

- For starters, when it comes to AI, the disarmament idealism that shaped India's stance toward nuclear weapons is thankfully in the past.
- In contrast to the nuclear realm, India cannot afford to wait until it is too late to take action in the AI area.
- Second, it's crucial to maintain the momentum that the US cooperation is currently experiencing in the areas of AI and other important and developing technologies.
- Large-scale technical collaboration with the US and other Western nations that were keen to support Delhi's stance against Communist China marked the beginning of India's independence.
- However, an India that was keen to make friends with China made a mistake.
- With less inhibition, the NDA administration has elevated technological collaboration with the US and the West to the top of India's national agenda.
- It must, however, act swiftly on a number of policy fronts in order to climb the global AI hierarchy.
- Third, there is still a risk on the downside. Delhi has long been tempted to claim India's uniqueness in technology advancement and discover a "third way."

- Science and technology can be applied anywhere, even though it depends on the context and the nation. The term "Indian physics" does not exist.

Way forward

- Developing robust AI skills at home is essential to maximizing the benefits of global collaboration.
- This in turn necessitates giving the private sector a bigger role.
- If governments drove scientific advancement throughout the latter half of the 20th century, particularly in the nuclear and space industries, the private sector is driving AI research, development, and innovation in the West.
- The recent S&T sector opening initiatives by the NDA are a positive beginning.
- However, there is a significant and pressing need to restructure India's technology industry.

Conclusion:

Delhi's political posturing on technology advancement in the 1970s severely hampered India, and it cannot afford to repeat the same error with artificial intelligence today.

PRELIM FACTS
1.Lakadong turmeric

Context: Recently, Meghalaya's Lakadong turmeric has been awarded the Geographical Indication (GI) tag.

- About Lakadong turmeric:
- It is considered to be one of the world's best varieties of turmeric, with a curcumin content of around 6.8 to 7.5 per cent.
- It is darker in colour and is grown organically without the use of fertilisers.
- It is found in Lakadong area of Jaintia Hills, has high curcumin content.
- Other GI products from Meghalaya: Garo Dakmanda (traditional dress), Larnai pottery and Garo Chubitchi (alcoholic beverage) were also awarded the GI tag.

What is Curcumin?

- It is a polyphenol which has been shown to target multiple signalling molecules while also demonstrating activity at the cellular level.
- It has been shown to benefit inflammatory conditions, metabolic syndrome, pain, and to help in the management of inflammatory and degenerative eye conditions.
- In addition, it has been shown to benefit the kidneys.
- Most of these benefits are due to its antioxidant and anti-inflammatory effects.

Key facts about Geographical Indication (GI) tag

- It is a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin.
- This is typically used for agricultural products, foodstuffs, wine and spirit drinks, handicrafts and industrial products.
- The Geographical Indications of Goods (Registration and Protection) Act, 1999 seeks to provide for the registration and better protection of geographical indications relating to goods in India.
- This GI tag is valid for 10 years following which it can be renewed.

2.Pompe disease

Context: Recently, India's first patient diagnosed with the Pompe disease died after spending nearly six years in a semi-comatose state.

About the Pompe disease:

- It is a rare inherited disorder that affects one child per million.

Causes:

- Mutations in the GAA gene cause Pompe disease.
- The GAA gene provides instructions for producing an enzyme called acid alpha-glucosidase (also known as acid maltase).
- This enzyme is active in lysosomes, which are structures that serve as recycling centres within cells.
- The enzyme normally breaks down glycogen into a simpler sugar called glucose, which is the main energy source for most cells.
- Mutations in the GAA gene prevent acid alpha-glucosidase from breaking down glycogen effectively, which allows this sugar to build up to toxic levels in lysosomes.
- This buildup damages organs and tissues throughout the body, particularly the muscles, leading to the progressive signs and symptoms of Pompe disease.
- Some common side effects and symptoms include muscle weakness, respiratory issues, heart problems and difficulty swallowing.

This disease can be:

- Infantile-onset: symptoms begin in the first few months after birth.
- Late-onset or delayed-onset: symptoms appear later in childhood or in adulthood.
- It affects males and females equally.
- Treatment: The treatment includes enzyme replacement therapy (ERT).

3.Panchayat Development Index

Context: Recently, the Union Minister of State for Panchayati Raj informed Lok Sabha about the Panchayat Development Index.

About the Panchayat Development Index:

- It is a multi-domain and multi-sectoral index that is intended to be used to assess the overall holistic development, performance & progress of panchayats.
- The Panchayat Development Index (PDI) is released by the Union Ministry of Panchayati Raj in India.
- It takes into account various socio-economic indicators and parameters to gauge the well-being and development status of the local communities within the jurisdiction of a panchayat.
- It would play a significant role for performance evaluation and progress assessment in achieving the localization of Sustainable Development Goals in rural area.
- Under this the Local Indicators Framework on nine themes of Localization of Sustainable Development Goals was prepared.
- The nine themes taken into account are poverty free and enhanced livelihood in village, healthy village, child friendly village, water sufficient village, clean and green village, village with self-sufficient infrastructure, socially just and socially secured villages, village with good governance, and women friendly village.
- Ranks: This Index ranks panchayats on the basis of scores, and categorises them into four grades.
- Those with scores under 40 per cent fall in grade D, 40-60 per cent in grade C, 60-75 per cent in grade B, 75 to 90 per cent in category A, while those scoring above 90 per cent will be categorised as A+.

Significance:

- It shall provide valuable insights into the areas that require attention for improvement within the rural areas under the jurisdiction of the panchayats.
- It helps in identifying disparities, achievement of development goals, and formulating targeted policies and interventions to enhance the overall well-being and quality of life of rural communities.

4.JT-60SA: World's biggest experimental nuclear fusion reactor inaugurated in Japan

Context: JT-60SA is a joint initiative between European Union and Japan and is a forerunner for under-construction International Thermonuclear Experimental Reactor (ITER).

About ITER

- ITER aims to demonstrate nuclear fusion as a clean green source of energy.
- It is located in France and is a collaboration of China, EU, India, Japan, Korea, Russia and US.
- It aims to build the world's largest tokamak, a magnetic fusion device designed to tap into the potential of fusion energy.
- The tokamak operates based on same principles that power the Sun and stars.
- Using a robust magnetic field, it fuses hot plasma, and can reach temperatures of over 150 million degrees Celsius (ten times hotter than Sun's core).
- Nuclear fusion is a process in which two or more light atomic nuclei fuse to produce a heavier nucleus and release a tremendous amount of energy.
- In nuclear fission, atoms are split apart into lighter elements releasing energy. All nuclear power plants use nuclear fission.
- Advantages of fusion: Release of abundant energy and fuel is nearly inexhaustible. Neither produces CO₂ and other greenhouse gases nor radioactive waste.

5.Group of Companies

A Constitution Bench of the Supreme Court recently held that an arbitration agreement can bind non-signatories as per the "group of companies" doctrine.

About 'Group of Companies' Doctrine:

- The "group of companies" doctrine states that a company that is a non-signatory to an arbitration agreement would be bound by the agreement if such a company is a member of the same group of companies that signed the agreement.
- The doctrine deems that the parties to the arbitration agreement mutually intended for such a non-signatory to be bound by it.
- Arbitration is a mechanism to resolve disputes between parties without going to court. A neutral person is appointed to adjudicate the dispute, and the judgment of an arbitrator is legally enforceable.
- The "group of companies" concept, unlike other non-signatory theories that are based on domestic law principles, is based on international arbitration jurisprudence.
- The doctrine was first recognised by the Indian Supreme Court in Chloro Controls India Private Limited v. Severn Trent Water Purification Inc. (2013). Since then, Indian courts have applied the doctrine to bind group companies of signatories to arbitration agreements.
- The Supreme Court in ONGC Ltd. vs. Discovery Enterprises (P) Ltd. came up with certain factors to be considered in order to decide whether the Doctrine would find application or not, being:
 - the mutual intent of the parties
 - the relationship of a non-signatory to a party which is a signatory to the agreement

- the commonality of the subject-matter
- the composite nature of the transaction
- the performance of the contract
- The main purpose behind bringing the 'group of companies' doctrine in India was to prevent fragmentation of disputes in composite transactions i.e., disputes consisting of several parties and multiple contracts.

Recent Supreme Court Ruling:

- The Court held that it is not necessary that only persons who are signatories to the arbitration agreement will be bound by the arbitration agreement.
- The requirement of a written arbitration agreement does not mean that non-signatories will not be bound by it, provided there is a defined legal relationship between the signatories and the non-signatories and that the parties intended to be bound by it by the act of conduct.
- Non-signatories, by virtue of their relationship with the signatory parties and their commercial involvement in the subject matter, are not total strangers to the arbitration agreement.

ANSWER WRITING
Q. Should the criteria for special category status (SCS) for Indian states be revisited? Critically examine

The centre government's Special Category Status (SCS) categorization aids in the development of states that suffer from socioeconomic and geographic disadvantages. Based on the Fifth Finance Commission's 1969 recommendations, this classification was carried out. It was predicated on the Gadgil equation. A resolution requesting Special Category Status (SCS) for Bihar was recently voted by the Bihar Cabinet in response to the survey's results, which showed the state's extreme poverty.

Several standards are used to award SCS, including:

The justification for special status is that some states have low resource bases due to natural characteristics and are unable to mobilize resources for development.

The benefit must go to the state that is experiencing a shortage of resources. The primary requirements are:

- low income per person
- The unavailability of state finances
- Backwardness in terms of infrastructure and economy
- a sizable tribal population exists
- steep and challenging terrain
- A site that is strategically placed near international borders
- low density of inhabitants
- Must have inadequate infrastructure and be economically backward.

States that are given special category status benefit in a number of ways:

- Preferential consideration for obtaining central funding.
- Excise duty concession in an effort to draw businesses to the state.
- Significantly, special category states receive 30% of the centre's gross budget.
- Programs for debt reduction and switching are available to these states.
- Special Category States receive 90% of foreign aid in the form of grants and 10% in the form of loans under Centrally Sponsored Schemes.
- A Special Category Status encourages private investment, creates jobs, and brings in more money for the state.
- Furthermore, as the Centre pays 90% of the costs associated with all Centrally Sponsored Schemes, the State can use the additional savings to fund more welfare-based initiatives.

Issues with SCS status:

- The 14th Finance Commission recommended eliminating the "special category" designation for states, with the exception of the three hill states and the north-eastern state.
- The NDA administration, which took office in 2014, has maintained that Andhra Pradesh is not entitled to this kind of treatment under the 14th Finance Commission.
- It was never addressed in the Constitution, which seems to have served as the commission's guide. The Constitution treats every state equally and never treats any of them differently.
- No authority to distribute funds: NITI Aayog, the organization that took over for the Planning Commission, is not able to distribute monies. Consequently, the authority that the Central government has to grant particular benefits to individual states via the plan panel is no longer in use.

Way Forward:

- Articles 371, 371-A to 371-H, and 371-J of the Indian Constitution contain a long list of provisions that apply to up to ten states.
- Maharashtra, Gujarat, Nagaland, Assam, Manipur, Andhra Pradesh, Sikkim, Mizoram, Arunachal Pradesh, and Telangana are a few of these states.
- Furthermore, the Centre may, on a case-by-case basis, offer a unique package to states that require further assistance.

Conclusion:

- These sections aim to defend the interests and goals of certain underdeveloped areas, as well as the tribal people's cultural and economic rights, and to address law and order issues in particular areas.
- Merit-based special packages for states can be a useful next step. A committee consisting of independent members from the states and the centre, supported by executive powers and statutory authority, may provide recommendations in this area.

MCQs

- Which of the following statements accurately describes the 'Creator Economy'?
 - The Creator Economy refers exclusively to traditional artists and musicians.
 - In the Creator Economy, creators generate income primarily through traditional employment.
 - The Creator Economy involves individuals leveraging digital platforms to create and distribute their content, often earning revenue through diverse monetization channels.**
 - The Creator Economy is limited to well-established celebrities and influencers, excluding emerging talent.
- Which of the following statements about the Navy of Ancient India is correct?
 - The ancient Indian Navy primarily used elephants in naval warfare.
 - Ancient Indian naval forces were known for their extensive use of chariots at sea.
 - The Maurya Empire is credited with having one of the earliest recorded naval fleets in ancient India.**
 - Ancient Indian naval strategies were heavily influenced by cavalry tactics.
- Consider the following statements:
 - The G20 consists of the 20 largest economies in the world.
 - The G20 was established to address political issues only.
 - All G20 countries are permanent members of the United Nations Security Council.
 - The G20 meetings are held annually, with rotating host countries.
 How many of the above statements are correct?
 - Only one
 - Only two**
 - Only three
 - All four
- Consider the following statements regarding 'Lakadong turmeric'
 - It is considered to be one of the world's best varieties of turmeric, with a curcumin content of around 6.8 to 7.5 per cent.
 - It is darker in color and is grown organically without the use of fertilizers.
 - Recently, it gets GI tag from the state of Sikkim.
 How many of the above-mentioned statements are correct?
 - Only one
 - Only two**
 - All three
 - None
- The 'Group of Companies' Doctrine, recently seen in the news, primarily deals with:
 - Determining corporate tax liabilities
 - Establishing corporate governance standards
 - Facilitating cross-border mergers and acquisitions
 - Binding a non-signatory to an arbitration agreement**
- Recently, 'JT-60SA' was in the news. It is a/an
 - Fifth generation fighter jet
 - Hypersonic missile
 - Nuclear fusion reactor**
 - Newly found black hole in Milky way galaxy
- 'Panchayat Development Index' is released by which one of the following institutions/organizations?
 - National Institute of Rural Development and Panchayati Raj (NIRDPR)
 - National Centre for Good Governance (NCGG)
 - Indian Institute of Public Administration (IIPA)
 - Ministry of Panchayati Raj (MoPR)**
- Recently, 'GAA Gene' was in the news. Regarding this gene, which one of the following statements is correct?
 - It is newly mapped Gene, which was unknown to humanity.
 - Its mutation causes a rare inherited disorder in children.**
 - It is the main reason of recent surge in Pneumonia cases in China.
 - It is cancer causing Gene in Humans.
- Consider the following statements regarding the Garba dance:
 - It is mainly performed during the festival of Navaratri.
 - It is inscribed in the Representative List of Intangible Cultural Heritage (ICH) of Humanity by UNESCO.
 Which of the statements given above is/are correct?
 - 1 only
 - 2 only
 - Both 1 and 2**
 - Neither 1 nor 2
- Kopili Fault (KF) zone, recently seen in news, is located in:
 - Northeastern India**
 - Western Himalayas
 - Deccan Plateau region
 - Gulf of Mannar