

ENVIRONMENT
How mangroves help in averting climate change risks

- ❖ **CONTEXT:** India joined the Mangrove Alliance for Climate, launched on the sidelines of the ongoing United Nations Climate Summit in Egypt. The alliance was launched by the U.A.E. and Indonesia, and India, Australia, Japan, Spain and Sri Lanka have joined it as partners.
- **What are mangroves?**
 - Mangrove is a tropical tree, essentially adapted to thrive near the coastline, in brackish water and loose and wet soil. These trees cannot survive in colder temperatures.
 - A characteristic feature of mangroves is their tangled prop roots. These roots allow the trees to survive the daily tides and also capture sediments while slowing waterflow.

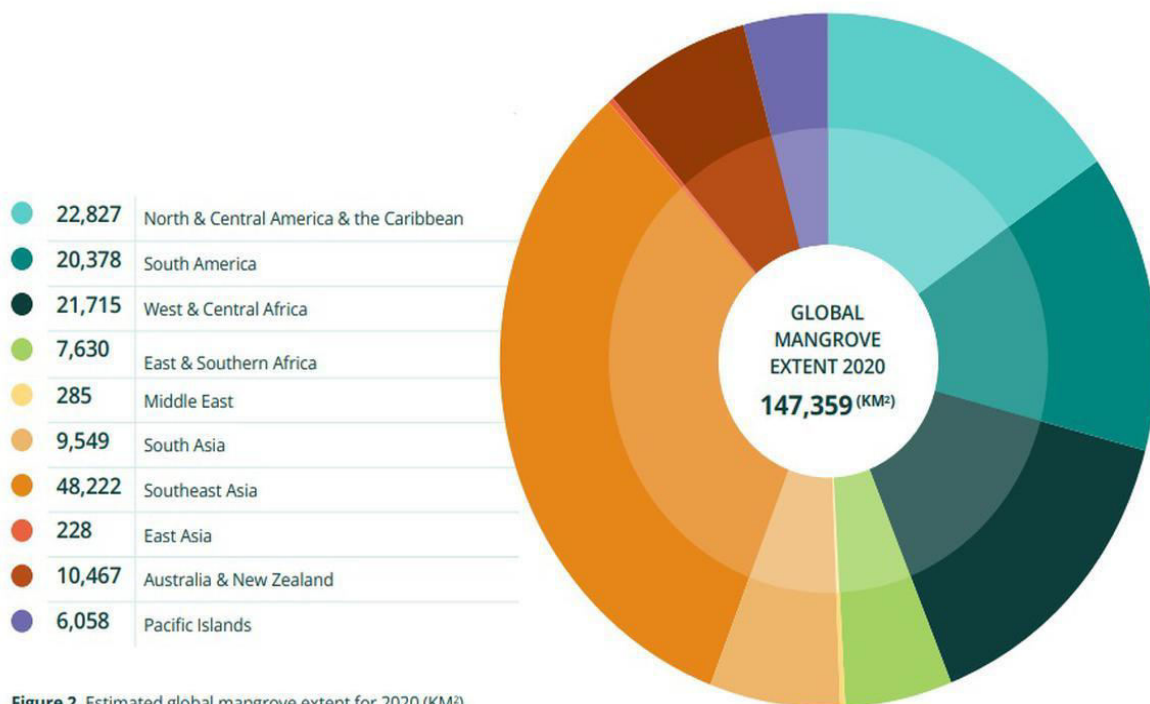
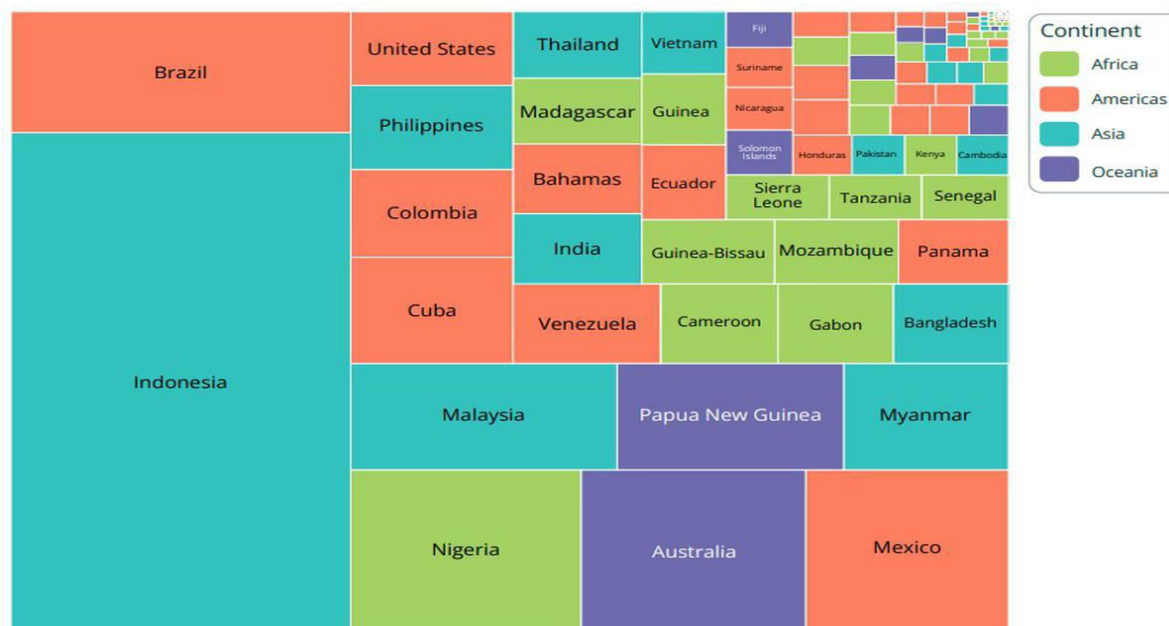


Figure 2. Estimated global mangrove extent for 2020 (KM²)

Estimated global mangrove extent for 2020 (in sq km) | The State of the World's Mangroves 2022

- Mangroves serve a multitude of purposes in their ecosystem, including coastal protection, filtration of water, and disaster risk reduction.
- **How do mangroves help in mitigating climate change effects?**
 - Mangrove forests stabilise coastlines, reduce erosion, encourage biodiversity growth, and shield coastal communities from sea-level rise, and natural disasters like hurricanes and cyclones.
 - The 2022 State of World's Mangroves Report, prepared by the Global Mangrove Alliance, finds that mangroves prevent more than \$65 billion in property damages and reduce flood risk to some 15 million people every year.
 - **Carbon sinks:** Mangroves are one of the most carbon-rich forests of the tropics, storing carbon from the atmosphere at up to four times the rate of terrestrial forests. This makes mangrove forests an indispensable tool in achieving the goal of net zero carbon emissions by 2050.
 - ✓ Part of this carbon is stored in living biomass, while part of it is sequestered in the soil. Dead mangroves decompose very slowly due to waterlogging in the soil, making the accumulation of carbon in the soil last hundreds of years. The waterlogged soil is also a reason why mangroves hold more carbon than other forests, such as temperate or boreal ones.
 - ✓ According to The State of the World's Mangroves Report, mangrove forests store around 6.23 gigatonnes of carbon (with an error margin of +/- 2.3). This is equivalent to 22.86 gigatonnes of carbon dioxide, with 87% of that being soil carbon. The loss of even 1% of the remaining mangroves will equate to over 520 million barrels of oil or the annual emissions of 49 million cars in the U.S.



Mangrove carbon by country and continent with areas scaled to total carbon

- ✓ Indonesia, Brazil, Nigeria, Australia, and Mexico hold 50% of the total world mangrove carbon, mainly due to their large mangrove areas. Variations in carbon concentrations are also affected by environmental conditions. This is the reason why Nigeria is placed third in global rankings, primarily due to its rich soil carbon, even though Australia and Mexico have more mangroves by area.
- **Ecosystems:** Mangroves usually do not exist in isolation but support interconnected terrestrial, freshwater, and marine habitats (think Royal Bengal Tigers, river dolphins, and crocodiles, all within each other's vicinity in Sunderbans).
- ✓ The roots of mangrove trees capture sediments, resulting in the formation of new, fertile lands. This process also ensures that offshore water is clearer, allowing marine life to thrive.
- ✓ While mangrove creeks provide safe grounds for young fish, providing them food and protecting them from predators, they simultaneously provide rich feeding areas for predatory fish.
- **Disaster risk reduction:** Not only do mangroves stabilise coastlines by holding sediments together but they also act as safety nets against storms and surges.
- ✓ In tropical coastal areas, mangroves are the first line of defence against natural disasters like cyclones and hurricanes that originate in seas and oceans and impact land. Mangrove trees act as a buffer zone and arrest winds, slowing them down and hence minimising impact on land.

➤ **Socio-economic importance of mangroves**

- Mangrove ecosystems are home to a variety of fish. According to estimates, 4.1 million of the 52 million marine small-scale fishers worldwide fish in mangrove areas. This activity provides a critical source of jobs and protein to local, coastal communities. In Indonesia alone, mangroves are critical to an estimated 893,000 small-scale fishers. In Bangladesh and Nigeria, an estimated 82% and 89% of fishers respectively fish predominantly in and around mangroves.
- Mangroves are also important resources for timber and fuelwood, when collected sustainably.
- In India, mangroves are found in the Sunderbans, which are extremely rich in biodiversity. The area, transformed into a national park, is also home to threatened or endangered species like the Royal Bengal Tiger, fishing cats, macaques, leopard cats, wild boar, flying fox, pangolin, and Indian grey mongoose. The biodiversity hotspot attracts thousands of visitors every year, generating valuable revenue.

➤ **Threat to mangroves**

- Agriculture, overfishing, and rapid urbanisation are some of the glaring threats to mangrove forests around the world. Indirect threats to mangroves include change in sedimentation rates and patterns, rising sea levels, and increase in pollutants, and these are often exacerbated by human actions.
- In Kenya, overreliance on mangroves for fuel because of a lack of affordable alternatives, pollution from land-based sources, and conversion of mangrove areas to other land uses such as salt mining or settlements pose serious threats to mangroves. Similarly, deforestation for fuel is the biggest threat to mangroves in Madagascar too.
- Mozambique lost more than 6% of its mangrove cover in the last 20 years, mainly due to the extraction of wood resources and deforestation to create land for salt pans and urban settlements. Solar salt production, which involves clearing and selective logging, altering microhabitats and microclimates, is also a threat to mangroves.
- In India's Sunderbans, salinisation, population pressure, and overexploitation are the primary threats to mangroves and the area's biodiversity. The Sunderbans are sandwiched between a densely populated, poor rural

area and a rising sea. These climatic and demographic challenges contribute to the degradation of the immensely fertile land and the biodiversity hotspot.

MINORITY WELFARE INITIATIVES

What are the hurdles to building schools for tribals?

❖ **CONTEXT:** The government is pushing to set up 740 Eklavya Model Residential Schools (EMRS) for tribal students — one each in every sub-district that has at least a 20,000-odd Scheduled Tribe population, which must be 50% of the total population in that area.

- The government is persisting with its mission despite the Parliamentary Standing Committee on Social Justice and Ministry noting this year that the population criteria was “impractical” and needed an “immediate review”.

➤ **When was the idea mooted?**

- The EMRS model was first introduced in 1997-98 to provide quality education to tribal students with residential facilities in remote corners. The aim was to build schools at par with the Jawahar Navodaya Vidyalayas and Kendriya Vidyalayas.
- Until 2018-19, the scheme was overseen by the Ministry of Tribal Affairs with maximum control of identifying new schools, recruiting, management and admissions lying with State governments.
- While the Union government had sanctioned a certain number of preliminary EMRS, the guideline of the scheme noted that States and Union Territories would be responsible for seeking sanction of new schools as and when they needed it.
- The funds for these schools were to come from the grants under Article 275(1) and the guidelines mandated that unless States finished constructing the schools sanctioned by the Centre, they would not be entitled to funds for new ones. Apart from the infrastructural requirements of 20-acre plots for each EMRS, the guidelines did not have any criteria of where the EMRS could be set up, leaving it to the discretion of State governments.

➤ **When was it revamped?**

- In 2018-19, the Cabinet approved the revamping of the EMRS scheme. The new guidelines gave the Union government more power to sanction schools and manage them.
- A National Education Society for Tribal Students (NESTS) was set up and entrusted with the management of the State Education Society for Tribal Students (SESTS), which would run the EMRS on the ground.
- The new guidelines set a target of setting up an EMRS in every tribal sub-district and introduced a “population criteria” for setting them up.
- The new guidelines also reduced the minimum land requirement from 20 acres to 15 acres. Since the new scheme was put into place, the Ministry of Tribal Affairs sanctioned 332 of the targetted 452 schools till 2021-22.
- However, the Standing Committee in its report noted that a large number of schools were being delayed because the area (15 acre) requirement and the population criteria were making identification and acquisition of land “more cumbersome”, especially in hilly areas, leftwing extremism-affected areas and the northeast. It noted that even though the new guidelines provided for relaxations in these areas, other problems with land acquisition continued to persist.
- The Standing Committee noted that the population criteria ran the risk of depriving a “scattered tribal population” of the benefit of EMRS, “which are a means towards their educational empowerment”.

➤ **What is the current status?**

- The Tribal Affairs Ministry insists on maintaining the new criteria. As of November 2022, a total of 688 schools have been sanctioned, of which 392 are functional.
- Of the 688, 230 have completed construction and 234 are under construction, with 32 schools still stuck due to land acquisition issues.
- As for serving less dense tribal populations, Minister of Tribal Affairs will take care of it after the targetted 740 schools under these criteria are built.

PRELIMS

1. SEA VIGIL-22

❖ **CONTEXT:** The third edition of the ‘Pan-India’ Coastal Defence Exercise ‘Sea Vigil-22’ will be conducted on 15-16 Nov 22.

- This National Level Coastal Defence Exercise was conceptualised in 2018 to validate various measures that have been instituted towards enhancing maritime security since ‘26/11’.
- Coastal Security being a major sub-set of Coastal Defence construct, the concept of ‘Sea Vigil’ is to activate the Coastal Security apparatus across India and assess the overarching Coastal Defence mechanism.
- The exercise will be undertaken along the entire 7516 km coastline and Exclusive Economic Zone of India and will involve all the Coastal States and Union territories along with other maritime stakeholders, including the fishing and coastal communities.
- The exercise is being conducted by the Indian Navy in coordination with the Coast Guard and other ministries entrusted with the task of maritime activities.
- The scale and conceptual expanse of the exercise is unprecedented in terms of the geographical extent, the number of stakeholders involved, the number of units participating and in terms of the objectives to be met. The

exercise is a build up towards the major Theatre Level Readiness Operational Exercise (TROPEX), which the Indian Navy conducts every two years.

- Sea Vigil and TROPEX together will cover the entire spectrum Maritime Security challenges. Assets of the Indian Navy, Coast Guard, Customs and other maritime agencies will participate in Ex Sea Vigil.
- The Ministry of Defence, the conduct of this exercise is also being facilitated by the Ministries of Home Affairs, Ports Shipping and Waterways, Petroleum and Natural Gas, Fisheries Animal Husbandry and Dairying, Customs, and other agencies of Centre/ State.
- The conduct of exercise Sea Vigil at the national level is aimed to serve a larger purpose. It provides opportunity, at the apex level, to assess preparedness in the domain of Maritime Security and Coastal Defence. Exercise Sea Vigil-22 will provides realistic assessment of strengths and weaknesses and thus will help in further strengthening Maritime and National Security.

2. **Long-Term Low Emission Development Strategy**

❖ **CONTEXT: India submitted its Long-Term Low Emission Development Strategy to the United Nations Framework Convention on Climate Change (UNFCCC), during the 27th Conference of Parties (COP27) recently.**

- **The Long-Term Low Emission Development Strategy was launched by the Union Minister for Environment, Forest and Climate Change, Shri Bhupender Yadav, who is leading the Indian delegation to COP 27, being held at Sharm-el-Sheikh, Egypt from 6-18 November, 2022.**

➤ **The salient features of the strategy which focus will be on the rational utilization of national resources with due regard to energy security.**

- **The National Hydrogen Mission** launched in 2021 aims to make India a green hydrogen hub. The rapid expansion of green hydrogen production, increasing electrolyser manufacturing capacity in the country, and three-fold increase in nuclear capacity by 2032 are some of the other milestones that are envisaged alongside overall development of the power sector.
- Increased use of **biofuels**, especially ethanol blending in petrol, the drive to increase electric vehicle penetration, and the increased use of green hydrogen fuel. India aspires to maximise the use of electric vehicles, ethanol blending to reach 20% by 2025.

- While **urbanisation** will continue as a strong trend from current relatively low base, future sustainable and climate resilient urban development will be driven by smart city initiatives, integrated planning of cities for mainstreaming adaptation and enhancing energy and resource efficiency, effective green building codes and rapid developments in innovative solid and liquid waste management.

- India's **industrial sector** low carbon development transitions should not impact energy security, energy access and employment. The focus will be on improving energy efficiency by the Perform, Achieve and Trade (PAT) scheme, National Hydrogen Mission, high level of electrification in all relevant processes and activities, enhancing material efficiency and recycling leading to expansion of circular economy, and exploring options for hard-to-abate sectors, such as steel, cement, aluminium and others.

- India has a strong record of enhancing **forest and tree cover** in the last three decades alongside high economic growth. India's forest fire incidence is well below global levels, while its forest and tree cover are a net sink absorbing 15% of CO₂ emissions in 2016. India is on track to fulfilling its NDC commitment of 2.5 to 3 billion tonnes of additional carbon sequestration in forest and tree cover by 2030.

- The transition to low carbon development pathway will entail several costs pertaining to the development of new technologies, new infrastructure, and other transaction costs. Provision of climate finance by developed countries will play a very significant role and needs to be considerably enhanced, in the form of grants and concessional loans, ensuring scale, scope and speed, predominantly from public sources, in accordance with the principles of the UNFCCC.

➤ The Paris Agreement in Article 4, paragraph 19, states, "All Parties should strive to formulate and communicate long-term low greenhouse gas emission development strategies, mindful of Article 2 taking into account their common but differentiated responsibilities and respective capabilities, in the light of different national circumstances."

➤ COP 26 at Glasgow in November 2021, in Decision 1/CP.26 (i) urged Parties that have not yet done so to communicate their LT-LEDS by COP 27 (November 2022).

➤ **India's approach is based on the following four key considerations:**

- ✓ India has contributed little to global warming, its historical contribution to cumulative global GHG emissions being minuscule despite having a share of ~17% of the world's population.
- ✓ India has significant energy needs for development.
- ✓ India is committed to pursuing low-carbon strategies for development and is actively pursuing them, as per national circumstances
- ✓ India needs to build climate resilience.
- The two themes of "climate justice" and "sustainable lifestyles", alongside the principles of Equity and Common But Differentiated Responsibilities and Respective Capabilities (CBDR-RC), in the light of national circumstances, that India had emphasized at Paris, are at the heart of a low-carbon, low-emissions future.

- The LT-LEDS has been prepared in the framework of India's right to an equitable and fair share of the global carbon budget, which is the practical implementation of India's call for "climate justice." This is essential to ensure that there are no constraints on realizing India's vision of rapid growth and economic transformation, while protecting the environment.
- The LT-LEDS is also informed by the vision of LiFE, Lifestyle for the Environment, that calls for a world-wide paradigm shift from mindless and destructive consumption to mindful and deliberate utilization.
- 3. **Satellite based methane Alert and Response System**
 - ❖ **CONTEXT: A new satellite-based Methane Alert and Response system will now help governments detect methane emissions and tackle them.**
 - It is launched at the 27th Conference of Parties (COP27) to the United Nations Framework Convention on Climate Change in Sharm El-Sheikh, Egypt.
 - MARS is a part of global efforts to slow climate change by tackling global warming gas.
 - It will use state-of-the-art satellite data to identify significant emission events, notify relevant stakeholders, and support and track mitigation progress.
 - MARS will integrate data from the rapidly expanding system of methane-detecting satellites to include lower-emitting area sources and more frequent detection.
 - Data on coal, waste, livestock, and rice will be added gradually to MARS to support the Global Methane Pledge
 - India has not signed up for the Global Methane Pledge.
 - **Components of the Methane Alert and Response System**
 - MARS will use data from global mapping satellites to identify very large methane plumes and methane hot spots and data from high-resolution satellites to then attribute the emissions to a specific source.
 - UNEP(United Nations Environment Programme) will then notify governments and companies about the emissions, either directly or through partners, so that the responsible entity can take appropriate action.
 - If requested, MARS partners will provide technical or advisory services such as help in assessing mitigation opportunities.
 - UNEP will continue to monitor the event location and make the data and analysis available to the public between 45 and 75 days after the detection

ANSWER WRITING

Q. Analyse the complexity and intensity of terrorism, its causes, linkages and obnoxious nexus. Also suggest measures required to be taken to eradicate the menace of terrorism.

Terrorism can be defined as the calculated use of violence or the threat of violence to inculcate fear; intended to coerce or to intimidate governments or societies in the pursuit of goals that are generally political, religious, or ideological.

Causes of terrorism:

- Lack of political legitimacy and continuity, as well as a lack of integration for the political fringes, encourages ideological terrorism.
- Perceptions of deprivation and inequality, especially amongst culturally defined groups. This can lead to civil violence, of which terrorism may be a part.
- Terrorist tactics are used not out of a random desire to fire rockets at civilians but to leverage violence to gain specific concessions.
- Socio-economic explanations of terrorism suggest that various forms of deprivation drive people to terrorism, or that they are more susceptible to recruitment by organisations using terrorist tactics. Poverty, lack of education or lack of political freedom are a few examples.
- Extreme ideologies may sometime result in hatred towards other sections of society and may lead to terrorism. Examples of terrorist groups motivated by ideology include the Irish Republican Army (IRA) and the Liberation Tigers of Tamil Eelam (LTTE).

The linkages and obnoxious nexus of terrorism include:

- Terrorism and organised crime aid each other to thrive and survive. The financial proceeds of organised crime such as extortion/kidnapping are made legal through money laundering and then used to fund terrorist activities.
- Terrorist groups levy taxes on drug traffickers to provide security to criminals in their controlled area.
- Terrorist groups act as proxies of enemy governments which in turn provide them funding and shelter.

The measures undertaken to combat terrorism are:

- Adoption of a Comprehensive Convention on International Terrorism.
- Strengthening national coordination mechanisms to promote inter-agency participation and information exchange, facilitating joint monitoring, threat assessment.
- Updating national legislation to ensure that terrorist and organised crime offences are precisely defined.
- Awareness generation and deradicalization of the youth to wean them away from the clutches of their influencers.

MCQs

1. Consider the following statements
 1. UNEP celebrates International Day for the Conservation of the Mangrove Ecosystem on 26th July

2. International Society for Mangrove Ecosystem (ISME) is an inter-governmental organization, established to promote the study of mangroves with the purpose of enhancing their conservation, rational management and sustainable utilization.
Which of the above statement/s is/are correct?
a) 1 only b) 2 only c) Both 1 and 2 **d) Neither 1 nor 2**
2. Among the following crops, which one is the most important anthropogenic source of both methane and nitrous oxide?
a) Cotton **b) Rice** c) Sugarcane d) Wheat
3. The 'Common Carbon Metric', supported by UNEP, has been developed for
a) Assessing the carbon footprint of building operations around the world.
b) Enabling commercial farming entities around the world to enter carbon emission trading.
c) Enabling governments to assess the overall carbon footprint caused by their countries.
d) Assessing the overall carbon footprint caused by the use of fossil fuels by the world in a unit time.
4. What is blue carbon?
a) Carbon captured by oceans and coastal ecosystems.
b) Carbon sequestered in forest biomass and agricultural soils.
c) Carbon contained in petroleum and natural gas.
d) Carbon present in atmosphere
5. Which of the following statements are correct about the deposits of 'methane hydrate'?
1. Global warming might trigger the release of methane gas from these deposits.
2. Large deposits of 'methane hydrate' are found in Arctic Tundra and under the seafloor.
3. Methane in atmosphere oxidizes to carbon dioxide after a decade or two.
Select the correct answer using the code given below.
a) 1 and 2 only b) 2 and 3 only c) 1 and 3 only **d) 1, 2 and 3**
6. Given below are two statements: One is labeled as Assertion A) and the other is labeled as Reason R):
1. Assertion A: Long-term low emission development strategies by each country are crucial to realizing the goals of the Paris Agreement.
2. Reason R: Nationally Determined Contributions (NDCs) declared by each country are not sufficient to keep the rise in global temperature up to 2°C above the pre-industrial level.
In the light of the above statements, choose the most appropriate answer from the options given below:
a) Both A and R are correct and R is the correct explanation of A
b) Both A and R are correct but R is NOT the correct explanation of A
c) A is correct but R is not correct
d) A is not correct but R is correct
7. With reference to the Methane Alert Response System (MARS) consider the following
1. MARS will be the first publicly available global satellite system to identify major emission events, alert stakeholders, and support and track mitigation progress.
2. According to the Intergovernmental Panel on Climate Change, it needs to reduce methane emissions at least 80% by 2025 to keep the target of limiting global warming to 1.5°C within reach.
Choose the correct statement/s using the codes given below?
a) 1 only b) 2 only c) Both 1 and 2 d) Neither 1 nor 2
8. With reference to recently conducted exercise Sea Visil-22 consider the following
1. It aims to test the country's preparedness to thwart any attempt by anti-national elements to carry out an attack on its territory or against its citizens by infiltrating through the sea route.
2. It was the largest coastal exercise conducted between India and Indian Ocean Countries.
Which of the above statements is/are correct?
a) 1 only b) 2 only c) Both 1 and 2 d) Neither 1 nor 2
9. Consider the following statements about Eklavya Model Residential Schools (EMRS):
1. Administered by the Ministry of Tribal Affairs, it is established with grants under Article 275(1) of the Indian Constitution.
2. It pays special focus in Integrated Tribal Development Projects (ITDP) where there shall be at least one EMRS in the demarcated project spatial area.
Which of the above statement/s is/are incorrect?
a) 1 only b) 2 only c) Both 1 and 2 **d) Neither 1 nor 2**
10. Terms like "Rhizophora Mueronata" " Avicennia officinalis' often mentioned in news recently are related to which of the following species?
a) Sal tree **b) Mangrove** c) Corals d) Sea grasses