

ARCTIC WARMING

SYLLABUS: GS PAPER-III (ENVIRONMENT POLLUTION & DEGRADATION)

CONTEXT: A recent study shows out that the Arctic is heating four times faster than the rest of the planet.

The warming is more concentrated in the **Eurasian part of the Arctic**, where the **Barents Sea north of Russia and Norway** is warming at an alarming rate-seven times faster than the global average.

Recent studies show that the region is fast changing and that the best of the climate models may not be able to capture the rate of changes and predict it accurately.

ABOUT ARCTIC AMPLIFICATION

- Any **change in the surface air temperature and the net radiation balance** tend to produce larger changes at the north and south poles. This phenomenon is known as **polar amplification**.
- Such changes are more pronounced at the northern latitudes and are known as the **Arctic amplification**.

CAUSES OF ARCTIC AMPLIFICATION

- **Global Warming:** The long-term heating of the earth's surface, expedited due to anthropogenic forces since pre-industrial times has increased the average temperature of the planet by 1.1 degrees Celsius.
- **Ice Albedo Feedback:** Sea ice and snow have high albedo (measure of reflectivity of the surface), implying that they can reflect most of the solar radiation as opposed to water and land. In the Arctic's case, global warming is resulting in diminishing sea ice. As the sea ice melts, the Arctic Ocean will be more capable of absorbing solar radiation, thereby driving the amplification.
- **Lapse Rate Feedback:** The lapse rate or the rate at which the temperature drops with elevation decreases with warming.
- Studies show that the ice albedo feedback and the lapse rate feedback are responsible for 40% and 15% of polar amplification, respectively.
- **Water Vapor Feedback:** The heat-trapping effect of water in the air validates the role of the gas as a critical component of climate change.
- **Ocean Heat Transport:** The ocean transports vast amounts of heat around the planet, helping to regulate regional climate. Enhanced ocean heat transport into the Arctic is linked to stronger future Arctic warming and polar amplification.

WHAT DO THE PREVIOUS STUDIES SAY?

- The earlier studies have shown that the Arctic was warming at twice the global rate prior to the beginning of the 21st century.
- **The Inter-governmental Panel on Climate Change:** released a '**Special Report on the Ocean and Cryosphere in a Changing Climate**' in 2019, according to which the "**Arctic**

surface air temperature has increased by more than double the global average over the last two decades.”

- **The Arctic Monitoring and Assessment Programme (AMAP):** warned that the Arctic has warmed three times quicker than the planet, and the chance of the sea ice completely disappearing in summers is 10 times greater if the planet is warmer by two degrees Celsius above the pre-industrial levels.
- The report also said that the average annual temperature in the region increased by 3.1 degrees Celsius compared to the 1 degree Celsius for the planet.
- The recent studies have shown that the mean Arctic amplification saw steep changes in 1986 and 1999, when the ratio reached 4.0, implying four times faster heating than the rest of the planet.

CONSEQUENCES OF ARCTIC WARMING

- **Ice sheet is melting:** Greenlandic ice sheet holds the second largest amount of ice, after Antarctica. In 2019, this was the single biggest cause for the rise in the sea level i.e., about 1.5 meters.
- **Changes in the nature of water:** The acidification of water accompanied by changes in the salinity levels, is impacting the biodiversity, including the marine as well as the dependent species.
- **Increase in rainfall:** The warming has increased the incidence of rainfall which in turn is affecting the availability and accessibility of lichens to the reindeer.
- **Death of fauna:** The Arctic amplification has resulted in the widespread starvation and death among the Arctic fauna.
- **Permafrost thawing:** It release **carbon and methane**, the major greenhouse gases responsible for global warming.
- **Disease outbreak:** The melt will release long-dormant bacteria and viruses that were trapped in the permafrost giving rise to potential diseases. For instance, Permafrost thaw led to an **anthrax outbreak in Siberia in 2016**, whereby 2,00,000 reindeer succumbed.

IMPACT ON INDIA

- The link between the changing Arctic and Indian monsoons is growing in importance due to the extreme weather events the country faces, and the heavy reliance on rainfall for water and food security.
- A study titled **‘A possible relation between Arctic Sea ice and late season Indian Summer Monsoon Rainfall Extremes’** published in 2021 by a group of Indian and Norwegian scientists found that the **reduced sea ice in the Barents-Kara Sea region can lead to extreme rainfall events in the latter half of the monsoons.**
- The changes in the atmospheric circulation due to diminishing sea ice combined with the warm temperatures in the Arabian Sea contribute to enhanced moisture and drive extreme rainfall events.
- According to **World Meteorological Organization’s, ‘State of Global Climate in 2021’**, sea level along the Indian coast is rising faster than the global average rate due to melting of sea ice in polar regions, especially the Arctic.

PROJECT SMILE

SYLLABUS: GS PAPER-II (GOVERNMENT POLICIES & INTERVENTIONS), GS PAPER-III (INCLUSIVE GROWTH)

CONTEXT: The Union Government of India has formulated **SMILE (Support for Marginalized Individuals for Livelihood and Enterprise)** Scheme covering comprehensive measures for the welfare of beggars.

The government has prepared a list of 75 areas including Delhi, Tirupati, Guwahati, Patna, Ahmedabad, and Mumbai where Municipal Corporations will take on this challenge.

ABOUT SMILE PROJECT.

- The objective of this scheme is to extend welfare measures to the Transgender community along with the people engaged in the act of begging.
- The scheme strengthens and expands the reach of the rights that provide the targeted group with necessary legal protection as well as a promise to secured life.
- It focuses on the aspect of social security by emphasizing on medical care, education, occupational opportunities, and shelter.
- This will be done in collaboration with the State Governments/UTs/Local Urban Bodies, Voluntary Organizations, Community Based Organizations, and institutions.
- Budget: Rs. 365 crores
- Nodal Ministry: Ministry of Social Justice & Empowerment

SUB-SCHEMES UNDER SMILE INITIATIVE

Central Sector Scheme for Comprehensive Rehabilitation for Welfare of Transgender Persons:

- It provides Scholarships for Transgender Students studying in IX and till post-graduation to enable them to complete their education.
- It provides for the provision of **Transgender Protection Cell** in each state which will monitor cases of offences and ensure timely registration, investigation, and prosecution of offences.
- Through Composite Medical Health, the scheme will provide a comprehensive package in convergence with PM-JAY supporting Gender-Reaffirmation surgeries through selected hospitals.

Central Sector Scheme for Comprehensive Rehabilitation of engaged in the act of Begging:

- It will focus on Survey and identification, Mobilization, Rescue/ Shelter Home, and Comprehensive resettlement.

PRELIMS FACTS

BARA IMAMBARA

- The dome of Bara Imam Bara in Lucknow collapsed following heavy rain.
- Bara Imam Bara or Asafi Imam Bara was **constructed in 1784 by Nawab Asaf-udDaulah**, the fourth nawab of Awadh.
- Shia Muslims come here to mourn during the month of Muharram to commemorate the **martyrdom of Imam Husain, the grandson of Prophet Muhammad, in the battle of Karbala held in 680AD.**
- The main feature of this monument is that **no pillars or beams were used to support the roof.**



- **Kifatullah was the architect and designer of the monument** who came from Delhi. Around 20,000 people were employed to construct the building.

KAMAKHYA TEMPLE

- The **Northeast Frontier Railway (NFR)** is planning to construct a ropeway from the Kamakhya railway station to the Kamakhya temple in Guwahati.
- If given the nod, this ropeway would be the second in the city after the 1,820-metre one connecting Guwahati and North Guwahati across the Brahmaputra.
- The KamrupKamakhya Temple, or the Kamakhya Temple, is one of the oldest Hindu temples in Guwahati, Assam. The temple is situated on **Nilachal hills**.
- It is one of the oldest of the **51 Shakti Pithas** that is famous for tantric worship.
- It is the main temple in a complex of individual temples dedicated to 10 Goddesses: Kali, Tara, Sodashi, Bhuvaneshwari, Bhairavi, Chhinnamasta, Dhumavati, Bagalamukhi, Matangi and Kamalatmika.
- The current structural temple and the rock-cut sculpture strewn in the vicinity indicate that the temple has been built and renovated many times in the period 8th–9th, 11th–12th, 13th–14th centuries and even later.
- The current form, from the 16th century has given rise to a hybrid indigenous style that is sometimes called the **Nilachal type: a temple with a hemispherical dome on a cruciform base**.
- The temple consists of four chambers: **garbhagriha and three mandapas** called **calanta, pancharatna and Nata mandira** aligned from east to west.



LAKE GARDA

- **Italy's worst drought in decades** has reduced Lake Garda (also known as **Benaco**), the **country's largest lake**, to near its lowest level ever recorded.
- The drought has exposed the **swaths of previously underwater rocks and warmed the water to temperatures** approaching the average in the Caribbean Sea.
- **Significantly lower rainfall** for months in Northern Italy accompanied by **70% lower snowfall** has dried up important rivers like the Po, which flows across Italy's agricultural and industrial heartland.
- The parched condition of the Po (**Italy's longest river**) caused losses of billions of euros to farmers who normally rely on it to irrigate the fields and rice paddies.
- To compensate for the loss, the authorities allowed more water from Lake Garda to flow out to local



rivers. But in late July 2022, they reduced the amount to protect the lake and hence, the financially important tourism tied to it.

ATAL BHUJAL YOJANA (ABY)

- The Ministry of Science & Technology has announced financial support to the Start-up Company incubated at IIT Kanpur to **develop smart water management technologies** benefitting Atal Bhujal Yojana.
- **ABL is a central sector scheme of the Ministry of Jal Shakti** aimed at facilitating sustainable groundwater management.
- It emphasizes on **community participation along with demand side interventions for sustainable groundwater management** in identified water stressed areas in the States of Haryana, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh.

Towards Sustainable Conservation of Water

Atal Bhujal Yojana Launched

- Outlay of **Rs.6000 Crore** to be implemented over a period of **5 years (2020 - 25)**
- Aims to improve **ground water management** through community participation in **7 States**
- Will benefit nearly **8350 Gram Panchayats** in **78 districts** in these States
- Will promote participatory **Groundwater management** & **contribute in farmer's income**