

Melting Antarctica: Gist of RSTV In depth

Rajya Sabha TV programs like 'The Big Picture', 'In Depth' and 'India's World' are informative programs that are important for UPSC preparation. In this article, you can read about the discussions held in the 'In Depth' episode on "**Melting Antarctica- New Dimensions**" for the [IAS](#) exam.

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What's in News?

A research base in the Antarctic region has registered its highest-ever temperature on record, as the temperature soared over 20 degrees Celsius (°C), amid concerns over global warming that has caused an increase in the melting of ice sheets along the South Pole.

- Researchers logged 20.75°C on an island off the coast of the continent on 9th February, 2020, a record high temperature never seen before in the region, raising serious concerns about climate instability in the region.
 - It was recorded by the Brazilian scientists at the Seymour Island.
 - Seymour Island is an island in the chain of 16 major islands around the tip of the Graham Land on the Antarctic Peninsula.

Antarctica:

- Antarctica encompasses land, island and oceans south of 60° latitude.
- This region stores about 70% of the world's fresh water in the form of snow and ice.
- The average annual temperature ranges from about -10°C on the Antarctic coast to -60°C at the highest points of the interior.
- Its immense ice sheet is upto 4.8 km thick and contains 90% of the world's fresh water; enough to raise the sea levels by around 60 meters, if it were to melt completely.

Details:

- The latest reading follows another temperature record logged on 6 February 2020, when an Argentinian research station at Esperanza had measured 18.3°C - the highest reading on mainland Antarctica.
 - The World Meteorological Organisation (WMO) has confirmed that the region is one of the fastest warming regions of the planet. Over the past 50 years, it has warmed over 3°C .
 - The annual ice loss in the Antarctic region has increased at least six folds between 1979 and 2017.
 - 87% of glaciers along the West Coast of the Antarctic Peninsula have retreated in the last 50 years with most of these showing accelerated retreats in the past 12 years.
 - Accelerated melt-offs from glaciers and ice sheets are driving the increase in Sea levels, threatening coastal mega cities and small island nations.
 - Further, the population of Chinstrap Penguins has fallen by upto 77% in the last 50 years. The Chinstrap Penguin is named after the narrow black band under its head. It inhabits the shores of Southern Pacific and Antarctic oceans.
 - It is believed that these Chinstrap Penguins are great bio-indicators and their populations are going down owing to the decline in food abundance.
- The previous record for the entire Antarctic region - which includes the continent, islands and ocean that are in the Antarctic climatic zone - was 19.8°C , logged in January 1982.
- Scientists warn that the temperature recent readings are enough to indicate how fast Antarctica is warming.
- While temperatures in the Eastern and Central Antarctica are relatively stable, there are growing concerns about West Antarctica.
- The United Nations Organisation (UNO) has underscored that the past decade has been the hottest on record with 2019 being the second hottest year ever after 2016.
- According to satellite images from the European Space Agency (ESA), a large ice berg has broken off from Pine Island glacier on the edge of Antarctica.

Major causes of melting ice glaciers:

- Human activity is at the root of this phenomenon. Specifically, since the industrial revolution, carbon dioxide and other greenhouse gas emissions have raised temperatures even higher in the poles.
- Burning of fossil fuels has resulted in the build-up of greenhouse gases influencing the warming trend because they trap heat in the atmosphere.
- Oil and gas drilling that emits methane which is the main constituent of natural gas is another contributor.
 - Methane is more damaging to environment than carbon dioxide, locking in heat more efficiently and escalating global warming.
- Deforestation, on the rise, across the globe, has a lot of negative effects like a rise in sea levels.
- In summer, Ice breaking ships that head to the north in the Arctic Ocean leave trails of open waters, leaving the oceans with lesser ability to reflect back sun rays.
 - Consequently, water gets heated up and melts more ice. This is also contributing to Global Warming.

Impact of increasing temperatures on our environment:

- Global climate change has already brought about immediate observable effects on the planet. Glaciers have shrunk, ice is melting world wide – especially at the North and the South Poles. This includes mountain glaciers, ice sheets covering Antarctica, Greenland and the Arctic sea ice.
 - Example: In Montana’s Glacier National Park, the number of glaciers has declined to fewer than 30 from more than 150 in 1910.
- Scientists say, sea levels are rising 0.3 inches or 3. 2 millimetres every year. The rise has been rapid in the recent years and has threatened low lying islands and coastal cities.
- Rising temperatures are affecting wildlife and their habitats. It has made survival of certain species difficult, pushing them towards extinction.
- The world is witnessing more frequent and extreme weather events like bush fires, cyclones, droughts and floods.

- Scientists say, oceans have absorbed most of the extra heat and carbon dioxide more than the air, making the seas both warmer and more acidic.
- 2015 was the first year in which the global annual average surface temperature reached 1°C above the pre-industrial levels. Each year since then, the global average has hovered close to or above the 1°C mark.
- The decade from 2014 to 2023 has been predicted to be the warmest in more than 150 years of record-keeping. Scientists see it as a critical threshold for climate change.

Causes of Concern:

- Scientists predict, that if climate change remains unchecked, the Arctic could be ice-free in the summers by the year 2040.
- Scientists have warned that the world is losing its ice quite fast. Glaciers provide a scientific record of how climate has changed over time.
 - Ice acts as a protective cover over the Earth and the oceans. It also reflects excess heat, back into the space and keeps the planet cooler.
 - Rapid glacial melt in Antarctica and Greenland influences ocean currents. Massive amounts of very cold glacial melt water entering warmer oceans, slows down ocean currents.
- The major concern is the rate at which the melting ice is pouring down into the sea. The intense melting is producing big ripple effects like extreme flooding and biodiversity loss.
 - Rising water levels also affects aquatic animals and plants which in turn affects the birds that rely on them.
 - Coral reefs that require sunlight for photosynthesis also get affected with the increase in water levels.
- Warming waters are bleaching coral reefs and driving stronger storms.
 - Rising ocean acidity threatens shell fish including the tiny crustaceans without which marine food chains would collapse.
- Besides, climate change is a major threat to agriculture.
 - Agriculture is vitally connected to the climate patterns.
 - Farms are more likely to face attacks from weeds, diseases and pests which affect yield.

- Further, a warmer atmosphere increases formation of ground level ozone also known as smog in polluted regions.
- Melting glaciers discharge the chemicals deposited on them, into the water bodies.
- Rapid melting of glaciers would eventually cause serious scarcity of fresh water.
- Economic costs of melting glaciers affect the whole world.
- Over the past decade or two the frequency of natural disasters has increased. The lungs of Earth - Amazon on fire, bush fires in Australia, melting of glaciers in the Himalayas and Antarctica are just a few examples.
- The consequences will be more drastic and widespread if the world gets warmer by 2°C.
- Sea levels could rise between 10 and 32 inches higher by the end of the century; hurricanes and other storms are likely to become stronger, floods and droughts will become more common, the world faces the risks of decades' long mega droughts by 2100.
- Less fresh water will be available since glaciers store about three quarters of the world's fresh water.
- Vector borne diseases will spread to vast areas and there could be a resurgence of the Zika virus.
- Ecosystems will continue to change some species may venture farther north while some others who are unable to could become extinct.

Responding to climate change:

- It was in the year 1975 that economist William Nordhaus saw the warming planet as a threat to the global economy.
- He had said, “An increase in the global average temperature of 2°C caused by manmade CO₂ would change our climate in ways not seen in the last several hundred thousand years”. And over the decades, the world has witnessed rapid changes resulting from global warming.
- Responding to climate change needs a two-tier approach –
 - Mitigation (reducing the flow of greenhouse gases into the atmosphere) and
 - Adaptation (learning to live with and adapt to the climate change that has already been set in motion).

- Climate change being a truly global, complex problem with economic, social, political and moral ramifications, the solution requires both globally coordinated response and local efforts on the city and regional levels.

Are we doing enough in terms of climate change?

- A UN Report from November 2019 paints a bleak picture. It states that the commitments countries have pledged to limit the climate crisis are not enough and that delaying changes any further would make it impossible to reach desired temperature goals.
- The United Nations Environment Programme (UNEP) 2019 Emissions Gap report says that the current committed measures will not keep global temperature increases within the 1.5 to 2°C range.
- At the current rate of emissions, the world's temperature could rise 3.2°C by 2100. Therefore, the UNEP suggests some extreme changes.
 - To get Earth back to the 1.5 ° goal, countries must multiply commitment levels five times current rate outlined in Paris Accords.
 - This means that the global greenhouse gas emissions must fall 7.6% annually to remove 32 gigatonnes of CO₂ from the atmosphere.

Global Initiatives:

- To prevent the severe effects of climate change, the UN signed the Paris agreement in 2016, an international treaty designed to keep the average global temperature well below 2°C above pre-industrial levels until greenhouse gas emissions are reduced.
- 2019 UN Climate Action Summit saw some commitment from countries to advance their Carbon Neutrality efforts.
 - With most G20 Nations absent from the events at the summit, the 78% global greenhouse gas emissions they are responsible for is a big concern.
 - Just 5 of the 20 member countries have set a date to reach Net zero emissions. Of those, only two have created legislations to enforce those goals.
- Countries like the U.S. that leads G 20 nations in per capita emissions have already backed out of efforts against climate change.

- When it completes the withdrawal procedure this year, the U.S. will be the only country in the world to not have signed onto the Paris Climate Accords.
- India has worked towards International Solar Alliance which is a step forward in consciously trying to reduce the amount of greenhouse gas emissions.

Way forward:

- Climate policy is consistent with the 1.5°C goal could cost upto 6.3 trillion dollars per year globally. But the cost likely outweighs the consequences of inaction. If global temperatures rise more than 1.5 °C, humankind will have to make adaptations that will make a serious dent on the world's economy and reduce food security and biodiversity.
- Delaying action any further will need nations to remove CO₂ at an unmanageable magnitude that current technology and resources cannot achieve.
- 2020 is a critical year for climate change. Countries will meet to renegotiate their commitments at the UN Climate change conference in Glasgow in November 2020. But extensive actions must be taken to avert a future crisis.
- There are some changes that are needed to chip away the emissions. These include:
 - Establishing vehicle emission standards and investing in public transportation that runs on electricity.
 - Pricing carbon, i.e, making major polluters pay for their emissions. This provides an incentive for major emitters to reduce their output.
 - Phasing out coal power plants.
 - With renewable energy technology becoming increasingly affordable, Solar power and Wind turbines are needed to phase out coal plants. However, it is important to note that these changes on a global scale will not be cheap.
- While immediate action is needed to save the earth, it is not too late to do something about it either.
- It may be important to revisit the commitments of global climate change before it is too late, as the changes that have already set in due to climate change might continue to cause damage for a several decades, even if solid measures are taken to contain the changes.

- Incremental changes no longer enough to stall devastating effects of climate change. The need of the hour is rapid and transformational changes.

