Thawing Permafrost

This article is based on **Will the next killer disease originate in the Arctic?** which was published in the Hindustan Times on 05/08/2021. It talks about the concerns emerging from thawing permafrost and the way forward.

The Earth faces a looming crisis. Globally, temperatures are rising. **Heatwaves**, **droughts**, **ocean acidification**, and **rising sea levels** are on the horizon.

Around 90% of the world lives in the northern hemisphere with major population centres in the **tropical and subtropical regions.** These regions will be severely affected.

Scientists are also concerned about the unforeseen problems that can emerge from thawing of **permafrost** and glacial ice.

Permafrost

- Permafrost is any ground that remains completely frozen—32°F (0°C) or colder—for at least two years straight.
- These permanently frozen grounds are most common in regions with high mountains and in Earth's higher latitudes—near the North and South Poles.
- Permafrost covers large regions of the Earth. Almost a quarter of the land area in the Northern Hemisphere has permafrost underneath. Although the ground is frozen, permafrost regions are not always covered in snow.

Associated Issues With The Thawing of Permafrost

- **Accentuate** Climate Change**:** In the Arctic, temperatures are rising twice as fast in other parts of the world. As a result, the permafrost that has remained frozen throughout the year is thawing.
    - The thawing of permafrost will worsen the effects of the climate crisis, because **stored carbon is released** in the process.
    - Likewise, the loss of sea ice and ice sheets covering land will accelerate the rise in temperatures **(As Ice has more albedo than Water).**
- **Tropical Challenges Spreading Up Into Higher Latitudes:** The diseases that have typically afflicted the equatorial belt are spreading up into higher latitudes. Mosquitoes, ticks, and other insects spread many of these diseases.
    - The **West Nile virus** causes hundreds of deaths every year in the United States, where it was first reported in 1999.
    - With rising temperatures, West Nile will become **more prevalent in Canada**, including parts of the Arctic.

- **Prevalence of Zoonotic Diseases:** Warming temperatures are also causing changes in the habitats of wild birds such as ducks and geese that can carry avian flu.
    - Earlier, Russia has reported the first case of the **H5N8** avian flu passing from birds to humans.
    - Changes in habitats of other wild animals such as foxes might also increase the geographic distribution of rabies.
- **Rise of Viruses And Bacteria:** Scientists are also concerned about the rise of viruses and bacteria from thawing permafrost and ice. In the summer of 2016, there was an outbreak of anthrax in a remote part of Siberia.
    - Dozens of people were infected, and a young boy was killed. Around 2,300 reindeer perished in the outbreak.
    - **Spread:**
        - Anthrax is a serious infectious disease **caused by bacteria** that can remain dormant as spores.
        - Spores of anthrax can remain **viable for at least a few decades** in frozen soil and ice.
        - As carcasses of infected animals (including those of extinct mammoths) thaw, there can be more disease outbreaks.
- **Epidemic And Pandemic:** Another concern is the emergence of viruses and bacteria with the potential to cause epidemics. These disease-causing microbes might be dormant for hundreds or even thousands of years.
    - Genetic material from the H1N1 influenza virus that caused the **Spanish Flu pandemic** of 1918, as well as that of smallpox have been recovered from permafrost.
    - The reemergence of a virus like smallpox (which have been eradicated) would be disturbing since humans are no longer routinely vaccinated.
- **Virus Samples From Tibetan Plateau:** These conditions are not restricted to the Arctic alone. Glacial ice that has persisted for thousands of years is melting.
    - Recently, **15,000-year-old-viruses** (including 2**8 different kinds identified** for the first time) were found **in glacial ice from the Tibetan Plateau.**

Way Forward

- **Stop Rapid Climate Change:** In order to curtail climate change and save the permafrost, it is indispensable that global CO_2 emissions be reduced by 45% over the next decade, and that they fall to zero after 2050.
    - To mitigate climate change, there is a need to take a global collective action. If one country cuts its emissions, that is going to be of little use if the others do not follow suit.
- **Slow Down Erosion:** The scientific journal Nature suggested building a 100-metre-long dam in front of the Jakobshavn glacier (Greenland), the worst affected by Arctic melting, to contain its erosion.
- **Combine Artificial Icebergs:** Indonesian architect has won an award for his project **Refreeze the Arctic**, which consists of collecting water from melted glaciers, desalinating it and refreezing it to create large hexagonal ice blocks.
    - Thanks to their shape, these icebergs could then be combined to create frozen masses.
- **Increase Their Thickness:** Some researchers propose a solution **to manufacture more ice.** Their proposal consists of collecting ice from below the glacier through pumps driven by wind power to spread it over the upper ice caps, so that it will freeze, thus strengthening the consistency.
- **People's Awareness:** The tundra and the permafrost beneath it may seem far away, but no matter where we live, the everyday choices we make contribute to climate change.
    - By reducing our **carbon footprint**, investing in **energy-efficient products**, and **supporting climate-friendly businesses, legislation, and policies**, we can help

preserve the world’s permafrost and avert a vicious cycle of an ever-warming planet.

Conclusion

Every country needs to move climate change, global warming to the top of our foreign policy agenda. This is a critical move we need to make and the sooner we do it, the greater is the benefit that we will draw from our own climate actions.

Drishti Mains Question

‘Unforeseen problems can emerge from thawing of permafrost and glacial ice.’ Discuss.