

# Glacier melting

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**Source:** *Down to earth*

**Manifest pedagogy:** Since the advent of the industrial revolution the phenomenon of glacier melting has gained pace. The impact that this event is having on earth is really dangerous and is increasing everyday more. Studying the consequences is important for mains.

**In news:** Recent years have seen rapid rise in glacial melting

**Placing it in syllabus:** Climate change

**Dimensions:**

- What is glacier melting?
- Consequences
- Case study of Himalayas

**Content:**

**What is glacier melting?**

- Glaciers are **large sheets of snow and ice** that are found on land all year long.
- Today, about 10% of land area on Earth is covered with glacial ice.
- Almost 90% is in Antarctica, while the remaining 10% is in the Greenland ice cap.
- **Warmer temperatures cause glaciers to melt faster than they can accumulate new snow.**
- The **North Pole** is the area where it is easier to observe the melting glaciers.
- During the last 30 years, the surface of the arctic glaciers has extraordinarily decreased.
- The surface of the ice cap of the **South Pole** is less, between 2010 and 2016 of approximately 1500 km<sup>2</sup>.

- The **ice cap is losing every year approximately 5 meters of thickness from the base of the ice layer**, near the ocean floor.
- The intensive **combustion of fossil carbon** and the extended process of **deforestation** has increased global warming.
- As a result, the **raised temperatures**, even higher in the poles, are **causing glaciers to rapidly melt**.
- Scientists project that if emissions continue to rise unchecked, the Arctic could be ice free in the summer by 2040.

### Consequences:

#### **On Sea:**

- Melting glaciers add to **rising global sea levels, which in turn increases coastal erosion**. E.g. The Greenland ice sheet is disappearing four times faster than in 2003 and already contributes 20% of current sea level rise.
- **Storm surge gets elevated** as warming air and ocean temperatures create more frequent and intense coastal storms like hurricanes and typhoons.
- The **ocean currents get influenced**, as massive amounts of very cold glacial-melt water entering warmer ocean waters slows down ocean currents.

#### **On weather patterns:**

- As permafrost thaws, the trapped carbon inside it is released to the atmosphere in the form of methane, a powerful greenhouse gas. This process leads to more climate change and is an example of a **positive feedback loop**, *which happens when warming causes changes that lead to even more warming*.
- The Arctic is warming twice as fast as anywhere on earth, and research shows the **polar vortex is appearing outside of the Arctic more frequently because of changes**

**to the jet stream**, caused by a combination of warming air and ocean temperatures in the Arctic and the tropics.

- The glacial melt in Antarctica and Greenland is **changing the circulation of the Atlantic Ocean** and has been **linked to more destructive storms and hurricanes** around the planet.

### ***On humans and wildlife:***

- Industries that thrive on vibrant fisheries will be affected as warmer waters change where and when fish spawn.
- **Coastal communities will suffer** as flooding becomes more frequent and storms become more intense.
- In the Arctic, as sea ice melts, **wildlife like walrus are losing their home and polar bears are spending more time on land**, causing higher rates of conflict between people and bears.
- The habitats of several marine and terrestrial species are changing which results in the **imbalance of the food chain**.
- When permafrost melts, the land above it sinks or changes shape. **Sinking land can damage buildings and infrastructure** such as roads, airports, and water and sewer pipes and also affects ecosystems.

### **Case study of Himalayas:**

- The Himalayas is considered as the **Third Pole**.
- Within it, the **core area is known as the Hindu Kush Himalaya (HKH) region**.
- According to an estimate, HKH has the **maximum snow storage after the poles**.
- HKH is spread over 3,500 square kilometers across eight countries and is **known as the Water Tower of Asia** due to its reserve of frozen water.
- Being a major source of water for the rivers, these

glaciers are the **lifeline for one-third of the population across the globe.**

- According to an international study on the world's glaciers published in journal Nature Geoscience, glaciers are melting and receding at an alarming rate in the Himalayas and **glaciers in the HKH might contain 27 per cent less ice than previously suggested.**



- The region is **expected to lose half of its present-day glacier area by 2060**, a decade earlier than the previously expected deadline of 2070.
- There is an increase in the number of glaciers primarily due to **glacier fragmentation.**
- This is happening due to global warming and consistent loss in areas the glaciers occupy.
- **Eastern Himalayan glaciers have tended to shrink faster** than glaciers in the central or western Himalayas due to increase in the surface area or the surface exposed to the sun and the fragmented and smaller glaciers shrink faster than the larger ones.

**Mould your thought:** What are the consequences of glacial melting? How has global warming affected the Himalayan glaciers?