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**DAILY EDITORIAL  
ANALYSIS**

**TOPIC**

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Threats from  
Contracting Glaciers

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## THREATS FROM CONTRACTING GLACIERS

**In Context:** The **World Meteorological Organization's** report, the **Global Climate 2011-2020**, outlined the threats from contracting glaciers.

### Glaciers

- **About:**
  - ♦ Glaciers around the world can range from **ice** that is **several hundred to several thousand years old**.
  - ♦ They are formed in areas where the temperatures are exceedingly low, including areas that are at sea level and mostly in high altitude areas like the mountain tops.
  - ♦ 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.
- **Why are glaciers important?**
  - ♦ Ice **acts like a protective cover** over the **Earth and our oceans**. These bright white spots reflect excess heat back into space and keep the planet cooler.
    - In theory, the Arctic remains colder than the equator because more of the heat from the sun is reflected off the ice, back into space.
- **Significance:**
  - ♦ The Glaciers provide a **scientific record** of how **climate has changed** over time.
  - ♦ Through their study, we gain valuable information about the extent to which the planet is **rapidly warming**.

### Melting of Glaciers

- **Reasons:**
  - ♦ Since the early 1900s, many glaciers around the world have been rapidly melting. **Human activities are 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, and as a result, glaciers are rapidly melting, calving off into the sea and retreating on land.
- **Outcomes of melting glaciers**
  - ♦ **Rapid glacial melt in Antarctica and Greenland** influences **ocean currents**, as massive amounts of very cold glacial-melt water entering warmer ocean waters is slowing ocean currents.
  - ♦ As ice on land melts, **sea levels** will continue to rise.
  - ♦ **Scientists project** that if emissions continue to rise unchecked, the Arctic could be **ice free in the summer** as soon as the year 2040 as ocean and air temperatures continue to rise rapidly.

### Global Climate 2011-2020 report highlights

- The Global Climate 2011-2020, gives a broad view of the planet's response to greenhouse gas emissions.
- **Melting & thinning of Glaciers:**
  - ♦ In the section on the state of glacier health, it points out that, on average, the **world's glaciers thinned** by approximately **a metre** a year from 2011 to 2020.
  - ♦ When compared across decades, there is **significant regional variability**, but the **overall pattern** remains that glaciers in all regions of the world are becoming smaller.
  - ♦ Some of the **reference glaciers**, which are used to make long-term assessments of glacier health, **have already melted** away as the nourishing winter snow is completely melting away during summer.
    - In **Africa**, glaciers on the **Rwenzori Mountains and Mount Kenya** are projected to **disappear by 2030**, and those on **Kilimanjaro** by **2040**.
- **GLOF:**
  - ♦ The report points to the **rapid growth** of **pro-glacial lakes** and the likelihood of **glacier lake outburst flood (GLOF)**, posing additional threats to ecosystems and livelihoods.

- ◆ The reports singled out how the water from glacial melt contributed to one of the decade's worst flooding disasters, the Uttarakhand floods of June 2013.

#### GLACIAL LAKES

A glacial lake is a body of water that originates from a glacier. It typically forms **at the foot of a glacier** but may form on, in, or under it.

##### Glacial Lake Outbursts Floods (GLOF)

- As glacial lakes grow larger in size, they become more dangerous because they are mostly **dammed by unstable ice** or **sediment** composed of loose rock and debris.
- In case the boundary around them breaks, huge amounts of water rush down the side of the mountains, which could cause flooding in the downstream areas.
  - ◆ This is called **glacial lake outburst floods** or **GLOF**.
- These lakes are often found in **steep, mountainous regions**, which means landslides or ice avalanches can sometimes fall directly into the lakes and displace the water, causing it to over-top the natural dam and flood downstream.
  - ◆ In **2013 Uttarakhand's Kedarnath** witnessed flash floods along with a GLOF caused by the **Chorabari Tal glacial lake**, killing thousands of people.
  - ◆ The **Chungthang dam in Sikkim** was recently destroyed after the **South Lhonak Lake** flooded from a melting glacier, triggering catastrophe downstream.

#### Melting of Himalayan Glaciers

- Significance:
  - ◆ Himalayan glaciers are of paramount importance in the Indian context, especially for the millions of dwellers living downstream who rely on these perennial rivers for their day-to-day water needs.
  - ◆ The Himalayan mountains are also referred to as the third pole because they hold the world's third-largest amount of glacier ice, following Antarctica and the Arctic.
- **Challenge of Climate change & melting of Himalayas:**
  - ◆ A recent **report** by the **International Centre for Integrated Mountain Development** found that the disappearance of glaciers in the **Hindu Kush Himalayas** was "**65% faster in the 2010s** than in the previous decade".
  - ◆ At the current rate of global greenhouse gas emissions, which is expected to see **temperatures increase by 2.5°-3°C** by the end of the century, the volume of glaciers is forecast to **decline anywhere from 55% to 75%**.
    - This means **sharp reductions in freshwater supply** in the immediate vicinity of 2050.
  - ◆ Despite awareness of the risks posed by Himalayan glaciers there is **no early warning system** for the likelihood of GLOF events.

#### Suggestions & Way Ahead

- The sensitivity of glacier systems to warming underlines the **need for their careful monitoring**.
- Correspondingly, there is a need to make **comprehensive risk assessments**, map **regions of vulnerability** and **commission infrastructure development** with the highest standards of care.
- Much like warnings before cyclones, floods and earthquakes, authorities must elevate threats from contracting glaciers to the same category of risk.

#### DAILY MAINS QUESTION

Examine the significance of Glaciers for the environment. What are the challenges posed by melting of glaciers in India & globe?