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Climate Change Report on Hindukush Karakoram Ranges

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Why in News

According to the '**Assessment of Climate Change over the Indian Region**' report, **snowfall** over the higher reaches of the **Hindukush Himalayan mountain ranges** has been **increasing** in recent decades, which has **shielded the region from glacier shrinkage**.

- The recent **massive flooding in the Alaknanda river**, probably due to **glacial bursts** has highlighted the issue of higher **glacier retreat in recent decades due to global warming**, however, the report indicates a contrasting picture of the Hindukush Himalayas.
- Assessment of Climate Change over the Indian Region Report has been **published by the Ministry of Earth Sciences (MoES)**. It is **India's first-ever national forecast on the impact of global warming** on the subcontinent in the coming century.

HinduKush Himalayan (HKH) Region

- The HKH region spans Afghanistan, Bangladesh, Bhutan, China, India, Kyrgyzstan, Mongolia, Myanmar, Nepal, Pakistan, Tajikistan, and Uzbekistan.
- It traverses about 5 million square kilometres and hosts a large and culturally diverse population.
- It is **considered the Third Pole** (after the North and South Poles), and has significant implications for climate.
- It contains **vast cryospheric zones** (frozen water parts) and is also the world's largest store of snow and ice outside the polar region.



Key Points

- **Findings of the Report:**

- Several areas of **Hindukush Karakoram Himalayas** have experienced a **declining trend in snowfall** and also **retreat of glaciers** in recent decades.
- **In contrast**, the **high-elevation Karakoram Himalayas** have experienced **higher winter snowfall** that has shielded the region from glacier shrinkage.

The **Karakorams are part of a complex of mountain ranges** at the centre of Asia, including the HinduKush to the west, the Pamirs to the northwest, the Kunlun Mountains to the northeast, and the Himalayas to the southeast.

- Even when the **winter snowfall has increased over the high-elevation Karakoram Himalayas**, the **overall climate along the Hindukush Karakoram region is undergoing warming** at a higher rate during the winter season as compared to other seasons.

- **Reasons:**
 - **Faster Heating of Himalayas:**
 - Weather dynamics is intricate in the Himalayan region, arising due to **extensive interactions of tropical and extratropical weather systems.**
 - The Himalayas have been **warming at a faster rate** than the rest of Indian landmass during 1951 - 2018.
 - Besides, the warming reported from this region is **higher than global mean temperatures.**
 - **Global Warming:**

The decadal warming trend recorded over these ranges from 1951 to 2014 was **1.3 degree Celsius.** This is a rise from 0.16 degree Celsius recorded from 1900 to 1950, when global warming was less pronounced.
- **Effect:**
 - **Increasing Annual Mean Surface Temperature:**

The Report has forecast an increase in annual mean surface temperature by 2.2 degree Celsius during 2040 - 2069 and a further increase by 3.3 degree Celsius during 2070 – 2099, along these ranges.
 - **Extreme Precipitation:**

Due to this warming trend, there is **an expected increase in the precipitation** projected over the region. It is predicted that there will be a significant increase in extreme precipitation over the Hindukush Karakoram region, with maximum consecutive five-day precipitation events.
- **Significance:**
 - **Driver of Monsoon:** The Hindukush Karakoram ranges, along with the **Tibetan Plateau**, are the **main drivers of the Indian Summer Monsoon.**
 - **Source of Subsistence:** These ranges form the source to 10 major river systems in Asia, supporting drinking water, irrigation and power supply to 1.3 billion people in the continent.
 - Major Indian rivers which replenish due to the melted snow are **Indus, Ganges and Brahmaputra.**
 - After the North and the South poles, the Hindukush – Karakoram ranges, along with the Tibetan Plateau, hold the largest reserves of freshwater.

Source:IE