



# Retreat of Glaciers in Ladakh

## Why in News

According to a recent study by the **Wadia Institute of Himalayan Geology (WIHG)**, the **Pensilungpa Glacier** located in **Ladakh's Zaskar Valley is retreating** due to **increase in temperature and decrease in precipitation** during winters.

- This study **assesses** the **impact of [climate change](#) on glaciers**. Earlier, the **[UNDP \(United Nations Development Programme\)](#)** also assessed that the **[Hindu Kush Himalayan \(HKH\) mountain ranges could lose up to two-third of its ice](#)** by 2100.
- **WIHG** is an **autonomous body** under the **[Department of Science and Technology](#)** located in Dehradun, Uttarakhand.

## Key Points

### ▪ Findings:

#### ◦ Rate of Decline:

- The **glacier is now retreating** at an **average rate of 6.7 plus/minus 3 metre per annum**.
- Glaciers may **retreat when their ice melts more quickly than snowfall can accumulate** and form new glacial ice.

#### ◦ Debris Cover:

- There is a **significant influence of debris cover** on the **mass balance and retreat of the glacier's endpoint**, especially in summer.
  - Furthermore, the mass balance data for the three years (2016-2019) showed a negative trend with a small accumulation area ratio.
  - **Mass balance** of the glacier is the **difference between the snow accumulated** in the winter and the **snow and ice melted** over the summer.

#### ◦ Impact of rise in the Air Temperature:

- **Due to continuous rise in the air temperature** in line with the global trend, the **melting would increase**, and it is possible that the **precipitation of summer periods at higher altitudes will change from snow to rain**, and that may influence the summer and winter pattern.

### ▪ Impact:

#### ◦ Impact on Human Life:

- It will impact the **water, food, energy security** and **agriculture, including soil loss** due to soil erosion, **[landslides](#)** and **[floods](#)**.
- Glacial lakes may also form due to the accumulation of melted ice, which may result in **[Glacial Lake Outburst Floods \(GLOF\)](#)** and **even shifting global**

**climate** by dumping freshwater into the oceans and so altering their circulation.

- **Leaves Debris:**

- Glacial retreat leaves boulders and masses of scraped-together rocky debris and soil called **glacial moraines**.

- **Initiative for Himalayan Ecosystem:**

- **National Mission for Sustaining the Himalayan Ecosystem**: It is one of the **8 national missions** under the **National Action Plan on Climate Change (NAPCC)**.

## Glacier

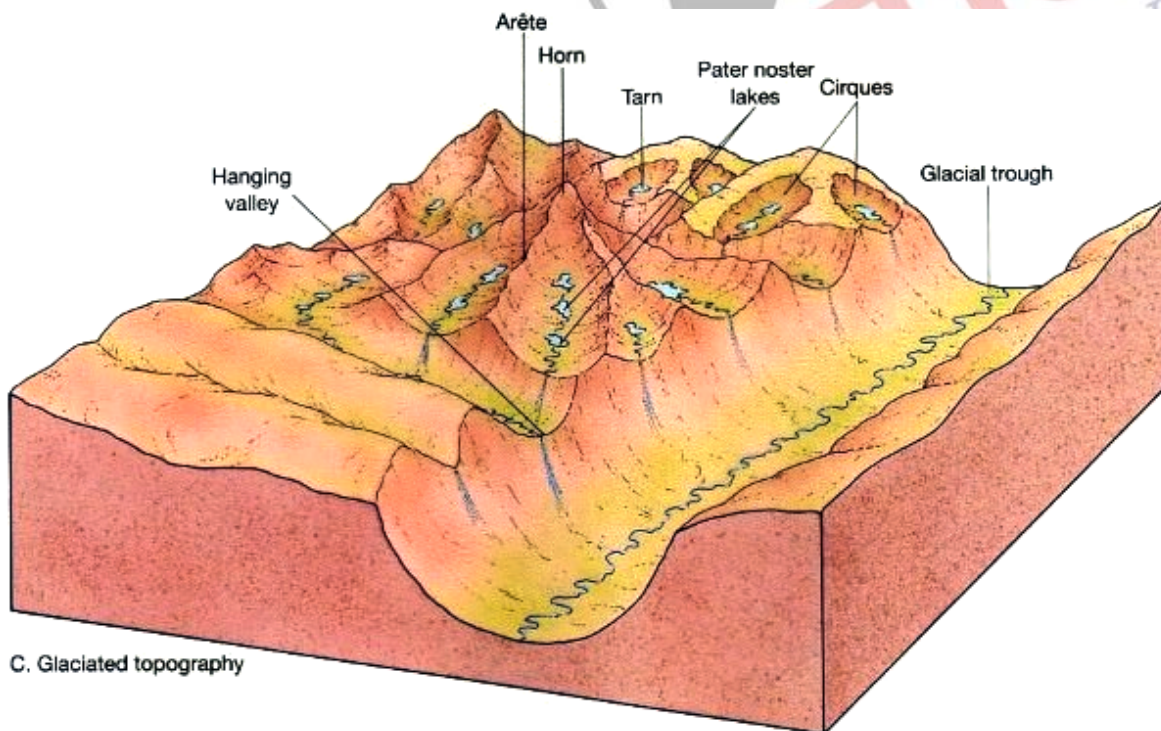
- **About:**

- It is a **large, perennial accumulation** of crystalline ice, snow, rock, sediment, and water that originates on land and moves down slope under the influence of its own weight and gravity. They are **sensitive indicators of changing climate**.
- Out of total water on Earth, **2.1% is in glaciers** while 97.2% is in the oceans and inland seas.

- **Condition of glacier formation:**

- Mean annual **temperatures are close to the freezing point**.
- **Winter precipitation** produces significant accumulations of snow.
- **Temperatures** throughout the rest of the year **do not result in the complete loss of the previous winter's snow accumulation**.

- **Glacial Landforms:**

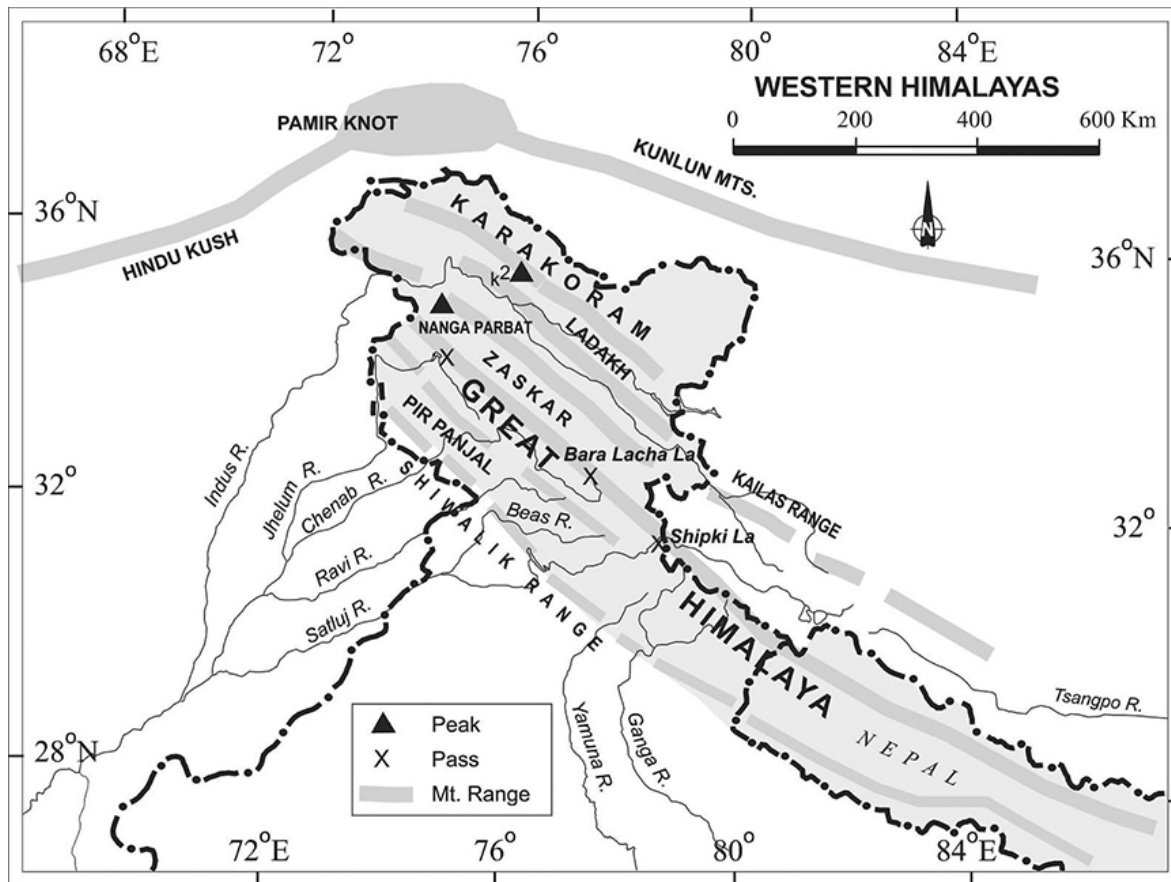


## Zaskar Valley

- It is a **semi-arid region** situated in the **northern flank of the Great Himalayas** at an altitude of more than 13 thousand feet.
- The Zaskar Range **separates Zaskar from Ladakh** and the average height of the Zaskar Range is about 6,000 m.
- This mountain range acts as a **climatic barrier protecting Ladakh and Zaskar** from most of the monsoon, resulting in a pleasantly warm and dry climate in the summer.
- **Marbal Pass, Zojila Pass** in the extreme northwest of Zaskar range are two notable passes in

the region.

- Many rivers start in different branches of this range flow northward, and join the great Indus River. These rivers include **Hanle River, Khurna River, Zaskar River, Suru River (Indus), and Shingo River.**
- The Zaskar river then takes a north-eastern course until it joins the Indus in Ladakh.



[Source: TH](#)

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