Geography · GS - I

How will the melting of Himalayan glaciers have a far-reaching impact on the water resources of India?

EXAM YEAR	PAPER	SUBJECT
2020	GS - I	Geography

MARKS	WORD LIMIT
10	~150 words

Answer Hint

River flows; seasonal water availability; agriculture; drinking water; hydropower; floods and glacial lake outburst floods; ecosystems; climate change adaptation

Model Answer

Introduction

The Himalayan glaciers feed major river systems, including the Indus, Ganga and Brahmaputra. Their accelerated melting due to rising temperatures has significant implications for India's water security.

Impacts on water resources

- **Short-term increase in flows:** Rapid melting can temporarily increase river discharge, raising flood risks in downstream areas.
- **Long-term water scarcity:** As glaciers shrink, their contribution to river flow may decline, particularly during dry seasons and droughts.
- **Agricultural stress:** Changes in irrigation water availability can affect crop productivity, food security and rural livelihoods.
- **Drinking water insecurity:** Himalayan communities and downstream settlements dependent on glacier-fed streams may face greater seasonal shortages.
- **Hydropower challenges:** Unpredictable river flows and sediment loads can disrupt hydropower generation and damage infrastructure.

- **Glacial lake outburst floods:** Newly formed or expanding glacial lakes can burst, causing sudden floods and extensive downstream destruction.
- **Ecological consequences:** Altered river flows affect wetlands, aquatic biodiversity and the ecological balance of river systems.
- **Interstate and transboundary concerns:** Changing water availability may intensify competition among states and complicate cooperation with neighbouring countries.

Way forward

India should strengthen glacier monitoring, climate-resilient water management, early-warning systems and watershed conservation. Efficient irrigation, groundwater recharge and river-basin planning can reduce vulnerability.

Conclusion

Glacial retreat threatens both the quantity and reliability of Himalayan water supplies. Integrated river-basin management and climate adaptation are essential to protect India's long-term water security.

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