

07/10/23

UPSC

Answer Questions in NOT MORE THAN the Word Limit specified for each in the Parenthesis.
Content of the Question is more important than length.
(Specimen Answer Booklet - For Practice Purpose Only)

उम्मीदवारों को इस हाशिए में नहीं लिखना चाहिए
Candidates must not write on this margin

What is Glacial Lake Outburst Flood (GLOF)? Discuss how the Indian Himalayan Region is affected by the GLOF. (250 words)

Glacial lakes are large water bodies situated on top of, beneath a melting glacier. These water bodies grow larger in size as the glacier melts and eventually it becomes dangerous as these water bodies are bordered by unstable ice and sediment of loose rock and debris. When the boundary breaks due to several reasons like earthquake, rainfall, landslide and avalanche, these water rush down which causes flooding in the downstream areas. This phenomenon causes inundation in the downstream region. This is known as Glacial Lake Outburst ^(GLOF) Flooding. In India, there are more than 2000 Glacial lakes and within them, 200 and above are present listed as vulnerable by the government and most of the vulnerable glacial lakes are situated in the Himalayan region.

The Himalayan region, with its steep mountains are particularly vulnerable to GLOFs. There are several instances where GLOFs had caused devastating inundation in the Himalayan Region:-

- (a) South Lhonak Lake, a glacial lake in Sikkim burst due to incessant rains which resulted in

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कृपया इस स्थान में प्रश्न संख्या के अतिरिक्त कुछ न लिखें।

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the rise of water level in the Tista river that flooded 4 districts in Sikkim.

(b) In 2013, Chorabari Tal glacial lake in Uttarakhand bursted and caused GLOF and led to flash floods in the downstream areas.

(c) Similarly in 2014, a glacial lake outburst flood hit Ladakh.

The above mentioned disasters in the Himalayan region are not entirely natural, they are more of anthropogenic in nature. Climate change, accompanied with rising global temperature is the main reason for the melting of glaciers in the Himalayan region.

The major impact experienced is loss of life, property as this phenomena can lead to catastrophic downstream flooding. It has the ability to release million cubic meters of water, to be more precise, according to the National Disaster Management Authority, they have recorded upto 15000 cubic meters per second release of water. Economic and social impact is humungous due to unplanned development and allowing people to reside in places which are listed under the vulnerable regions.

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The recent incident in Sikkim is not a sudden melting of glacier, it has been a continuing process and the lake has been expanding for many years now. In 2016, Sikkim Disaster Management Authority and other stake holders decided to syphon off the lake water from the South Honak Lake by employing high density polyethylene pipes. This remedy is not a good option for a long term solution. The following can be implemented to get a long term solution:-

- (a) Establishing a comprehensive glacial ~~lake~~ lake monitoring system using Remote Sensing, Artificial Intelligence to evaluate the stability of the lakes.
- (b) Integrated development of early warning systems, flood protection barriers, diversion channels to warn & evacuate ^{the} downstream region people.
- (c) Conducting drills & educating ^{the} people who reside in the downstream region on GLOF and how to act during the occurrence of the event.
- (d) India can collaborate with the neighbouring countries near the Himalayan region by sharing & exchanging knowledge and the best practices followed for GLOF risk reduction and management.