

Hydroelectric Projects and the Himalayas

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Recurrent disasters in the last decade in the State of Uttarakhand have been studied and analysed. And in every disaster, the increasing anthropogenic pressure in this area has been found to be a direct or an indirect contributor. In this context, let us understand the impacts of hydel projects on the Himalayas.

In news: A hydro onslaught the Himalayas cannot take

Placing it in syllabus: Environment

Dimensions

- Disasters from 2013 flash floods to till Rishi Ganga valley disaster 2021
- Earthquake prone Himalayas
- The ongoing HE projects
- The ills of HE Projects in the region
- How is climate change associated with disasters?

Content:

Disasters from 2013 flash floods to till Rishi Ganga valley disaster 2021:

2013 Uttarakhand Flash Floods (Kedarnath tragedy of 2013):

- In June 2013, flash floods in Uttarakhand wiped out settlements and decimated lives.
- The 2013 Flash Floods were one of the worst disasters in living memory, causing widespread damage and destruction, besides heavy casualties.
- The Chorabari Lake outburst and debris flow killed over 6,000 people and damaged roads, buildings and

infrastructure.

- The entire State was hit by very heavy rainfall and flash floods.
- Though all the thirteen districts of the State were hit, five districts, namely Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi were the worst affected.
- The disaster coincided with the peak tourist and pilgrimage season, significantly enhancing the number of the casualties and adversely affecting the rescue and relief operations
- Other pilgrimage centers in the region, including Gangotri, Yamunotri and Badrinath, which are visited by thousands of devotees during the summer season, were also affected
- The worst impact of the disaster on human settlements was in the Kedarnath shrine area (Gaurikund to Kedarnath), the Mandakini valley, the Alaknanda valley (at Gobindghat and upstream), the Pindar valley, and along the banks of the river Kali in Dharchula area

2014 Nepal snowstorm disaster

- The 2014 Nepal snowstorm disaster occurred in central Nepal during the month of October.
- It resulted in the deaths of at least 43 people of various nationalities, including at least 21 trekkers.
- Injuries and fatalities resulted from unusually severe snowstorms and avalanches on and around the mountains of Annapurna and Dhaulagiri.
- The incident was said to be Nepal's worst trekking disaster.

2015 Nepal earthquake

- A magnitude 7.8 earthquake struck Nepal on April 25, 2015, toppling multi-story buildings in Kathmandu, the capital, and creating landslides and avalanches in the Himalaya Mountains.

- Nearly 9,000 people died and more than 22,000 suffered injuries.
- It was the deadliest earthquake in the seismically active region in 81 years.

2016 Uttarakhand forest fires

- In April and May 2016 series of widespread, damaging wildfires that took place in Uttarakhand.
- The fires were caused by a heatwave that spread across Uttarakhand and were the worst recorded in the region with a reported 4,538 hectares (11,210 acres) of forest burnt down and seven people dead
- The forest fires began on February 2, 2016, and went initially unnoticed for several weeks
- Consequently, these fires went largely unchecked and spread from the pine forests on the slopes of the sub-Himalayan region to the oak and broadleaf forests which resulted in heavy clouds of smoke that changed the usually blue skies to grey.

Uttarakhand Flood Disaster 2016

- A period of heavy rain in Uttarakhand left at least 30 people dead and several houses destroyed or washed away
- The districts of Chamoli and Pithoragarh were affected.
- River levels increased dramatically and the Alaknanda River and a tributary, the Mandakini, both overflowed.

Chamoli Flash Floods 2021 / Rishi Ganga Valley Disaster

- Parts of Uttarakhand witnessed massive flash flooding after a chunk of the Nanda Devi glacier broke off at Joshimath in Uttarakhand's Chamoli district.
- Glacial Lake Outburst Flood (GLOF) was considered to be the most likely trigger for this tragedy.
- A chunk of the Nanda Devi glacier broke off at Joshimath in the Tapovan-Reni area of Chamoli District and created massive flash floods in parts of Uttarakhand.

- The glacial break led to a massive Flash Flood in Dhauliganga and Alaknanda Rivers, damaging houses and the nearby Rishi Ganga power project.

Earthquake prone Himalayas:

- The Himalayas are among the most seismically active regions in the world, the result of an ongoing collision between two continental plates: the Indian and the Eurasian.
- The Indian plate continually marches northward a few centimeters each year, shoving its way under the Tibetan plateau in fits and starts.
- Each jerky advance causes earthquakes of varying intensity.
- In the Himalayas, the geologic shift usually occurs along the boundary between the two plates—what's known as the **Main Himalayan Thrust**.
- And it can have visible effects on the surface, elevating the landscape feet at a time.
- The latest version of the seismic zone map by the Bureau of Indian Standards (BIS) categorizes Himalayan Region under Very High Risk Zone V- the most seismically-active region.
- Recently, a study found the suture zone of the Himalayas or the Indus Suture Zone (ISZ) in the Ladakh region – where Indian and Asian Plates are joined to be tectonically active, as against current understanding that it is a locked zone.
- About 15% of the great earthquakes (of magnitudes greater than 8) of the 20th century took place in the Himalayas and many of its segments are likely to see a period of intense earthquake activity in the future, as studies show.

The ongoing Hydro-Electric projects

The eight major projects in Uttarakhand are:

- the 171-MW Lata Tapovan (NTPC) Central;
- 520-MW Tapovan Vishnugad (NTPC),
- 1000-MW Tehri PSS (THDC) Central,
- 444-MW Vishnugad Pipalkoti (THDC);
- 60-MW Naitwar Mori (SJVNL);
- 120-MW Vyasi (UJVNL),
- 76-MW Phata Byung (LANCO) a private company commissioned project and
- the 99-MW Singoli Bhatwari (L&T).

Sikkim And Arunachal Pradesh:

- The proliferation of Hydro-Electric Projects is not restricted to Uttarakhand.
- By 2007, Sikkim had entered a contract with private public sector players for development of 5,000 MW and Arunachal Pradesh signed memoranda of understanding in 2010 for 40,000 MW.

The ills of Hydro-Electric Projects in the region:

The dams in the mountainous regions that are exposed to earthquakes, floods, extreme rainfall, avalanches and landslides, are “risk-laden artifacts” .

Failure of Mountain Slopes / Landslides:

- The construction and maintenance of an extensive network of underground tunnels carrying water to the powerhouses contribute to the failure of mountain slopes.
- Example: 510 MW Teesta V hydropower plant in central Sikkim, commissioned in 2008. The local communities have been complaining about the sinking of mountain slopes, drying up of springs, development of fissures and increased incidents of landslides.

Exacerbate Ecological Vulnerability:

- In the Himalayan terrains, these projects exacerbate ecological vulnerability, in a region that is already in

a precarious state.

- The intense anthropogenic activities associated with the proliferation of the hydroelectric projects in these precarious regions accelerate the intensity of flash floods, avalanches, and landslides.

Earthquake Vulnerability:

- The dangers of an impending earthquake or flash flood loom large over the highly vulnerable Chamoli region where Vishnugad-Pippalkoti is based.
- During the 2015 Nepal earthquake, several dams were damaged destroying a third of Nepal's hydropower.

Socio-cultural Impacts:

- The existing fully commissioned dams in the region are already indicative of the fact that these high-capital intensive ventures have negatively impacted local communities and their livelihoods.
- They also create contentious externalities such as social displacement, ecological impacts, environmental and technological risks.

Aggravating Flash Floods:

- The Chopra Committee Report presents a strong case against projects between 2,200 and 2,500 metres above the sea level – paraglacial regions – which have loose glacial debris (moraines) which when carried downstream can be disastrous, as was witnessed in the Vishnuprayag project, during the 2013 deluge.
- Some of the projects among the 24 lie in the paraglacial regions.
- The report states that intensive debris was brought to the hydropower projects along with the river water due to flash floods.

How is climate change associated with disasters?

- The additional element of climate change makes these Hydro-Electric Projects much worse.
- The sustainability of the dams in the long term is highly questionable as hydropower solely relies on the excess availability of water.
- Climate change models are clear about the cascading impacts of global warming trends on the glaciers of the Himalaya – the main source of water in the region that sustains the drainage network within the mountain chain.
- Temperatures across the region are projected to rise by about 1°C to 2°C on average by 2050. Retreating glaciers and the alternating phases of floods and drought will impact the seasonal flows of rivers.
- The most crucial aspect is the existence of sediment hotspot paraglacial zones, which at the time of a cloud burst, contribute huge amounts of debris and silt in the river, thereby increasing the river volume and the devastation downstream.
- The flash floods in these Himalayan valleys do not carry water alone; they also carry a massive quantity of debris.

Mould your thought: There is rock solid scientific evidence to demand the cancellation of many upcoming and approved hydel projects in Himalayan Region. Evaluate.

Approach to the answer:

- Introduction
- Discuss the basis for locating hydroelectric projects in Himalayas
- Mention the vulnerabilities of Himalayan Region
- Discuss about how Hydel projects magnify these vulnerabilities
- Discuss the role of Climate Change

- Conclusion