Hazardous Ideas for the Himalayas - Hydroelectric Projects of India and China

What is the issue?

- Over the past 20 years, China and India have been competing with each other to build hydroelectric dams in the Himalayas.
- Planning hydropower projects in the ecologically fragile and seismically vulnerable area is placing the region at great risk.

What is China's recent proposal?

- In an article published on the website of the Central Committee of the Communist Youth League, China made a proposal.
- It announced that it was planning to build a major hydropower project as a part of its 14th Five-Year Plan (2021-25).
- This will be built on the Yarlung Zanbo River, in Mêdog County in Tibet.
- The hydropower generation station is expected to provide 300 billion kWh of electricity annually.
- China says that the project would help the country realise its goal of reaching a carbon emission peak before 2030 and carbon neutrality before 2060.

What is India's response?

- Mêdog County is not far from Arunachal Pradesh.
- So, soon after speculations about China's plan, Indian counterparts were quick to reiterate their plans to dam the Himalayas on this side of the border.
- India is reportedly considering a 10-GW hydropower project in an eastern State.

What are the other key ongoing projects?

- There are two hydropower projects in the works in Arunachal Pradesh on the tributaries of the Brahmaputra:
    1. the 600 MW Kameng project on the Bichom and Tenga Rivers

2. the 2,000 MW Subansiri Lower Hydroelectricity Project
- On the other side of the border, China has already completed 11 out of 55 projects that are planned for the Tibetan region.

Why is it unfavourable?

- Both countries ignore how unviable such 'super' dam projects are.
- They are being planned in an area that is geologically unstable and where massive earthquakes are bound to take place.
- In executing the hydroelectric projects, the two countries overestimate their economic potential.
- On the other hand, they grossly underestimate the earthquake vulnerability of the region.

How intense is the earthquake vulnerability of the region?

- High seismic zones coincide with areas of high population concentration in the Himalayan region.
- Notably, landslides and glacial lake outburst floods are common here.
- About 15% of the great earthquakes of the 20th century (with a magnitude of more than 8) occurred in the Himalayan region.
- The northeast Himalayan bend has experienced several large earthquakes of magnitude 7 and above in the last 100 years.
    - This is more than the share from other parts of the Himalayas.
- **1950 earthquake** - The 1950 earthquake just south of the McMahon Line was of magnitude 8.6.
- It was the largest continental event ever recorded, and devastated Tibet and Assam.
- The earthquake killed thousands, and caused extensive landslides, widespread land level changes and gaping fissures.
- It resulted in water and mud oozing in the Himalayan ranges and the upper Assam valley.
- This ultimately dammed the rivers.
- Later the dams were breached generating flash floods in the downstream sides, seriously silting the drainage systems.
- **2015 Gorkha earthquake** - This is a more recent example with magnitude 7.8 in central Nepal.
- This resulted in huge losses in the hydropower sector.
- Nepal lost about 20% of its hydropower capacity consequent to the earthquake.
- About 30 projects with a capacity of 270 MW, mostly located along the steep river valleys, were damaged.
- The cost of physical damage is calculated to be about $200 million.

- All these reflect what could be expected in the north-eastern bend of the Himalayas if a similar event was to take place in the background of the fast-developing hydro projects.

How do hydropower projects endanger the region?

- A study published in 2018 reveals the earthquake-borne damage sustained by hydropower projects in Nepal.
- The main mechanisms that contributed to the vulnerability of hydropower projects were found to be landslides.
    - This depends on the intensity of seismic ground shaking and slope gradients.
- Heavy siltation from giant landslides is expected in the project sites and headwater region from future earthquakes.
- This will severely reduce the water-holding capacity and life expectancy of such dams.
    - Desilting of dams is not an economically viable proposition and is technologically challenging.
- Even without earthquakes, the steep slopes made of soft rocks are bound to slide due to deforestation and road-building.
- These activities will get intensified as part of the dam-building initiatives.

What do these imply?

- The northeast Himalayan bend with its deep gorges is the most unsuitable locale within the Himalayas for giant dams.
- Also, it is not known how reservoirs with their water load would alter the existing stresses and strains on the earth’s crust in the long term.
- This, in turn, could impact the frequency of earthquakes and their mechanisms.

How significant is the Himalayas and what is the imminent threat?

- The Himalayan range is a transnational mountain chain and is the chief driver of the Asian climate.
- It is a source for numerous Asian river systems and glaciers which are now under the threat of degradation and retreat due to global warming.
- These river systems provide water for billions of people.
- In recent years, the Himalayas (the legacy of humanity) have seen the highest rate of deforestation and land use changes.
- Besides, it has now become highly contentious with territorial disputes between two nuclear powers - India and China.
- The military confrontations have also led to demands for further

infrastructural development including all-weather roads.
- But this would impact regional biodiversity and the livelihoods of the indigenous population.

What is the way forward?

- Carbon neutrality should not be at the expense of the environment.
- The upper Himalayas could be converted into a nature reserve by an international agreement.
- The possibility of a Himalayan River Commission involving all the headwater and downstream countries needs to be explored.
- Rather than engaging in unsustainable dam-building activities, India and China would be well advised to disengage from military adventurism.
- They should seek ways of transforming this ‘roof of the world’ into a natural reserve for the sake of humanity.

Source: The Hindu