

Disaster resilience in the Built Environment

Introduction

Disaster resilience in the built environment refers to the ability of the built environment to withstand, adapt to, and recover from disasters. Disaster resilience in the Himalayas is a critical issue due to the region's vulnerability to natural hazards such as floods, landslides, avalanches and earthquakes. The Hindu Kush Himalaya (HKH) region, covering more than four million square kilometres from Afghanistan to Myanmar, is one of the world's most ecologically diverse mountain biomes and one of the most hazard prone as well.

Take the case of Himachal Pradesh, which has recently experienced severe flooding due to heavy monsoon rains and landslides. The floods have resulted in significant loss of life and extensive damage to property and infrastructure. The floods have led to disruption of life, with the closure of schools, disruption of flights and train operations in various parts of North India.

A study, published in the journal Nature found that increased rain and melting of snow and ice due to climate change has made the mountain regions more dangerous. The rainwater also loosens the soil resulting in landslides, rockfalls, floods, and debris-flows. Human-induced disasters resulting from planned development have also played a significant role in causing such colossal losses. The major causes of destruction in Himachal Pradesh are four-lane roads, hydro-power projects, deforestation, cable car projects, multi-story buildings, etc.

It is crucial to incorporate sustainable development practices and disaster risk reduction strategies while planning and implementing projects in the Himalayan region.

Key strategies for building disaster resilience in the Himalayas include:

Risk assessment: Understanding and managing a variety of institutional, social and political considerations that influence actions leading to reductions in natural hazard risk.

Cross-disciplinary approaches: Exploring cross-disciplinary approaches, methodologies and applications of disaster risk reduction systems, tools, procedures and models, which can be incorporated into a resilient built environment.

Innovation: One example of disaster management in the Himalayan region is the "Disaster Management System (DMS) – Himalaya." This is an innovation developed by *Pragya* to empower remote and marginalized Himalayan communities to take charge of disaster management at the local level. It enables seamless community-state collaboration as well.

Construction sector resilience: The role of construction in disaster resilience is critical. There is a need to focus on how better construction resilience can be built. The impact this will have on recovery and reconstruction requires to be examined as well.

How can this be addressed?

Building community resistance to disasters in the wake of the recent increase in floods in the mountains involves a multi-faceted approach. This may include:

Holistic strategy: Developing a holistic, proactive, technology-driven, and community-based strategy through a culture of prevention, mitigation, preparedness and response is crucial.

Community empowerment: Empowering local communities over their assets is key. The losses faced in the forms of culverts, village drains, small bridges, schools and other social infrastructure must be

compensated. This can be done if the assets are insured, and the custodians are the local communities.

Multi-disciplinary evaluation: A case study involving a multi-disciplinary evaluation of villages in the Phojal Nalla catchment (Himachal Pradesh, northwest India) that have been impacted by damaging floods and earthquakes describes how elements of community heritage and capital contribute to Disaster Risk Reduction (DRR).

Sustainable development: It is important to get the opinion of geologists, environmental experts, and local people before any development project is undertaken.

These strategies, and others, can help build safe and disaster-resilient infrastructure in the mountains. Taking the above into consideration, select a mountainous region where a holistic disaster resilience plan will help mitigate the impacts of the next natural disaster.