



BHUTAN

Reduce Climate Change-Induced Risks and Vulnerabilities from Glacial Lake Outbursts in the Punakha-Wangdi and Chamkar Valleys

LEAST DEVELOPED COUNTRIES FUND	
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GEF Agency	United Nations Development Programme (UNDP)
Other executing partners	Department of Geology and Mines (DGM), Ministry of Economic Affairs, Disaster Management Division (DMD), Ministry of Home and Cultural Affairs

Bhutan experiences a number of natural hazards annually, including climate-induced disasters such as landslides and floods, which result in extensive damage. Climate change is likely to further exacerbate some of the natural hazards to which Bhutan is prone and lead to significant additional impacts, in terms of either severity or frequency, on the country's development pathway. A majority of Bhutan's population and infrastructure development is concentrated in large river valleys. The economy is highly dependent on hydropower resources, with proceeds from hydropower export to India constituting 45 percent of the country's revenue. A major, climate-induced

natural disaster could cause great human and economic devastation.

Of the natural hazards to which Bhutan is prone, none is more significant than that of climate change impacts on glaciers. Bhutan's entire northern upper land has glacier/snow-fed lakes in the mountaintops. Rising mean temperature, attributed by the scientific community to climate change, is the main cause of glacial retreat. Recent studies suggest the rate of glacial retreat in the Himalayas is as high as 30 to 60 meters per decade. The melting of glaciers is leading to the volumes of water in downstream glacial lakes



increasing at an alarmingly rapid rate. The concern is that when the current holding capacity of the lakes reaches a critical threshold, loose glacial debris that act as dams or barriers could fail, leading to flash floods that result in severe adverse impacts on downstream communities.

Project Activities and Expected Impacts

The objective of the project is to reduce climate change-induced risks and vulnerabilities from glacial lake outbursts in the Punakha-Wangdi Valley and Chamkhar Valleys. The project will integrate climate risk projections into existing disaster risk management practices and implement corresponding capacity development measures. The project will implement demonstrative and practical measures for reducing climate change-induced glacial lake outburst flood (GLOF) risks from the potentially dangerous Thorthormi glacier lake. The lessons learned will facilitate replication in other high-risk GLOF areas, both within and

outside Bhutan. Complementary to this demonstration, the project will ensure that the existing early warning system in the Punakha-Wangdi Valley, which is not equipped to handle the full extent of potential GLOF risks, is expanded to incorporate coverage of this growing risk. Lessons learned from this initiative will enable scaling up of early-warning systems in other disaster-prone areas downstream of potentially hazardous glacier lakes.

At the national level, the expected adaptation benefits include improved government capacity to deal with dynamic, climate-induced hazards and to design, implement, evaluate, and replicate systems for GLOF risk reduction and preparedness. Vulnerability of communities in high-risk GLOF areas is reduced as the project catalyzes cost-effective management of glacier lake levels and adjustment of communal early-warning systems to climate change-induced hazards.

For More Information

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