

# Monitoring and Assessing Bhutan's Water Resources



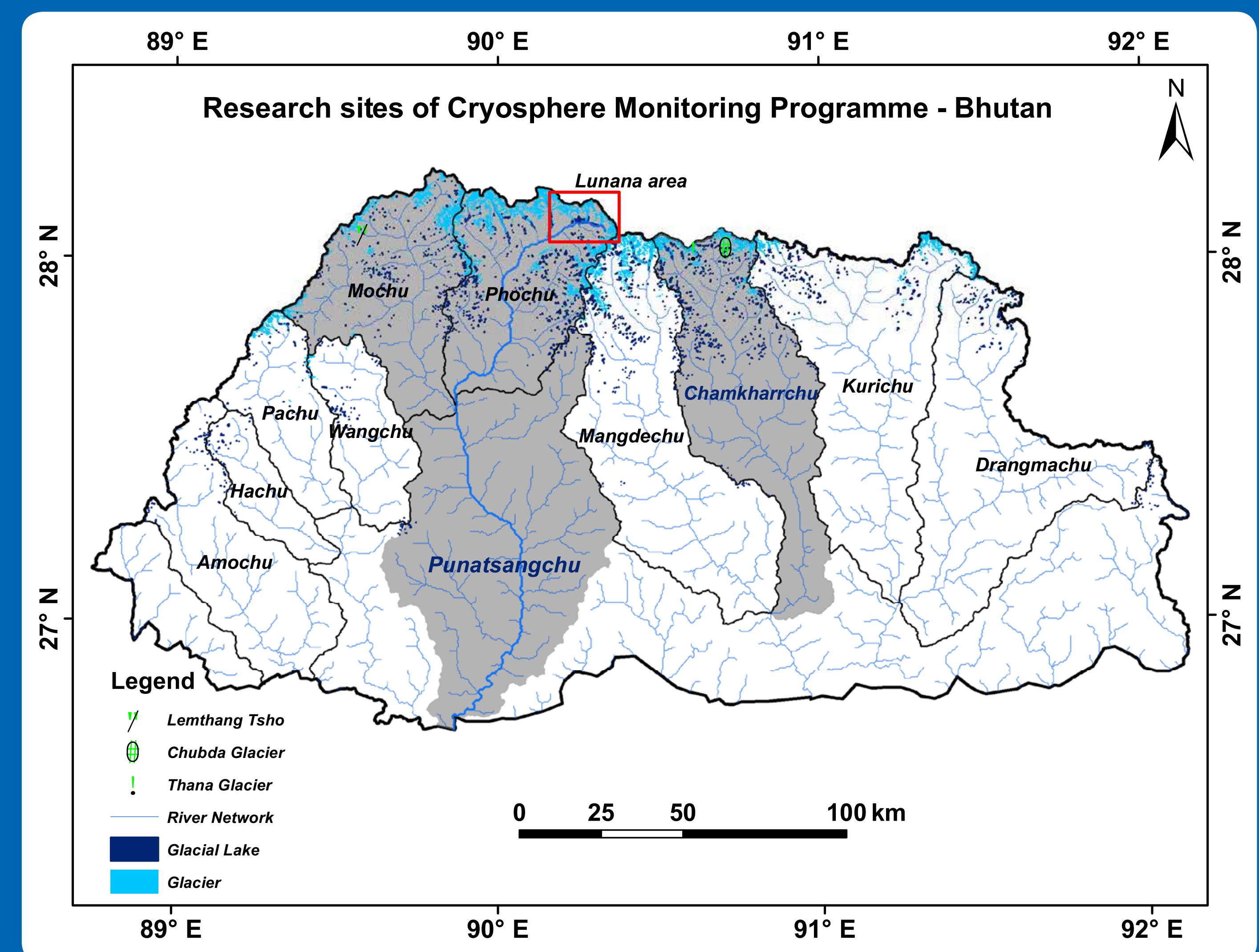
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## Background

The Cryosphere Monitoring Programme Bhutan (CMP-B) carries out annual field monitoring on the benchmark Thana glacier, collects and analysis data from automatic weather stations and hydrological monitoring stations in selected research sites downstream. CMP-B also monitors glacial lakes and assesses socio-economic vulnerability in the Punatsang Chu basin. It produces remote sensing data, analyses, and inventories on the cryosphere for the entire Bhutan Himalaya. The programme is funded by the Government of Norway and implemented by the National Center for Hydrology and Meteorology (NCHM) and the International Centre for Integrated Mountain Development (ICIMOD).



## Cryosphere Monitoring Programme

### Measuring Annual Glacier Mass Balance of the Thana Glacier

- Monitored the Thana glacier's mass balance every year since 2015, both glaciologically (on site) and geodetically (using remote sensing).



### Monitoring and Assessing Glacial Lake Outburst Flood (GLOF) Vulnerability in the Punsang Chu basin

- Assessed the volume and dam composition of the Baychung, Raphstreng, Thorthormi, and Luggye glacial lakes in Lunana.



### Strengthening NCHM Capacity for Cryosphere Monitoring

- Held thematic trainings, on-the job trainings, and workshops in field data collection, remote sensing, data analysis, and database management system.



### Knowledge and Data Generation and Documentation

- Analysed the causes, process, evolution, and effects of the Lemthang tsho glacial lake outburst in June 2015.
- Created a database of decadal changes in glaciers and glacial lake areas in the Bhutan Himalaya.
- As its correspondent for the World Glacier Monitoring Service (WGMS), NCHM submits Bhutan's national monitoring data.
- The Cryosphere Knowledge Hub Bhutan will host hydro-meteorological, snow cover, and glacier mass balance data on the cryosphere in the Bhutan Himalaya.

- Conducted socioeconomic surveys on communities in Thanza, Tenchi, Lhedi, Shangsang, and Tshojo villages located close to the glacial lake outlets in Lunana.

