RESILIENCE, ENVIRONMENT & CLIMATE CHANGE

United Nations Development Programme

PROJECT BRIEF

Glaciers and Students

The northern parts of Pakistan are home to some of the vast stretches of glaciers after the northern pole. The glacier reserves feed local livelihood systems and support unique ecosystems of global importance, in addition to serving as a source of water for downstream areas. In face of the growing threat of global warming, these resources need assessment and monitoring through scientific technologies. The people living in mountain slopes of GB region are faced with the risk of mountain hazards originating from glacier changes under the effect of climate change. The lack of information on climate change and assessment of glacial changes makes it difficult to predict the hazards.

QUICK FACTS

Duration: July 2021 – Dec 2023
Implementing partners: EvK2CNR Italy
Funding partner: AICS Italy
Location: Gilgit-Baltistan
Total budget (2023): USD 716,247.71

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This project aims at developing a consolidating program to establish monitoring of high-altitude climate and assessment of glacier changes, in support of environmental monitoring and natural resources management in Pakistan Mountains. Project activities will also contribute to improving risk assessment and prevention, dealing particulary with GLOFs and hydrogeological hazards through application of remote sensing and GIS techniques and a dedicated web information system.

Objectives

- The first fundamental contribution is the realization of an inventory of all the glaciers of Pakistan. The cadastre will be created starting from the most recent satellite images. The glacier inventory will be updated by 2022/2023, producing high-resolution glacier outlines mainly from Sentinel-2 data.
- Mass variations of the glaciers of Pakistan. Through this investigation, it is possible to provide further information on the "Karakorum Anomaly" and on the mechanisms that cause it.
- Multitemporal analysis compares the maps that are in literature starting from 1980: it is important to provide an indication of the glacier's evolution.
- Knowledge sharing through the involvement of local academia, students and researchers in glacier analysis and field activities, starting point for the creation of glaciology center and high-level school /department on glaciers in GB.
- Field expeditions to selected glaciers for in-depth analyses and to validate satellite surveys, including installation of weather stations to monitor temperatures and measure ice melt, microplastic analysis, carbon deposit. The data collected will be available for local institutions and universities for further research.
- Creation of a database with all this information that will remain available and usable for the local institutions.

Key Stakeholders

This project involves many provincial-level authorities like EPA-GB, Department of Forests, Parks and Wildlife, and CKNP for their support in providing NOCs required to complete the project tasks and for giving permission in organizing various projects in Baltoro region and CKNP.

Furthermore, local universities like Karakorum International University (KIU) and University of Baltistan, Skardu (UoBs) also support the project in providing researchers and management to participate in the field activities as well as capacity building interventions.

Finally, international institutes like University of Millan and University of Cagliari provide quick support in carrying out of field investigations, installations and trainings to the local researchers and students by their own scientists and researchers.

Key activities

Some of the key activities for this project are:

- *Planning and installation of weather station restoration activities*
- *Selection of areas for multitemporal glacier analysis*
- *Update Pakistan Glacier Inventory*
- *Update and test GB GeoApp*
- *Training for glaciological activities, Geomatics and Avalanche risk*
- *Coordination between national and international Universities*

Expected results

Some of the expected results include:

- *Restoration survey of existing weather stations and installation of new automatic weather stations for data provision and sharing.*
- *Multitemporal analysis of glacial bodies to monitor and develop a report on area change assessment.*
- *Field monitoring of glaciers for data acquisition and validation of field data.*
- *Publication of a book on Pakistan Glacier Inventory by the end of this project.*
- *Review and update of existing GBGeoApp and SHARE Platform as well as publication of new web service.*
- *Capacity building of universities, and local government institutes including training for geomatics, weather stations, glaciological field activities and avalanche risk.*

Main achievements:

Key achievements so far include:

- Installation of 04 Automated Weather Stations (AWS) in Passu, Gulkin and Shisper glaciers and reinstallation of 01 AWS in Askole
- AWS restoration survey on Baltoro region from Askole to Concordia
- Multitemporal and field analysis of 04 glaciers and glacial bodies
- Outline and methodology for Pakistan Glacier inventory developed and identification of new glaciers done as well as RS work initiated.
- Trainings of 140 students and government officials from KIU, UOBS and EPA-GB for glaciological field activities and GIS
- GBGeo App upgraded, and Point of Interest (POI) has been developed and incorporated into the app.
- GB Geo APP training was organized in which150 students participated
- Avalanche training manual developed

What's next?

In 2023, the following outcomes are planned:

- Weather stations restoration at Askole and Urdukas, along with checking and maintenance of already installed weather stations
- Report on Glacier area change assessment
- Validation of acquired field data from glaciological activities and planning of field missions on selected glaciers for data elaboration and sharing.
- Development and validation of classified map and morphometric analysis for Pakistan glacier inventory.
- New release of GB GeoApp, update of SHARE Geonetwork platform and publication of new web service with new high-altitude weather stations data.
- Avalanche training and training for Geomatics to be organized.

Geographical Area: Gilgit Baltistan