Empowering Vulnerable Communities in Gilgit-Baltistan through Community Based Flood Early Warning Systems

Focus Humanitarian Assistance

WWF

ICIMOD

About HKH and GB, Pakistan

The Hindu Kush Himalayan (HKH) region is one of the most dynamic and complex mountain systems in the world. It is also extremely fragile and sensitive to the effects of climate change. It is believed that climate change and other drivers of change are gradually increasing the frequency and magnitude of extreme weather events and natural hazards in the region, which has led to higher levels of risk and uncertainty. Flash floods are a hazard in the highlands, and floods can cause considerable loss of life and property in lowland communities, particularly during the monsoon season.

Although floods in small rivers and tributaries are also equally disastrous, they do not receive enough attention from governments and other concerned agencies.

Gilgit-Baltistan (GB) is home to 12 of the world's 30 tallest mountain peaks, including K2 and Nanga Parbat. Approximately 46% of the population in the 250 villages surveyed is at risk from different natural disasters including earthquakes, flash floods, and glacial lake outburst floods.

Natural disasters are considered a major hindrance to development, affecting infrastructure and the functioning of schools, health facilities, and other community institutions. Timely warnings can save human and animal lives and safeguard infrastructure.

The International Centre for Integrated Mountain Development (ICIMOD), through the Indus Basin Initiative (IBI), is implementing the "Agricultural Water, Energy and Hazard Management in the Upper Indus Basin for Improved Livelihood and Building Resilience" project with support from the Government of Australia through the Sustainable Development Investment Portfolio. Its partners are World Wildlife Fund–Pakistan (WWF–Pakistan), the Gilgit-Baltistan Disaster Management Authority (GBDMA), and the Aga Khan Planning and Building Services, Pakistan (previously known as Focus Humanitarian Assistance).

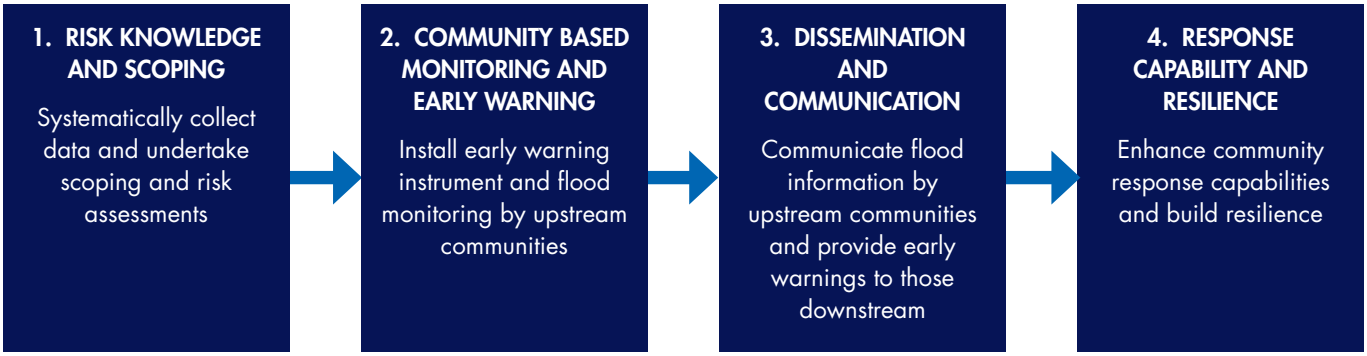
The project aims to minimize community vulnerability and strengthen livelihoods through water management for agriculture, and improved management of water-induced hazards. In this regard, two community based flood early warning systems (CBFEWS) have been piloted in two sites in Punial Valley, District Ghizer of Gilgit-Baltistan. In Sherqilla, a system was installed along a stream to disseminate flash flood warnings, and in Dammas, a system was installed to warn about debris flow.

What is CBFEWS?

CBFEWS is an integrated system of tools and plans to detect and respond to flood emergencies that is managed by communities. The people-centric CBFEWS developed by ICIMOD emphasize the four essential elements of early warning systems as presented below. Although the detection of flood risk and its communication to vulnerable communities is driven by technology, the core of the CBFEWS lies in how well the communities are prepared to respond to floods. Therefore, community preparedness is an integral part of the system.

To be effective, CBFEWS should involve local communities and be based on four elements: risk knowledge and scoping, community based monitoring and early warning, dissemination and communication, and response capability and resilience.

Four Elements of CBFEWS: More than Just a Warning



Source: Based on UNISDR, 2006, http://www.unisdr.org/2006/ppew/whats-ew/basics-ew.htm

How does CBFEWS work?

Communities are trained to monitor flood warnings through a simple device installed upstream of a flood-prone river. The station measures rainfall and water levels, and senses the presence of water beyond the normal water channel, communicating this data through the internet. The instrument is capable of generating alerts via a siren. As the water level rises in the naala (stream), an early warning is generated at the caretaker's house, who then relays the warning to downstream communities through pre-established channels to enable individuals, communities, and organizations threatened by flood hazards to prepare and take action to reduce harm or loss of lives and property.

Why CBFEWS?

1. Innovative use of low-cost technology and tools
2. People centered
3. Upstream/downstream linkages
4. Enables close to real time information
5. Provides guidance on how to respond to warnings

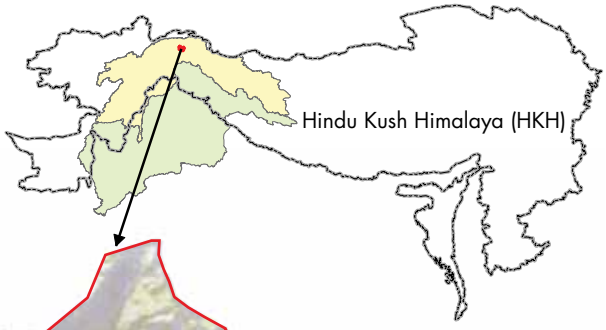
Source: Real-time Solutions (RTS), Nepal

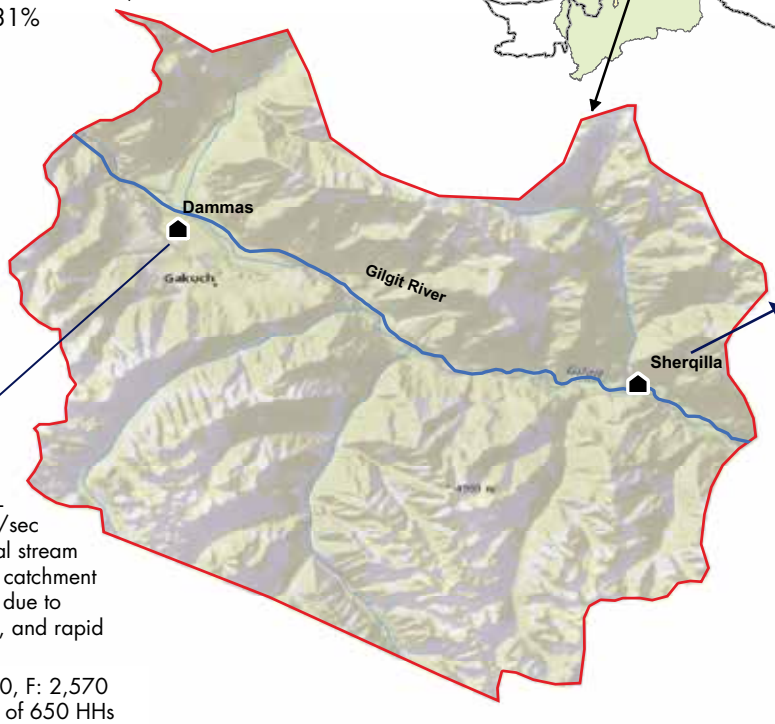
Description of pilot areas

Punial Valley in District Ghizer of Gilgit-Baltistan, Upper Indus Basin, Pakistan

Punial Valley

- Area: About 3.59 million hectares, Villages: 24
- Temperature - maximum: 32.8 °C, minimum: 12 °C
- Annual precipitation - about 430 mm, rainfall: 69%, snowfall: 31%





Legend

- Villages
- Gilgit River
- Punial Valley
- Upper Indus Basin
- Lower Indus Basin
- HKH boundary

Dammas

- Elevation: 6000-7000 ft ASL
- Maximum discharge: 80 m^3/sec Dammas naala is a perennial stream fed by the 26 km^2 glaciated catchment debris flow during monsoon due to thunderstorm, cloud outburst, and rapid melting of snow and glacier
- Population: 5,040, M: 2,470, F: 2,570
- Vulnerable households: 630 of 650 HHs
- One village at risk: 630 households 3 offices, 5 schools, 11 prayer halls, 1 heath facility and 1 petrol pump

0 2.75 5.5 11 16.5 22 Kilometers

Sherqilla

- Elevation: 5,500-6,500 ft ASL
- Maximum discharge of main stream: 500 m^3/sec
- Source of flow: glacier melt and rainfall from 150 km^2 catchment
- Seven sub-villages with population 8,000, M: 4,240, F: 3,760
- Vulnerable to floods: 710 out of 800 HHs
- Three villages at risk, including 3 prayer halls, 1 health facility and 360 households vulnerable to flash-floods in Bilchar and Derani streams converging into main stream 4 km upstream of Sherqilla

Sherqilla

This area has a history of frequent flash floods triggered by severe, torrential rains. In 2016, the floods caused around USD 70,000 in damage as reported by locally active agencies, sweeping away livestock, houses, and destroying hundreds of acres of scarce cropland.

This system was established in June 2017 based on the success of ICIMOD's previous experience in implementing CBFEWS in Nepal and India. On 3 August 2017, at 4:30 am, the system generated a flood warning activating a siren that woke up 2,800 people from 350 households. The community had an hour to evacuate, taking around 2,000 heads of livestock and precious belongings to higher ground before the flash flood could reach even the upstream-most part of the village. If caught unawares, the community is certain that many families and livestock would have been swept away.

"We had no way of knowing when a flood would hit before the early warning system was put in place. Most men have out-migrated for work, so women are constantly alert as we are responsible for safeguarding our children, property, and belongings. In 2010, the floods came with no warning one night. The village woke up as water entered the village and we scrambled to get our children to safety. This has changed after the installation of the CBFEWS. We can now get on with our lives, go to school, and work knowing that the system will alert us well before the flood hits"

Zarnash Bibi, teacher

"The CBFEWS are a miracle for our community. Before they were put in place, we would spend entire nights at the point of origin of flash floods for situation updates to alert others. Now, we can all sleep in peace. The 3 August 2017 flood showed that the system works and made it possible for the community to flee to higher ground with precious belongings"

Fida Ali, Businessman and Volunteer Area Captain of the Community Emergency Rescue Team

Dammas

Dammas has a history of frequent flash floods and debris flow. Locally active agencies indicate damages from the 2010 floods amounted to around USD 80,000. Debris flow put 650 households at risk, sweeping away 450 livestock, 14 houses, and destroying 200 fruit and other trees.

"Community Emergency Rescue Team (CERT): Although there was no debris flow in Dammas during the 2017 floods, the success of the system in Sherqilla has provided us psychological relief, alleviating everybody's fears about sudden, unexpected debris flow."

Shah Wali, Teacher and Volunteer

Partnerships build climate resilience of Gilgit mountain villages

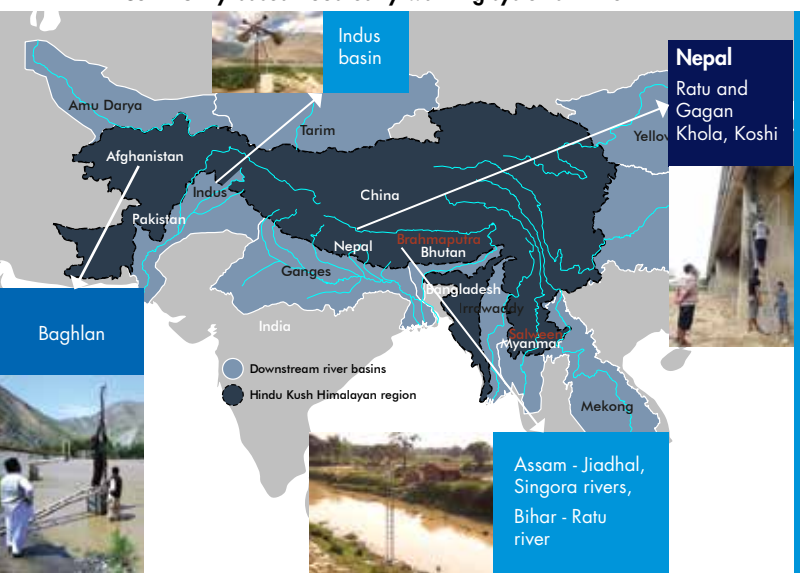
- The Government of Gilgit-Baltistan in Pakistan has recognized ICIMOD's Indus Basin Initiative and consortium partner efforts to establish resilient mountain villages through partnerships with GBDMA. As part of this effort, ICIMOD has enhanced the institutional capacity of GBDMA to enable the transition from a response-based approach to a proactive one by helping update the Gilgit-Baltistan Disaster Risk Management Plan.
- Following the 2017 Sherqilla floods, Pakistan's National Disaster Management Authority (NDMA) has acknowledged the efficiency of the system in Gilgit-Baltistan. The NDMA has stated that the system safeguarded Sherqilla's vulnerable community as it battled the elements. Communities have appreciated and taken ownership of the CBFEWS, saying they put them at ease with nature.

These efforts have strengthened service providers and helped communities adapt to climate change through a mix of preventive as well as responsive measures, from anti-erosion agronomy to flood early warning systems.

"With the success of the piloted system, the Government of Gilgit-Baltistan is working towards upscaling CBFEWS in other disaster prone areas/districts of Gilgit-Baltistan. These systems are the first of their kind in Gilgit-Baltistan, detecting floods and triggering alarm mechanisms that give downstream communities ample time to flee to safety".

Shehzad Baig, Assistant Director, GBDMA

Community based flood early warning systems in the HKH



For further information contact

Neera Shrestha Pradhan neera.pradhan@icimod.org
www.icimod.org/cbfews

Photos: Deedar Karim and Muhammad Ali Qasim of Focus/AKAH

CBFEWS activity is supported by the Australian government through the Sustainable Development Investment Portfolio for South Asia in Pakistan under the Indus Basin Initiative, and in Nepal and India (Bihar) under the Koshi Basin Programme; the governments of Norway and Sweden in India (Assam) under the Himalayan Climate Change Adaptation Programme; and ICIMOD's core donors in Afghanistan. ICIMOD gratefully acknowledges the support of its core donors: the Governments of Afghanistan, Australia, Austria, Bangladesh, Bhutan, China, India, Myanmar, Nepal, Norway, Pakistan, Sweden, and Switzerland. We acknowledge technical support and manufacturing of the instrument by Sustainable Eco-Engineering.

Australian Aid

International Centre for Integrated Mountain Development
GPO Box 3226, Kathmandu, Nepal **Tel** +977-1-5275222
Email info@icimod.org **Web** www.icimod.org

Prepared by ICIMOD Publications Unit, April 2018