

Chitral, Pakistan

Flash flood risk assessment, capacity building, and awareness raising

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FOCUS Pakistan partnered with communities in Chitral District to develop a flash flood early warning system consisting of announcements in mosques and other gathering places and via mobile phones, and to build community response skills through a dedicated team of volunteers. This approach could be scaled up to greatly minimize vulnerability across the whole district.

Introduction

Chitral District is located in the Koh Hindu Kush range in Khyber-Pakhtunkhawa Province of Pakistan. It shares a border with Afghanistan to the west and north and with Gilgit-Baltistan, the northernmost part of Pakistan. Geographically, it is one of the largest districts in Khyber-Pakhtunkhawa Province, covering an area of around 14,800 km² with a population of over 450,000 people.

Administratively, Chitral District has two tehsils (Chitral and Mastuj), 24 union councils, and 523 villages. Around 4.8 per cent of the land is covered by forest and 76 per cent is mountains and glaciers; barely 4 per cent of the total land area is viable for cropping. The literacy rate is 59 per cent (men 77 per cent; women 40 per cent) and the population growth rate has been estimated at 2.5 per cent per annum. The people of Chitral belong to over a dozen different cultures and speak more than 14 languages. As a result of its unique location and historical links with Central Asia, the culture of Chitral bears traces of Greek, Iranian, Mongolian, Tatar, and Turk influences.

Agriculture is the main source of livelihood for the people of Chitral. Approximately 60 per cent of the area is a single cropping zone. Some parts of Upper and Lower Chitral are in a double cropping zone. Maize, wheat, and barley are the main crops. Fruit and vegetable sales contribute to the income of several families. Almost 40 per cent of Chitral's population is engaged in government service, private jobs, trade, or some form of entrepreneurship.

Chitral is situated in a multi-hazard prone zone. Every year, life, property, and hard-earned means of livelihood are lost as a result of different kinds of natural and human-induced disasters. Flash floods, glacial lake outburst floods, earthquakes, avalanches, landslides, debris flows, droughts, heavy rain and snow, soil erosion, and riverbank collapses are common natural hazards in the district. In 2007, massive snowfall led to the loss of 78 lives and caused widespread devastation and disruption of infrastructure, with recovery efforts costing around USD 12 million. About 90 per cent of Chitral District is at risk of flash flooding.

There are limited contextualized policies in place at the national level in Pakistan to deal with flash floods as a separate category of flood. The majority of organizations, including disaster management authorities, rely on materials and plans proposed by international agencies like ICIMOD.

In 2008, FOCUS Pakistan, in collaboration with ICIMOD, implemented a community-based project on reducing flash flood risk in Chitral District. The project aimed to assess the risk of flash floods, raise awareness about flash flood risk, and strengthen the capacity of local people to manage such risk.

Flash Floods in the Study Area

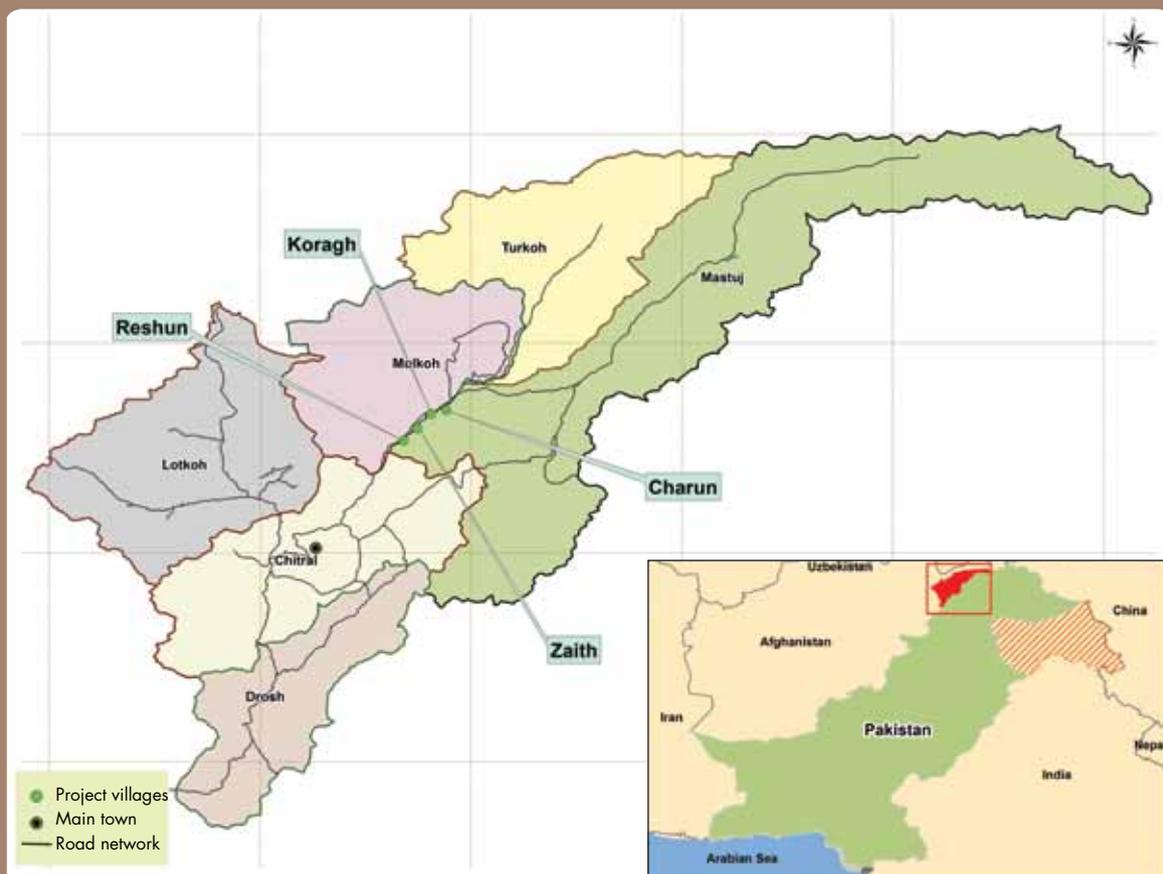
Four villages in Chitral were selected for study: Charun, Koragh, Zaith, and Reshun (Figure 6). These villages are situated in Mustuj Tehsil, on the west side of the Yarkhun River, 70 km from Chitral town, and fall into a double cropping zone. Of the four villages, Zaith is the most flash flood hazard prone. Two streams flow into the village from different directions and meet at the centre of the village. Many other tributaries also flow into the main stream and increase the volume of water, frequently causing bank collapse and eroding fertile lands into the stream. The combined population of the villages in the study area is 8,650 distributed in 1,015 households. Every year these villages are affected by flash floods. Major flash floods have occurred in 1973, 1984, 1997, 1998, 2004, and 2005, causing the loss of hundreds of lives and affecting houses, agricultural production, infrastructure, and livestock. The recurring trend of disasters has forced villagers to move numerous times to different places within the village.

As in other parts of Chitral District, the villages in the study area are surrounded by mountains and do not receive significant monsoon rain. The Drosh Valley and Chitral town, both located in Lower Chitral, receive rainfall of approximately 650 mm and 500 mm per year, respectively, falling mainly in spring and winter. During summer and autumn these areas are mostly dry, receiving barely 10–25 mm of rain per month. Temperatures are very hot in summer and extremely cold in winter, with snow falling at higher altitudes.

Methodology

The project initiated a community-level dialogue at the start of the project with government representatives, local support organizations, Community Emergency Response Team (CERT) volunteers, and local leaders. The study objectives and pilot phase were explained to the communities in the study area. The methodology and processes of project implementation were also shared and agreed upon at the implementation stage.

Figure 6: Map of Chitral District showing target villages for flash flood mapping



Project Activities

The study had three main components:

- **Risk assessment:** Hazard, vulnerability, capacity, and risk assessments were undertaken through the documentation of indigenous flash flood management mechanisms in the community.
- **Capacity building:** The project built the capacity of CERT volunteers as first responders for flash flood management and to develop community-based flash flood response and evacuation plans.
- **Awareness raising:** The project conducted awareness raising at the community level through an awareness-raising walk, quizzes, and a lesson sharing workshop.

Project activities included the following:

- **Technical studies:** Technical studies were conducted by FOCUS Pakistan's Hazard Vulnerability Risk Assessment Team and used for evacuation planning. Flash flood mapping was conducted to identify where flash floods may occur and where additional evaluation is needed to assess the hazard and recommend mitigation measures. FOCUS Pakistan's Regional Programme Office in Chitral, in collaboration with ICIMOD, completed flash flood hazard and risk mapping of Charun, Koragh, and Zaith. These maps can be used to develop an early warning system and for land use planning, village disaster management plan (VDMP), and to compile an inventory of scientific and indigenous knowledge on flash floods in the area to enhance the response at the community level to reduce the impact of flash floods.
- **Hazard and risk assessment:** Hazard and risk assessment was one of the key activities conducted by the project. Building on the technical assessment of hazard and risk conducted by the Hazard Vulnerability Risk Assessment Team, household surveys and focus group discussions were conducted with the help of questionnaires and pre-defined checklists to obtain data on community and government assets, gather historical data, and ensure community involvement. Community members were provided with satellite images to develop their own risk and hazard maps. Community-based risk and hazard map transect walks were conducted in the hazard prone areas identified by communities. Communities also identified evacuation routes and safe locations on the maps.

- **Social hazard mapping:** Social hazard mapping was conducted in three of the study sites – Reshum, Koragh, and Zaith (Figure 7).
- **Training needs assessment and target group profile:** A training need assessment and target group profile were conducted to select participants and assess their training needs for capacity building on flash flood response.
- **Training of trainers for community-based flash flood risk reduction:** A community-based flash flood risk reduction workshop was conducted to develop the capacity of the local CERT volunteers in flash flood response. Theoretical and practical sessions were held for all volunteers on hazard awareness, light search and rescue, first aid, and evacuation.
- **Awareness raising:** Disaster risk reduction sessions were conducted in schools and for CERT leaders (CERT leadership workshop and refreshers). A quiz on flash floods was held to share information on flash floods. The quiz contained questions on preparedness and measures to be taken during a flash flood event. Communities also participated in awareness walks to raise mass awareness about flash flood risk management, particularly among female CERT volunteers (Figure 8).

Figure 7: Social hazard map of Charun village



Figure 8: Awareness walk in Koragh village



Figure 9: Simulation exercise in Reshun village



- **Simulation exercises:** Simulation exercises were conducted in Reshun village to enhance community response in a flash flood disaster situation (Figure 9). One-hundred-and-twenty CERT volunteers were given skills training on how to react in an actual flash flood situation. The readiness of these teams is constantly tested through drills and simulation exercises.
- **Lesson-sharing workshop:** A lesson-sharing workshop was conducted to share key findings and lessons learnt on flash floods with relevant stakeholders, i.e., government representatives, members of the Aga Khan Development Network, members of NGOs, representatives of civil society organizations, local leaders, and CERT leaders. This workshop had two main objectives: advocacy and the capacity development of stakeholders. It also served as a platform for discussing ways of mitigating flash flood risk and how to develop institutional mechanisms to minimize hazards with community participation at various levels.

Results

The study found that short-duration intensive rainfall and cloudbursts are the main causes of flash floods in the study area (as identified in group discussions with community members and verified by technical analysis). The surface topography of the upper study area and its composition of very loose, unconsolidated soil, which is highly unstable and non-cohesive in nature, make the area prone to flash floods during intensive rainfall. Human activity and interference with the natural environment,

such as overgrazing in the upper catchment and deforestation, compound the problem as lack of vegetation causes direct runoff which can trigger a flash flood. This, together with climate change, is contributing to increases in the frequency and magnitude of flash floods in the study area.

Up to 13,428 km² of land is at risk of flash floods in these four villages, and siltation caused by frequent flash flood events has reduced local agricultural production. Livestock are also at risk: about 200 animal sheds in the four study villages are exposed to flash flood hazard of high intensity. While community members are aware of flash flood hazard, extreme poverty and population growth is forcing villagers to build in hazard prone areas, exacerbating their vulnerability and risk.

The project's contributions to flash flood risk reduction in the study area can be summarized as follows:

- CERTs established in each study village;
- community-based flash flood response and evacuation plans developed for each study village;
- 120 CERT volunteers trained as first responders and in community-based flash flood risk management;
- community stockpiles of materials and equipment provided for flash flood preparedness and response in Charun and Reshun;
- awareness raised among community members of flash flood risk and preparedness strategies;
- early warning system set up through CERT volunteers who provide early warning to downstream people using mobile phones and

through announcements in mosques and other gathering places;

- non-structural mechanisms implemented including the formation of natural resource management committees and strengthening of indigenous social organization system; and
- structural mitigation programme implemented in collaboration with the government and NGOs including the construction of protective walls and check dams.

In addition, improved irrigation channels have also been constructed by the Aga Khan Rural Support Programme and the government.

The results of the project can be summarized as follows:

- **Improved capacity of CERT:** The project significantly improved the capacity of CERT volunteers as first responders during flash flood events. This brought with it a certain level of awareness of how to mitigate flash flood risk (Box).
- **Reduced flash flood risk and hazard:** The project activities have minimized the flash flood risk and hazard in the study. Communities are now more prepared through CERT volunteers, the early warning system, evacuation plans, and community stockpiles, which have already proved useful in flash flood emergencies.
- **Informed decision making:** The technical studies conducted as part of this project have helped policy makers in planning and decision making. Development initiatives are benefiting from the flash flood hazard and risk maps developed by the project, which are being used as a pathfinder and guideline for development practitioners.

Best Practices and Lessons Learnt

The practice of community-based flash flood risk management should be up-scaled and replicated at all levels, as well as in other parts of Chitral District, which are equally at risk of flash floods. Harnessing communities as a resource is imperative to disaster management, which is a shared responsibility between all stakeholders, and, therefore, all stakeholders must be involved.

Box: Building community resilience: CERT volunteers respond to flash flood events

In 2010 and 2011, CERT volunteers in the study area responded to several flash flood events. They provided shelter and relief to affected families and conducted damage assessments, which they shared with FOCUS, the government, and responding agencies. CERT volunteers have also been involved in re-construction work with families that lost their homes and other valuable asset. CERT volunteers are seen as 'blessing squads' in the study villages and their valuable contribution has been acknowledged at all levels.

The following lessons were learnt from the project and may be relevant throughout the region:

- A holistic approach and community participation is imperative for the success of any intervention.
- Structural mitigation is crucial and goes hand-in-hand with non-structural mitigation in reducing risk and ensuring safety. Non-structural measures alone are insufficient.
- Risk reduction is more complex than mitigation and requires the involvement of all stakeholders at the community level as well as district, and national levels to be effective.
- Social mobilization is needed at the grassroots level; for this, strong and motivated leadership at the community level is important.
- Revitalization of local knowledge and community organizations is important for risk management.
- Poverty compounds the vulnerability and risk faced by communities.
- Rapid population growth and overgrazing can increase risk and vulnerability to flash flood, particularly when settlements expand into unsafe areas.
- Community preparedness is pivotal for flash flood risk reduction.

Recommendations

- ◆ Implement structural measures to mitigate flash flood risk such as protective gabion walls, which have been identified as necessary to mitigate risks by the communities and through technical assessments.
- ◆ Replicate and up-scale community-based flash flood risk management in other parts of Chitral, and empower communities to withstand and minimize flash flood hazard.
- ◆ Encourage afforestation and discourage deforestation. A sustainable plan should be developed by the community, government, and other responsible agencies for dealing with the issue of deforestation and balancing the needs of the community for fuelwood.
- ◆ Strengthen indigenous social organizations and mechanisms as a way of controlling overgrazing and deforestation, and develop an effective standard operating procedure for the local committees in each village.
- ◆ Integrate scientific knowledge with traditional knowledge and indigenous practices, and establish communication channels with scientific technicians.
- ◆ Develop effective insurance/micro-insurance and credit schemes to compensate local people for the loss of crops, livelihoods, livestock, and other property as a risk sharing initiative. Government and non-governmental organizations and stakeholders working in this field could be motivated to initiate such a programme.
- ◆ Use hazard maps for land use planning to ensure that houses, animal shelters, and crops are not in hazard prone areas.
- ◆ Prioritize and mainstream disaster risk management at all levels and systematically consider risk from natural hazards for the sustainability of development activities.
- ◆ Develop and introduce school-based flash flood risk management sessions for students, teachers, staff, and management.
- ◆ Promote the conservation and preservation of natural resources, with community participation as an effective way to minimize natural disasters.