



Strengthening Community-Based Preparedness through Impact-Based Forecasting

Implemented by Practical Action Consulting (PAC), Nepal
Location: Panchpokhari-Thangpal Rural Municipality, Sindhupalchok District, Nepal
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4.1 Background

Sindhupalchok is one of Nepal's most multi-hazard-prone districts, having experienced severe losses from the 2015 Gorkha earthquake and the 2021 Melamchi floods. Panchpokhari-Thangpal Rural Municipality faces high exposure to floods, landslides, and fires, with vulnerabilities amplified by limited local capacity and gaps in risk communication. Existing Early Warning Systems provide forecasts, but communities often lack the knowledge or tools to take timely protective action. This project addresses these gaps by strengthening anticipatory action, community-level risk mapping, preparedness, and coordination across upstream and downstream communities using an Integrated Impact-Based Forecasting (IBF) approach.

Project Objectives:

The project aimed to strengthen community risk assessment and early action through IBF, ensuring that hazard information is not only available but actionable at the local level. The IBF bulletin goes beyond weather forecasting, integrating weather information with local risk information by assessing their likely impacts on people, infrastructure, and livelihoods. By linking forecast information with local risk and vulnerability data, the approach supports timely early warning, preparedness planning, and anticipatory actions. Using the Missing Voice Approach, the project identifies the most vulnerable communities and ensures that the perspectives of marginalised groups are incorporated into preparedness planning.

Local government and communities are capacitated across IBF, risk mapping, risk communication, emergency response, and disaster planning. To enhance coordination, the project promotes upstream-downstream community linkages, ensuring timely dissemination of flood and rainfall alerts. Scientific data from EWS is combined with local observations and knowledge, supported by citizen science activities in schools and community events. All activities are implemented in close collaboration with the local NGO, Community Development and Environment Conservation Forum (CDECF), which brings deep knowledge of the local hazard and vulnerability context and experience of working in the region, along with field-based facilitators who speak the local language, and facilitates effective engagement with communities.



Training on disaster information management system and risk communication for municipal officers.

Photo credit: PAC project photos

Key Activities:

- Training CDMC task forces, and local government officials on IBF, Anticipatory Actions (AA), disaster information management, risk communication, and risk mapping.
- Conducting participatory risk mapping and risk communication exercises to identify hazards, vulnerabilities, and preparedness needs of the locals.
- Piloting IBF approaches to support forecast-based decision-making and early action.
- Prepare impact-based flood risk maps to support local planning and DRR.
- Facilitating upstream–downstream community dialogues to strengthen coordination and information sharing.
- Promoting citizen science and disaster awareness through school workshops and mural art activities.
- Strengthening local capacity to interpret early warning information and take timely preparedness actions.

A distinct feature of this project was the use of the Missing Voices Approach to ensure marginalised and vulnerable communities are included in preparedness planning. Community-level risk mapping was used to identify hazard-prone areas and inform early action. Strong upstream–downstream coordination was undertaken for real-time hazard monitoring and information dissemination. In addition, schools and youth were engaged in disaster awareness and limited citizen science activities.

Project Reach:

As a result of the work carried out, the project trained 6 CDMC members – including Indigenous communities on IBF, and also engaged the community in participatory risk mapping, and preparedness activities. Officials from 4 municipalities were also trained on IBF, risk communication, and BIPAD Portal¹. In addition, the older community members (18) participated in the risk monitoring and information dissemination dialogues between upstream and downstream communities and more than 120 students were educated on DRR, Climate Change Adaptation (CCA), early actions and risk communications.



Participatory risk mapping with different communities.

Photo credit: PAC project photos

¹ BIPAD Portal: BIPAD (Building Information Platform Against Disaster) is a national digital platform developed to consolidate disaster-related data and spatial information from multiple agencies into a single system. It supports DRR and DRM through modules that enable preparedness and early warning, emergency response, post-disaster coordination, and evidence-based planning and decision-making. The system is designed for use by federal to local governments, emergency operation centers, and first responders, integrating hazard maps, vulnerability data, incident reporting, and resource inventories to support risk-informed planning and anticipatory action.

4.2 Realities from the Ground

The project engagement across Panchpokhari Thangpal Rural Municipality brought forward a range of lived experiences that reflect how disaster risk is shaped not only by hazards, but also by social, economic, and institutional realities. It also shows the importance of recognising the different circumstances and dimensions (like being a single mother or a person with disabilities) that affect how individuals and their households can adapt to disasters.

Missing Voices from the Ground: Journey of Risk and Resilience

The story of Ms. Sunita Dong (33), from Ward 7, Bhotenamlang, reflects the long-term and layered impacts of disasters. Originally from Lidi in Jugal Rural Municipality, she relocated after losing one of her sons in the 2015 earthquake. However, her challenges continued after moving as she lost her husband and now carries the full responsibility of raising four children alone. With very limited land and income, her eldest daughter had to leave school, while two children continue their education, the youngest is yet too young to attend school. Sunita's concerns are deeply rooted in uncertainty and fear about her children's future.

"I have faced a lot of hardship in my life. I only hope my children do not have to go through the same suffering, but I fear they might face even more."

Her experience shows how disasters can lead to prolonged socio-economic vulnerability, especially for female-headed households, where recovery remains incomplete and fragile.

A similar intersection of vulnerability is seen in the case of Kamil Tamang (63), who has been living with a physical disability after losing his leg in a work-related accident. Supporting a large family dependent on small-scale farming and wage labour, he faces ongoing economic hardship. Previously, his family relied on bamboo-based handicrafts for income, but restrictions on forest resource use have eliminated this option. Mobility challenges further limit his access to services.

"Even to collect my disability allowance, I have to travel a long distance. When my leg hurts, even reaching the health facilities becomes difficult."

He also expressed concerns about limited access to responsive public services, pointing to systemic gaps that make it harder for persons with disabilities to cope with both daily life and disaster risks.

The experience of Purnamaya Danuwar, a single mother from Duduwar, further reveals how exclusion can compound vulnerability. After the earthquake damaged her home, the reconstruction support issued in her name was taken by her in-laws, leaving her without the means to rebuild. She was forced to relocate to a flood-prone riverbank, where she restarted her livelihood through a small tea and snacks business. Despite being aware of the risks, she continues to live there due to lack of alternatives and limited support.

"The earthquake took my house, but what hurt more was losing the support that was supposed to help me rebuild."

She also shared how access to information remains unequal.

"No one tells me about meetings or early warnings. I hear about risks only when something is already happening."

Her story reflects how social position, gender, and access to information directly influence disaster risk and recovery pathways.



Kamil Tamang as a person with disabilities, faces difficulties in mobility and access to services.

Photo credit:
PAC project photos



Purnamaya Danuwar, a single mother who was displaced due to the earthquake has no option but to relocate to a flood-prone riverbank.

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PAC project photos

4.3 Changes due to the Project

The project has contributed to strengthening understanding, capacities, and dialogue around disaster risk and early action at community levels. Through a combination of training, community dialogues, risk mapping exercises, and school-based engagement, stakeholders, including CDMCs, local government representatives, and community members have been exposed to IBF, risk communication, and anticipatory action concepts.

The use of participatory approaches, particularly the Missing Voice Approach, has helped surface local risk realities and perspectives of vulnerable groups, strengthening inclusivity. While changes in institutional practice are still evolving, there are clear indications of improved awareness, clearer roles, and increased engagement around early warning and preparedness processes.

Participation and Inclusion of different community members: Participation expanded beyond formal structures, with community members actively engaged in dialogues, risk mapping, and knowledge-sharing processes. The application of the Missing Voice Approach enabled the identification of the most vulnerable communities and brought forward perspectives that are often overlooked in conventional planning processes. School-based activities further broadened participation, where students were oriented on DRR, climate risks, EWS, and early action, and are expected to share this knowledge within their households and communities.

Students were seen actively engaging in disaster risk discussions of their locality through interactive sessions, mural art, and practical learning activities, which made hazard and early action concepts easier to understand and retain. During follow-up visits, community members noted that students have started discussing these topics within their households and communities, particularly around early warning messages, safe evacuation practices, and flood preparedness. With the 2026 monsoon season approaching, this increased awareness is already influencing family-level preparedness actions, such as discussing safety measures and keeping emergency items ready.

From the students' perspective, they shared that the sessions helped them clearly understand "what to do, where to go, and how to respond" during hazards, especially flooding, which they previously only read about in textbooks. This reflects an emerging citizen science approach, where students are not only learners but also active information multipliers, helping strengthen community-wide awareness and preparedness. By observing, understanding, and sharing disaster-related knowledge within their homes and communities, they help spread awareness beyond the classroom and contribute to more informed and prepared households.



Students engaged in disaster risk interactive sessions, mural art discussions.

Photo credit: PAC project photos

Practical exercises to strengthen planning and preparedness:

The project has strengthened understanding of preparedness and early action at the community level through targeted practical exercises. Participants were introduced to IBF concepts, risk matrices, and early action protocols, enabling them to better interpret warning information and relate it to potential local impacts. Participatory risk mapping exercises supported communities in identifying hazard-prone areas, vulnerable households, and safe locations in their locality. These processes have contributed to improved contextual understanding of risk and preparedness actions.

Communities described their experience as follows. Members from upstream communities described how early warning often depends on manual efforts:

Syangbo from Yangri CDMC said, *"During floods, we must activate the siren ourselves. At night, it becomes very difficult to manage. If I am away from the village during times of crisis, there might not be anyone to inform the communities."*

At the same time, downstream communities emphasised the value of coordination and information sharing by upstream users on rainfall and river levels, so that those downstream are able to prepare earlier.

These reflections showcase the importance of upstream and downstream linkages, while also pointing to gaps such as unreliable electricity, weak network connectivity, and the need for automated systems.

Engagements with CDMCs showed growing confidence and clarity in roles following trainings and practical exercises. Participants reported improved understanding of IBF risk matrices, early warning interpretation, and task force responsibilities, which has supported better coordination and preparedness planning. The use of a simple four-color warning in IBF bulletins (green, yellow, orange, and red representing very low, low, medium, and high risk respectively) helped make forecast information more understandable and actionable for communities. Trainings conducted at the local level improved accessibility, ensuring early warning information be clearly understood by different groups, including those with limited literacy.

CDMC president from Tipeni, Motiram reflected, *"Before the training, we did not clearly understand rainfall types or how to act based on IBF warnings. Now we can link the information to what we should do. We will continue with participatory risk mapping and planning based on IBF bulletins and also focus on conducting regular CDMC meetings."*

Community members also emphasised the importance of sustaining these efforts with regular discussions and trainings so that they remain prepared and active.

Across these experiences clear insights emerged; DRG is most effective when it is grounded in lived realities, inclusive of diverse voices, and supported by continuous engagement. The project has contributed to creating spaces where these voices are heard and linked to practical actions, through risk mapping, IBF training, and community dialogue, supporting a gradual shift toward more informed, connected, and locally driven preparedness and response systems.



Locals with the risk maps they prepared of their community during participatory risk mapping activity.

Photo credit: PAC project photos

Enhanced technical understanding, role clarity and community engagement:

Capacity-building efforts focused on CDMCs and local government representatives, including trainings on IBF, risk communication, and the use of the BIPAD portal for disaster information management. These engagements have contributed to enhanced technical understanding and role clarity, particularly among CDMC task forces in relation to early warning dissemination, evacuation planning, and coordination. Community dialogues also strengthened linkages between upstream and downstream communities, supporting improved information sharing during risk periods. While institutionalisation within government systems is still in progress, the project has laid groundwork for more coordinated and informed engagement.

State officials view the project as an important contribution to strengthening risk-informed planning and disaster management at the local level. The officials receiving the training mentioned that the technical capacity-building provided to municipal and ward-level officials on IBF, AA, and risk communication improved their ability to understand the forecast information and act accordingly. The training on disaster information management system, BIPAD Portal has helped the municipal DRR focal persons access and apply disaster information for decision-making. The disaster data can now be managed in a structured manner.

Officials also valued the flood risk and vulnerability mapping outputs, which translated complex hazard data into practical planning tools for identifying high-risk settlements and prioritising interventions. The municipal authorities also expressed willingness to incorporate the recommendations from the mapping exercises into their upcoming fiscal year plans and policies. This shows a growing institutional ownership and uptake of project findings

4.4 Lessons Learnt

Limitations on EWS can delay timely action: Despite multiple early warning channels, manual systems and network disruptions can delay timely action. Limited search and rescue equipment and resource constraints restrict community response. Certain risks, such as landslides and large-scale floods, require technical and financial support beyond local capacity, and delays in assessments can slow early action and response activities.

Technology alone does not result in better risk management: IBF offers communities better guidance on what actions to take under different risk scenarios. However, technology alone is not enough; communities need training, engagement, and contextualisation to act on early warnings. Visual tools like risk maps, IBF matrices, information in local languages, and mural arts translate complex risk information into actionable knowledge. It stresses on the need for a good combination of accurate technology and appropriate communication with deeper community engagement.

All of community approach is needed for better resilience: Inclusive approaches are essential for equitable and effective DRG. Participatory risk mapping and dialogues, along with the Missing Voice Approach, ensure local knowledge and marginalised perspectives inform preparedness. Upstream-downstream coordination enhances anticipatory action, while school engagement and mural arts help youth transmit DRR knowledge to households, embedding resilience in the wider community.

A coordinated approach can increase coverage: Strengthening coordination across CDMCs, communities, and local government enhances the impact of preparedness measures. Tools like the BIPAD portal have potential for more systematic, data-informed decision-making if institutionalised.



IBF bulletin disseminated by the Department of Hydrology and Meteorology, Nepal

4.5 Way forward

Sustaining the outcomes of the project will depend on how far the momentum built within CDMCs and communities is continued. Following the training and dialogues, CDMCs have agreed on initiating regular meetings, discussing risk scenarios, and planning preparedness actions more proactively. Building on this, continued facilitation of IBF simulations, scenario-based exercises, and participatory risk mapping will be important to ensure that communities can consistently interpret IBF bulletins and translate them into early action. The installation and use of hazard and evacuation maps in public spaces, as emphasised by community members, can further support a shared understanding of risks and quicker decision-making during emergencies. Strengthening task force coordination within CDMCs, particularly in linking risk levels to clear actions, will remain critical for improving response effectiveness.

At the same time, sustaining engagement with upstream and downstream communities will be key to maintaining real-time information sharing and anticipatory coordination, especially during monsoon periods. Continued collaboration with local partners such as the Community Development and Environment Conservation Forum (CDECF) will support consistent community-level facilitation and follow-up. There is also a scope to build on current practices by strengthening dual communication systems (manual and digital) and addressing locally identified gaps such as early warning equipment and rescue resources. Engagement with local government can further support these efforts, particularly in improving communication systems, supporting community preparedness initiatives, and gradually strengthening the use of tools such as IBF bulletins, risk maps, and the BIPAD portal within local processes.



Understanding the IBF scenario building process.

Photo credit: PAC project photos

The Strengthening Inclusive Disaster Risk Governance for Climate Resilience in Asia (SIDRRA) project was funded by the Swedish International Development Cooperation Agency (Sida). It was implemented by a consortium comprising the International Rescue Committee (IRC), the Asian Disaster Reduction and Response Network (ADRRN), and Duryog Nivaran (DN) to strengthen resilience among at-risk communities in Asia and amplify local voices in disaster risk governance. Under this project, DN supported several network members – the Institute of Disaster Management and Vulnerability Studies (IDMVS) in Bangladesh, Practical Action Consulting, and Dalit Women Rights Forum (DWRF) who worked with DanChurchAid in Nepal, and Hari Welfare Association in Pakistan — to operationalise inclusive, local-level disaster risk governance.

[From Risk to Readiness: Community-Driven Local-Level Disaster Risk Governance](#) compiles case studies and lessons from this work, strengthening the evidence base for inclusive local-level governance and adding to the wider knowledge on what works, for whom, and why.

Each case study is also available as a standalone publication.



Scan for the Document:
From Risk to Readiness: Community-Driven Local-level
Disaster Risk Governance
Published by Duryog Nivaran

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by PAC

**From Risk to Readiness:
Community Driven Local-Level Disaster Risk Governance**