

Reaching the most vulnerable: Community-based flood early warning system



Background

Floods and flash floods are major natural hazards in the Hindu Kush Himalayan (HKH) region and are catastrophic to vulnerable riverside communities, particularly during monsoon. Floods can be disastrous in small rivers and tributaries.

Though early warning systems have been developed at the global, regional, and national levels to provide flood information, the Hyogo Protocol and the United Nations Framework Convention on Climate Change (UNFCCC) Special Report on Extreme Events and Disasters (SREX 2012) have identified that gaps exist in relaying this information to communities that are most vulnerable. ICIMOD has been working to address these gaps through a community-based flood early warning system (CBFEWS) piloted in Afghanistan, India, Nepal, and Pakistan.

What is CBFEWS?

CBFEWS is an integrated system of tools and plans managed by and for communities. It provides near real-time early

warnings when rising flood waters are detected. The warning information is transmitted to caretakers who disseminate the information to the rest of the community, government line agencies, and stakeholders. Although the detection of flood risk and its communication to vulnerable communities are driven by technology, the primary functioning of the CBFEWS lies in a people-centred approach to flood response.

The UNFCCC acknowledged the effectiveness of CBFEWS and awarded ICIMOD, Aaranyak, and Sustainable Eco Engineering (SEE) with the Momentum for Change: 2014 Lighthouse Activity Award in the ICT category.



How does CBFEWS work?

Early warning systems are an important component of disaster risk management strategies, which assess flood risk and provide warnings when a flood is imminent or already occurring. For this, the system monitors the river water level and conveys this information to downstream communities through a transmission system.

The CBFEWS instrument co-developed and implemented by ICIMOD consists of three units: a data acquisition unit at the riverbank upstream, a data upload unit at a caretaker's house upstream at a safe distance from the river, and a GSM alarm unit downstream for the vulnerable communities.

Steps for generating and disseminating warning messages



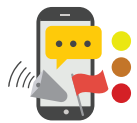
Source of warning

A sensor in the data acquisition unit senses water level rise and transmits this data to the data upload link, which generates audible and visible signals. A trained caretaker interprets, verifies, and relays the warning to downstream communities and nodal authorities.



Recipients of early warning

Nodal persons downstream receive the message directly from the caretaker or other concerned authorities and disseminate it.



Warning message

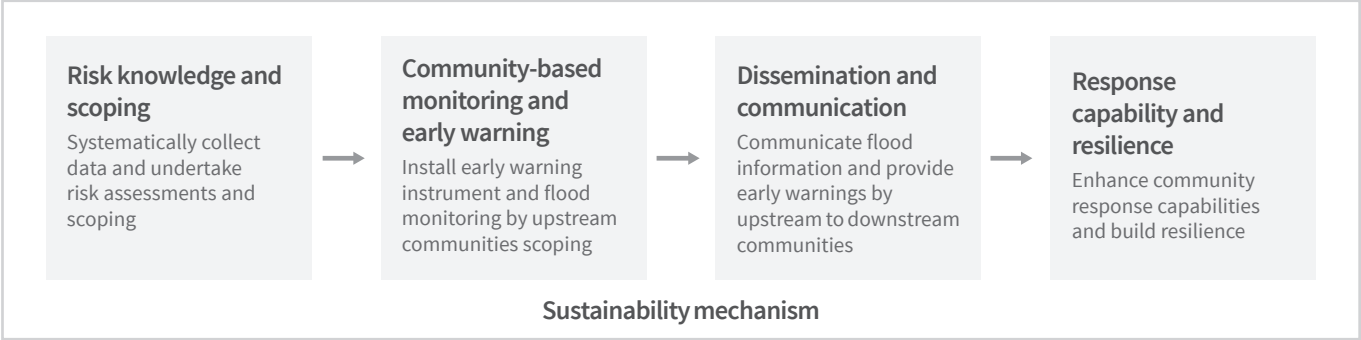
Warning message is the information sent from the source to the intended recipients in different forms: text (e.g. SMS), verbal or sound (e.g. telephone), and visual (colour, flag, sign, etc.)



Communication channel

Communication channel is a network of people for information dissemination, particularly among the upstream (caretaker) and downstream (concerned people and authorities).

Key elements of CBFEWS implementation



Source: UNISDR (2006)

Features of CBFEWS



Cost effective

The manufacturing, repair, and maintenance of the system can be done at the local level.



People-centred

Community members and government line agencies take ownership of the system and are involved in managing and disseminating early warning information.



Near real-time information

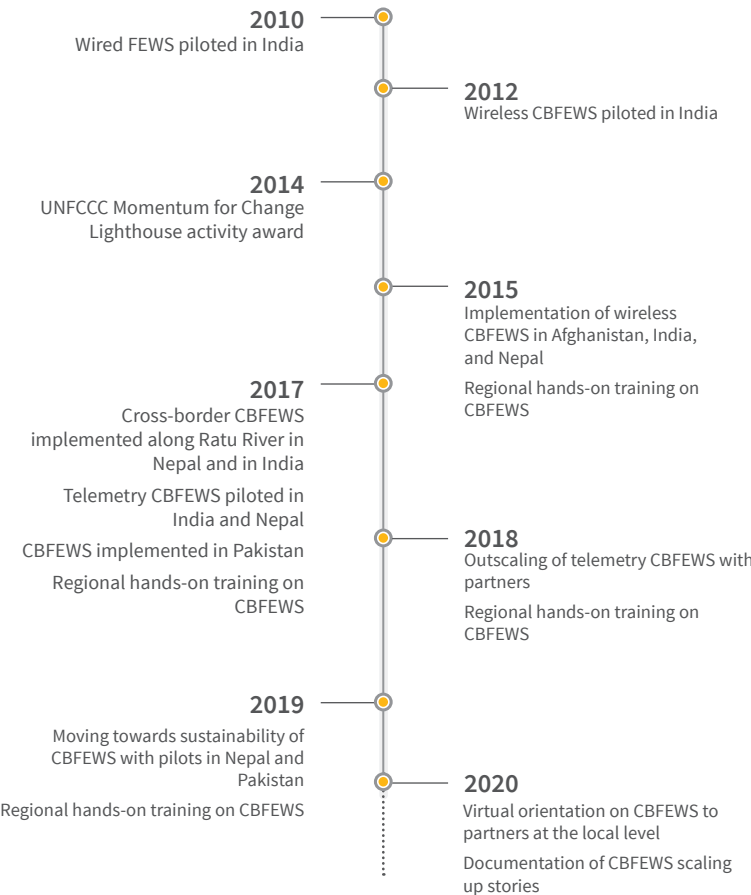
As water levels rise, upstream communities disseminate near real-time information to vulnerable downstream communities.



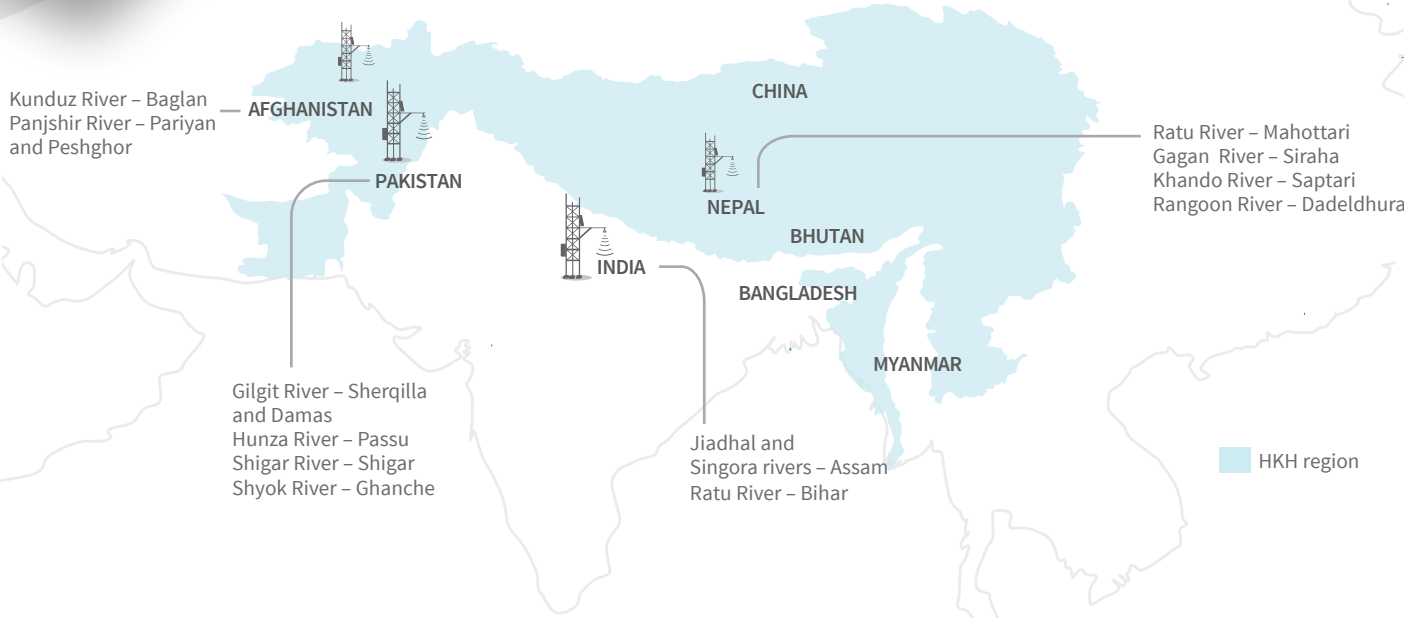
Response mechanism

Trainings and awareness activities enhance community response on early warnings and provide lead time for preparedness.

Journey of CBFEWS



Installed CBFEWS sites in the HKH





What next for CBFEWS?

The system still needs to be further customized at the local level and outscaled to many more flood-vulnerable rivers and tributaries. ICIMOD's work with communities has focused on ensuring continued operation, system maintenance, and community buy-in. Ensuring long-term operation requires financial sustainability, annual maintenance, compensation for caretakers, regular stakeholder meetings, and strong upstream-downstream collaboration.

Promoting ownership of the system among nodal agencies could enhance sustainability and facilitate the system's full ownership by communities. For this, CBFEWS needs to be included in annual disaster management strategies and upscaled in all flood-prone areas. A network of these instruments would

further improve the flood preparedness of communities. The private sector can also contribute to enhancing the technology and improving the instrument's accessibility.

Sustainable implementation

Basket fund for CBFEWS (2019)

A basket fund has been created by upstream and downstream municipalities along Khando River, Nepal, to ensure maintenance and upkeep of the CBFEWS. The fund will be handled by three municipalities in the district.

Handover to local disaster management authority (2019)

ICIMOD handed over the CBFEWS to the Gilgit-Baltistan Disaster Management Authority, Pakistan. The government plans to incorporate CBFEWS into the local disaster management plans and upscale the system in other areas.



For further information

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