



CASE STUDY

PRACTICAL ACTION PERU

Influencing government investment in early warning systems

This case study is about using phased, long-term engagement to foster co-creation and adoption of climate-adaptive technologies by national government.

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Key Alliance terminology

Zurich Flood Resilience Alliance (Alliance):

The Alliance is a multi-sector collaboration between the humanitarian sector, academia, and the private sector focusing on shifting from the traditional emphasis on post-event recovery to pre-event resilience. We are nine years into an eleven-year program that has been delivered in two Phases (Phase I from 2013-2018; Phase II from 2018-2024).

Flood Resilience Measurement for Communities (FRMC):

Created by the Alliance in 2013, the FRMC is a framework and associated web-based data tool/app which conceptualizes flood resilience as a function of social, human, natural, physical, and financial capitals. The FRMC is implemented at the beginning of Alliance work to assess resilience strengths and gaps. This information is used to shape community programs and advocacy.

The win

After 12 years of work developing and operationalizing community-based early warning systems (EWS), Practical Action Peru (Practical Action) has achieved national government scaling of its EWS approach:

- In 2021, the National Meteorology and Hydrology Service of Peru (Senamhi) allocated and disbursed USD 435,000 toward a national program to expand EWS in the Rímac Watershed. As part of this program Senamhi is adopting aspects of the EWS approach developed by Practical Action and Practical Action is supporting Senamhi with this expansion. To date, newly installed EWS are now benefiting approximately 457,000 people by alerting them of potentially dangerous flooding. Ultimately, the expansion of EWS is expected to impact the lives of over 9.3 million people living in the Rímac Watershed.
- Senamhi is working toward scaling out the EWS approach to other Peruvian river basins.



Volunteer, Lourdes Garcia, of the Participatory Rain Monitoring Network taking a picture of her rain gauge in the community of San Miguel de Viso in Lima, Peru © Practical Action

- The SDC regional hub for Latin America is funding a three-year regional program that aims to strengthen early warning and early action in the Vilcanota basin in the Cusco region and the La Paz and Beni watersheds in Bolivia, based on the Peruvian EWS work.

How the win was achieved

Communities in Peru’s Rímac watershed face rapid-onset floods, intense rainfall, and landslides almost annually, and these risks are being compounded by rapid land use change and climate change. Forecasting these events, however, is difficult. Rainfall in the Andes varies considerably — even from community to community — and remote communities in particular lack weather information to make informed, real-time decisions about their risk and what actions to take to reduce their vulnerability. Practical Action has been working with communities since 2011 to increase community access to early warnings.

Practical Action has been operating in Peru since 1985, addressing energy, agriculture, and disaster risk reduction. It has a strong reputation

in development work with communities, and from this has built working relationships with various departments and ministries. Practical Action’s work on EWS began before the launch of Phase I of the Alliance in 2013. In 2011 and 2012, Practical Action, in partnership with the National University of Cusco, developed and deployed its first prototype weather monitoring station and EWS. In Phase I of the Alliance, Practical Action continued working on EWS in response to data from community Participatory Vulnerability and Capacity Assessments. In these, Practical Action consistently saw a high community need for advance warning of and capacity to prepare for and respond to disasters, and a lack of institutional capacity for meeting these community needs.

Setting up and operationalizing EWS required a set of interlinked activities with multiple stakeholders and at multiple scales, including:

- Working with communities to establish community brigades and associated risk awareness and response capabilities.
- Iteratively developing simple, inexpensive technical solutions to locally monitor weather

so that communities would have access to the information they needed to trigger emergency preparedness and response plans. This work was done in collaboration with communities to ensure both that it addressed their needs and equipment could be operated and maintained locally.

- Developing rainfall-risk relationships relating rainfall measurements to subsequent events.
- Building relationships with local and national government, the geological service, the meteorological service, and other stakeholders in the EWS space.

Near the end of Phase I, in 2017, Practical Action deployed a second generation of improved weather stations and associated community structures to leverage those improvements to increase community safety and wellbeing. The timing was opportune — in late 2017 Peru experienced ‘El Niño Coastal’, an extremely heavy rainfall event caused by unusually warm waters off the coast. Unlike a typical El Niño, the event was caused by local winds and therefore not predicted in advance.

Consequently, it took the country by surprise and resulted in catastrophic damage. The ability of the communities Practical Action had been working with to prepare and respond appropriately to the resulting flooding — informed by data from the new weather stations that the communities were operating — drew the attention of local, regional, and national officials, including Senamhi.

In particular, the demonstrated ability of communities to use low cost technological solutions to predict, act, and reduce impact built Senamhi’s confidence in Practical Action’s work. Furthermore, the Sendai Framework came at the right moment to further emphasize the importance of decentralized technologies, community-centered engagement, and EWS.

Given Senamhi’s growing interest, Practical Action intentionally refocused its work at the beginning of Phase II of the Alliance. It strategically aligned its work with government priorities and attention and increased its engagement and focus on national-level engagement. It shifted the focus of its work to be better aligned with Senamhi’s hydrological services and it located its work intentionally in



Practical Action and Senamhi team installing a monitoring station in Arequipa, Peru © Practical Action



Meeting and sharing of information for the operation of a monitoring station between Practical Action and Senamhi teams in Arequipa, Peru © Practical Action

the Rímac watershed, recognizing its importance to the national government: floods in the Rímac watershed directly affect Lima, and the location facilitated working with key stakeholders and government in the capital city. The latter was especially valuable given Peru’s centralized government structure; working close to the capital allowed community interaction with high-level stakeholders.

Practical Action coupled this strategic positioning with evidence of success. It focused on sharing, at the national and regional levels, its experience not just with its low-cost weather stations but also with the way stations were embedded within communities to make the information usable. In doing this, it made sure to make its work relevant to government goals and ways of working. For example, Senamhi recognizes the value of community approaches connecting national services to community needs. But like many national institutions, Senamhi has limitations on how closely

it can work with communities. Because of this, Practical Action seized the opportunity to connect the meteorological agency with the communities with whom Practical Action was working.

To maximize the sustainability of its EWS work, Practical Action sought to facilitate ownership and co-ownership by Senamhi. This meant actively using Senamhi terminology, e.g., naming the weather measurement systems ‘vigilance systems’ rather than ‘monitoring systems’. By adopting Senamhi’s language, Practical Action made it clear that it was not deviating from national regulations, and made it easier for Senamhi to work with it to push forward the same agenda.

Practical Action’s Phase II work was opportunistically bolstered by another extreme rainfall event in 2019. As part of its EWS work, Practical Action has established a Participatory Rain Monitoring Network in the Rímac River Basin (MOP Rímac Network). The MOP Rímac Network works with volunteers who are trained to measure rainfall

using basic rain gauges. In February 2019, the network had 25 community members distributed throughout the basin using handmade, manual rain gauges to measure and report rainfall data. On February 25, three of those volunteers recorded a very localized, extreme rainfall event which resulted in localized flooding. Combining the data from all 25 volunteers and the Senamhi data collection network made clear to everyone involved the highly localized nature of the event, something that had previously been anecdotally reported but never empirically measured. This provided further evidence of the need for a spatially dense precipitation measurement network for accurately predicting flood risk. It also highlighted to Senamhi the potential for communities to be collaborators in meteorological measurement.

Throughout the EWS development and refinement, Practical Action's adaptability and strategic opportunism, supported by the long-term, flexible funding provided by the Alliance, enabled it to seize opportunities while staying on course toward long-term goals. For example, bigger and more formal collaborations, including the expansion of the process to other river basins, emerged from discussions at an event Practical Action co-

organized with Senamhi. Practical Action has also just launched a new strategic collaboration with the Swiss Agency for Development and Cooperation (SDC) and a technical knowledge transfer and exchange between Peru and Bolivia based on the Peruvian EWS work. Overall, the success of Practical Action's EWS work has been a balancing act between the strategic development and execution of plans and activities; ongoing adaptation and refinement of those plans and activities based on learning, particularly at the pause point between Phases I and II of the Alliance work; and flexibly responding to opportunities to provide knowledge and expertise.

Now, Practical Action is poised to support Senamhi with the scale out of its community-based EWS model in the Rímac watershed. This work is taking on its own dynamic, separate from the community-level work Practical Action is engaged in, and leading to new lines of research by Senamhi. This shift from community-level work in Phase I to an integrated community to nation-wide body of work in Phase II has deepened Practical Action's impact, but is also a natural evolution, recognizing that EWS require this level of integration to be fully effective.



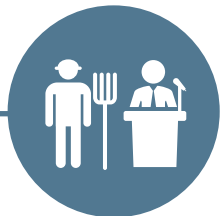
Meeting between Practical Action and Senamhi teams in Cusco, Peru © Practical Action

Why Alliance advocacy was successful



ESTABLISHED RELEVANCE

- Generated community and government buy-in to the program by measuring and sharing comprehensive resilience data (via the FRMC) that validates community priorities and needs.
- Addressed community resilience gaps by connecting national services and government priorities with community needs.
- Encouraged ownership and uptake of new approaches by adopting government language and modifying approaches to better align with government ways of working.
- Pushed forward thinking around communities as central users of climate services and integral parts of developing those systems by leveraging the impact of global frameworks.



BUILT RELATIONSHIPS

- Built strong relationships with government by strategically aligning the work and work locations with government priorities.
- Intentionally shifted the focus of relationship building from local to national between Phase I and Phase II as it became clearer which government stakeholders would be best positioned to scale the work.



PROVIDED EVIDENCE-BASED KNOWLEDGE

- Created a successful, low-cost, easy to use and maintain technology by collaborating with communities and iterating over time to increase usability and efficacy.
- Demonstrated not just a technical solution, but also how the technical solution had to be operationalized (through community capacity building and establishment of community systems and protocols) to be successful.
- Used EWS as a versatile tool for advocacy by demonstrating to key stakeholders its effectiveness in minimizing flood risk for communities.

Additional resources

- [Monitoring rainfall for early warning: Peru's ingenious solutions.](#)
- [Practical Action and Early Warning Systems.](#)
- [How can participatory monitoring help us better understand rainfall?](#)