Flood Resilience Alliance

SOLUTIONS BRIEF — FEBRUARY 2023

Raised granaries and nurseries

Raised granary © Sanjib Chaudhary, Practical Action

Summary

Smallholder farmers in villages on the flood plains of the Karnali river system in Nepal are using raised nurseries and granaries to protect their seedlings and food grains from seasonal floods and unseasonal heavy rain. The raised nurseries protect seedlings from the floodwaters and can be used to create better growing conditions, allowing farmers to grow a wider range of vegetables (including unseasonal vegetables) and improve their harvest. This enhances the human, financial, and social capital of the communities, making them more resilient.

Our approach

As part of wider work to enhance flood resilience in communities, Practical Action worked with 25 communities based on the flood plains of the Karnali river in Nepal. Farming provides food security and a livelihood for these communities, but seasonal floods often destroy their crops. Using the Flood Resilience Measurement for Communities (FRMC) approach, Practical Action worked with the communities to identify priorities to enhance their flood resilience and so improve their financial stability. Raised nurseries and granaries were seen as a priority for protecting food supplies. Practical Action worked with the communities to implement these interventions in order to increase resilience and build capacity.

In numbers

Cost of a granary:
US$16 (in Nepal)

Cost of a raised nursery
US$12 (in Nepal)

Ongoing costs and maintenance
low cost, nurseries rebuilt annually

Time taken to set up
3-5 months from initial discussions, 2-5 days to rebuild annually.

Easy to replicate?
Yes
Yes – communities (and community disaster management committees) can pass on the knowledge.

Nepal

Practical ACTION

Listen to the interview

Mangali Tharu explains how she profited despite the unpredictable monsoon rains.

floodresilience.net
@floodalliance

What was the problem?

Smallholder farmers, including many Tharu communities who have been resettled on the Karnali river floodplains, farm on the riverbanks where frequent floods in the monsoon season and flooding from unseasonal heavy rain were damaging their crops. The damage caused by the floods affected food security as harvested grains and seedlings for planting new crops were often damaged. The loss of seedlings meant communities could not plant their crops for a year, resulting in loss of food and livelihoods. Families were forced to use savings or take out loans to buy food. As a result, many men have left the community to earn a living elsewhere.

What was the solution?

Building raised nurseries and raised granaries was selected as the most appropriate intervention by women in the community after they had discussed possible solutions, based on the results of the FRMC survey and the needs identified. Both work by using a raised structure to protect assets from floodwater. Raised nurseries help protect seedlings and plants, allowing farmers to sell them to other farmers and the community to continue growing vegetables. Raised granaries help households protect their harvested food grains, which were often stored on the ground and therefore lost in floods. Using raised granaries avoids the extra costs and loans required to buy grain to ensure food security.

These solutions were selected as appropriate low-cost interventions, which could be developed using local materials and expertise. Practical Action provided training to selected women farmers on how to build the raised structures. Some opted to build a raised granary, some built raised nurseries, and some built both.

The women who opted to build raised nurseries also took part in a month-long farmer field school where they learnt about improved seeds, tunnel farming, and how to increase their harvest, thereby strengthening food security and business continuity. Farmers were supported by the Centre for Social Development and Research with fertilizer and equipment. Most invested their own money in the construction materials to build the raised nurseries and granaries.

How did it increase resilience?

The raised nurseries allowed farmers to continue growing vegetables despite the floods, provided more protection from pests, and enabled better control of growing conditions, with plastic roofs protecting the crops from the rain. This protected farmers' livelihoods, ensuring business continuity and aiding their household income continuity. Because the farmers were able to sell seedlings to other members of the community, they secured additional income – and supported the food security of the wider community.

Improved cultivation techniques also meant that farmers were able to diversify their crops and plant in the off-season, which resulted in more vegetables, and vegetables that could be sold at a higher price, during off season as well. By working together, farmers were able to benefit from better access to markets, which further increased their revenue.

The raised granaries protected their food grains from floods and supported their household asset and food security. Protecting their grains meant they did not incur extra costs buying replacement food grains, post flood.

Overall, this means the communities are well-equipped to deal with future floods, with greater food security and financial robustness.

Flood Resilience Measurement for Communities (FRMC)

The FRMC was created by the Zurich Flood Resilience Alliance in 2013. It allows users and community members to understand and unpack their resilience and to generate evidence about the ways in which a given area or community is already resilient to floods. It also provides a guide to further develop this resilience.

The process involves working with communities to collect data to assess 44 indicators called 'sources of resilience', which have the capability of generating resilience. The data is analyzed through several different lenses (the '5C-4R framework'), which helps highlight interconnections and dependencies in the data. This deep, systemic, and multi-dimensional insight can help the community to identify and implement resilience-building interventions.

The FRMC process is supported by a web-based tool and an app for mobile devices, which allow for the effective design of studies and seamless data collection and analysis.

Sita Devi's husband is proud of his wife's work with the raised nursery © Sanjib Chaudhary, Practical Action

Other benefits:

- The increased profits from vegetable sales more than covered the cost of building the raised structures and allowed the communities to also invest in raised houses and toilets, increasing their protection and resilience to the floods. Families were able to invest in more education for their children and better healthcare.
- Improved livelihoods also made it possible for some of the men in the community to return home, rather than leaving the area to look for work.
- Many of the women farmers who took part in the training reported increased confidence and felt that they could use their voice in the community far more than before.

Common conditions for success

Is this intervention appropriate for other communities?

Yes, for all flood-prone communities. Raised structures are low-cost, can be constructed using locally available materials, and are easy to replicate.

What conditions are needed for the intervention to be appropriate?

Farming-based livelihoods in an extremely flood-prone area.

Was there anything special about the communities where this was most effective?

- A strong Community Disaster Management Committee (CDMC) that acted as a facilitator
- Women's voices and participation at decision-making levels
- A good systemic analysis of the communities' resilience (using the FRMC)

Success story

Farmers in Kailali in Nepal regularly lost seedlings to the floodwaters caused by the monsoon rains, leaving them with nothing to plant. After taking part in training, the farmers were able to build their own raised nurseries and implement improved vegetable farming techniques. They were able to sell vegetable seedlings to other villagers and grow off-season vegetables to sell at market, allowing them to double their profit.

> ***"Our community is now famous for vegetable cultivation, which has encouraged men from communities to live with their families and cultivate vegetables as a livelihood option. This vegetable cultivation has helped families reunite and reduced male migration."***

Mangali Tharu with her tomato harvest © Sanjib Chaudhary, Practical Action

Listen to the interview

We spoke to Mangali to understand her perspective.

Expert view

Bikram Rana said that the interventions provided a rapid solution for communities to meet their farming and food security priorities in a timely manner, reducing their losses and allowing them to carry on with their traditional livelihoods.

The interventions also enhanced the communities' resourcefulness, providing them with practical knowledge and experience. This helped individuals and the wider community to develop the ability to be more innovative, to cope with situations, to deal with challenges, and to resiliently recover from any setbacks they faced. This in turn boosted their robustness as it helped them to cope with the stress created by floods and the potential loss of food.

Bikram Rana,
Project Manager, Practical Action

Raised nursery during the October 2022 floods © Sanjib Chaudhary, Practical Action

Mangali Tharu with her raised nursery © Sanjib Chaudhary, Practical Action

Lessons learnt

- **Some farmers found that the raised nurseries were not high enough to protect crops from the floods as flood levels were higher than anticipated.**
- **Communities should take into account the likelihood of higher flood levels (due to climate change) and make sure the structures are high enough to provide protection.**

Get in touch

If you have any questions contact: bikram.rana@practicalaction.org.np

For more resilience solutions visit www.floodresilience.net/solutions

Follow us on social or sign up to our newsletter

Further reading

International Federation of Red Cross and Red Crescent Societies (IFRC) (2011) *Breaking the Waves: Impact Analysis of Coastal Afforestation for Disaster Risk Reduction in Vietnam,* Geneva: IFRC < https://www.preventionweb.net/files/globalplatform/entry_bg paper~mangrove impactreportfinallowapril2011.pdf >.

Keating, A., Campbell, K., Mechler, R., Magnuszewski, P., Mochizuki, J., Liu, W., Szoenyi, M., and McQuistan, C. (2016) 'Disaster resilience: what it is and how it can engender a meaningful change in development policy', Development Policy Review 35(1): 65–91 < http://dx.doi.org/10.1111/dpr.12201 >.

The Zurich Flood Resilience Alliance is a multi-sectoral partnership which brings together community programmes, new research, shared knowledge, and evidence-based influencing to build community flood resilience in developed and developing countries.

We help people measure their resilience to floods and identify appropriate solutions before disaster strikes.

Our vision is that floods should have no negative impact on people's ability to thrive. To achieve this we are working to increase funding for flood resilience; strengthen global, national and subnational policies; and improve flood resilience practice.

Find out more: www.floodresilience.net

In partnership with:

Concern worldwide · IFRC · International Institute for Applied Systems Analysis IIASA www.iiasa.ac.at · ISET International · LSE The London School of Economics and Political Science · Mercy Corps · Plan International · Practical Action · Zurich

The Zurich Flood Resilience Alliance is funded by Zurich Insurance through the Z Zurich Foundation; however, the views expressed do not necessarily reflect the company's official position.