Climate Resilience Alliance

SOLUTIONS BRIEF

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Concern Worldwide

Community-led drainage construction to reduce prolonged flooding

Summary

Nij Goddimari village in Lalmonirhat, Bangladesh, faces chronic flooding and waterlogging due to its proximity to the Saniajan River. Through the advocacy of the local community resilience action group (CRAG), a 26 m long U-drain was constructed with government support to protect the village and surrounding farmland from prolonged flooding. The drain prevented crop loss and restored the community's physical access to markets, schools, and healthcare facilities. Community involvement in constructing and maintaining the drain ensured sustainability of the system and strengthened the flood resilience of the village.

Our approach

The local CRAG, which meets monthly in Nij Goddimari to identify and address community resilience needs, led the design and implementation of the U-drain, with support from the Zurich Climate Resilience (ZCRA) programme and Concern Worldwide. The CRAG mobilized financial and technical construction support from the union parishad and upazila administration to support the community-led initiative. The drain was designed using local knowledge and locally available materials, and community members were involved in the construction and maintenance of the drainage system, under guidance from local technical experts.

Facts and figures

Costs:
US$2,150 to construct a drain; approximately $150 every two to three years for ongoing maintenance

Skills:
Community engagement, resource mobilization, partnership building, drainage design, and U-drain construction

Time to implement:
Four months (design and construction)

People reached:
Approximately 4,500 people across a large village

Easy to replicate?
Yes, with some financial and technical construction supports

Bangladesh

CONCERN worldwide

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The constructed U-drain. Photo: Md. Noor Islam Chowdhury, GUK

What was the problem?

Nij Goddimari village and its 4,500 residents experience prolonged flooding due to their proximity to the Saniajan River, which overflows its banks during seasonal floods. Inadequate drainage systems in the village caused waterlogging, which prolonged local flooding and severely damaged crops, disrupting transportation and blocking access routes for community members, including school children. Aman rice is a key crop for the monsoon season and requires flooded fields; however, it is highly susceptible to submersion (which happens if there is increased or flash flooding and floodwater cannot leave the fields), reducing food production and deepening food insecurity for Nij Goddimari's residents. Waterlogging also blocked access routes to markets, preventing residents from selling goods and earning a livelihood, further straining the local economy.

What was the solution?

The Nij Goddimari CRAG led a multi-stakeholder process involving community members, local government staff, and project technical teams to design and construct a strategically located drainage system at a critical waterlogging point, consisting of a hand-dug uncovered U-drain that was 26 m long, 3 m wide, and 1.5 m high. It offers a durable, low-maintenance, and cost-effective solution for managing surface water and floodwater. Compared to alternatives, such as earthen canals or temporary ditches, the U-drain is less prone to erosion, is easier to clean, and provides a long-term safeguard against waterlogging in community and farmland areas.

Constructed using concrete, a material readily available locally, the drain's accessibility and familiarity within the community make the design highly replicable in other flood-prone areas.

The cultivation of rice after the construction of the U-drain. Photo: Md. Noor Islam Chowdhry, GUK

The cultivation of rice after the construction of the U-drain. Photo: Md. Noor Islam Chowdhry, GUK

The drainage system was designed by local experts and engineers to ensure that excess floodwater and stormwater are channeled effectively into the Saniajan River and away from households and farmland. Furthermore, the community members themselves applied existing skills and gained new ones through the process.

Concern Worldwide provided most of the funding through the ZCRA programme, whilst the community and union parishad contributed labour and locally available materials and supervised the construction work. Under the CRAG's leadership, Nij Goddimari community members have committed to maintaining the drainage infrastructure to clear blockages that might prevent the drain from channeling excess water into the nearby river.

How does it increase resilience?

In 2024, the U-drain helped to reduce the severity of four flood events in the Nij Goddimari area, protecting 1,000 households and 100 acres of farmland. While the floods still submerged farmland, the constructed U-drain prevented long-term waterlogging by channeling excess water into the nearby river and ensuring that floodwater receded more quickly

Climate Resilience Measurement for Communities (CRMC)

The Climate Resilience Measurement for Communities (CRMC) is a data-driven process, complemented by a web-based tool and mobile app, which helps communities to evaluate and measure how resilient they are to climate hazards. Using the results, they can identify and implement resilience-building interventions and run additional measurements to track improvements.

Find out more: ZCRAlliance.org/crmc

than previously. With the farmland draining more quickly, aman rice transplants remained unaffected, ensuring an uninterrupted farming cycle and boosting local food security and livelihoods. With reduced waterlogging, road accessibility was improved, enabling traders and farmers to continue transporting goods with less disruption to commercial and economic activities. The drainage system's effectiveness also ensured that children could return to school after two to three days instead of missing two to three weeks due to flooded pathways. By combining community-led assessments, local knowledge and resources, and collaborative planning, Nij Goddimari's community was able to construct a strategic drainage system that increased their self-sufficiency and strengthened their resilience to flood risk.

Other benefits:

- The U-drain reduced stagnant water accumulation in the community, reducing the risk of waterborne diseases and improving community health and well-being.
- Previously, food insecurity because of damaged crops meant that many families were forced to leave home in search of work for four to six months of the year. With agricultural production and activity protected from flood impacts, food security increased, and seasonal migration decreased.
- During floods, women's household burdens increase, with chores such as cooking on outdoor fires, collecting water, and ensuring the safety of children and elderly family becoming more challenging. With floodwater receding more quickly, women's household burdens were decreased.

Common conditions for success:

Q: *Is this intervention appropriate for other communities?*
A: Yes, this intervention can be replicated easily because it relies on locally available materials and construction expertise.

Q: *What conditions are needed for the intervention to be appropriate?*
A: Community-led design and implementation is essential for ensuring a shared sense of ownership and responsibility for the project, and for successful ongoing maintenance of the infrastructure.

Q: *Was there anything special about the communities where this was most effective?*
A: The strong partnerships between community members, local government, and external partners facilitated the mobilization of local resources, technical expertise, and financial support, resulting in successful construction.

Constructed U-drain. Photo: Md. Noor Islam Chowdhury, GUK

Success story

Md. Azhar Ali and his family own approximately two acres of land, where he used to cultivate paddy crops during the dry season but which he left fallow for the rest of the year due to severe waterlogging. While the harvest provided enough food and income for six months, he and his children were forced to leave home for the remaining six months to search for work. In 2024, the improved drainage system in Nij Goddimari meant that his fields were less severely impacted by waterlogging, and he was able to harvest more crops than before.

"Everything changed after the construction of the U-drain. Even after feeding my family, I still have about 2.5 metric tons stored. Now, instead of worrying about food, I am planning to sell a portion and start a business for my youngest child. We no longer need to leave home in search of work. Life has become stable"

Md. Azhar Ali, Nij Goddimari village

Expert view

"The Nij Goddimari model exemplifies how community-driven solutions, strategic infrastructure, and strong partnerships can effectively address waterlogging, enhance resilience, and transform vulnerable areas into thriving, sustainable communities."

Uttam Kumar Nandi,
Secretary of Upazila Disaster Management Committee and Government Project Implementation Officer, Hatibandha, Lalmonirhat

Before the U-drain was constructed in Nij Goddimari..
Photo: Tanoy Kumar Sarker, GUK

Lessons learnt

- Strong community leadership and early support from the union parishad and upazila administration were vital for resource mobilization, technical input, and sustainability.
- Using locally available materials and skilled community labour made the intervention cost effective, replicable, and easy to maintain.
- Community-led design and implementation fostered local ownership, accountability, and ongoing locally managed maintenance of the drainage infrastructure.

Get in touch

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Further reading

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The Zurich Climate Resilience Alliance is a multi-sectoral partnership, powered by the Z Zurich Foundation, focused on enhancing resilience to climate hazards in both rural and urban communities. By implementing solutions, promoting good practice, influencing policy and facilitating systemic change, we aim to ensure that all communities facing climate hazards are able to thrive. **Find out more at ZCRAlliance.org**

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