



# Nature-based solutions to reduce soil erosion

## Summary

Severe erosion from increasing rainfall and river waters increases the flood risk for many riverine communities in Gaibandha District, Bangladesh. Community resilience action groups (CRAGs) are groups of community volunteers trained to support communities in reducing their risk to floods. CRAGs from two of the 11 communities with which Concern Worldwide has been working since 2018 worked with their communities to plant a variety of saplings, plants, and grasses to help minimize erosion, thereby reducing their risk to floods.

## Our approach

Using the Flood Resilience Measurement for Communities (FRMC), which has evolved into the Climate Resilience Measurement for Communities (CRMC), and working with communities, the local government, and experts, Concern Worldwide identified the need to reduce soil erosion to help these communities build resilience to floods.

Concern Worldwide worked with community volunteers to ensure communities were included in the FRMC process. Communities formalized these volunteers into CRAGs, who worked with the local government to identify the planting of local plants and grasses along canal banks as a solution to minimize soil erosion.

## Facts and figures



**Cost of saplings per community:**  
US\$1,005 for 20,000 saplings and cuttings



**Cost of planting per community:**  
US\$2.70



**Time to implement:**  
Three to four months  
(including discussion, decision-making, and planning)



**Lifespan:**  
Unlimited



**Easy to replicate?**  
Yes. It's cost effective, and most plants are locally procured



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## What was the problem?

An intricate network of waterways surround Vati Kapasia and Ujan Burail, two communities situated along the banks of the Teesta River and isolated from the Bangladesh mainland. During the monsoon season (July to October), these waterways turn into formidable torrents, eroding already fragile riverbanks, washing away homes, and inundating nearby communities. For decades, these annual floods have taken a heavy toll on livelihoods, claiming shelters, schools, houses, and acres of crops and farmland. The survival of these isolated communities, known as 'chars' in Bengali,<sup>1</sup> hangs in the balance, leaving the communities fearing the onset of every monsoon season.

## What was the solution?

Working with communities, local CRAGs, the Department of Agricultural Extension (DAE), and experts, Concern Worldwide identified that a nature-based solutions (NBS) approach could be an effective solution. After meeting with the DAE, Concern Worldwide narrowed down the solution based on feasibility, alignment with goals, sustainability, etc. They decided to plant banana saplings, local plants, and grasses alongside canal banks to control erosion because

- this approach builds on local planting practices around homesteads;
- banana plants have a shallow root system that helps to stabilize soil and absorb water to reduce run-off;
- dhol kalmi have an extensive network of deep roots, which help prevent soil from washing away, and their sprawling vines protect the ground from rain and run-off;
- Napier grass can stand in water for extended periods of time and can be used to feed animals.

1 These chars are commonly found in the riverine areas of Bangladesh, particularly in the delta region formed by the Ganges, Brahmaputra, and Meghna rivers. Chars can be temporary or permanent, and they play a significant role in the geography and ecology of the region.



CRAG meeting agenda focuses on nature-based solutions to mitigate flood-related losses and strengthen the community's resilience. Photo: Saikat Mojumder, Concern Worldwide



A CRAG reconstructed embankments for flood resilience and built pathways to make movement easier during floods. Photo: Gavin Douglas, Concern Worldwide

Community members planted 3,000 banana trees along the 1 km canal's edge and introduced 7,000 dhol kalmi cuttings and 10,000 binnarthope cuttings to serve as a protective buffer. The Zurich Climate Resilience Alliance programme provided BDT200,000 (CHF1,587) to support logistics and labour. The community contributed BDT200,000 (CHF1,587) of in-kind support, and the DAE and the Department of Forestry provided strategic guidance on tree planting. The CRAGs and community provided regular care and follow-up.

## How does it increase resilience?

The stabilization of the canal banks by planting banana trees, dhol kalmi, and binnarthope plants builds on local practices that use similar planting efforts around homesteads and on best practices for managing canal and riverbank erosion. In 2023–4, after the planting was completed, less soil erosion occurred along the canal and riverbank. Previously, canal banks would see 7–8 m of soil erosion on an annual basis; however, this was not observed after the planting. Moreover, the planting reduced erosion and the work required to maintain the canals. When there are high levels of erosion, the canals need more regular maintenance, as they become shallower, increasing the risk of flooding. With limited erosion taking place, the canals maintain their depth,

### 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](https://ZCRAlliance.org/crmc)

allowing water to flow with higher capacity without the impact of widespread flooding. The collaboration between CRAGs, the community, and the local government has also increased social capital and empowerment.



Life is a relentless struggle against the constant threat of losing homes and croplands to riverbank erosion.  
Photo: Saikat Mojumder, Concern Worldwide

## Common conditions for success:

**Q:** *Is this intervention appropriate for other communities?*

**A:** Yes, the intervention of protecting canal and nala (small water channels) banks from erosion is highly appropriate for other communities facing similar challenges in flood management. This solution leverages locally available, fast-growing, and cost-effective plant species with proven benefits in stabilizing soil and reducing erosion.

**Q:** *What conditions are needed for the intervention to be appropriate?*

**A:** Community participation and engagement are the preconditions for the success of this intervention. Community willingness is vital for planting, maintenance, grazing protection, watering, etc.

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

**A:** The urge to find a solution to this problem from the community as a whole and the consensus to work on the solution jointly.

## Success story

Raja, a widow living near the Vati Kapasia canal, always used to worry that flooding might erode the canal bank under her house. Now, with the planting, she knows that her house is more secure against current flood levels.

*“We used to be terrified that the canal would dissolve while we were sleeping, especially during monsoon season. After tree planting, we now sleep peacefully at night”*

*Raja, local resident*



Displaced families have relocated to a flood-resistant plot in Kajir Char.  
Photo: Saikat Mojumder/Concern Worldwide



## Expert view

The Vati Kapasia and Ujan Burail communities showcase a commendable model of resilience through collaborative efforts and utilizing nature-based solutions (NBS). Their strategic use of banana trees, dhol kalmi, and binnarthope plants not only combats canal and river erosion but also fosters environmental and social resilience. By actively involving community members and aligning with nature, this initiative serves as a testament to the efficacy and sustainability of NBS in addressing pressing environmental challenges, offering valuable insights for similar communities grappling with canal and river erosion threats.



**Liton Mia,**

Sub-Assistant Agriculture Officer, DAE,  
Sundarganj, Gaibandha, Bangladesh



Monthly CRAG meeting in which the ultimate goal is to reduce the loss and damage from flooding.  
Photo: Gavin Douglas, Concern Worldwide

## ! Lessons learnt

- Sustainability is supported through collaborative initiatives.
- NBS reduced hazard risks without negatively impacting the natural environment.
- The solution works with current flooding, but it is not clear how it will perform during severe flooding.

## Get in touch

If you have any questions contact:  
Afsari Begum,  
Programme Manager, Concern Worldwide  
[afsaribegum@concern.net](mailto:afsaribegum@concern.net)

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