

How agroecological farming almost halved cyclone damage

Evidence from coastal Bangladesh





+ When Cyclone Remal struck coastal Bangladesh in May 2024, not all households were equally affected. Those who had spent years farming agroecologically - building diverse crops, sharing knowledge through Farmer Field Schools, and strengthening their community networks - experienced roughly half the damage of their neighbours. They also recovered faster, relied on savings rather than debt, and were more likely to emerge from the crisis better prepared than before.

Soleiman producing gourds on a trellis structure

The BRACE study (Building Resilience through Agroecology for Coastal Emergencies) conducted in cooperation with BOKU University compared 297 programme participants against 80 matched non-participants across three coastal villages in the Latachapli Union of Kalapara Sub-District, all struck by Cyclone Remal in May 2024. Both groups lived on similarly small plots of land, in the same villages, facing the same storm. Programme participants tended to come from more educationally disadvantaged backgrounds - making the resilience differences that follow all the more striking.

For donors and practitioners working on climate resilience, the central finding is stark: the single strongest predictor of whether a household survived and recovered well, was not where they lived, or how much land they owned, but whether they had participated in a sustained agroecological programme. Location explained almost nothing. Programme participation explained almost everything.

About the Proyash Programme

Proyash – meaning ‘effort’ in Bengali – is a Caritas Bangladesh programme funded by CAFOD, launched in April 2019 to support 3,000 marginalised families in the southern coastal belt of Bangladesh.

Through Farmer Field Schools (FFSs), households learn agroecological practices through collective experimentation – testing crop varieties, building soil health, and developing ecological pest management. Over time, these schools became community preparedness hubs.

Women’s Business & Information Centres gave women access to markets, training, and income opportunities. Seed banks provided access to climate-tolerant, locally adapted varieties before and after disasters.

The programme builds technical skills, social networks, and – critically – the confidence and knowledge to act before a cyclone arrives.

Before the Storm

Before Cyclone Remal hit, the two groups of households were already living in fundamentally different states of readiness - not because of their geography or wealth, but because of how they farmed and who they were connected to.

Agroecological Practices

Programme households had an agroecology score of 3.11 out of 4 compared to **0.96 for non-programme households**. The gap is not marginal - it reflects a fundamentally different model of farming.

In practice, this meant:

- **98% of programme households** participated in Farmer Field Schools, versus 4% of non-programme households.
- **97% had seed bank access**, compared to 4% of non-programme households - giving them local climate-tolerant varieties ready to plant after a storm.
- **99% maintained kitchen gardens** (vs. 68%), providing food security buffers during disruptions.
- **Monocropping - the most fragile system** - was practised by just 1% of programme households but 51% of non-programme households.
- **Programme participation was the strongest predictor of practice uptake**, even after controlling for land size, financial inclusion, and service access.

Community seed banks ensure quick access to local crop varieties for post cyclone recovery



Recovering from the Storm

How households cope in the days and weeks after a cyclone determines whether they recover fully or remain trapped in a cycle of debt, asset loss, and vulnerability to the next storm.

Coping Strategies

- **Programme households relied predominantly on savings:** 73% reported using savings, compared to 28% of non-programme households.
- **Non-programme households turned to debt:** 54% relied on loans or credit (vs. 26% of programme households) and were far more likely to sell assets or disrupt household stability.
- **Food insecurity was widespread for all households**, with meal reduction reported by 74% of programme and 55% of non-programme households - underscoring that the cyclone was severe for everyone.

Recovery Pathways

- **Recovery was significantly faster among programme households**, with earlier resumption of farming and household routines.
- **Programme households prioritised restoring farming first.** Non-programme households focused first on housing repair and food security, remaining in a stabilisation phase for longer.
- **Programme households were more likely to 'bounce forward'**, using the recovery period to adapt their farming practices or diversify income, rather than simply restoring what was lost.
- **Most programme households reported full recovery at the time of the survey.** Many non-programme households continued to face unresolved deficits, particularly in farming.



The strongest driver of recovery was the agroecological composite index - households with greater agroecological transition recovered faster and more adaptively, even after controlling for damage, support, and other factors.

Sanjita Rani cultivating vegetables in movable sacks



Preparedness and Anticipatory Capacity

Knowing a storm is coming is not the same as knowing what to do. The study found a profound gap in preparedness between the two groups.

- **Programme households had made multiple permanent improvements** to their farms to reduce cyclone-related risks. Non-programme households had most often made no changes at all.
- **Programme households rated their preparedness actions as highly effective** (2.61 vs. 0.38 on a 0–3 scale).
- **Preparedness was knowledge-driven:** almost all programme households attributed their actions to training and programme engagement. Non-programme households relied mainly on past shock experience.
- **Agroecological transition was also associated with stronger social capital**, collaboration, and future-oriented thinking - programme participants more frequently emphasised collective action and personal agency.



68% of non-programme households said they did not know what actions to take before Cyclone Remal arrived. Among programme households, the figure was 2%.

During the Storm

All 377 households faced the same cyclone. They lived in the same three villages, at similar distances from water bodies. The storm did not discriminate by location. But the damage it caused was anything but equal.

Cyclone damage to vermicompost shed



Despite the same exposure, non-programme households experienced roughly double the damage (2.65 vs 1.36 on a 0–3 scale)- across crop loss, livestock loss, infrastructure damage, and income loss.

- **Damage variation was barely explained by location.** Distance to water bodies - the most commonly assumed risk factor - accounted for little of the difference in outcomes.
- **Programme participation was the strongest predictor of lower damage**, even after statistically controlling for village location, distance to water, farm size, and household size.
- **The composite damage index confirmed a large, consistent gap** across every dimension measured.

What This Tells Us

The data reveals a clear sequence. Programme participation builds agroecological practices and the confidence to prepare for shocks and stresses. Together, these reduce damage when a cyclone strikes. Less damage means less reliance on debt or asset sales to cope. And households that cope without eroding their assets recover faster and more fully. Each step reinforces the next. Piecemeal interventions that address only one link in this chain tend to produce weaker results.

Community networks, aid organisations, and the connections built through Farmer Field Schools all matter - often more than physical infrastructure. Recovery is a collective social process, not an effort undertaken by households alone.

What protected households from the worst of Cyclone Remal was not where they lived, but what they knew, who they knew, and how they farmed. The more agroecological their farming practices, the more resilient they were. This allows us to conclude that vulnerability to storms – and resilience – are socially constructed. Communities and households with greater skills, better information, and stronger networks pass through storms far more safely than others.



"In May 2024, Cyclone Remal severely damaged my house and kitchen garden. However, my vermicompost unit and sack garden remained intact, allowing me to restore my livelihood quickly after the disaster."

Lutfa Begum,
52 year old agroecological farmer

Recommendations

For NGOs and Donors

Place agroecological programmes at the centre of resilience programming.

Sustained, iterative training is the strongest upstream driver of both practice adoption and preparedness. Programmes should be continuous, not delivered as one-off sessions.

Explicitly connect agroecology to disaster preparedness (as well as the wider humanitarian programme cycle).

Help farmers understand how diversification, soil management, and on-farm integration are not just farming practices but directly reduce cyclone losses and improve recovery speed. This could reduce future reliance on humanitarian aid.

Build anticipatory capacity as part of farming, not separately.

Embed preparedness planning into agricultural decision-making so it becomes a normal part of how households manage their livelihoods.

Strengthen social and institutional linkages.

Recovery outcomes are consistently stronger for households embedded in supportive networks. Farmer groups, knowledge platforms, and NGO connections are not peripheral – they are core to resilience.

Reduce reliance on erosive coping strategies.

Promote savings mechanisms, income diversification, and asset-protection assistance so households do not have to sell their way through a crisis.

Support adaptive recovery, not just restoration.

Allow flexibility in recovery support so households can adjust farming systems and strengthen preparedness for future shocks, rather than simply rebuilding what was lost.

Invest in small but mighty approaches.

Relatively modest funding (the Proyash programme cost £70,000 annually over five years, or around £115 per participant household) can reach thousands of farmers and deliver substantial impact, representing strong value for money.

For Policymakers

Adopt a systems-based approach to climate resilience.

Isolated investments in infrastructure, farming, or relief alone are less effective than integrated approaches that connect agroecology, preparedness, and post-disaster support across the full disaster cycle.

Balance physical protection with sustained capacity building.

Embankments and shelters remain essential, but this study shows household capacities matter more than location in determining outcomes. Long-term investment in farmer training offers strong value for money.

Embed agroecology within national climate adaptation strategies.

The evidence supports integrating agroecology into the National Adaptation Plan, Bangladesh Delta Plan 2100, and DRR frameworks as a proven pathway to farm resilience.

Strengthen post-disaster support quality and coordination.

Timely, well-coordinated support from NGOs, extension services, and local government is a strong predictor of recovery. Coordination should be treated as a policy priority, not an afterthought.

Align financial tools with resilience objectives.

Promote savings mechanisms and recovery-sensitive financial products. Post-disaster assistance should protect productive assets, not push households into debt.

Recognise recovery as an opportunity to build back better.

Support households to improve practices and diversify livelihoods during recovery - those who adapt tend to become more resilient to future cyclones.



*Minara Begum
fertilises her
flourishing garden
with vermicompost*



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