

Building Community Resilience Through Safe Housing, Water Security, and Climate Preparedness

An Evidence-Based Assessment from South 24 Parganas, West Bengal

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EQUIDIVERSITY FOUNDATION
Promoting Equity in Diversity

Executive Summary

Women in the coastal villages of South 24 Parganas face disproportionate and compounding impacts of climate change. These include increased water collection burdens, responsibility for household recovery, and heightened health risks. At the same time, women are leading climate response efforts through Nari Jagaran Committees by conducting surveys, water testing, and participating in local governance. This report highlights both vulnerability and strong women-led climate leadership.

The South 24 Parganas district—forming the northern part of the Indian Sundarbans—is among the most climate-vulnerable regions globally. Over the past decade, the area has faced repeated high-intensity cyclones such as Aila (2009), Bulbul (2019), Amphan (2020), Yaas (2021), and Sitrang (2022). These disasters have produced cumulative and compounding impacts:



Cyclone Amphan alone destroyed or damaged over 28 lakh houses in West Bengal, with South 24 Parganas accounting for the highest proportion. Saline water inundation affected more than 1.5 million people, contaminating drinking water and destroying agricultural land. Recurrent cyclonic winds exceeding 120–150 km/h destabilize traditional housing structures and increase household repair costs annually. The region experiences progressive embankment failure, leaving approximately 40% of settlements exposed to tidal flooding.
Women and girls experience disproportionate impacts, including increased drudgery, water scarcity, mobility restrictions, and heightened risks during emergencies.

Against this backdrop, the Equidiversity Foundation, Nari Jagaran Committees, and trained youth volunteers carried out a series of community-led assessments on housing safety, water quality, pond health, and embankment stability. The analyses reveal significant infrastructure degradation and systemic climate vulnerability, but also a high degree of community readiness, particularly among women-led collectives.

This report consolidates the evidence and proposes a Community Resilience & Demonstration Initiative that focuses on:

- Demonstrating cyclone-resilient housing solutions
- Ensuring safe drinking water through tube-well rehabilitation and women-led water testing
- Revitalizing critical ponds and watershed structures
- Strengthening river embankments using ecological and structural measures
- Building long-term community capacity, with women at the center of governance

The next level initiative based on the finding can directly benefit **600–800 households** and influence more than **3,000 community members**, establishing a scalable model for climate resilience in the Sundarbans.

Background and Problem Analysis





The climate risks in South 24 Parganas arise from a combination of environmental degradation, weak infrastructure, and socio-economic vulnerability. The community-generated data reveals a multi-dimensional risk environment affecting housing, water, and ecological systems.

Equidiversity Foundation employed a participatory evidence-generation model, empowering women's groups (Nari Jagaran Committees) and youth volunteers to assess risks systematically. This approach yielded quantitative data, qualitative observations, and locally informed risk interpretations, enabling a more accurate and legitimate representation of vulnerabilities.

Community Led Situational Analysis

1. Community-Led Documentation and Housing Risk Assessment

Training Engagement

- 18 village-level sessions conducted
- 426 women and 112 youth trained in housing safety diagnostics
- 355 households participated in hazard identification exercises
- Coverage across 7 villages within the Gram Panchayat

Key Analytical Findings

- **64% of houses** have traditional two-slope asbestos roofs—structurally weak in cyclonic wind conditions.
- **71% of these roofs** lacked proper clamp spacing (<3 ft), increasing risk of uplift.
- **42% of houses** have verandah roofs fixed to the main structure, creating a domino-collapse risk.
- **29% of homes** have unsafe door–window alignments, increasing internal air pressure during storms.



2. Community Water Testing by Women and Youth

Community volunteers conducted water testing using pH, TDS, EC, turbidity, and sensory assessments across **47 tube wells**.

Quantitative Results

- **38%** (18/47) had TDS >500 mg/L (unfit for drinking).
- **51%** (24/47) had EC >200 µS/cm, indicating high salinity and mineral content.
- **43%** (20/47) showed unsafe turbidity levels.
- **23%** (11/47) had iron odour/taste or discoloration.
- **19%** (9/47) were partially or fully non-functional.
- **13 wells** had cracked platforms; **8 wells** lacked overhead shade.
- **9 instances** recommended urgent laboratory testing.



These results point to a widespread breakdown of drinking-water infrastructure, driven by saline intrusion, platform damage, and lack of preventive maintenance. Women spend more time collecting water from distant or unsafe sources, exacerbating health and livelihood stress.



3.Community Monitoring of Ponds and Watersheds

A total of **22 ponds**—essential for household water use—were monitored.

Findings

- **64% (14 ponds)** have moderate to severe embankment erosion.
- **45%** show contamination from cattle washing or domestic waste.
- **73%** lack protective vegetation.
- Only **23%** underwent liming or bleaching within the last year.
- **36%** are used for bathing/utensil washing—high risk for waterborne diseases.

Ponds remain a critical gendered resource, primarily managed and used by women. Their decline indicates both ecological stress and systemic neglect. Lack of vegetative cover accelerates erosion, while contamination raises daily health hazards for women and children



4. Summary of Findings from a "Study of Common Ailments" Across Age Groups in 2021-22 in the same geographical area conducted with Udayan NGO

The study conducted in between the 2 phases of covid and post Amphan with 27 respondents across Govt. Health workers (ASHA, AWW, ANM), private doctors and other health service providers indicate a clear health burden pattern linked to unsafe water, sanitation gaps, pond contamination, and seasonal climate shocks in 2 Gram Panchayat areas of Pathar Protima Block of Sunderbans. Across age clusters, ailments concentrate around four recurring categories: **water-borne illnesses, skin & hygiene conditions, vector-borne diseases, and musculoskeletal strain.**



Key Findings:

➔ Children (0–14 years) face the highest exposure to unsafe water and open ponds, with weekly symptom recurrence during monsoon peaks.

- High incidence of diarrhoea, stomach infections, and fever.
- Recurrent skin rashes and fungal infections due to contaminated pond use and stagnant water.
- Cold, cough, and throat irritation linked to damp housing and cyclonic humidity.
- Play-area exposure near ponds = heightened vulnerability.

➔ Health stress intersects with gender norms, mobility limits, and hygiene constraints for adolescent girls (15–21 years)

- Anaemia, fatigue, and appetite loss observed frequently (especially girls).
- Dermatitis and skin allergies due to washing/bathing in degraded ponds.
- Menstrual discomfort complications connected to poor sanitation + water access.
- Headaches and vision strain noted during summer heat spells.

➔ Women (18–60 years) bear compounded physical and mental health load — as primary water collectors, caregivers, and pond-use managers.

- Highest reported group for gastro-intestinal infections, diarrhoea/loose motion, and chronic acidity from inconsistent water quality.
- Musculoskeletal pain (back, knee, shoulder) from daily water-carrying loads.

● Skin conditions like eczema, fungal patches, itching from repeated pond contact.

● Hypertension, stress-related migraines linked to repeated climate shocks and caregiving pressure.

➔ Elderly (60+)

● Persistent joint pain, rheumatism, and breathing complications made worse by damp walls and cyclone leakage.

● Recurrent digestive infections when water is untreated or saline.

● Skin irritation noted from pond proximity and mosquito-dense embankments

Cross-Age Analytical Insights

Ailment Cluster	Primary Drivers	Affected Groups
Water-borne Disease	Unsafe wells, saline intrusion, pond contamination	Children, Women, Elderly
Skin Infections	Pond degradation, detergent runoff, algae, stagnation	Children, Adolescents, Women
Heat Stress & Headaches	Rising heat waves, tin/asbestos roofs	Adolescents, Elderly
Musculoskeletal Strain	Water load carrying, flooding displacement	Women, Elderly

Key Gendered Takeaways

a. Women exhibit the highest disease exposure frequency due to:

❖ repeated pond contact (washing, cleaning, livestock)

❖ water-collection drudgery

❖ caregiving burden for sick family members

b. Girls and adolescent women report anaemia + menstrual hygiene complications, exacerbated by lack of safe water.



The ailment trends observed across age groups are directly linked to environmental and infrastructural stressors rather than incidental illness patterns. Salinity intrusion in wells, erosion of ponds, cyclone-damaged roofs, embankment seepage, and contamination at domestic washing points together create a continuous pathway of exposure to waterborne and hygiene-related diseases. These conditions demonstrate that current health outcomes are largely preventable rather than inevitable. With investment in safe-water systems, pond restoration, climate-resilient housing, and

embankment reinforcement—implemented through women-led community committees—these recurring ailments can be substantially reduced and long-term wellbeing restored.

5. River Embankment Vulnerability Assessment

Community youth documented **4.3 km** of embankments, identifying:

a. 17 high-risk points
b. 6 active cracks
c. 5 sites of soil extraction
d. 3 sections weakened by encroaching fisheries
e. 0 vegetative protection measures prior to intervention

The embankment system is deteriorating under pressure from tidal surges, unregulated human activity, and ecological degradation. These failures threaten not only property but the habitability of entire settlements, particularly where women face restricted mobility and heightened disaster risk.





Community driven resilience is visible and sustainable, with women and youth positions as frontline implementors.

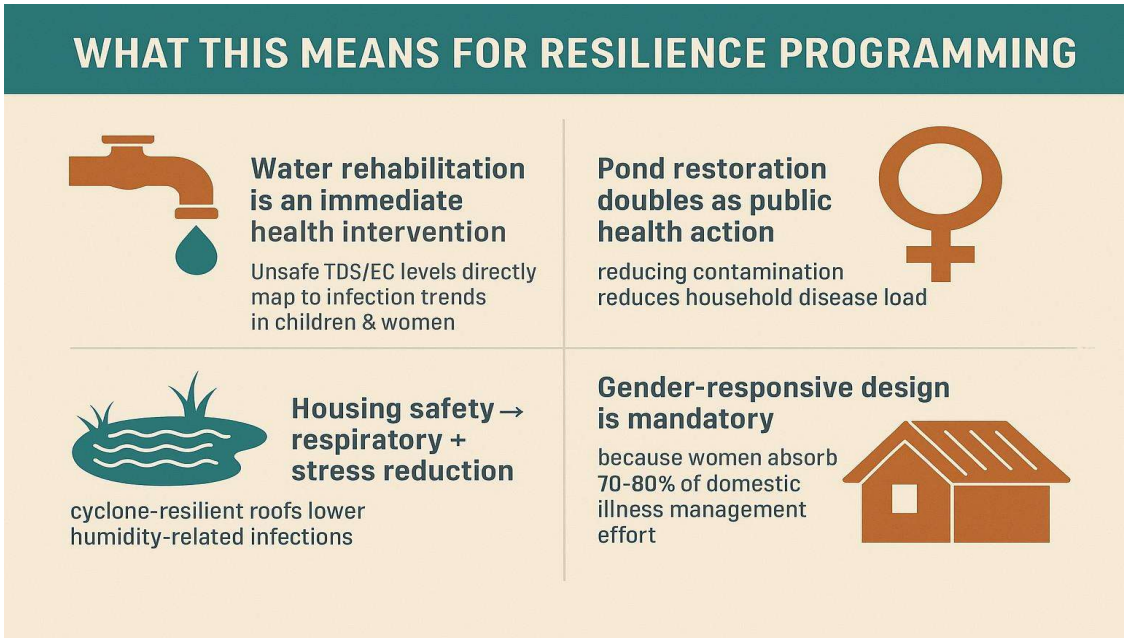
6. Evidence of Community Willingness and Capacity

Community engagement indicators reflect strong ownership:

a. Women's committees expressed readiness to maintain water-testing cycles.
b. Youth volunteers have adopted GPS-based monitoring.
c. Households showed high willingness to adopt cyclone-resilient roofs if affordable.
d. Communities demonstrated commitment to pond and embankment protection.

Why This Evidence Matters

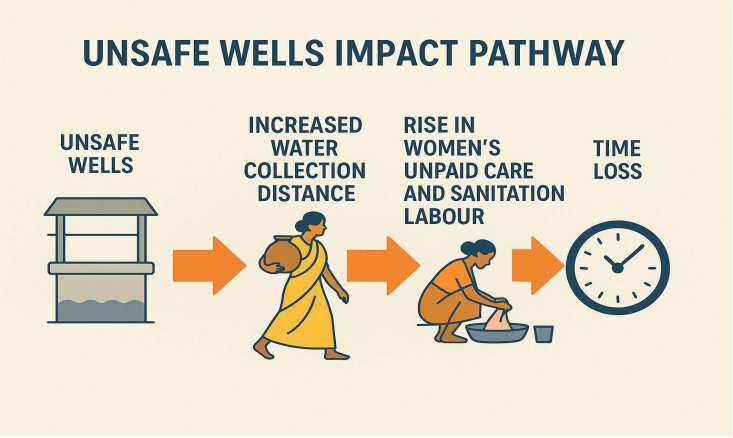
The collected evidence is not theoretical—it is locally generated, technically verified, and points directly to actionable risks. It demonstrates that communities already possess the capacity to monitor, document, and guide resilience solutions, requiring investment primarily in infrastructure, demonstration models, and technical reinforcement. The data reflects a multi-system vulnerability (housing, water, ponds, embankments) and a clear pathway for sustainable, women-led climate adaptation with minimal long-term dependency.



Way Forward

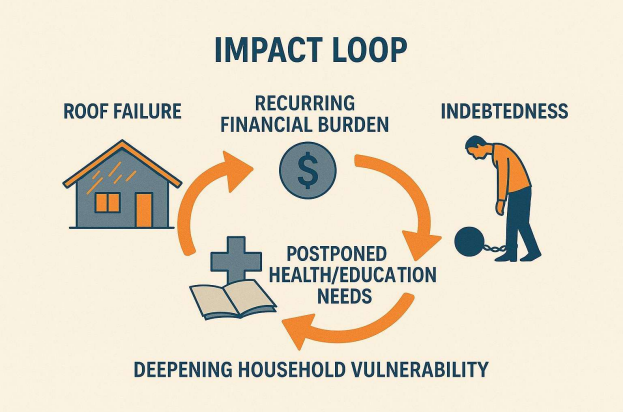
The integrated analysis of water testing records, housing assessments, pond observations, and embankment monitoring confirms a systemic pattern of climate-driven fragility across South 24 Parganas. Rather than isolated infrastructure failures, the data reveals interconnected risk loops linking cyclones, saline intrusion, structural erosion, and women's safety burdens.

Drinking Water Stress Is Chronic, Not Episodic: With **70% of tube wells either contaminated or structurally compromised**, the community faces persistent water insecurity, not just monsoon-season risk. Elevated EC/TDS readings reflect cumulative saline intrusion after cyclones like Amphan, Yaas, and Aila. Broken platforms, turbidity, and missing shades signal high contamination probability during runoff. **Water security is both a climate safety intervention and a women's time-economy intervention.**



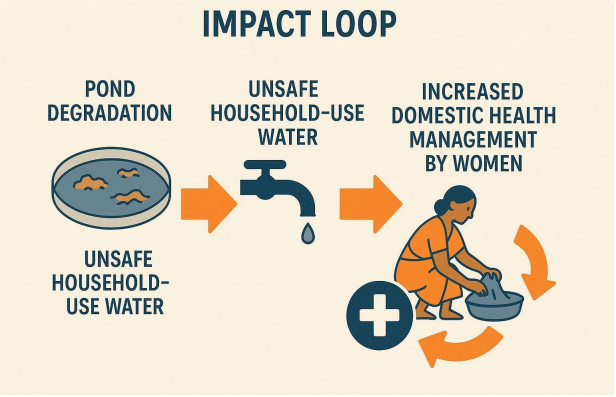
Housing Failures Are Technically Preventable: Two-slope asbestos roofs, incorrect clamp spacing, and verandah attachments show a pattern of **non-resilient rural construction norms**. Each cyclone season triggers re-repair cycles, draining savings.

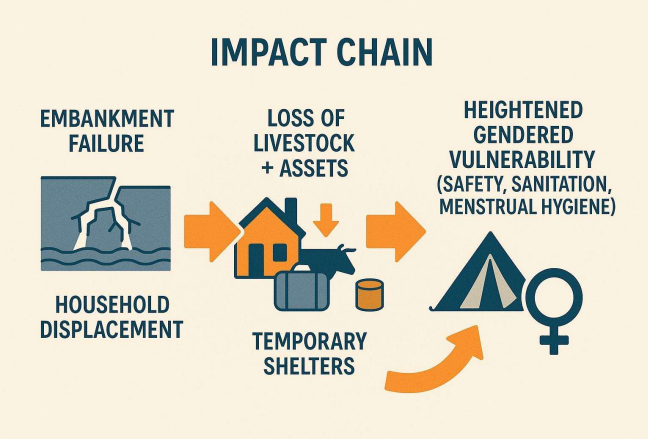
Roof safety is not just engineering—it is poverty prevention.



Ponds Reflect Ecological and Gender Stress: Ponds are not passive water bodies; they are gendered infrastructure. With 64% eroded, 73% vegetation loss, and 36% used for bathing/utensils, degradation directly hits hygiene, disease exposure, and women's workload.

Pond restoration is simultaneously ecosystem repair + WASH + unpaid labour reduction.





Embankment Fragility Is a Settlement-Level Threat: The 4.3 km stretch showing **17 high-risk points** and absence of vegetative binding underscores direct land–life risk. Each breach displaces entire clusters, not individuals. **Embankment strengthening is not an annual repair—it is community protection architecture.**

Overarching Analysis

- Damage is recurrent, predictable, and climate-amplified.
- Impacts accumulate disproportionately on women and girls.
- Solutions already have community legitimacy and trained local agents.

This shifts the programme from crisis-response to prevention-based climate adaptation.

The evidence clearly indicates that investment in climate resilience in South 24 Parganas is no longer optional, but strategically urgent.

- *Critical thresholds have been exceeded:* Key indicators, such as electrical conductivity (EC), show widespread exceedance beyond safe limits, signaling systemic water quality failure rather than isolated issues.
- *Climate impacts are outpacing recovery capacity:* The frequency and intensity of climate events are accelerating infrastructure degradation faster than communities can repair or adapt using their own resources.
- *Local capacity is already established:* Women's groups and youth volunteers are trained, actively engaged, and generating credible, community-level monitoring data—creating a strong foundation for immediate and scalable intervention.

These conditions position the proposed interventions in direct alignment with global climate financing priorities, including:

- **Low-regret investments** that deliver benefits across multiple risk scenarios
- **Nature-based solutions** that restore ecological balance while strengthening resilience
- **Women-led adaptation models** that ensure sustainability and social equity
- **Multi-hazard resilience approaches** addressing interconnected climate risks

Together, this makes investment not only necessary, but **highly strategic, scalable, and impact-efficient**.

Way Forward: Strategic Programme Priorities

The evidence points to the need for a systemic, locally-led, and gender-responsive climate resilience strategy, where infrastructure strengthening is combined with women's leadership, ecological restoration, and community governance.



Priority Action	Rationale	Expected Transition	SDG Alignment
Cyclone-Resilient Housing Demonstrations	High proportion of losses originate from roof failure during cyclones	From repetitive repair cycles → **preventive, resilient housing systems**	SDG 11, SDG 13
Women-Led Water Safety Governance	Majority of water sources unsafe; women bear primary burden of collection and care	From unsafe, time-intensive dependency → **locally monitored, women-led water systems**	SDG 6, SDG 5, SDG 3
Pond & Watershed Eco-Restoration	High erosion, contamination, and ecosystem degradation impacting health and livelihoods	From degraded and contaminated systems → **restored ecological balance and safe water use**	SDG 6, SDG 15, SDG 3, SDG 13
Embankment Strengthening (Ecological + Structural)	Multiple high-risk points threaten entire settlements	From recurring breach risk → **long-term settlement protection and climate buffering**	SDG 13, SDG 11, SDG 15
Community Climate Leadership (Women & Youth)	Existing trained groups lack institutional support and decision-making authority	From participation → **institutionalized local leadership and governance**	SDG 5, SDG 16, SDG 17

Strategic Value Proposition for Donors

This programme offers a high-confidence, scalable, and systems-oriented investment opportunity with its:

- Reduced implementation risk: Community-generated data ensures accuracy and ownership
- Gender-transformative impact: Women's leadership reduces long-term dependency and care burdens
- Scalability: Demonstration models are replicable across climate-vulnerable geographies &
- Integrated outcomes: Addresses infrastructure, ecosystems, public health, and time poverty simultaneously

Resilience in South 24 Parganas is not solely an infrastructure challenge—it is a **gendered, ecological, and systemic transformation agenda**. Strategic investment will strengthen infrastructure, restore ecosystems, secure water, and reduce women's labour burdens—shifting communities from recurrent climate loss to sustained resilience, dignity, and locally-led development.