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The Impact of Microinsurance on Post-Disaster Recovery Time: Evidence from Vulnerable Households in Bangladesh

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Abstract

This study explores how microinsurance can help strengthen the economic resilience of poor households in rural Bangladesh after natural disasters. By analyzing data from 200 households affected by a cyclone, we used a Logit (logistic regression) model to look at how microinsurance impacts the chances of recovery, specifically focusing on whether households can fully recover within six months. In our analysis, we considered several socio-economic factors, such as household size, education level, asset value and income. Our findings indicate that microinsurance significantly increases the likelihood of a timely recovery, suggesting a strong causal link, which we further confirmed through additional robustness checks. These results highlight that microinsurance not only helps households recover more quickly after a disaster but also reduces their vulnerability to future shocks, thereby strengthening their overall resilience. This research offers important insights for policymakers, pointing to the necessity of expanding inclusive insurance schemes to enhance disaster resilience in vulnerable communities.

Keywords: *Microinsurance; Economic Resilience; Rural Households; Natural Disasters; Logit Regression; Climate Adaptation*

Introduction

Background of Study

Natural disasters such as cyclones, floods, and soil erosion pose persistent threats to livelihoods in Bangladesh, particularly in coastal and flood-prone areas. This country faces an estimated annual loss of nearly $3 billion from extreme weather events (Adil et al., 2025). Recent estimates from the World Bank (2023) that the poor households\ disproportionately, leading to significant income and well-being losses

that deepen poverty. While there have been improvements in emergency response efforts, the ability of low-income populations—who often depend on subsistence agriculture and informal employment—to achieve sustained recovery remains severely limited.

Microinsurance, which consists of affordable, low-cost insurance products specifically designed for low-income households, has emerged as a promising financial mechanism to enhance climate resilience. It provides timely payouts that can help mitigate the immediate impacts of disasters and facilitate quicker recovery. However, there is a lack of empirical evidence regarding whether microinsurance causally contributes to improved recovery within a specific timeframe, especially within the Bangladeshi context. Most existing studies tend to concentrate on aspects such as insurance uptake or asset protection, often overlooking critical recovery benchmarks.

Problem Statement

Microinsurance initiatives have been launched in Bangladesh by various organizations, including non-governmental organizations (NGOs), microfinance institutions (MFIs), and government programs. However, the actual uptake of these initiatives remains relatively low. Furthermore, the impact of microinsurance on post-disaster recovery, especially within the critical six-month period following a disaster, is not well understood. This lack of empirical evidence presents a significant barrier to scaling policies and designing effective insurance products. It is essential to investigate whether microinsurance not only correlates with improved recovery outcomes but also has a causal effect on the accelerated rebuilding of income and assets during this important timeframe. Such understanding is vital for informing future policy development and ensuring that microinsurance can effectively support vulnerable populations in their recovery efforts.

Rationale of the Study

This research seeks to fill an important gap by examining how Microinsurance impacts household recovery in the crucial six months following a disaster—a timeframe recognized by experts as a key measure of resilience (Sphere Association, 2018; UN OCHA, 2020). By exploring this relationship, we aim to provide valuable insights for policymakers. These insights can help in developing effective financial strategies for disaster risk reduction, which align with Bangladesh's climate adaptation objectives, including the Delta Plan 2100 and the National Adaptation Plan.

Significance of the Study

This study provides important insights for academics, policymakers, and development practitioners alike. By using a robust econometric method known as logit regression, the research carefully accounts for socio-economic factors, including household size and education level. The findings help establish causal relationships, which can inform the development of inclusive insurance schemes and targeted interventions aimed at supporting vulnerable populations. These insights are vital for creating policies that truly meet the needs of communities affected by disaster, ultimately contributing to more resilient recovery efforts.

Objective of the Study

The primary objective of this study is to evaluate the effectiveness of microinsurance in enhancing the economic resilience of disaster-affected rural households in Bangladesh. Specifically, the study seeks to:

a) Determine the current insurance coverage rate in rural Bangladesh and identify necessary policy actions to increase coverage

b) Evaluate whether microinsurance coverage causally increases the likelihood of full household recovery (bounce back) within six months following a natural disaster.

c) Examine the influence of socio-economic factors (education, household size, asset) on recovery time.

d) Provide evidence-based recommendations to improve microinsurance product design, implementation, and integration into disaster resilience policies.

Literature Review

Microinsurance and Economic Resilience

Microinsurance has emerged as a vital financial tool for low-income and vulnerable communities, particularly those facing recurring climate and disaster-related shocks. Its core function is to provide immediate financial relief, helping households cope with unexpected events and recover more quickly. Research indicates that families with microinsurance are often better equipped to preserve income and protect their assets during crises than those without such coverage (Cole et al., 2013; Mahul & Stutley, 2010; Mechler et al., 2019).

While the theoretical advantages of microinsurance—such as risk-sharing and protection from catastrophic losses—are well-established, direct empirical evidence linking it to accelerated recovery remains relatively limited. Still, several studies and real-world examples offer meaningful insights into its impact.

In the Philippines, households covered by mutual microinsurance recovered more effectively after Typhoon Haiyan than uninsured households. They were better able to meet urgent expenses and avoid selling productive assets under distress (CISL, 2021). Similarly, in Bangladesh, BRAC's microinsurance programs have demonstrated how rapid benefit disbursement—such as funeral cost coverage—can reduce financial strain and speed up recovery. Pilot programs have cut claim processing times from ten days to as little as three, with some payments even being made on the same day as the insured event (BRAC, 2023). These operational efficiencies directly enhance families' capacity to bounce back and resume normal livelihoods.

These findings echo the "buffering hypothesis" discussed by Dercon and Krishnan (2000), who found that in rural Ethiopia, household income and consumption fluctuate dramatically due to both individual and widespread shocks. Without adequate buffers, families often fall into poverty temporarily or even permanently. While informal coping mechanisms (like labor migration or family support) do help, formal tools such as insurance are more reliable and sustainable over time.

Moreover, studies highlight that the actual effectiveness of microinsurance often hinges on non-financial factors, especially the speed of payouts, clarity of the claims process, and levels of trust in service providers (Farrington & Bredenkamp, 2014; Churchill et al., 2015). These factors are especially important in rural contexts, where poor infrastructure and limited literacy can hamper effective service delivery.

Although rigorous quantitative data on microinsurance's impact on recovery time is still scarce, existing evidence strongly suggests that it can reduce financial stress and enable timely responses to shocks, supporting faster and more stable recovery.

Microinsurance in Bangladesh

In Bangladesh, microinsurance schemes are primarily designed to address risks related to agriculture, health, and climate change. Despite supportive policy frameworks, actual coverage remains limited. According to BIDS (2023), only about 35% of rural households have access to any form of insurance. However, Ahsan et al. (2023) estimate that around 30 million microfinance clients roughly 69% are covered by microinsurance product, suggesting significant overlap with microfinance institutions.

Recent technological innovations, such as mobile apps and SMS-based services, have helped extend microinsurance coverage to remote populations by lowering transaction costs and simplifying enrollment and claims processes (The Insurance Universe, 2023). Yet, these advancements are not without challenges. Community-Based Health Insurance (CBHI) programs in Bangladesh still struggle with issues like limited population coverage, lack of understanding about how insurance works, and insufficient access to healthcare services (Sheikh et al., 2022).

Community-driven models led by organizations like BRAC and ASA have been more successful in building trust and encouraging enrollment in health insurance schemes (Rahman et al., 2017). However, broader adoption is still hindered by several key barriers. Low public awareness, skepticism about the fairness of claims processing, and inadequate digital infrastructure all pose major challenges (Islam, 2022; Sheikh et al., 2022).

A recent study by Farrington et al. (2024) shows that combining microinsurance with broader social safety nets and disaster response mechanisms can significantly improve credibility and increase uptake. Still, the sector faces persistent obstacles such as adverse selection, high administrative costs, and the need for product designs that meet the specific needs of local communities (Farrington & Mahmud, 2022).

Barriers and Challenges

Despite its potential, microinsurance is not without significant challenges, especially in low-resource settings. Issues like adverse selection and moral hazard continue to distort pricing and discourage insurers from expanding coverage to risk-prone populations (Mahul & Stutley, 2010). Additionally, high administrative costs—due in part to rural dispersion, low literacy levels, and poor infrastructure make it difficult to scale up services efficiently (Dror & Jacquier, 1999).

To address these hurdles, many programs have turned to digital delivery methods, including mobile money platforms like bKash, which reduce costs and expand geographic reach (Hasan & Mollah, 2019). However, these solutions face their own limitations. Digital illiteracy, unreliable mobile networks, and a lack of trust in electronic systems remain key barriers, particularly in older or more isolated populations.

Ultimately, the long-term success of microinsurance depends not just on financial innovation, but also on social and community engagement. Clear communication, culturally appropriate outreach, and trust-building are crucial for sustainable adoption (Churchill & Matul, 2012). Local organizations such as BRAC have shown that embedding insurance within trusted institutions significantly boosts uptake and retention (Rahman et al., 2017).

Methodology

Data Collection

This study adopts a cross-sectional quantitative design. Primary data were collected between May and June 2025 from 200 households in the disaster-prone upazila of Moheshkhali in the Cox's Bazar district. A stratified purposive sampling technique ensured representation of both insured and uninsured households affected by cyclones and floods in 2023. Data collection was conducted through structured, face-to-face interviews using a pre-tested questionnaire.

Econometric Model

To assess the impact of microinsurance on post-disaster recovery outcomes, a logit regression model was used to estimate the probability that a household achieved full recovery within six months following a natural disaster. Although the six-month recovery benchmark is not universally adopted in prior microinsurance research specific to Bangladesh, it is both a theoretically sound and policy-relevant timeframe. This choice is supported by extensive literature in disaster management, humanitarian response, and financial resilience.

The selection of a six-month period for evaluating disaster recovery is both evidence-based and widely recognized in international practice. Global frameworks such as *The Sphere Handbook* (Sphere Association, 2018) and the UNDP's *Guidance Note on Early Recovery* (UNDP, 2008) identify the first 3–6 months following a disaster as a critical window for early recovery assessment and planning. This period allows for capturing immediate stabilization outcomes while offering a practical timeline for monitoring the effectiveness of interventions. The Post-Disaster Needs Assessment (PDNA) guidelines, jointly developed by the World Bank, UNDP, and European Union, also emphasize the relevance of the six-month mark in structuring recovery monitoring and evaluation (GFDRR, 2013).

Academic research supports this operational benchmark. For example, Runkle et al. (2012) employed six-month indicators to assess the public health impacts of disaster recovery following Hurricane Katrina, highlighting the utility of this interval in capturing intermediate outcomes.

Importantly, this six-month window represents more than just a technical benchmark; it is a critical period in which households begin to either stabilize or experience deepening vulnerability. Many government and NGO-led programs in Bangladesh also synchronize their monitoring cycles with this timeframe, making it not only practical but policy-aligned for evaluating post-disaster support mechanisms like microinsurance.

The logit regression model is particularly suitable for this analysis due to the binary nature of the dependent variable—whether a household fully recovers within six months and its ability to model non-linear relationships between independent variables and recovery probabilities.

Control variables were carefully selected based on theoretical relevance:

- Household size serves as a proxy for resilience capacity and dependency burden.
- Education level of the household head represents financial literacy.
- Additional controls include income and asset collectively account for socio-economic conditions that influence recovery potential.

Model Specification:

The functional form of the logit model is specified as follows:

$$logit\,(Recovery_i) = ln\,\{\frac{P(Recovery_i = 1)}{1 - P(Recovery_i = 1)}\}$$
$$= \beta^0 + \beta^1 Insurance_i + \beta^2 Disaster\ Exposure_i + \Sigma\gamma X_i + \varepsilon_i$$

Where:

P (Recovery$_i$ = 1) is the probability that household *i* achieves full recovery within six months.

Insurance$_i$ is a binary variable indicating whether household *i* has Microinsurance (1 = insured, 0 = not insured).

Disaster Exposure is a binary variable indicating whether the household was affected by a natural disaster in 2023.

Xki is a vector of control variables, including household size, education level, income and asset $_i$

εi is the error term capturing unobserved factors.

This model allows for an assessment of the marginal effects of Microinsurance on the likelihood of full recovery, controlling key socio-economic variables.

Data Analysis

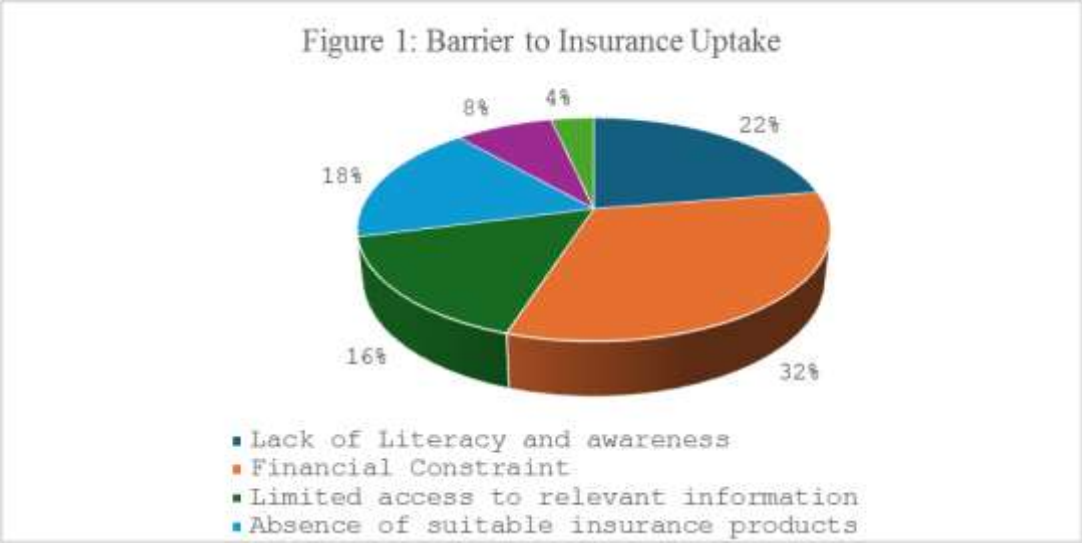
Descriptive statistics were first used to summarize the socio-economic characteristics of the sample and the distribution of microinsurance uptake among respondents. The logit regression model was then employed to estimate the determinants of household recovery within six months. Results are presented using both odds ratios and marginal effects to enhance interpretability.

To assess multicollinearity among explanatory variables, Variance Inflation Factors (VIFs) were calculated. A VIF greater than 5 was used as the threshold for concern. Any variable exceeding this threshold was either transformed or excluded from the model to maintain the robustness of the estimates.

Results

Socio Economic Status and Insurance Uptake among Respondents

Among the respondents surveyed, only 2% had attained a university degree or higher, while 12% had completed secondary education or above. A significant portion (22%) reported having no formal education. In terms of insurance coverage, only 32% of households held some form of insurance. The majority (78%) of these were affiliated with microfinance institutions offering life and liability coverage. A smaller share (12%) also held health insurance policies. Key barriers to insurance uptake included lack of awareness, limited access to information, the absence of suitable products, and low trust in insurance providers (see Figure 1).



4.2: Income, assets loss and recovery gap

The findings show that households with microinsurance were significantly better positioned to absorb and recover from disaster impacts. Post-disaster, insured households reported an average income of BDT 16,500 over 68% higher than the BDT 9,800 reported by uninsured households. Asset loss followed a similar trend: insured households lost only 22% of their total assets, compared to 48% among the uninsured. In terms of recovery, 70% of insured households reported full recovery within six months, while only 48% of uninsured households did so. These results suggest that microinsurance not only cushions the immediate economic shock but also accelerates the path to recovery.

Table 1: Income, insurance uptake, loss assets and recovery

Variable	Insured Households	Uninsured Households
Average Income (Post-Disaster, BDT)	16,500	9,800
Recovery Rate (%)	70%	48%
Asset Loss (%)	22%	48%
Microinsurance Uptake (%)	32%	0%

The regression analysis confirms the descriptive patterns. After controlling household size and education, insurance emerged as the strongest predictor of recovery within 180 days. Insured households were 92% more likely to recover within this period compared to uninsured households (odds ratio = 1.92, p = 0.009). Education also played a significant role: each additional year of schooling increased the likelihood of recovery by 35% (OR = 1.35, p = 0.0124). Conversely, larger household size slightly decreased the odds of timely recovery (OR = 0.89, p = 0.0164), likely due to greater consumption needs and limited resources.

Table 2: Logit Regression --Micro insurance and recovery time within 180 days

Variable	Coefficient	Odds Ratio	Std. Error	p-Value
Insurance	0.65	1.92	0.25	0.009
Household Size	-0.12	0.89	0.05	0.0164
Education	0.30	1.35	0.12	0.0124
Constant	-1.50	0.22	0.30	0.004

Taken together, these findings show that Microinsurance significantly reduces post-disaster asset losses and speeds up recovery, while education strengthens household capacity to rebound. However, larger household size can slow recovery, highlighting the importance of targeted support for bigger families. In disaster-prone areas, expanding Microinsurance coverage and improving educational access could be powerful strategies for building resilience

Discussion

This study underscores the vital role that microinsurance plays in strengthening disaster resilience among vulnerable households in Bangladesh. Our findings reveal that insured households experienced substantially higher post-disaster incomes (BDT 16,500 compared to BDT 9,800), suffered notably lower asset losses (22% versus 48%), and achieved faster recovery rates (70% versus 48%). These results were further supported by logit (logistic regression) analysis, which showed that having insurance nearly doubled the odds of full recovery within 180 days. Additionally, higher levels of education were positively associated with recovery, while larger household size appeared to slow the recovery process.

These results resonate with earlier research in Bangladesh. For example, Akter and Fatema (2011) and Akter (2012) emphasize that weather-indexed microinsurance and related products hold promise as safety nets for households exposed to environmental hazards. However, these studies also caution about ongoing challenges such as low demand, governance issues, and questions around product viability. Recent IFPRI findings (2023) similarly suggest that many smallholder farmers still resort to distress coping mechanisms like selling productive assets, often due to delays in insurance payouts or doubts over coverage highlighting the need for better tailoring of microinsurance products.

Looking beyond Bangladesh, regional evidence from the Philippines supports these conclusions. After Typhoon Haiyan, households with access to a mutual microinsurance scheme recovered more effectively than those without such protection (CISL, 2019). Education emerges repeatedly in literature as a crucial factor that enhances uptake, builds trust, and improves navigation of insurance products. Nonetheless, more research is needed to clarify how education directly influences recovery speed across different contexts.

A notable and somewhat unique insight from this study is the negative relationship between household size and recovery speed a finding not commonly reported in similar regional research. This may reflect specific socio-economic realities in coastal Bangladesh, where larger families often face higher dependency ratios, fewer income diversification opportunities, and limited access to external resources and support.

Taken together, these findings highlight microinsurance's potential as a key instrument in Bangladesh's disaster risk reduction toolkit. They also emphasize the importance of designing products that meet local needs, ensuring timely and transparent claims processing, and providing additional support tailored to vulnerable groups, especially larger households and those with limited education. Expanding access to microinsurance, alongside complementary interventions like financial literacy training and credit access, could significantly strengthen household resilience in disaster-prone areas.

Limitations and Directions for Future Research

While this study employed instrumental variable techniques to reduce bias and strengthen causal inference, it is important to acknowledge its limitations. Given the observational nature of the data, we cannot conclusively establish causality. Unobserved factors may still influence both the decision to purchase insurance and recovery outcomes.

Additionally, our analysis focused on short-term recovery, defined as recovery within 180 days of the disaster. Yet recovery is an ongoing process that extends well beyond this period. Future research should examine the longer-term impacts of microinsurance, such as its role in helping households maintain stable incomes, keeping children in school, or reducing distress migration.

It would also be valuable to compare different types of microinsurance models—such as index-based versus indemnity-based products to better understand their relative effectiveness. Further exploration into behavioral and informational barriers that prevent people from enrolling in or fully utilizing microinsurance is also needed.

To gain deeper insight into these dynamics, future studies could benefit from longitudinal designs or randomized controlled trials. Such approaches would not only clarify whether microinsurance works but also shed light on how it works, for whom, and under what conditions.

Conclusion

This study adds to growing evidence that microinsurance can make a real difference in the lives of disaster-affected households. In rural Bangladesh, insured families were more likely to recover fully within six months, lost fewer assets, and maintained higher incomes than those without coverage. These results highlight the promise of microinsurance as a practical tool to strengthen household resilience in areas facing frequent natural hazards.

To build on this potential, collaboration between public and private actors is essential. Expanding access to microinsurance, streamlining how claims are processed, and building trust especially in low-income communities should be priorities. Equally important is understanding the broader, long-term benefits. Future research should look at how insurance influences not just short-term recovery, but also longer-term wellbeing like lifting families out of poverty, keeping children in school, and reducing forced migration.

With the right design and delivery, microinsurance can be more than a financial product—it can be a foundation for resilience and recovery in vulnerable communities.

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