



Sustainable Economic Security and Household Resource Management During Disaster Periods in Southwestern Bangladesh

Shakil Ahmed¹

North Western University,
Bangladesh

Tanbir Hossain^{2*}

North Western University,
Bangladesh

Shaikh Faisal Shah

Ripon³

UNDP Bangladesh,
Bangladesh

Md. Ahasanullah⁴

UNDP Bangladesh,
Bangladesh

Parimal Kumar

Karmokar⁵

UNDP Bangladesh,
Bangladesh

***Corresponding author:**

Tanbir Hossain, North Western University,
Bangladesh.

✉ tanbir.nwustu@yahoo.com

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Abstract

Background: Economic security is a critical determinant that shapes the socioeconomic resilience of disaster-affected populations, particularly those rendered vulnerable by prolonged economic instability.

Objective: This study aims to analyze the role of economic security on resource management factors in southwestern region of Bangladesh.

Methods: This study employed Spearman's rank correlation analysis to examine the relationship between disaster-resilient community conditions and sustainable economic security factors among 200 systematically sampled households in the southwestern region of Bangladesh.

Results: The study examined seven sustainable economic security indicators and their correlations with eight disaster-resilient community status variables. Sustainable agricultural practices showed the strongest positive correlation with adaptation capacity ($r = 0.845$, $p < 0.001$), while monthly income exhibited a strong negative correlation with informal loan dependency ($r = -0.987$, $p < 0.001$).

Conclusion: Sustainable agricultural practices, governmental assistance, and housing construction are significantly correlated with enhanced disaster resilience. Income stability reduces dependency on formal and informal loans. Integrated policy frameworks addressing economic security and disaster preparedness are essential for vulnerable coastal communities.

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INTRODUCTION

Over the past several decades, sustainable natural resource management has emerged as a cornerstone of disaster resilience and economic security in many communities, subject to high levels of environmental hazards. Unlike hometown security, sustainable economic security is the ability of a village, town or nation to maintain long-term economic stability when faced with natural co-seismic source disasters, resource depletion or economic shocks. Disaster-resilient community building that can resist, recover from, and increase prosperity after disaster is premised on the sound management of natural resources (Barbier, 2016; Barro, 2000; Steenbrink & Skali, 2026). Human capital and sound governance are essential aspects to facilitate the successful inculcation of such strategies into any community (Ahmed & Karim, 2018; Raza et al., 2026).

When implemented in developed countries, the notion of economic security is realized for example in regions that are suffering of extreme weather conditions, such as North America. In Canada or the USA, they've come up with sound economic policies to deal with heavy snow fall and very bad winter weather. Carefully managing snow removal, maintaining infrastructure as well as ensuring energy security are all vital for continued economic activity even during severe weather (Awal et al., 2013; Azam et al., 2021; Fülöp & Cifuentes-Faura, 2026; Su et al., 2025). Ensuring a strong infrastructure during the harshest winter months is part of the Government's job to keep local economies stable and resilient (Campbell, 2021; Sadik et al., 2018; Su et al., 2025).

Conversely, the southwestern division of Bangladesh suffers with frequent flooding, cyclones and high-water level issues. Such environmental hazards often have an adverse effect on local economies, particularly in areas relying heavily on agriculture and fisheries (Ahaduzzaman & Hossain, 2026; Hossain, 2014). The urgency to formulate policies that account for not only the short-term impact of disasters but also ensure long term sustainability and economic security is further highlighted by Bangladesh's susceptibility to climate change (Alam & Sammonds, 2017; Islam et al., 2020; Monwar & Sakib, 2026). The way natural resources, that is water bodies, forests and land are managed are very important for a reduction of disaster impact and sustainable living (Afroz et al., 2021; Ahmed & Karim, 2018; Raza et al., 2026). According to Alam et al. (2017), it would be critical to incorporate the disaster resilience planning into resource management efforts to guarantee sustainable economic security (Monwar & Sakib, 2026). Within this framework of reference, conservation and sustainable use of natural resources rise as a mechanism through which the negative effect of disaster can be minimized while works to restore the society and promote its long-term development.

Governance, including accountability, transparency and enforcement of the law is critical in enabling efficient utilization of resources and enhancing the resilience for areas prone to disasters (Ha, 2015; Reddy et al., 2026). Policymakers across developed and developing country contexts alike need to wrestle with the odds that economic security is not won at the expense of environmental degradation. However, achieving both objectives demands a mode of integrated approach and macro-level measures combined in the practice with micro-level applications to drive policies that orient economic security into demonstrations that induce environmental sustainability (Alvarez, 2017; Fülöp & Cifuentes-Faura, 2026). North American models do offer important lessons in developing sustainable economic security, it is crucial to develop solutions that are culturally specific to southwestern region of Bangladesh which enhance resilience against future shocks (IPCC, 2007; Tanakov et al., 2026; Zhuang, 2007).

To be protected from disaster in Bangladesh's southwest region, there is a requirement for Macro-economic measures that incorporate both vulnerabilities at the local and changing economic conditions elsewhere in the world to reduce wealth inequality, especially social investment (e.g., in health and education) should be prioritized (Birchall et al., 2026; Perotti, 1996). In some places particularly for the southwest Bangladesh, areas facing a greater brunt of natural disasters than the rest of the country. This concept was further developed by Kabir et al. (2016), who argued that economic growth may reduce inequality at the outset, but if not well managed, it can exacerbate inequities, particularly in a region prone to frequent natural disasters such as cyclones and floods (Birchall et al., 2026).

Sina et al. (2019) also emphasized the importance of tax policies to mitigate inequality and to promote a more robust economic system after a disaster (Smith et al., 2026). The fact that agriculture is the most important economic sector in the southwestern, and is particularly sensitive to climate change, emphasizes the importance of policies that secure and stabilize income from local farming families and small-scale enterprises. Saha et al. (2024) emphasized the role trade liberalization may play in technology adoption and dissemination that could increase agricultural productivity and enhance rural Bangladesh's ability to withstand disasters. But foreign direct investment (FDI), while likely to be long-term beneficial, can initially widen income inequality, and potentially slow down a recovery for the poorest households as well (Birchall et al., 2026; Kabir et al., 2016). Barro (2000) emphasized inclusive growth agenda, especially in the areas like South-West Bangladesh where income inequality and poverty exist (Steenbrink & Skali, 2026). These are growth strategies that can facilitate economic recovery by

focusing on income status and supporting local resource management, and community-led recovery processes.

Awal et al., (2013) emphasized that macroeconomic policies which provide long-term infrastructural development and investment in human capital are necessary if we plan to create resiliency to future shocks, especially for resource-based communities who are prone to natural hazard threats (Fülöp & Cifuentes-Faura, 2026). On a Micro-economic scale, disaster recovery in Bangladesh's southwest centers upon the capacity of local livelihoods and asset management and recovery mechanisms at the community level through strong sectors. Bhuiyan et al. (2017) observed that from a disaster microenterprise, the most important part of local economy, recover more quickly than large-scale industries (Samad et al., 2026). Microfinance loans and credit schemes for small businesses would provide short-term relief and jump-start recovery. Furthermore, Campbell (2021) emphasized the role of assets such as land, livestock and small businesses in building household resilience to floods (Su et al., 2025). The importance of asset management in re-establishing lives is highlighted by Chakraborty & Haque (2018) during reconstruction. Mental and physical well-being from the perspective of mental and physical health, individuals who are affected by a disaster may be traumatized (Azam et al., 2021) that could hinder economic recovery through decreases in labor participation (Anwar & Selim, 2025). That is the case even more so in the southwest, where cyclones and floods tend to interrupt daily life. Psychological and physical rehabilitation together are important for the affected population to get back to normalcy and productive work.

Okesanya et al. (2026) highlighted that the inclusion of mental health in recovery plans enables people to return to work and life hampering issues are low, which speeds up economic recovery. Islam et al. (2020) also tested the influence of income status and life hampering factors, reporting that communities with business/job opportunities and spring of money recover very poorly after disasters (Anwar & Selim, 2025). Recovery approaches which concentrate on re-establishing livelihoods, i.e. agriculture and shopkeeping, are key to economic survival in post-disaster scenarios. Restoring agricultural production and market access is crucial to decreasing income losses in the many households that rely on agriculture in the southwestern Bangladesh.

Mudasser et al. (2020) also looked at the role of community-driven recovery models, which emphasizes giving control back to local citizens in the events of disaster relief (Palash et al., 2026). These models work especially well in the southwest where resource management and local knowledge is a key component of long-term resilience. When combined with the microfinance programs, these models deliver faster recovery and a more sustainable livelihood, addressing questions of continuity and access to resources. Nguyen et al. (2021) have suggested income diversification as a major strategy for the households in the disaster-prone areas (Nguyen et al., 2026). By supporting smallholder farming and local businesses, communities can grow savings funds and become less vulnerable to future economic shocks. Rahman and Ahsan (2015) emphasized the benefits of education and skills programs in driving better recovery outcomes, with access to these types of services helping affected areas recover quicker and take advantage of new employment prospects (Nguyen et al., 2026).

Sullivan et al. (2002) investigated how water resources sustainability and land use strategy could contribute to minimizing vulnerabilities and thereby enhancing economic security in post-disaster situations (Cho & Ogwang, 2024). They said communities with better resource management could more easily recover and sustain resilience in the long term by not becoming too reliant on one source of income and promoting future sustainability. The work of Wheeler and Braun (2013) added to this finding by revealing how adaptable business models, specifically within the agricultural industry, enable communities to modify their market following a disaster (Nassar, 2026). And they discovered that businesses that can diversify their lines of products or services usually have swifter recoveries and become sources for local economic stabilization. However, Campbell (2021) made very useful contributions to understanding in terms of environmental governance for the disaster risk management (Su et al., 2025). They should sustainably manage resources and restore natural ecosystems in a bid to mitigate disaster risks, and they will also provide the southwestern communities with the necessary resources for their long-term economic security and recovery, according to the signed document.

Despite growing literature on disaster resilience in Bangladesh, no empirical study has systematically examined the correlation between sustainable economic security indicators and disaster-resilient community status variables in the southwestern coastal region using quantitative correlation analysis. This study contributes by employing Spearman rank correlation to quantify the strength and direction of relationships between seven economic security indicators and eight disaster resilience variables, providing statistical evidence for targeted policy interventions.

This study aims to: (1) profile the occupational and income characteristics of disaster-affected households; (2) identify the types and frequency of natural calamities; and (3) analyze the correlations between sustainable economic security indicators and disaster-resilient community status. Theoretically, this study extends the disaster resilience framework by integrating economic security dimensions. Practically, it provides evidence for local governments and disaster management organizations to design effective resource allocation strategies.

METHOD

This study was conducted in Shyamnagar Upazila, Satkhira District, in the southwestern region of Bangladesh, one of the most disaster-prone areas in the country. A total of 200 households were selected using systematic random sampling from communities affected by cyclones, waterlogging, and salinity intrusion over 20 years. The sampling frame was drawn from union-level household registries, selecting every fifth household. Sample size was determined at a 95% confidence level with a 7% margin of error.

Data Collection

Data were collected using a structured questionnaire through face-to-face interviews. Focus Group Discussions (FGDs) captured contextual economic vulnerability information. The questionnaire was pre-tested with 20 households and validated by three disaster management experts. Internal consistency (Cronbach alpha = 0.78) confirmed acceptable reliability.

Effect Assessment Testing

However, this research assesses the medium-level impacts of tropical cyclones on various facts of life, including monthly-income, employment creation, and easily access to daily life essential services like fresh water and sanitation. This assessment is crucial for understanding the broader socioeconomic implications of natural disasters.

Data Analysis

This study examined socioeconomic conditions, risk exposure, livelihood strategies, and adaptive capacities of cyclone-affected households. Following the approach adapted from Afroz (2021), Spearman rank correlation was employed to assess associations between sustainable economic security indicators and disaster-resilient community status (Raza et al., 2026). Spearman rank correlation was chosen because data were measured on ordinal scales, and the Shapiro-Wilk test confirmed non-normal distribution ($p < 0.05$), violating parametric test assumptions. Correlation coefficients were interpreted as: weak (0.10-0.29), moderate (0.30-0.49), and strong (0.50-1.00).

RESULTS AND DISCUSSION

This section presents the findings on household saving behavior and economic security in the context of recurrent natural calamities in the southwestern region of Bangladesh. Data were collected through systematic household surveys to examine how annual disaster events disrupt local economic systems and household financial stability.

Profession of Household Head

The household head plays a critical role in shaping savings behavior and ensuring economic security. In the study area, the primary income is generated by the household head, whose occupational decisions fundamentally influence household-level economic security and resource

management.

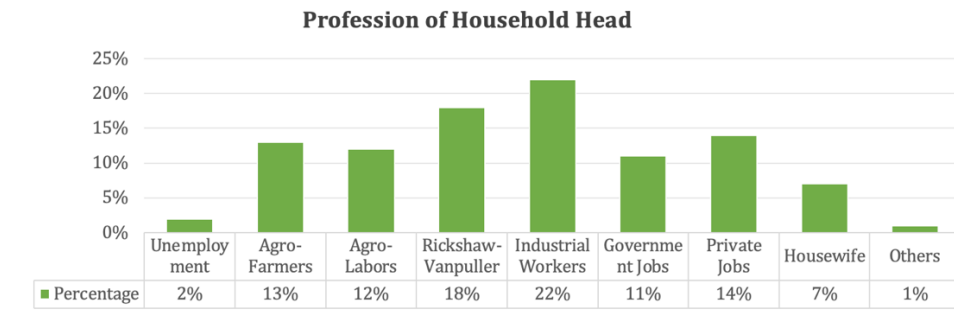


Figure 1. Professional Status of Household Head

From the upper column graph, it is widely evident that, Industrial workers are the highest among the household head professions with 22%. Meanwhile, the profession of Rickshaw-Vanpuller covers 18%, securing the second position. Besides, Private job covers 14% and Agro-sectors are slightly behind with 13% as Agro-Farmers and 12% as Agro-Labors. The lowest percentage of professions are Unemployment with 2% and other miscellaneous jobs with only 1%.

Monthly Income Status of Households

Household Income is one of the major concerning factors to ensure monthly savings which is essential key for households. Economic security during disasters focuses that individuals, households, and whole affected communities can maintain healthy livelihoods and financial enriched despite of observing economic shocks during the period of cyclones, floods, or survival economic crises. It is a critical component of disaster resilience, as lower-income households are disproportionately affected, often losing up to one-third of their annual income to climate-induced disasters time.

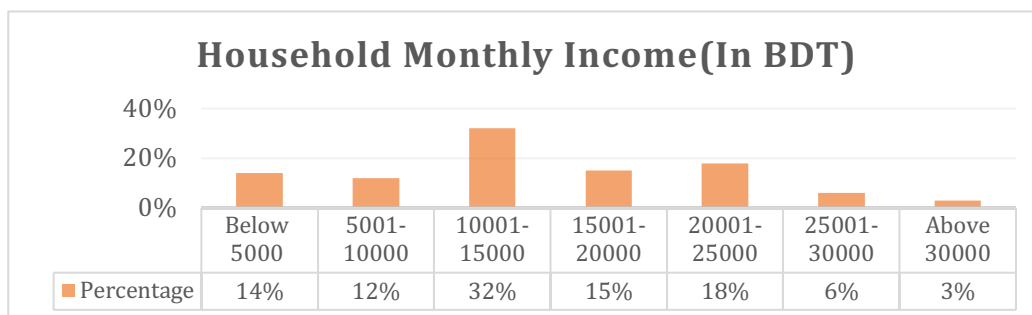


Figure 2. Monthly Income Status of Household Head

From figure 2, it is witnessed that, 32% of the monthly income comes from the amount between 10001-15000 BDT, which is the highest percentage of monthly income for the households. Also, around the amount of 20001-25000 is earned by 18% of the earners, claiming the second highest position. Whereas it is seen that, around 15% of income comes from the amount 15001-20000 in BDT, which is a strong percentage as well. The amount 25001-30000 is only earned by 6% in the household. Besides, only 3% income is earned by those who collect income above BDT 30000, which is the lowest of them all.

Natural Calamities Scenario of Households

South costal part of Bangladesh has been considered as the most disaster-affecting zone in Bangladesh where people fight with natural disaster.

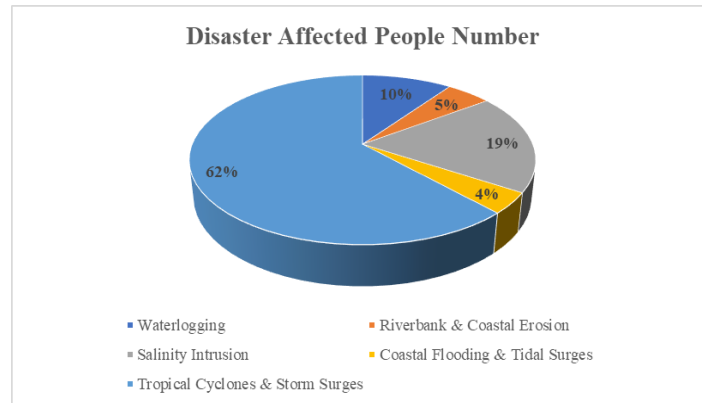


Figure 3. Types of Natural Disasters Affecting the Surveyed Households in the Coastal Region

From figure 3, it is found that mostly 62% of respondent are being affected by water-logging problems and only 4% of respondents are being affected by coastal and tidal surges which hampers their economic security in life.

In this section, the authors want to show the effect of seven dependent factors on some independent variables which have been scored based on their score which have been categorized with their gaining score. These results are very effective to grab social and economic policy for southwestern region of Bangladesh. This study has been formed on 200 households who have been affected with the imbalance mood between disaster and economic security. Wang et al. (2026) defined the flood-disaster is based on Multi-layer Perceptron. This article focused on the disaster preparedness and risk mitigation period.

Table 1. Spearman's correlations Analysis between the condition of disaster resilient community and sustainable economic security factors in southwestern region of BD

Indicators	Status →	Disaster-Resilient Community Status							
		Adaptati on Capacity	Disaster Prepared- ness	Disaster Response	Disaster Recovery	Disaster Risk Mitigation	Dependency on Relief and Rehabilitation	Dependency on Formal Loans	Dependency on Informal Loans
A. Monthly income and saving	Correlation Coefficient	0.098	0.197*	-0.056	0.166*	-0.222*	-0.659**	-0.549**	-0.987***
	Sig. (2-T)	0.056	0.000	0.145	0.000	0.985	0.000	0.964	0.000
B. Governmental assistance and support	Correlation Coefficient	0.399*	0.005	0.199*	0.266*	0.745***	-0.005	-0.548 ***	-0.658 ***
	Sig. (2-T)	0.000	0.836	0.004	0.000	0.000	0.923	0.001	0.001
C. Sustainable agricultural practices	Correlation Coefficient	0.845***	0.622***	0.546***	0.224*	0.194*	-0.156	-0.033	0.0125
	Sig. (2-T)	0.000	0.000	0.000	0.000	0.0050	0.456	0.000	0.000
D. Education and training	Correlation Coefficient	0.013	0.564**	0.345**	0.223*	0.436**	-0.123	-0.355**	-0.466**
	Sig. (2-T)	0.598	0.001	0.000	0.000	0.000	0.001	0.000	0.000
E. Availability of employment	Correlation Coefficient	0.222*	0.052	0.789***	0.042	0.009	-0.224*	-0.089	-0.776
	Sig. (2-T)	0.169	0.063	0.000	0.000	0.002	0.001	0.236	0.034
F. Access to NGOs, banks, and insurance agencies	Correlation Coefficient	0.145*	0.246*	0.299*	0.0192	0.045	0.089	0.069	0.078
	Sig. (2-T)	0.001	0.126	0.035	0.000	0.995	0.569	0.169	0.895
G. Housing construction and protection	Correlation Coefficient	0.655***	0.277*	-0.004	-0.094	-0.056	-0.496**	0.042	-0.419**
	Sig. (2-T)	0.001	0.000	0.945	0.056	0.145	0.001	0.369	0.000

Note: * Weak (0.10–0.29), ** moderate (0.30–0.49), and *** strong correlation (0.50–1.00). N = 350 and (–) negative correlation

Source: Author Own Compilation, 2026

From the table 1, the authors try to make a connection between sustainable economic security factors and different variables affecting the economic sustainability issue. Firstly, from A, when the monthly income level helps to increase the savings pattern, it helps to improve disaster preparedness with an effective recovery process. At the same time, a secure income level helps to reduce the risk level and relief dependency pattern. A secure income level helps to reduce dependency on formal and informal loans. From the perspective of B, governmental support is one of the major factors to ensure economic security, which maintains a positive connection with adaptive capacity, disaster response, recovery and risk mitigation for long-term aspects. In contrast, governmental support behaves negatively with loan acceptance from a formal and

informal perspective. From the aspect of C, sustainable agricultural practices depend on the response of green agricultural components, which is positively connected with disaster before and after the disaster period and risk mitigation strategy in long-term issues. From the side of D, educational facilities and training period connect positively with all periods of disasters, including before and after the disaster period. Disaster risk mitigation is negatively connected with educational training facility. From the perspective of E, employment creation has a positive connection with adaptive capacity and disaster response, but it has a negative connection with relief dependency. At the same time, access to banks, NGOs, and insurance facilities has a positive correlation with adaptive capacity, disaster preparedness and response period. Lastly, from the perspective of G, adaptive capacity and disaster preparedness have a positive connection with housing preparation and construction. Conversely, it has a negative connection with dependency relief and informal loan granting.

Disaster management policies are very effective in reducing the risk to households, which also reduces the damage to household-level assets like cattle, furniture, etc. There are some indicators that can boost up the indicators sustainable economic security and disaster resilience through community rules and policies, which are tried to cover from the ideas of Spearman's correlations and hypotheses. There are some formal organizations which are very effective in reducing risk vulnerability and enhancing economic security with proper guidance and policies. Some formal frameworks have been working, like District Disaster Management Committees (DDMC), Cyclone Preparedness Programs (CPP), and climate-adaptive infrastructure to reduce the vulnerability of households. This article helps policymakers develop sustainable policies regarding economic security and household well-being.

There is some scopes to develop further research activities showing the connectivity between sustainable economic security and agricultural production, sustainable economic security and fish production, sustainable economic security with local level forestry, etc.

CONCLUSION

This study examined the relationships between sustainable economic security indicators and disaster-resilient community status in southwestern Bangladesh using Spearman rank correlation. The findings demonstrate that household socioeconomic factors are significantly correlated with disaster preparedness and recovery outcomes. Disaster resilience enables households to adopt protective strategies for safeguarding assets during disaster events. Ensuring economic security requires robust, long-term sustainable livelihood planning, coastal-community resilience strategies, and comprehensive financial risk protection. Local governments should prioritize sustainable agricultural programs, strengthen governmental assistance for disaster preparedness, and enforce disaster-resilient housing standards. This study is limited to Shyamnagar Upazila; generalizability requires further research. Longitudinal designs across multiple disaster-prone regions and integration of qualitative methods are recommended.

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AUTHOR CONTRIBUTION STATEMENT

All authors contributed to the research process, including conceptualization, methodology development, data collection, analysis, interpretation of results, and manuscript preparation. The first author contributed to the research design and initial manuscript drafting, while the other authors contributed to data validation, critical review, refinement of the manuscript, and supervision of the research process.

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