



Impact of Resilience on the Livelihood of the People at Risk: A Study on South-west Coastal Bangladesh

Shuvrodeb Biswas¹ and MD. Sohedul Islam^{2*}

¹Fisheries Expert, Khulna, Bangladesh

²Research, Monitoring and Evaluation Expert, Dhaka, Bangladesh

*Corresponding Author: MD. Sohedul Islam, Research, Monitoring and Evaluation Expert, Dhaka, Bangladesh.

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Abstract

Background: South-west coastal Bangladesh is a region highly vulnerable to natural disasters and climate change, posing significant challenges to the livelihoods of its residents. Building resilience has become crucial for adapting to these challenges and securing sustainable livelihoods.

Aim: To assess the relationship between resilience and livelihood in south-west coastal Bangladesh.

Methods: This study examines the resilience-livelihood relationship in south-west coastal Bangladesh, focusing on Dacope and Koyra Upazilas in July-December 2018. Employing purposive sampling, four strategically chosen unions were studied, totaling 120 households from 4 unions in south-west Bangladesh was used. Within each union, systematic random sampling was used to select 60 households. Primary data, gathered through structured questionnaires, complemented secondary data from government sources. SPSS facilitated quantitative analysis, utilizing descriptive statistics and tests of difference to explore key variables. This comprehensive approach unveils the intricate dynamics between resilience and livelihood in the region.

Results: Exploring the link between resilience and livelihood in south-west coastal Bangladesh, our study revealed a significant gender imbalance (1:2.5 female-to-male ratio) and potential financial strain (higher expenditure than income). Nonetheless, positive impacts emerged: resilience factors like Disaster Risk Reduction (DRR) training, Water Sanitation and Hygiene (WASH) knowledge, technology adoption, resilient housing, and diversified farming significantly improved disaster preparedness, health, awareness, risk mitigation, and income, highlighting resilience's multifaceted role in empowering communities.

Conclusion: The findings underscore the multifaceted nature of resilience and its significant role in improving livelihoods in south-west coastal Bangladesh.

Keywords: Resilience; Livelihood; DRR; WASH; Multifaceted

Introduction

Coastal regions, particularly in low-lying countries like Bangladesh, are progressively vulnerable to the adverse impacts of climate change and natural disasters [1]. In south-west coastal Bangladesh, where a large population depends on agriculture and

fisheries for sustenance, the challenges posed by environmental hazards are particularly acute [2].

Resilience, defined as the capacity to adapt and recover from adversity, has emerged as a crucial concept in addressing the complex challenges faced by vulnerable populations [3].

Understanding the relationship between resilience and livelihood is essential for developing effective strategies to enhance community resilience and promote sustainable development in coastal areas [4]. However, limited empirical research has explored this relationship in the context of south-west coastal Bangladesh. Research by Islam, Sallu, Hubacek, and Paavola (2014) provided valuable insights from coastal Bangladesh, delving into the vulnerability of fishery-based livelihoods to the effects of climate variability and change [5].

In addition to academic research, international organizations such as the World Bank have also been instrumental in addressing disaster risk and climate resilience in Bangladesh. The Bangladesh Disaster Risk and Climate Resilience Program, spearheaded by the World Bank in 2018, aims to enhance the country's capacity to manage disaster risks and adapt to climate change [6]. This program underscores the global recognition of Bangladesh's vulnerability to environmental hazards and the urgent need for comprehensive strategies to mitigate these risks. The coastal region of Bangladesh is facing natural disasters every year. These harsh events are constant companions for people in this area. Therefore, local communities must minimize the impacts of devastating natural disasters and adapt their livelihood to their effects. Adaptation strategies can help people mitigate risks [7]. The majority of the respondent households were headed by males, and Koyra had the highest proportion (98%). Moreover, the highest educational status was found in Koyra (51%), and Koyra had the most dependent people (children aged <15 years and/or people aged >65 years) in their households (84%). Similarly, about 61% of the households in each of the three unions surveyed had members who migrated to work in different communities. With nearly similar average agricultural livelihood diversification index (ALDI) in all unions, agricultural sources were the major source of income for just a limited proportion of households. About half of the households had chronically ill members in each union [8]. In exploring the multifaceted impacts of climate change on livelihoods, previous research has provided valuable insights into the vulnerabilities faced by communities in southwestern Bangladesh. Research such as those by Hossain, *et al.* (2015) [9] and Huq, *et al.* (2015) [10] shed light on the diverse challenges experienced by vulnerable populations in rural coastal areas. These investigations underscore the urgency of addressing climate-related risks and developing resilience strategies tailored to the specific needs of local communities.

Methods

This study investigated the relationship between resilience and livelihood in south-west coastal Bangladesh. In July-December 2018. The research design employed a purposive sampling technique to select four unions from two upazilas (Dacope and Koyra) in Khulna district encompassing four unions (Uttar-Bedkasi, Dakshin-Bedkasi, Sutarkhali, and Laudubi), was selected strategically to confirm a comprehensive understanding of the impact on livelihood. Dacope Upazila spans 991.56 sq. km., while Koyra Upazila covers 1775.40 sq. km., with distinctive geographical and demographic characteristics. Within each union, systematic random sampling was used to select 60 households, resulting in a total sample size of 120 respondents. Data gathering involved both primary and secondary methods. Primary data was collected over a structured questionnaire administered to household heads. Secondary data, including demographic and socio-economic statistics, was obtained from government sources such as the Bangladesh Bureau of Statistics and Banglapedia.

Quantitative data analysis was led using SPSS software. Additionally, tests of difference were employed to compare the characteristics of groups defined by resilience levels or livelihood outcomes. This multi-pronged approach enabled a comprehensive understanding of the intricate relationship between resilience and livelihood in the study area.

Results

The study unveils a significant gender disparity within the sample, with females comprising Please consider 120 sample for 4 upazila where Female 71.66 % (n=86), Male 28.33 % (n=34). Table-1 will also be corrected on these ratio depicts income versus expenditure among households in south-west coastal Bangladesh, indicating an average income of 5120 BDT and an average expenditure slightly higher at 5510.83 BDT, highlighting potential strain on financial resources.

Table 2 presents resilience characteristics, including disaster risk reduction training, with 77.5% receiving training from NGOs, 10% from the government, and 12.5% without training. It was show earlier the count value which need to require to share % value as above. Drinking water sources include wells (31.66%), filtered water (36.66%), tube wells (5%), and rainwater harvesting systems (26.66%). Sanitation practices predominantly employ kancha structures (80%), followed by jhupri facilities (15%) and semi-pucca arrangements (5%). Primary occupations comprise

agricultural farming (50.83%) and labor (38.33%), with 10.83% engaged in other activities (Figure 2).

Figure 3 indicates a shift from 66% to 50% of households involved in agriculture due to climatic changes.

Table 3 illustrates income-generating activities, with livestock rearing as the most common (35%), followed by vegetable gardening (16.66%), small-scale businesses (10%), and handicrafts/sewing (6.66%), collectively contributing to 72.5% of reported IGAs. Resilience factors such as DRR training (88% with training have 95% disaster preparedness knowledge), WASH knowledge (98% with knowledge have 88% better health), and modern technology adoption (90% leads to 80% disaster awareness) positively impact livelihood. Additionally, resilient housing (60% owned) increases capacity to mitigate risks (70%), and diversified farming (30% participate) yields 42% higher income compared to single-crop farmers (Figure 4). Engagement in multidimensional work further enhances resilience and livelihood maintenance, emphasizing resilience’s multifaceted role in improving lives in the region.

Gender	Frequency	Percent
Male	34	28.33 %
Female	86	71.66 %
Total	60	100.0

Table 1: Distribution of Gender.



Figure 1: Distribution of Monthly Income and Expenditure (BDT).

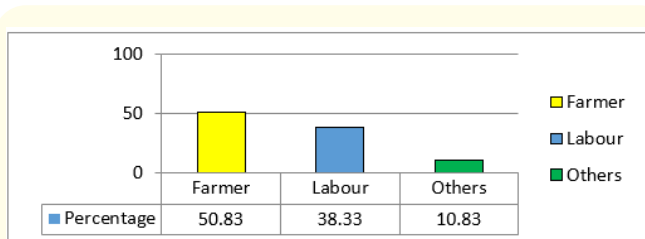


Figure 2: Occupation Pattern.

Training Received on Disaster Risk reduction From	Percentage
NGOs	77.5
Govt.	10
No (x)	12.5
Type of House	
Concrete	4.17%
Semi concrete	10%
Wooden	32.52%
Bamboo Made	28.33%
Soil Made	25%
Source of drinking water	
Buy	31.66
Filter	36.66
Tube-well	5
Rainwater Harvesting System	26.66
Hygienic latrine and Non Hygienic/open	
Semi Pucca	5
Kancha	80
Jhupri	15

Table 2: Distribution of Training Received, Type of House, Source of drinking water, Type of Sanitation System using.

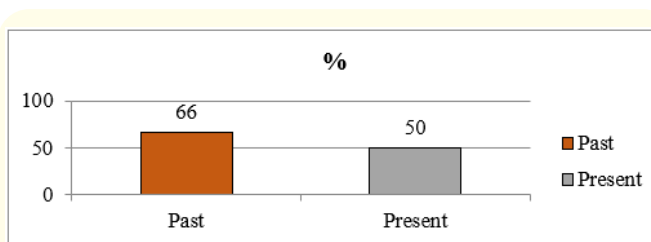


Figure 3: Household Association with Agriculture (Past vs. Present).

Types	Percentage
Livestock Rearing	35
Vegetable Garden	16.66
Small Scale Business	10
Handicraft and Swing	6.66
Others	4.166
Total:	72.5

Table 3: Income level comparison present vs. past (time boundary)

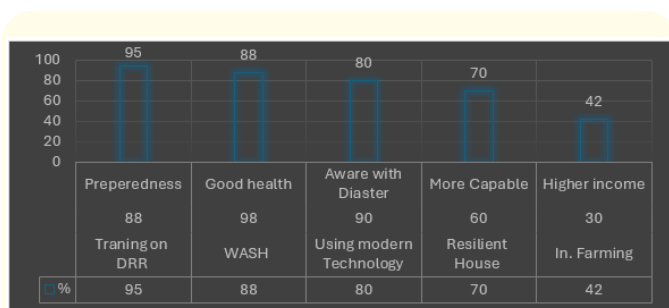


Figure 4: Impact Analysis of Livelihood and Resilience.

Discussion

In the discussion section, the findings of this study are contextualized within the broader literature, highlighting correlations and similarities with previous research. The significant gender disparity revealed in the sample aligns with previous studies that have also documented gender imbalances in various socio-economic contexts [24]. This disparity underscores the need for gender-sensitive resilience and livelihood interventions to address existing inequalities [3].

The observed strain on financial resources, as indicated by higher average expenditure than income among households, resonates with findings from other studies on economic vulnerability in climate-affected regions [11]. Furthermore, the predominance of bamboo and wooden houses, along with reliance on traditional sanitation systems, mirrors the challenges faced by coastal communities in adapting to climate impacts [2].

The shift in household engagement in agriculture, from 66% to 50%, echoes similar trends documented in studies examining climate-induced changes in livelihood patterns [8]. This shift underscores the adaptive strategies employed by communities to cope with changing environmental conditions, consistent with the concept of livelihood resilience [20].

The prevalence of income-generating activities such as livestock rearing and vegetable gardening aligns with findings from previous research highlighting the importance of diversified livelihood strategies in enhancing resilience [10]. Similarly, the positive impact of resilience factors like disaster risk reduction training and access to modern technology on livelihood outcomes resonates with evidence from other contexts [4].

Overall, the findings of this study contribute to the growing body of literature on resilience and livelihoods in climate-affected regions, emphasizing the need for context-specific interventions that address the complex interplay of socio-economic and environmental factors [22].

Limitations of the study

- A small sample size may not fully signify the diversity of households in south-west coastal Bangladesh.
- Responses on income and activities may be subject to social desirability bias.
- Incapability to track long-term impacts of resilience interventions over time.
- The reliability of secondary data sources may vary, affecting accuracy.

Recommendations

- The sample needs to be expanded to enhance the representation of diverse households in south-west coastal Bangladesh.
- Recommend techniques to minimize social desirability bias in income and activity reporting.
- Follow-up studies are needed to track the long-term impacts of resilience interventions over time.
- Need to validate secondary data sources and ensure consistency for improved accuracy.

Conclusion

The study underscores the crucial relationship between resilience and livelihood in south-west coastal Bangladesh. Through a comprehensive analysis of resilience characteristics and their impact on livelihood outcomes, the findings highlight the multifaceted nature of resilience-building efforts and their significance in improving the lives of vulnerable communities. Despite the challenges posed by gender disparities, financial strains, and shifting occupational patterns, the study reveals promising opportunities for enhancing resilience through targeted interventions.

Conflict of Interest

No conflict of interest.

Funding Source

Authors own fund.

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