ISSN : 3006-449X
INTERNATIONAL JOURNAL OF DIVERSE DISCOURSES

Published by: Centre for Academic Research and Development

An Open Access, Widely Indexed, Peer Reviewed Referred Journal
Vol. 2, No. 2, December 2025

Food Security Vulnerabilities in the Southern Coastal Regions of Bangladesh Amidst Climate Change

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ARTICLEINFO

Keywords: Climate Change, Food Security, Adaptation Strategies, Southern Coastal Regions, Bangladesh

Received : 10 November 2025
Revised : 12 December 2025
Accepted: 21 December 2025

ABSTRACT

This study investigates the influence of climate change on agriculture and food security in the southern coastal regions of Bangladesh, focusing on the Khulna and Bagerhat districts. It identifies adaptation strategies adopted by local farmers and evaluates their effectiveness and adoption rates. Logistic regression analysis reveals that higher household income significantly reduces food insecurity, with each 1% increase in income lowering the odds by 41%. Conversely, larger households face greater vulnerability, with each additional member increasing the odds by 24%. Higher education and crop diversity reduce food insecurity by 29% and 32%, respectively, while access to climate information lowers the likelihood by 52%. Major adaptation strategies include crop diversification, saline-resistant varieties, improved irrigation, agroforestry, and community-based resource management. However, financial constraints, limited knowledge, and inadequate infrastructure hinder their broader adoption. The study is limited to two districts, which may not represent the entire southern coastal region, and self-reported data may introduce bias. Findings underscore the importance of targeted financial aid, better climate information access, infrastructure investment, and education and training initiatives. Strengthening policy and institutional frameworks is essential to improve resilience and ensure food security in vulnerable coastal communities.

1.0 Introduction

1.1 *Background of the Study:*

Climate change has become a major global concern, with its impacts disproportionately affecting developing countries and low-lying coastal regions. In countries where rural livelihoods depend heavily on climate-sensitive agriculture, these challenges are particularly severe. The issue of climate change presents a pressing and extensive dilemma, with its significant consequences on cultivation and food safety being particularly severe in susceptible areas such as the southern coastal zones of Bangladesh. Bangladesh, located in low-lying regions, confronts an increasing array of challenges stemming from climate change. These challenges encompass rising sea levels, intensified salinity, and the event of extreme weather phenomena like floods and cyclones (Hossain et al. 2020).

Coastal communities in Bangladesh predominantly engage in small-scale sustenance agriculture, deeply reliant on agriculture. Climate-induced disruptions, such as soil ruin and shifting precipitation patterns, present formidable challenges to crop cultivation and livestock management, imperiling food security for millions (Hasan & Kumar, 2022). Understanding how agricultural adaptation strategies can mitigate these challenges and secure food supplies is paramount. This study investigates environment change's influence on agriculture in Bangladesh's southern seaside zones and explores local community's responses and adaptation measures to guarantee food security.

1.2 *Statement of the Problem:*

The southern coastal zones of Bangladesh are confronted with the imminent threat of climate change, this climate change-induced challenges have exacerbated food insecurity concerns and disrupted traditional agricultural practices, jeopardizing the well-being of coastal communities (Raj et al. 2022). In the appearance of these formidable encounters, understanding the extent of weather change's impact on agriculture in the southern coastal zones is crucial. Moreover, there is a pressing need to examine the adaptation strategies and practices that local farmers and communities employ to mitigate these impacts and secure their food supply. The economic and socio-cultural implications of these adaptation measures must also be explored to inform policy interventions effectively.

Bangladesh has developed cultivars to resist climate-induced changes. However, these cultivars offer limited adaptation. Before 2010, farmers suffered due to the lack of such cultivars, especially after Cyclone Aila and Sidr. (Rabbani et al. 2015).

1.3 *Rationale of the Study:*

This study addresses the pressing need to comprehend the tricky relationship between climate change, agricultural adaptation, and food safety in

Bangladesh's vulnerable southern coastal zones. With its great population concentration and dependence on coastal agriculture, aligning with multiple SDGs, including SDG 1,2 and 13. The research intends to improve evidence-based policies and community actions for climate-resilient agriculture, boosting the well-being of local people while contributing to global climate mitigation efforts, by analyzing both the agronomic and socioeconomic elements of adaptation

1.4 *Objectives of the Study*

General Objective:

To comprehensively examine the dynamics of food security in reaction to climate change in the southern seaside of Bangladesh.

Specific Objectives:

i. To quantify the impact of socio-economic and environmental factors on food insecurity among households in the southern coastal regions of Bangladesh using a logistic regression model.
ii. To identify and document the various adaptation strategies and practices employed by local farmers and groups in response to climate change-induced challenges.
iii. To investigate the effectiveness and adoption rates of various agricultural adaptation strategies through a combination of qualitative interviews and quantitative data analysis.
iv. To provide evidence-based recommendations for policymakers, local authorities and non-governmental organizations with a specific focus on ensuring food security and sustainable agricultural practices.

1.5 *Organization of the Study:*

The study follows a structured framework, commencing with an introduction presenting the research problem and objectives. It then delves into the theoretical background and literature review, identifying gaps in existing research. To ensure a systematic and thorough investigation of the impacts of climate change on agriculture and food safety in the southern coastal areas of Bangladesh, the methodology and study limitations are clearly described. This is followed by a comprehensive presentation of the results and discussion. The study concludes with actionable policy recommendations based on the findings.

2.0 LITERATURE REVIEW

2.1 *Theoretical Framework*

Sustainable Livelihoods Framework (SLF):

SLF emphasizes that livelihoods are multifaceted and depend on a number of forms of capital: social, human, financial, natural, and physical (Brocklesby et al. 2003). It views livelihoods not just as a means of generating income but as a broader strategy for achieving sustainable development. In the framework of climate change and food security in Bangladesh's coastal zones,

SLF helps to assess how different forms of capital contribute to adaptive strategies. For instance, natural capital (e.g., land, water assets) and common capital (e.g., community networks) are critical in shaping adaptive capacities and food security outcomes.

Complex Adaptive Systems Theory (CAS):

CAS recognizes socio-environmental systems as complex, adaptive, and interconnected. It emphasizes that these systems exhibit non-linear dynamics, feedback loops, and developing assets (Levin et al. 2013). CAS would highlight how adaptation strategies evolve and interact within the coastal communities facing climate change impacts. It helps to understand how changes in one aspect (e.g., agricultural practices) can have ripple effects across the entire system, touching food security and livelihoods.

Social-Ecological Systems (SES) Framework:

The SES framework mixes social and ecological systems, emphasizing the dynamic interactions between people and their environment (Ostrom, 2009). It underscores the role of institutions, governance in promoting resilience and sustainability. In Bangladesh's coastal zones, SES framework would analyze how local institutions and governance structures influence adaptation strategies. It helps to assess the effectiveness of community-based approaches in managing natural resources (e.g., fisheries, water resources) and enhancing food security amidst climate change impacts.

These frameworks collectively offer a comprehensive lens to analyze the complexities of climate change adaptation, agriculture, and food security in Bangladesh's southern coastal zones. They identified the significance of joined tactics that consider social, economic, ecological, and institutional dimensions for sustainable development goals.

2.2 ***Selected Literature Review:***

Climate change has led to increasing sea levels, exacerbating salinity interloping into seaside areas. This phenomenon adversely affects agricultural productivity by rendering soils less fertile and suitable for traditional crops like rice (IPCC 2019). Erratic weather patterns, including increased frequency of cyclones and floods, further threaten food security by disrupting agricultural cycles and causing crop losses.

The Bangladesh government estimates a significant financial requirement for adaptation measures. These funds are crucial for implementing infrastructure projects, such as dams and water supervision systems, to protect cultivated lands and communities from climate impacts.

Vulnerability assessments underscore the role of socioeconomic factors in determining the adaptive capacity of coastal communities. Factors such as income levels, access to resources (e.g., land, water), and social networks

significantly influence how communities can respond and adapt to climate change impacts (F. Islam et al. 2021). Communities in the coastal zones face varying degrees of exposure to climate risks, influencing their vulnerability and adaptive responses. Understanding these exposures helps in planning targeted adaptation strategies that report specific local challenges.

Research by Hossain et al. (2020) mentions the significance of community-based institutions in enhancing resilience. These institutions often facilitate local governance, decision-making processes, and collective actions aimed at adapting to climate impacts. They show a vital role in organizing resources and knowledge for implementing adaptation measures. Participatory approaches engage local communities in adaptation planning and implementation. They allow peoples to identify their priorities, share traditional information, and co-design interventions that are contextually appropriate and sustainable.

Aryal et al. (2020) emphasize the importance of crop divergence as a flexibility strategy. Diversifying crops can reduce dependence on traditional, climate-sensitive crops and enhance food security by safeguarding a more constant and varied foodstuff supply. Enhancing irrigation systems is critical for mitigating the impacts of water scarcity and salinity intrusion on agricultural productivity. Sustainable water management practices can optimize water use efficiency and support crop growth under changing climatic conditions.

Raj et al. (2022) highlight ongoing challenges in food security due to disrupted crop production. Climate-induced features such as risky weather events and soil salinity continue to threaten crop yields, affecting food availability and access. Climate alteration worsens food insecurity by limiting access to nutritious food items. Disruptions in agricultural production can reduce the availability of diverse and nutritious food options, impacting the dietary diversity and health outcomes of vulnerable populations.

These insights underscore the multifaceted nature of weather change impacts on nutrition security in Bangladesh's coastal zones and the urgent need for integrated edition policies that consider native contexts, communal resilience, and sustainable development goals.

2.3 ***Research Gap of the Study:***

While existing literature provides valuable insights into the food security encounters posed by climate alteration and agricultural adaptation in Bangladesh's southern coastal zones, significant research gaps persist. These gaps include a scarcity of quantitative assessments that empirically examine the efficiency of specific adaptation policies on food security outcomes and limited integrated research that comprehensively explores the multifaceted relations between climate change, adaptation measures, and food security. Closing these gaps is critical for developing evidence-based policies and practices that can

improve the food security and universal well-being of coastal communities in Bangladesh.

3.0 RESEARCH METHODOLOGY

3.1 *Research Design*

This study promised a quantitative research design, developing surveys and questionnaires to assemble numerical data that were subsequently subjected to statistical analysis (Creswell, 2014). This design facilitated a comprehensive examination of the influence of climate change on food security and the effectiveness of agricultural adaptation strategies in the southern coastal zones of Bangladesh.

3.2 *Study Area*

The research was conducted in the southern coastal regions of Bangladesh, specifically the Khulna and Bagerhat districts. These areas are characterized by their high vulnerability to climate change due to their low-lying topography, proximity to the Bay of Bengal, and heavy dependence on agriculture for livelihoods.

3.3 *Determining Sample Size:*

The sample size will be determined using the following general formula:

$$SS = \frac{p \times (1-p) \times z^2}{e^2}$$

$$= (1.96)2\ (.5)\ (.5)\ /\ (.05)2$$

$$= 384$$

Here,

SS = Sample size

p= 0.50 (proportion of the unknown population)

z=1.96

e= 5%

By applying Fisher's (1993) general formula to calculate the sample size for an unknown population, the determined sample size is 384. However, for this study, a sample size of 400 will be employed for quantitative study, exceeding the initially anticipated sample size significantly.

3.4 *Sampling Techniques*

A random sampling technique was hired to select households from various locations within the southern coastal region. This approach ensured that each household had an equal chance of being included in the study, thereby enhancing the impartiality and representativeness of the sample.

3.5 *Quantitative Data Analysis*

The collected quantitative data were analyzed using logistic regression analysis. Logistic regression was deemed appropriate as it models binary outcomes such as food insecurity (insecure vs. secure) and assesses the influence

of predictor variables—household income, household size, education level, crop diversity, and access to climate information—on the likelihood of food insecurity. The logistic regression equation can be expressed as:

$$log\frac{p}{1-p} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + u_t$$

Where, p is the probability of being food insecurity (Y = 1).
1-p is the probability of being food secure

Food Insecurity (Dependent Variable): Let Y = 1 if a household is food insecure (insecure) and Y = 0 if a household is food secure (secure).

Predictor Variables (Independent Variables): X_1 = Household Income, X_2 = Household Size, X_3 = Education Level (Multiple binary variables for each education level category), X_4 = Crop Diversity, X_5 = Access to Climate Information

We will estimate the coefficients (β values) using statistical software STATA 17.0.

3.6 *Ethical Considerations*

The study adhered to established ethical standards throughout its implementation. Informed consent and confidentiality of the collected data was strictly maintained. Participants' well-being and voluntary participation were prioritized at every stage of the research.

3.7 *Limitations of the Study*

Despite the rigorous design, the study had certain limitations. These included potential issues of sample representativeness, recall bias, and limited generalizability of findings beyond the selected study areas. Nonetheless, every effort was made to minimize these limitations through careful sampling, data verification, and robust statistical analysis.

4.0 RESULTS AND ANALYSIS

This section presents the demographic profile of the 400 surveyed households from the southern coastal regions of Bangladesh, specifically the Khulna and Bagerhat districts. The demographic information was collected to understand the socioeconomic background of the respondents and to examine how these factors influence food security conditions within the study area. Variables such as gender, age, education level, household size, occupation, income, and access to climate information were analyzed to provide a clear context for interpreting the subsequent statistical findings.

Table 1: Demographic Characteristics of Respondents (n = 400)

Variable	Category	Frequency (n)	Percentage (%)
Gender of Household Head	Male	298	74.5
	Female	102	25.5

Age of Household Head	18–30 years	64	16.0
	31–40 years	108	27.0
	41–50 years	126	31.5
	51–60 years	70	17.5
	Over 60 years	32	8.0
Education Level	No formal education	56	14.0
	Primary education	98	24.5
	Secondary education	106	26.5
	Higher secondary education	82	20.5
	Bachelor's degree	42	10.5
	Master's degree or higher	16	4.0
Household Size	1–3 members	74	18.5
	4–5 members	182	45.5
	6–7 members	98	24.5
	8 or more members	46	11.5
Monthly Household Income (BDT)	< 5,000	44	11.0
	5,001–10,000	122	30.5
	10,001–15,000	126	31.5
	15,001–20,000	70	17.5
	> 20,000	38	9.5
Primary Occupation of Household Head	Farming	222	55.5
	Fishing	74	18.5
	Laborer	48	12.0
	Business	26	6.5
	Service	20	5.0
	Unemployed/Other	10	2.5
Access to Climate Information	Yes	212	53.0
	No	188	47.0

The demographic data reveal that the majority of the surveyed households (74.5%) were male-headed, reflecting the traditional gender roles prevalent in rural Bangladesh. The age distribution shows that most household heads were between 31 and 50 years old (58.5%), indicating that the sample primarily represented the active working-age population. Educational attainment varied widely among respondents, with a substantial proportion (65%) having completed primary to secondary education, while only a small fraction (14%) had

no formal education. This suggests a moderate level of literacy within the study population, which may influence awareness and adoption of agricultural adaptation strategies.

Household size was relatively large, with the majority (45.5%) comprising 4–5 members, a common trend in rural agrarian communities where family labor contributes to agricultural production. Income levels were generally low, as 62% of respondents earned less than 15,000 BDT per month, highlighting economic vulnerability and limited access to resources.

In terms of occupation, farming (55.5%) was the predominant source of livelihood, followed by fishing (18.5%) and labor work (12%). This occupational pattern underscores the community's dependence on climate-sensitive sectors, which directly influences food security outcomes. Additionally, 53% of respondents reported having access to climate information, suggesting moderate exposure to agricultural advisories and early warning systems, which play a critical role in adaptive decision-making.

Overall, the demographic characteristics depict a population that is economically constrained, moderately educated, and heavily reliant on agriculture factors that collectively shape their vulnerability and adaptive capacity to climate change impacts in the southern coastal regions of Bangladesh.

This study conducted logistic regression analysis to understand the factors influencing food insecurity in the southern coastal regions of Bangladesh. The analysis included five predictor variables: household income, household size, education level, crop diversity, and access to climate information In this study, the dependent variable is food insecurity, which was measured as a binary outcome—assigned a value of 1 for food-insecure households and 0 for food-secure households. The model incorporated five key predictor variables that represent the major socioeconomic and environmental determinants of food security in the study area. These include household income (X_1), which reflects the economic capacity of the household; household size (X_2), capturing the number of members and thus the consumption pressure within a family; education level (X_3), indicating the highest level of formal education attained by the household head; crop diversity (X_4), representing the extent to which different types of crops are cultivated, which enhances resilience to climate risks; and access to climate information (X_5), reflecting whether the household receives timely and reliable information related to weather and agricultural conditions. Together, these variables provide a comprehensive framework for analyzing the socioeconomic and adaptive factors that influence the likelihood of food insecurity in the southern coastal regions of Bangladesh. The results of the logistic regression analysis are presented in Table 2

Table 2: Logistic Regression Output

Predictor	Coefficient (β)	Std. Error	Wald Chi-Square	p-Value	Odds Ratio (Exp(β))
Constant	-0.847	0.432	3.84	0.050	0.429
Household Income (X1)	-0.526	0.118	19.91	0.000	0.591
Household Size (X2)	0.214	0.065	10.84	0.001	1.238
Education Level (X3)	-0.346	0.095	13.27	0.000	0.708
Crop Diversity (X4)	-0.389	0.107	13.23	0.000	0.678
Access to Climate Info (X5)	-0.743	0.205	13.14	0.000	0.476

Interpretation of Results

Constant: The constant term (intercept) represents the log-odds of food insecurity when all predictor variables are zero. While it has limited practical interpretation in this context, it serves as the baseline log-odds.

Household Income (X1): Household income has a significant negative effect on food insecurity. For each unit increase in the income category, the odds of being food insecure decrease by approximately 41% (since 1 - 0.591 = 0.409 or 41%).

Household Size (X2): Household size has a significant positive effect on food insecurity. Each additional household member increases the odds of being food insecure by approximately 24% (since 1.238 - 1 = 0.238 or 24%).

Education Level (X3): Higher education levels significantly reduce the likelihood of food insecurity. For each increase in the education level category, the odds of being food insecure decrease by approximately 29% (since 1 - 0.708 = 0.292 or 29%).

Crop Diversity (X4): Greater crop diversity significantly reduces the odds of food insecurity. For each additional category of crop diversity, the odds of being food insecure decrease by approximately 32% (since 1 - 0.678 = 0.322 or 32%).

Access to Climate Information (X5): Access to climate information significantly reduces the odds of food insecurity. Households with access to climate information are about 52% less likely to be food insecure compared to those without access (since 1 - 0.476 = 0.524 or 52%).

The logistic regression model shows that household income, education level, crop diversity, and access to climate information are significantly associated with reduced odds of food insecurity. Conversely, larger household sizes are associated with increased odds of food insecurity. These findings can guide targeted interventions to improve food security in the southern coastal regions of Bangladesh.

5.0 DISCUSSION

The findings of this study highlight the complex interplay between various socio-economic and environmental factors in determining food security in the southern coastal regions of Bangladesh. The results underscore the importance of improving household income, education, crop diversity, and access to climate information as critical strategies for enhancing food security.

Household Income: The significant negative relationship between household income and food insecurity suggests that increasing household income can substantially mitigate food insecurity. This finding aligns with previous research indicating that higher income levels enable households to access better-quality food and diversify their diets.

Household Size: The positive association between household size and food insecurity indicates that larger households are more vulnerable to food insecurity. This could be due to the increased demand for food and resources in larger households, which may strain limited resources.

Education Level: Higher education levels significantly reduce the odds of food insecurity, highlighting the role of education in enhancing food security. Educated individuals are more likely to adopt improved agricultural practices, access better employment opportunities, and make informed decisions regarding nutrition and health.

Crop Diversity: The study found that greater crop diversity significantly reduces food insecurity. This finding suggests that promoting crop diversification can enhance food security by reducing dependence on a single crop, thereby spreading risk and ensuring a more stable food supply.

Access to Climate Information: Access to climate information significantly reduces the odds of food insecurity. This highlights the importance of disseminating timely and accurate climate information to farmers, enabling them to make informed decisions about crop selection, planting times, and other adaptive measures.

These insights can inform targeted interventions to improve food security in the southern coastal regions of Bangladesh. Policies aimed at increasing household income, promoting education, encouraging crop diversification, and improving access to climate information are likely to be effective in mitigating food insecurity in these vulnerable areas. Further research could explore the

implementation of these strategies and evaluate their long-term impacts on food security

The study identified several adaptation strategies and practices used by farmers and communities in the southern coastal regions of Bangladesh to combat climate change-induced challenges. Key strategies include:

Crop Diversification: Farmers have diversified their crops to reduce reliance on a single crop type, thereby spreading risk and enhancing resilience against climate variability. This practice has been widely adopted, with 78% of surveyed farmers reporting diversification as a key strategy.

Saline-Resistant Crop Varieties: The introduction and adoption of saline-resistant crop varieties, such as the BINA 8 rice cultivar, have been instrumental in mitigating the adverse effects of soil salinity. Approximately 64% of farmers have adopted these crop varieties, resulting in improved crop yields and food security.

The effectiveness and adoption rates of the identified adaptation strategies were evaluated through a combination of qualitative interviews and quantitative data analysis. Key findings include:

Effectiveness of Crop Diversification: Crop diversification has proven to be highly effective in enhancing food security and reducing vulnerability to climate shocks. Quantitative data analysis revealed that households practicing crop diversification experienced a 30% reduction in food insecurity compared to those relying on monoculture.

Adoption Rates of Saline-Resistant Varieties: The adoption of saline-resistant crop varieties has been moderately high, with 64% of farmers integrating these varieties into their farming systems. Qualitative interviews highlighted that farmers perceive these varieties as crucial for maintaining crop yields in saline-prone areas.

Impact of Improved Irrigation Practices: Improved irrigation practices have significantly increased water use efficiency, resulting in a 25% increase in crop productivity. Farmers reported that these practices have also helped mitigate the impacts of dry spells and saline intrusion, thereby enhancing overall food security.

Challenges and Barriers to Implementing Adaptation Strategies

In addition to identifying effective strategies, the study also explored the key challenges and barriers faced by coastal communities in implementing climate change adaptation strategies. These include:

Financial Constraints: Limited access to financial resources and credit facilities was reported as a significant barrier, preventing farmers from investing in new technologies and practices.

Knowledge and Information Gaps: Despite the availability of climate information, there are gaps in the dissemination and accessibility of this information to farmers. About 45% of farmers reported inadequate access to timely and accurate climate information.

Infrastructure Limitations: Poor infrastructure, including inadequate irrigation systems and transportation networks, hampers the effective implementation of adaptation strategies.

Policy and Institutional Support: Farmers highlighted the need for stronger policy and institutional support to facilitate the adoption of adaptation practices. This includes access to subsidies, training programs, and extension services.

By addressing these challenges and enhancing support mechanisms, policymakers and stakeholders can improve the resilience of coastal communities to climate change and ensure sustainable agricultural practices in the southern coastal regions of Bangladesh.

POLICY RECOMMENDATIONS

To strengthen food security and climate resilience in Bangladesh's southern coastal regions, policies should focus on reducing farmers' financial and knowledge constraints while improving institutional and infrastructural support. Targeted credit, subsidies, and microfinance can enable farmers to adopt climate-resilient technologies. At the same time, wider access to reliable climate information through mobile services, local media, and extension outreach will help farmers make timely and informed decisions. Investments in critical rural infrastructure such as irrigation, transport, and storage are essential for effective adaptation, particularly in highly vulnerable areas. Continuous education and skills training, delivered through collaboration with local institutions, NGOs, and extension services, can enhance adaptive capacity. Strengthening community-based resource management and ensuring

coordinated policy and institutional support will further promote sustainable agricultural practices and long-term food security for coastal communities.

6.0 CONCLUSION

This study examined the food security vulnerabilities and adaptation strategies in the southern coastal regions of Bangladesh, specifically focusing on the Khulna and Bagerhat districts. The findings underscore the complex interplay of socio-economic and environmental factors influencing food security in these regions.

Higher household income significantly reduces food insecurity, with each unit increase in income decreasing the odds of food insecurity by 41%. Conversely, larger household sizes increase vulnerability to food insecurity, with each additional member increasing the odds by 24%. Education level also plays a crucial role, as higher education levels are associated with a 29% reduction in food insecurity, highlighting the importance of education in enhancing food security.

Crop diversity emerges as a key adaptation strategy, reducing the odds of food insecurity by 32%. This underscores the effectiveness of diversifying crops to mitigate risks associated with climate variability. Additionally, access to climate information significantly reduces food insecurity, with households having access to such information being 52% less likely to experience food insecurity. This highlights the critical role of timely and accurate climate information in helping farmers make informed decisions.

The adoption of saline-resistant crop varieties has been significant, with 64% of farmers integrating these varieties into their farming systems. This practice has resulted in improved crop yields and food security. Improved irrigation practices have also been widely adopted, with 52% of farmers implementing measures such as rainwater harvesting and drip irrigation, leading to a 25% increase in crop productivity.

Community-based resource management has proven effective, with 60% of respondents participating in such initiatives. These practices have enhanced resource availability and community resilience. Agroforestry, practiced by 48% of farmers, has contributed to a 15% increase in household income and a 10% improvement in food security levels, showcasing its benefits for both environmental sustainability and economic well-being.

The study highlights the critical importance of enhancing financial support, improving access to climate information, investing in infrastructure development, promoting education and training, strengthening community-based resource management, and enhancing policy and institutional support to improve food security and support effective adaptation strategies in the southern coastal regions of Bangladesh. Addressing these challenges through targeted interventions can significantly enhance the resilience of coastal communities to climate change, ensuring sustainable agricultural practices and improved food security for vulnerable populations.

ACKNOWLEDGEMENT: This research was supported by the Research Centre of Gopalganj Science and Technology University during the 2023-2024 fiscal year.

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