



RESEARCH ARTICLE

INFORMATION NEEDS FOR CLIMATE SMART AGRICULTURAL PRACTICES AMONG COASTAL FARMERS IN SOUTHERN BANGLADESH

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ARTICLE DETAILS

Article History:

Received 23 April 2025
Revised 18 May 2025
Accepted 02 June 2025
Available online 10 July 2025

ABSTRACT

Coastal regions of southern Bangladesh are highly vulnerable to climate change, posing serious threats to agricultural productivity and the livelihoods of farming communities. Climate-smart agricultural practices (CSAP) offer promising solutions to enhance resilience, but their effective adoption depends on farmers' access to timely, relevant, and need-based information. Understanding the specific information needs of coastal farmers is therefore essential for designing targeted extension services and promoting sustainable, climate-resilient agriculture. This study aimed to assess the information needs of coastal farmers regarding climate-smart agricultural practices and also explored relationships and contribution of the selected characteristics of the coastal farmers to their information needs regarding climate smart agricultural practices. The study was conducted at Kalapara upazila of Patuakhali district. Data were collected with the help of pre-tested interview schedule from a sample of 310 coastal farmers selected through multi-stage random sampling technique. Results of information needs by the coastal farmers ranged from 50 to 85 against the possible range of 20 to 100. The mean and standard deviation were 71.14 and 8.51 respectively. Majority (66.13 percent) of the coastal farmers had medium information needs compared to 17.42 percent had high information needs and 16.45 percent had low information needs concerning climate smart agricultural practices. Correlation tests indicated that agricultural knowledge, training experience, communication exposure, cosmopolitanism showed significant negative relationship and innovativeness and economic motivation showed significant positive relationship with information needs by the respondents. Regression results indicated that 18.4 percent variation was contributed by cosmopolitanism (5.2 percent), agricultural knowledge (4.1 percent), economic motivation (3.5 percent), training exposure (3.6 percent) and innovativeness (1.9 percent) of the coastal farmers. These findings suggest that tailored extension strategies, informed by farmers' individual characteristics, are essential to effectively promote climate-smart agriculture in vulnerable coastal regions.

KEYWORDS

CSA-practices, Information need, Coastal farmers, Southern Bangladesh

1. INTRODUCTION

Bangladesh, located in the delta of the Ganges, Brahmaputra, and Meghna rivers, is one of the most climate-vulnerable countries in the world due to its low elevation, high population density, and dependence on agriculture (IPCC, 2022; MOEFCC, 2018). Among the most affected areas are the southern coastal regions, where agriculture is increasingly threatened by frequent cyclones, saline water intrusion, tidal flooding, sea-level rise, and erratic rainfall patterns (Haque et al., 2021; Rahman et al., 2020). These stressors pose significant risks to food security, income generation, and the overall well-being of coastal farming communities. In light of these challenges, Climate-Smart Agriculture (CSA) has emerged as a sustainable framework to address the adverse effects of climate change while ensuring agricultural productivity and resilience (FAO, 2013; Lipper et al., 2014).

Climate-Smart Agricultural Practices (CSAP) refer to context-specific strategies designed to increase agricultural productivity, enhance resilience (adaptation), and reduce or remove greenhouse gas emissions (mitigation), where possible (World Bank, 2016). In coastal Bangladesh, CSAP may include the use of salt-tolerant crop varieties, raised bed cultivation, water-saving irrigation methods, floating gardens, weather

forecasting tools, and integrated crop-livestock systems (Karim et al., 2018; Sarker et al., 2020). However, the success of these practices relies heavily on the timely availability, relevance, and accessibility of information to the farmers who implement them.

Information needs are a critical factor in the adoption of agricultural innovations. Farmers' access to adequate, accurate, and timely information on climate-smart technologies can significantly influence their decision-making process (Adolwa et al., 2012; Mittal et al., 2016). In coastal regions, where the digital divide, low literacy levels, and limited extension services prevail, understanding farmers' information needs is fundamental to tailoring effective communication and extension strategies (Kabir et al., 2019; Hossain et al., 2021). Despite various initiatives, including government-led extension programs and NGO interventions, a significant knowledge gap remains between what farmers know and what they need to know regarding CSAP (Islam et al., 2020).

Previous studies have shown that socio-economic and psychological characteristics such as education, farm size, farming experience, training exposure, innovativeness, and cosmopolitanism play a pivotal role in shaping farmers' information-seeking behavior (Rahman et al., 2022). For instance, farmers with greater communication exposure and training

Quick Response Code



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Website:
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DOI:
10.26480/bda.01.2025.56.61

Table 1(Cont.): Characteristic profile of the respondents

Agricultural knowledge	Unknown	10-29	Low (Upto 12) Medium (13 to 22) High (23 and above)	61 184 65	19.7 56.1 24.2	17.73	5.63
Training experience (day)	Unknown	0-6	No training With training	224 86	72.3 27.3	1.09	1.9
Farm size (Ha)	Unknown	0.15-3.20	Marginal (between 0.02 and 0.2 ha) Small (between 0.2 and 1 ha) Medium (between 1 and 3 ha) Large farmers (above 3 ha)	19 143 138 10	6.1 46.1 44.5 3.2	1.12	0.75
Annual income (TK)	Unknown	64.10-427.22	Low income (Upto Tk 116) Medium income (Tk. 116.01 to 232.0) High income (Tk. 232.01 – 427.22 and above)	204 86 20	65.8 27.7 6.5	116.05	55.06
Communication exposure	Unknown	14-39	Low (14-17) Medium (18-29) High (30-39)	55 189 66	17.7 61.0 21.3	23.78	6.69
Cosmopolitaness	Unknown	3-14	Low (3) Medium (4-8) High (9 and above)	32 236 42	10.3 76.1 13.5	5.98	2.27
Innovativeness	Unknown	11-20	Low innovativeness (11-14) Medium innovativeness (15-16) High innovativeness (17-20)	33 179 98	10.6 57.8 31.6	15.98	1.49
Risk orientation	Unknown	16-38	Low risk orientation (16-26) Medium risk orientation (27-32) High risk orientation (33 and above)	30 225 45	9.7 75.8 14.5	29.94	3.23
Economic motivation	Unknown	13-32	Low economic motivation (13-18) Medium economic motivation (19-27) High economic motivation (28-32)	56 210 44	18.1 61.3 14.2	22.51	4.51
Attitude towards modern technology	Unknown	13-29	Low (13-22) Medium (23-26) High (27 and above)	55 219 36	17.7 70.7 11.6	24.06	2.20
Information need of climate smart agricultural practices	Unknown	50-85	Low information need (50-62) Medium information need (63-79) High information need (above 79)	51 205 54	16.45 66.13 17.42	71.14	8.5

The observed scores of the respondents on information need of climate smart agricultural practices ranged from 50 to 85, with a mean of 71.14 and a standard deviation of 8.5. The farmers were classified as low

information need (50-62), medium information need (63-79), and high information need (above 79) categories based on mean \pm standard deviation categories given in the following table.

Table 2: Distribution of respondents according to their information need of climate smart agricultural practices

Categories (Scores)	Frequency	Percentage	Mean	SD
Low information need (50-62)	51	16.45	71.14	8.5
Medium information need (63-79)	205	66.13		
High information need (above 79)	54	17.42		
Total	310	100.00		

Table 2 shows that majority i.e. nearly two-thirds (66.13 percent) of the respondents had medium level information need of climate smart agricultural practices followed by 17.42 percent high and 16.45 percent low information need of the respondents. The findings of the study highlighted that slightly more than four-fifths of the farmers had medium to high information need of climate smart agricultural practices.

3.1 Relationships of selected characteristics of the farmers and their contribution to dependent variables

The study determined relationships of information need of the coastal farmers on climate smart agricultural practices as dependent variables

and 13 selected characteristics of the coastal farmers as independent variables discussed below under following sections:

3.2 Relationships between selected characteristics (independent variables) of the coastal farmers and information need (dependent variable) in adoption of climate smart agricultural practices

This objective aimed to explore the relationships between selected characteristics (independent variables) of the coastal farmers with their information need of climate smart agricultural practices (dependent variable). The co-efficient of correlation between the selected independent variables and the dependent variable are presented in table 3.

Table 3: Relationship with selected independent variables with information need of climate smart agricultural practices of the respondents

Dependent Variable	Selected Independent Variables	Value of correlation coefficient (r)
Information need of climate smart agricultural practices	Age	-.073
	Education	-.063
	Farming experience	-.076
	Agricultural knowledge	-.203**
	Training experience	-.208**
	Farm size	.003
	Annual income	.046
	Communication exposure	-.161**
	Cosmopolitaness	-.229**
	Innovativeness	.173**
	Risk orientation	.038
	Attitude towards modern agricultural technology	.029
	Economic motivation	.150**

** Significant at 0.01 level of significance * Significant at 0.05 level of significance

Table 3 indicates that from the selected characteristics, four variables viz. agricultural knowledge, training experience, communication exposure and cosmopolitaness showed negative significant relationships with information need of climate smart agricultural practices (dependent variable) and two variables viz. innovativeness and economic motivation showed positive significant relationships with information need to climate smart agricultural practices (dependent variable).

3.3 Contribution of selected characteristics to information need of climate smart agricultural practices by the coastal farmers

The coefficients of correlation indicate the linear relationship between the two variables. It did not reveal the contribution of independent variables i.e. characteristics of coastal farmers to information need. Therefore, linear multiple regression analysis was done to determine the

contribution of various characteristics of coastal farmers to their information need. Only those variables, which had significant relationship with information need, were included in the regression model. Thus, a total of 6 characteristics namely agricultural knowledge, training experience, communication exposure, cosmopolitaness, innovativeness, and economic motivation were included in the model.

Out of six variables the regression coefficients of only five variables viz. agricultural knowledge, training experience, cosmopolitaness, innovativeness and economic motivation were statistically significant indicating that these variables had significant contribution to the variation in the information need of the coastal farmers. It was observed that, the 5 variables namely agricultural knowledge, cosmopolitaness and economic motivation were entered into the regression model which combined accounted for 18.6 of the total variation in information need. The F value was 11.520, which was significant at 0.000 level of probability. The results of regression analysis are presented in the table 4.

Table 4: Regression coefficients of the selected characteristics of the coastal farmers with their information need for climate smart agricultural practices

Variable entered	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	61.520	5.442		11.304	.000
Agril. knowledge	-.211	.083	-.139	-2.538	.012
Training experience	-.775	.270	-.182	-2.877	.004
Communication exposure	-.072	.084	-.056	-.849	.396

Table 4(Cont.): Regression coefficients of the selected characteristics of the coastal farmers with their information need for climate smart agricultural practices

Cosmopolitaness	-.916	.198	-.245	-4.636	.000
Innovativeness	.806	.303	.142	2.661	.008
Economic motivation	.378	.103	.200	3.664	.000
			R ² = 18.6	F, 11.520	P= .000

In this connection, therefore, rejecting the concerned null hypotheses and the researcher concluded that each of the factors had significant contribution to information need of farm women. In other words, the farm women who had high agricultural knowledge, high training experience and high extension contact-had high information need.

The unique contribution of each three variables was also determined by taking the changes in R² value occurred for entry of a particular variable

in the step-wise regression model. The results are shown in Table 5. The variables together could explain 18.4 of the total variation in information need in adoption of climate smart agricultural practices by the coastal farmers, cosmopolitaness alone contributed 5.2 percent of the variation. The rest variation was from agricultural knowledge (4.1 percent), economic motivation (3.5 percent) and training experience (3.6 percent) and innovativeness (1.9 percent).

Table 5: Change in multiple R² for enter of a variable into the stepwise multiple regression model for information need in climate smart agricultural practices

Variables entered in the model	R ²	Adjusted R ²	Change in R ²	Variation explained (percent)	Level of significance
Cosmopolitaness	.052	.049	.052	5.2	.000
Agricultural knowledge	.094	.088	.041	4.1	.001
Economic motivation	.129	.120	.035	3.5	.000
Training experience	.165	.154	.036	3.6	.000
Innovativeness	18.4	.170	.019	1.9	.009

3.4 Cosmopolitaness

Cosmopolitaness enhances the mental and intellectual makeup of farmers by broadening their exposure to diverse ideas, practices, and knowledge systems beyond their immediate environment. Individuals with higher levels of cosmopolitaness are often more aware and informed due to their interaction with outside sources, experiences, and improved situations, which collectively enrich their understanding and decision-making capabilities. A farmer with strong cosmopolite orientation is likely to maintain regular connections with external information channels- such as agricultural extension services, media, training centers, or urban agricultural markets and thus stays updated with modern farming techniques. This exposure tends to foster a positive attitude toward innovation and new agricultural practices. Consequently, such farmers have reduced unmet information needs, as they proactively seek, access, and assimilate necessary knowledge from various sources. In this study, a statistically significant negative relationship was found between cosmopolitaness and information need ($r = -0.229^{**}$), indicating that as cosmopolitaness increases, the information needs decreases. This finding is consistent with earlier research that reported cosmopolite farmers are more receptive to change and tend to adopt innovations earlier than their more locally oriented counterparts (Rogers, 2003; Naznin et al., 2019; Hossain et al., 2020). These results underline the importance of fostering cosmopolite traits among coastal farmers to enhance their adaptive capacity and reduce dependency on external information support for climate-smart agricultural practices.

4. CONCLUSIONS

This study investigated the information needs of coastal farmers in Kalapara upazila of Patuakhali district concerning climate-smart agricultural practices (CSAP) and examined how various farmer characteristics influenced those needs. The majority of farmers were found to have a moderate level of information need, with a notable portion showing either high or low need, indicating diverse levels of awareness and access to relevant information. The overall findings suggest that while farmers are generally aware of the challenges posed by climate change, many still lack adequate knowledge to adopt appropriate adaptive practices. Farmers with higher agricultural knowledge, training experience, communication exposure, and broader social networks were found to have lower information needs, likely due to better access to learning resources and support systems. On the other hand, farmers who demonstrated more innovativeness and stronger economic motivation were more eager for information, reflecting their active search for new and efficient practices. These insights point to the necessity of developing customized extension services that address the specific needs of different farmer groups. In the future, targeted training programs, locally adapted

information dissemination tools, and inclusive communication strategies should be implemented to bridge the knowledge gaps. Strengthening farmer-to-farmer learning, enhancing digital access in rural areas, and integrating CSAP topics into mainstream agricultural education and policy agendas will be crucial for promoting resilience and sustainable farming in Bangladesh's coastal zones.

ACKNOWLEDGEMENTS

Research and Training Centre, Patuakhali Science and Technology University, Dumki, Patuakhali-8602, Bangladesh has been duly acknowledged for funding a project in the year 2018- 2019 in favor of corresponding author as Principal Investigator.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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