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Impact of Social Capital on Farmers' Climate Change Adaptation Decisions: Evidence from Rural Areas of Rajshahi District in Bangladesh

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Abstract: *Change in climate, one of the most dangerous threats to the globe, has a deleterious effect not only on agriculture by abating productivity but also on the status of food security in the country, especially in developing ones. Because of its geographic location, Bangladesh is a sensitive hotspot for climate extreme events, and the farmers of the country are among the most vulnerable, as multiple demographic and climatic stresses exacerbate their vulnerability. To mitigate the effect, adaptation to climate change has become an inevitable part of agriculture, and this, according to some scholars, is a social process. In more broad terms, including human and physical capital, social capital also has an influential role in the process of adaptation to traditional agriculture to combat climatic variability. Despite having significant importance, farmers' social capital in the climate change adaptation process has received less attention, perhaps due to the definitional ambiguity of the concept. Considering the value of this aspect and the impact of climate variability on agriculture in drought-prone Rajshahi district, the study probes to determine the effect of social capital on the climate change adaptation decisions of farmers in Rajshahi district and the impact of social capital on farmers' intensity of climate change adaptation. To achieve these objectives, the paper has used micro-level data obtained by conducting direct interviews with 119 crop farmers from two upazilas, Puthia and Godagari, of Rajshahi district during the farming season. Through binary logistic regression, the first objective is fulfilled, and multiple linear regression modeling is used for the second objective. The binary regression results of the study reveal that the number of institutions involved, the number of friends inside the respondent's residing village, and the respondent's cooperativeness have a positive and significant impact on the farmer's adaptation decisions. Variables, namely group trust, village trust, number of relatives outside the residing village of the respondent, and number of involved institutions, are found to have a direct and significant relationship with the intensity of climate change Adaptation in agriculture.*

Keywords: ***Adaptation, Climate change, Social capital, Rural Areas.***

1. Introduction
Large-scale climate change has been one of the most persistent threats to the global community. Climate change is any change occurring in the climate during a period of time that may vary from decades to centuries (Hope, 2009). An increase in temperature, rise in sea level, reduction in annual precipitation, depletion of groundwater level, and increase in the frequency of extreme weather events are projected by the IPCC (2007), and they marked all anthropogenic activities as the reason behind this hazardous change in the climate, which has a potentially devastating impact on agriculture, food

security, health, and biodiversity, particularly in developing countries. There are general agreements among environmental experts that residents around the world will confront more frequent natural disasters in the upcoming years (Thomas and Lopez, 2015).

According to Wheeler and Von Braun (2013), there is a scientific consensus that non-industrialized and low-income nations located in tropical and sub-tropical climates are more susceptible to the negative impacts of climate change. As a developing country, Bangladesh contributed a little to global warming, which is considered to be the main reason for climate hazards. Because of its geographical location, major rivers, and low-lying deltaic terrain, the country is highly exposed to the impact of both the slow and rapid onset of climate-driven disasters. Agriculture is supposed to be the most vulnerable among many sectors that are severely affected by the phenomenon of climate change (Chauhan et al. 2005). Climate change has three deleterious effects on agriculture: loss in crop productivity by changing temperature, decreased water availability for irrigation in cultivation, and frequent climate variability such as drought and rainstorms (Kurukulasuriya et al. 2003). The impact of climate change on agriculture, especially in Bangladesh, has been well-established in the literature (Uddin et al. 2014, Kabir et al. 2017, Sarker et al. 2013). The erratic pattern of climate in the country produces extreme events such as drought and floods, which have a noticeable adverse effect on crop yield (Alauddin and Sarker, 2014). Farmers, particularly crop farmers, are vulnerable to climate shocks such as seasonal variations in rainfall and changes in temperature.

The response to climate change often varies in terms of scope and intensity. Though in response to rising risk, some individuals and communities may not change their production techniques, others may respond to climate and environmental challenges on a coping, adaptive, and transformative level (Davies et al., 2013; Frankenburger et al., 2013).

An individual's adaptation behavior is triggered by his or her recognition of the need to adapt (Fankhauser et al., 1999), perceived climate risk, costs of adaptation, and potential reduction in damage (Kane and Shogren, 2000). Adaptation is highly context-specific, and socio-economic characteristics, social networks, and non-climatic aspects play a vital role in shaping adaptation measures (Eriksen et al. 2011). In the context of adaptation, the influence of social dimensions like cultural norms and ongoing economic and demographic change in a location has an important role because they determine how societies interact with climate change and vulnerabilities (Adger et al., 2003; Wolf et al., 2011). The greatest insights in the social sciences on how the ability to act collectively evolves and is distributed and utilized come from the growing interdisciplinary insights into social capital.

The process of adaptation involves the interdependence of agents through their relationships with each other. This includes the institutions in which the agents reside and the resources on which they depend (Adger, 2003). The resource embedded in such a relationship has been termed social capital in the theories.

In particular, the role of social capital in the climate change adaptation process, which may vary across locations or among farmers within the same location (Alesina and La Ferrara, 2000; Putnam, 1993), has long received little attention in the economic literature despite being recognized as an important rural sociological aspect.

Conley and Udry (2001) marked social capital as closely related to information diffusion and suggested a difference in adaptation rates and the possibility of differences in access to information from early adaptors by potential adopters. One reason why it has gained extensive attention is that it is "accepted to facilitate the achievement of the goals that could not be achieved in its absence or could be achieved only at a higher cost" (Coleman, 1988).

Focusing on these aspects, the first major objective of this study is to analyze the impact of social capital on farmers' climate change adaptation decisions, and estimating the impact of social capital on the intensity of the use of adaptation techniques is the second objective.

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2. Conceptual Development

The concept of social capital, unlike other forms of capital, is full of definitional and operational ambiguities in spite of gaining considerable attention among sociologists, political scientists, and economists. The concept was first developed by Durkheim in the nineteenth century, who emphasized group life as an antidote to anemia and self-destruction. His earliest works (1895 and 1877) showed a close relationship between social aspects like family, religion, beliefs, and suicides, which was thought to be linked with the biological aspect.

Although the concept originated in the nineteenth century, Hanifan introduced the term "social capital" in an informal context in 1920. He referred to social capital as the goodwill, sympathy, and social network of a group of people.

Pierre Bourdieu (1986), one of the major scholars leading the sector, termed social capital "the aggregate of the actual or potential resources that are linked to the possession of a durable network of more or less institutionalized relationships of

mutual acquaintance or recognition."

But mainstream economists have been influenced mostly by the works of Robert D. Putnam. His view of social capital drew much attention because of the deviation from previous theorists as he attempted to analyze at a macro level. In his famous 1994 book „Making Democracy Work, Putnam defined social capital as "the features of social organization such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions".

Social capital manifests in two ways. (Uphoff, 2000; Dasgupta et al., 2014). Firstly, the structural form of social capital, and secondly, the cognitive form of social capital This division is based on the fact that capital involves socio-economic institutions and networks or relates to individual states of mind.

The levels and types of social capital are demonstrated by different authors.

On the basis of relationships and functions that social capital performs inside one community or between organizations or individuals, three forms of it have been identified by the authors: bonding, bridging, and linking social capital. According to Szreter and Woolcock (2004), bonding social capital is the trusting and cooperative relations between members who are similar in a socio-demographic sense. It is characterized by strong ties. Networks requiring collaboration and coordination with other external groups to achieve set goals are termed bridging social capital. According to Harper and Kelly (2003), linking social capital is the connection of individuals with people in the hierarchy of power and resources, thus connecting people across different levels of authority and standing.

3. Literature review

Exploring several characteristics of the construct of social capital was the main purpose of the research conducted by Downing (2011). Only self-reported health, average community education attainment, and personal education attainment were significant from structural equation modeling, and members of a formal group with a mission to build social capital had a higher level of social capital compared to non-members. To provide a coherent overview of social capital in the Netherlands, to monitor social capital over time, and to compare subpopulations, Beuningen and Schmects (2013) integrated independent social capital indicators and constructed an index with the help of the application of structural equation modeling, which is based on partial least squares. Extended studies have been done on different aspects and issues concerning social capital and climate change in the context of different countries. Nam (2011) investigated whether social capital has an impact on climate change adaptation in the Mekong River Delta in Vietnam. To determine the effect of trust, cooperativeness, formal institutions, and informal institutions on adaptation to climate change, the author used four indexes. The empirical evidence showed that social capital does not affect adaptation to climate hazards at the individual level. Trust had no influence on farmers' adaptation or cooperativeness. Contrarily, with each additional friend, the probability of adoption increased by 2%. Wambugu et al. (2009) attempted to probe the determinants of different performances of smallholder producer organizations of groundnut growers in western Kenya, with a special emphasis on the role of social capital. The results showed that the heterogeneity of a group had a beneficial effect on household welfare, as opposed to the findings of Nagarajan et al. (1999). The researchers traced a significant relationship between the degree of solidarity and the performance of the organization. The performance was lifted by 0.124 in response to a unit change in the organization's meeting attendance index. Strikingly, the study identified that trust was negatively related to the level of commercialization. Generalized Poisson and a multivariate Probit model were used by Yameogo et al. (2018) to quantitatively determine the sway of social capital on smallholder farmers' choice of adaptation decisions, the number of adaptation practices used, and the extent of acclimatization in Burkina Faso, West Africa. Results from the multivariate Probit model uncovered the positive linkage between cognitive social capital and the adoption of soil and water conservation methods, among other techniques. One of the major findings was the inverse relationship between the adoption of crop diversification techniques and structural social capital variables.

4. Research Methodology

4.1 Study District and Its Characteristics

Rajshahi district was purposefully selected as the study area for this research work. The reason behind this is that this district is marked by increasing temperatures and reduced precipitation. Rajshahi is included in the drought-prone Barind Tract area, one of the most climate-vulnerable regions of the country.

Rajshahi, a district of the Rajshahi division, is situated in the north-western region of Bangladesh. The district was established in 1772. The region consists of Barind Tract, Diara, and Char lands. The total area of the district is 2425.37 sq. km., with a population of 2595197 people (BBS, 2011). The average annual rainfall in this area varies from 839 to 2408 mm (Sarker et al., 2013). In the case of extreme weather events, the region is drought-prone but free of floods and cyclones (Ahmed and Chowdhury, 2006).

4.2 Data Source

Mainly cross-sectional data, following a multi-stage random sampling method, is employed in this study. Rajshahi district consists of nine upazilas, of which two are selected randomly due to time and resource constraints. They are Godagari, which is included in the meteorologically drought-prone Barind Tract, and Puthia. The researcher has selected two unions randomly from a total of six unions in Puthia and two from nine in Godagari. By this process, Baneswar and Belpukuria unions are selected from Puthia upazila, and Matikata and Deopara unions are selected from Godagari upazila. In the next stage, from each union, two villages are selected randomly for data collection. Later, Biraldoho and Maipara villages from Baneswar union; Belpukuria and Jamira from Belpukuria union; Bogdamari and Boiragitola villages from Matikata union; and finally, from Deopra union, villages named Hatibandha and Fulbari are selected randomly by the researcher. Following a random sampling method, finally, 119 respondents have been interviewed using face-to-face interview methods for collecting data.

4.3 Explanatory Variables in the Binary Logistic and Multiple Linear Regression Models

The variables included in the model estimation and their measurements are described in Table 5.1. The dependent variable for binary logit regression is a dummy variable with a value of 1 if the respondent has adopted any adaptation techniques for mitigation of climate change and 0 otherwise. The total number of adaptation techniques adopted by the respondent is the dependent variable for the multiple linear regression model that is estimated to determine the factors responsible for the intensity of adaptation. The explanatory variables that are used are described in Table 1.1.

Table 1.1: Description of Explanatory Variables Used in Estimating Factors of Adaptation Decisions and the Intensity of Adaptation

Variable Name	Category	Measurement
Age of farmer	Continuous	Years
Education level of farmer	Continuous	Years of schooling
Monthly income of the farmer	Continuous	Tk. per month
Farming experience of the respondent	Continuous	Years of farming
Number of groups and institutions involved with	Continuous	Total number of groups and institutions
Number of persons the respondent believes would help him financially	Continuous	Number of persons
Number of friends inside the village	Continuous	Number of persons
Number of friends outside the village	Continuous	Number of persons
Number of relatives inside the village	Continuous	Number of persons
Number of relatives outside the village	Continuous	Number of persons
Cooperativeness	Dummy	1 if shows cooperativeness, 0 otherwise
Trust on the groups and institutions involved with	Continuous	5-points Likert scale
Trust on the villagers	Continuous	5-points Likert scale
Trust on people in general	Continuous	5-points Likert scale

4.4 Empirical Model

4.4.1 Measuring the Impact of Social Capital on the Climate Change Adaptation Decision of the Farmers

A binary logistic regression is employed to determine the role of social capital in the adaptation decisions of the farmers in the study area. Logistic regression is a variation of ordinary regression that is used when the response variable is a categorical variable and the independent variables are continuous, categorical, or both. Logistic regression measures the relationship between the categorical dependent variable and one or more independent variables by estimating probabilities using the logistic function, which is the cumulative logistic distribution. Since the dependent variable here is dichotomous, the study has applied the binary logistic regression model to analyze the relationship between dependent and predetermined variables. In this case, the researcher has considered a cause-and-effect relationship between farmers' adaptation decisions and a set of socio-economic and demographic characteristics as follows:

$$P_i = f(X_i) \ldots (1)$$

Where, P_i is the adaptation decision. It takes two values i.e., 1 if the farmer takes adaptive measures in response to negative effects of climate change and 0 if otherwise. Let us suppose that the probability of a household taking adaptation can be written as:

$$P_i = E(Y = 1/X_i) = \beta_1 + \beta_2 X_i \ldots (2)$$

Where X_i is a set of explanatory variables and Y=1 means that the household has adopted mitigating strategies. Now, considering the following representation of the adaptation strategy status of households, Equation (2) can be written as:

$$P_i = E(Y_i = 1/X_i) = \frac{1}{1+e^{-(\beta_1+\beta_2 X_i)}} = \frac{1}{1+e^{-z_i}} ...(3)$$

Where $Z_i = \beta_1+\beta_2 X_i$ is known as a logistic distribution function. In this case, Z ranges from $-\alpha$ to $+\alpha$; P_i ranges between 0 and 1and P_i is non-linearly related to Z_i(i.e. X_i). In this case, an estimation problem may be arisen due to non-linearity in X_i and β_i with P_i. For this reason, the OLS method cannot be applied to estimate the parameters. So, P_i is the probability of a household taking adaptation strategy can be expressed as:

$$P_i = \frac{1}{1+e^{-z_i}} ...(4)$$

Again, $(1-P_i)$ is the probability of a household not taking adaptation strategy can be written as:

$$1 - P_i = \frac{1}{1+e^{z_i}} ...(5)$$

Using equation (4) and (5), it can be written as:

$$\frac{P_i}{1-P_i} = e^{z_i} ...(6)$$

Taking a natural log, the logistic function (6) can be written as:

$$L_i = \ln[P_i/1-P_i] = \beta_1 + \beta_2 X_i ...(7)$$

It is assumed that age, education level, the income of the household, number of the groups and institutions involved with, formal training, level of trust on groups and institutions involved, on villagers and on people in general, cooperativeness affect the decision of undertaking adaptation strategy. On the basis of the above factors, a specified model is formulated as follows:

$$L_i = \ln[P_i/1-P_i] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 +$$
$$\beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} u_i ...(8)$$

In model (8), X_i, where, i = 1, 2,..., 14, are explanatory variables; $\beta_0 ... \beta_{14}$ are parameters to be estimated and u_i is the stochastic error term.

4.4.2 Multiple Linear Regression Model For Estimating The Intensity of Climate Change Adaptation Techniques

In the present study, the researcher has formulated a relationship between intensity of adaptation (number of adaptation techniques the farmer has adopted) and a set of socio-economic and demographic factors that affect the intensity as follows:

$$\text{Ri} = f(\text{Xi}) ...(9)$$

Where,

R_i= The dependent variable under consideration

X_i = A set of demographic and social capital related factors that affect the outcome variable.

In this Multiple Linear Regression model, the OLS method has been applied to estimate the determinants of intensity of using adaptation strategies to climate change in the study area.

On the basis of the above-mentioned factors, the researcher formulated a specified regression model as follows.

$$R_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 +$$
$$\beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} + u_i ...(10)$$

Where,

R_i= Intensity of use of adaptation techniques

and $\beta_0 \ldots \beta_{14}$ are parameters to be estimated; X_1, $X_2 \ldots X_{14}$ are the explanatory variables that affect farmers to adopt more strategies.

5. Results and discussion

5.1 Estimation of the Factors of Farmers' Adaptation Decision to Climate Change

Farmers' decision to adopt adaptation measures is largely dependent on the recognition of the need to adapt and on their ability, as well as incentives provided by government or private organizations. A binary logistic regression is run to investigate the social capital factors affecting farmers' climate change adaptation decisions. The estimation results of binary logistic regression are presented in Table 1.2.

Table 1.2: Impacts of Social Capital on Farmers' Decision of Adaptation to Climate Change

Variable	Coefficient	Odds Ratio	Robust Std. Error	z-statistic	P>|z|
Age (X_1)	-0.018	0.974	0.046	-0.40	0.689
Education level (X_2)	0.053	1.062	0.075	0.71	0.478
Monthly total income (X_3)	-0.000	0.999	0.000	-1.45	0.148
Farming experience (X_4)	0.048	1.052	0.041	1.18	0.239
Number of groups and institutions involved with (X_5)	1.524***	4.045	0.547	2.78	0.005
Number of persons the respondent believes would help him financially (X_6)	0.081	1.081	0.150	0.54	0.590
Number of friends inside the village (X_7)	0.151**	1.162	0.074	2.02	0.043
Number of friends outside the village (X_8)	-0.042	0.967	0.027	-1.54	0.125
Number of relatives inside the village (X_9)	0.017	1.019	0.017	0.99	0.322
Number of relatives outside the village (X_{10})	0.010	1.010	0.017	0.62	0.537
Cooperativeness (X_{11})	1.638*	3.366	0.924	1.77	0.076
Log Pseudo likelihood=-34.98771; LR Statistic (df=11)= 37.79 and Prob.>chi^2=0.0001; McFadden R-squared=0.3507. Note: *** Significant at 1%; ** Significant at 5%; * Significant at 10%					
Source: Author's own calculation					

However, it is essential to note that there are no direct economic interpretations of the estimated coefficients of the binary logit model, as the coefficients only provide the direction of the effects, not their enormity. The most appropriate way is to find out the marginal effects of the estimated coefficients of the model. The marginal effects of the explanatory variables used in logistic regression analysis are given in Table 1.3.

Table 1.3: Marginal Effects of the Explanatory Variables Used in Logistic Regression Analysis

Variable	dy/dx	Sta. Err.	z	P>|z|
Age (X_1)	-0.0017	0.004	-0.40	0.689
Education level (X_2)	0.0049	0.006	0.72	0.473
Monthly total income (X_3)	-8.93e-06	5.99e-06	-1.49	0.136
Farming experience (X_4)	0.0045	0.003	1.20	0.229
Number of groups and institutions involved with (X_5)	0.1417	0.043	3.22	0.001
Number of person(s) the respondent believes would help him financially (X_6)	0.0075	0.014	0.54	0.589
Number of friends inside the village (X_7)	0.0140	0.006	2.18	0.029
Number of friends outside the village (X_8)	-0.0039	0.002	-1.58	0.113
Number of relatives inside the village (X_9)	0.0015	0.001	1.01	0.313
Number of relatives outside the village (X_{10})	0.0010	0.001	0.62	0.535
Cooperativeness (X_{11})	0.1523	0.080	1.90	0.057
Log likelihood = -34.98771; LR Statistic (df=11)= 37.79 and Prob.>chi^2=0.0001; McFadden R-squared=0.3507. Note: *** Significant at 1%; ** Significant at 5%; * Significant at 10%				

From the table, it is found that out of eleven variables, three are statistically significant. The first significant variable is the number of groups and institutions involved. The variables have a positive influence on the dependent variable. The possible logic is that involvement with groups and institutions, both formal and informal, increases the availability of credit facilities that instigate farmers to adopt modern adaptation techniques in agriculture. It also imparts farming assistance and information about climate change.

The total number of friends inside the village is statistically significant at the 5% level (z = 2.02, p 0.05), which indicates a direct relationship with adaptation decisions. The rational explanation of this result is that, besides socialization, a larger group of friends also helps to provide farming and agricultural credit-related information.

Cooperativeness is the third significant variable in this case and has a positive impact on the climate change adaptation decision.

5.2 Determinants of Intensity of Adaptation Strategies

The intensity of adaptation refers to the number of adaptation strategies undertaken by a farmer simultaneously, and intensified adaptation can be a way of mitigating climate change in agriculture. In this section, OLS estimation of the multiple linear regression is performed to identify the decisive factors affecting the intensity of the use of adaptation strategies among the farmers. The estimation results are presented in Table 1.4.

Table 1.4: Regression Results for Intensity of Adaptation Strategies

Variable	Coefficient	Robust Std. Error	t-Statistic	P>|t|
Age (X_1)	-0.0262	0.022	-1.15	0.252
Education level (X_2)	0.020	0.039	0.50	0.618
Monthly total income (X_3)	-0.000	0.0003	-0.72	0.473
Farming experience (X_4)	0.0321	0.0210	1.53	0.130
Number of groups and institutions involved with (X_5)	0.465***	0.181	2.56	0.012
Number of person(s) the respondent believes would help him financially (X_6)	0.0110	0.0441	0.25	0.804
Number of friends inside village (X_7)	-0.011	0.017	-0.66	0.510
Number of friends outside village (X_8)	-0.010	0.0121	-0.86	0.391
Number of relatives inside village (X_9)	0.0020	0.0050	0.41	0.686
Number of relatives outside village (X_{10})	0.0120***	0.0055748	2.16	0.033
Cooperativeness (X_{11})	0.319	0.632	0.51	0.614
Trust on the groups and institutions involved (X_{12})	0.2876***	0.100	2.87	0.005
Trust on the villagers (X_{13})	0.347	0.170	2.04	0.044
Trust on general people (X_{14})	0.231	0.183	1.26	0.209
F(14,104)=4.24 and Probability > F= 0.0000 ; R-squared= 0.3632 Note: *** Significant at 1%; ** Significant at 5%; * Significant at 10%				
Source: Author's own calculation				

It can be said that among all of the variables under consideration, four of the explanatory variables have statistical significance and a positive relationship with the outcome variable. These variables are: number of groups and institutions involved, which is significant at 1% level; number of relatives outside the village at 5% significant level; trust in groups and institutions involved at 1% level; and trust in villagers at 5% level of significance.

The multiple linear regression results reveal that if one group or institution is added to the total number of groups and institutions involved with the farmer, the intensity of adaptation will be increased by 0.465 ($p< 0.01$). The logic behind this result is that involvement with groups and institutions acts as conduits for information not only about climate change but also about modern farming techniques and mitigating strategies, which in turn increases the intensity of adaptation in agriculture.

The second significant variable of the regression is 'the number of relatives outside the village. As per the rationale behind this result, the larger the number of relatives, the higher the number of adaptation techniques used, as relatives outside the village can provide more information regarding farming than methods used conventionally in the village. Farmers can learn from their peers experiences and success stories and be motivated to increase the intensity of adaptation. As a farmer's level of trust in the groups and institutions they are involved with increases, their knowledge of the farming activity and climatic hazards, as well as their expectation of getting a loan from them, goes up, which can positively affect the intensity of adaptation. Trusting information from local organizations can facilitate the recognition and understanding of climate change. Trust in the villagers is the last variable that positively affects the intensity of adaptation. It can encourage a farmer to use the strategies conventionally adopted by the village people.

7. Conclusion

The study mainly contributes to filling the gap in a rarely studied aspect of social capital in the case of climate change adaptation in the context of Rajshahi district. Based on the findings, the study suggests some policy implications. The major suggestion here is to increase the networking of farmers through both formal and informal groups and institutions. This will, in turn, increase their information diffusion process at a low cost that would not have been possible in the

absence of this form of social capital. Patronization of the groups and institutions by both the GOs and NGOs will harness the increment of social capital among the farmers. Interpersonal relationships and ties should be given more emphasis by the farmers, as they can learn from their peers' success stories and be encouraged to adopt newer technologies. Different training programs on agricultural production should be introduced by the government to increase farmers' experience.

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