Contribution of the Characteristics of the Disaster Affected People to Practice the Disaster Coping Strategies

ABSTRACT

A study was conducted in Gangachara Upazila of Rangpur district, Bangladesh from September to December 2018 to determine how the characteristics of affected individuals contribute to the implementation of coping methods during disasters. Information was gathered from a sample of 302 respondents, chosen at random from the population affected by the disasterthrough both qualitative and quantitative techniques.Among the nineteen personal, economic, and social factors of the disaster-affected individuals, fourteen showed a positive association, two showed a negative relationship, and three showed no significant relationship with their disaster coping strategies. Stepwise multiple regression analysis identified six key variables that significantly contributed to explaining 33.6 percent of the total variations: education (23 percent), income generating activities (3.6 percent), awareness about social safety net programme (2.9 percent), disaster affected land (1.2 percent), farm size (1.9 percent), and perception of climate change (1.0 percent). Path analysis indicated that disaster-affected land had the highest direct positive value (0.589), while farm size had the highest overall indirect influence (0.643) on disaster coping strategy practices. The order of importance for the disaster coping strategies practiced by affected people is as follows: disaster affected land, education, participation in income generating activities, awareness about social safety net programme, perception of climate change, and farm size.

Key words:Disaster AffectedPeople, Coping Strategies,Contributing Characteristics.

INTRODUCTION

"Bangladesh is a country located between 20°30' and 26°40' North latitude and 88°03' and 92°40' East longitude. The majority of its land is situated in a flood-prone location inside the deltaic plain of the Ganges-Brahmaputra-Meghna river system. The Bay of Bengal is located to the south of the country. Bangladesh has a population of approximately 15.58 million people and a total area of 147,570 square kilometres, making it one of the most densely inhabited countries in the world, second only to some city-states. Bangladesh is a riverine country with a total of 710 rivers, including 405 great and small rivers. Among them, 57 rivers are trans-boundary rivers shared with India and Myanmar. The main rivers of Bangladesh significantly impact the land, population, and resources in the areas they flow through" [1,2]. In Bangladesh, the channel width is expanding while the depth is diminishing due to the country's unfavourable geographic situation and discharge regulation by upstream

countries, resulting in unpredictable erosion-deposition dynamics along the main rivers [3].

Disasters frequently happen in Bangladesh, and the increasing impact of climate change is predicted to worsen this trend in the future [4]. Climate change affects manifest as disasters like cyclones, floods, and droughts. The IPCC has emphasised that poor countries are disproportionately susceptible to climate change [5].. Bangladesh ranked first in the Climate Change Vulnerability Index (2011) among 170 nations most exposed to the effects of climate change [6].According to CCVI, considering vulnerability, Bangladesh is an extreme risk country out of 194 country (1. Haiti, 2. Bangladesh). The common natural disasters are high rainfall, drought, riverbank erosion, flood, cyclone, earthquake, landslides, tornado, hailstorm, north-western wind, snowfall, insect pest diseases, etc. and again 50 or more disasters are created by man [7].

In Bangladesh, flood occurrence has increased after 1970 and it is reported that after every 4-5 years a severe flood occurs that covered 60 percent of the total area. After every 10 years a big severe flood takes place. In every two years, Bangladesh faces a middle category flood, in every four to five years a big flood and a big flood that inundates 60 percent areas, in every 8-10 years face a severe flood and in every 100 years a great flood (1786, 1876 and 1988). One fifth to one third of the country is flooded each year during June through October when nearly two thirds of the food grains (mainly rice) are produced. Crops, houses, market etc. go under water and people suffering were knows no bound. Bangladesh routinely has severe floods that have a significant impact on the national economy. Individuals experience food scarcity, inadequate water supply, poor sanitation and hygiene practices, agricultural and infrastructure damage, loss of life, and restricted movement due to the consequences of the disaster[8]. Flood such natural disaster hamper national economy, environment, livelihood, ecology as well as ecosystem [9].

Bangladeshis have evolved over generations to cope with the threats[10]of floods, droughts and cyclones by practicing numerous disaster coping strategies.Due to frequent natural disasters, high population density, poor infrastructure, and low resilience to economic shocks, Bangladesh is particularly susceptible to climatic risks. Insufficient awareness and cooperation among the population of Bangladesh regarding disaster preparedness [11]Climate change has increased the vulnerability of the Bangladeshi population to the impacts of disasters on both the environment and human lives. Despite having few choices, individuals are increasingly seeking

alternate ways to make a living [12] to adapt to the reality of severe disruption of their livelihoods [13].The climate change is posing challenge to the livelihoods in different ways [14] villagers have developed their own strategies to deal with calamities. But human personality is the most complex and fascinating phenomenon.

It is not possible to address all the contributing aspects of coping methods for improving livelihood in a single study. An individual's distinctive patterns significantly shape their mindset and impact their decision-making throughout various aspects of life[10, 15, 16]. This study examined 19 personal, economic, social, and psychological factors of the farmers as independent variables. Sarker (2010) [17] and Haque (2014)[16] discovered both adverse and beneficial correlations between the characteristics of respondents and their tactics for dealing with floods.. Shahiduzzaman (2012) [18] also found the same findings in case of study the food security condition in a char area of Rangpur district.

Objectives of the Study

The present study has been undertakento find out the characteristics of affected people that contributed on their disaster coping strategies towards better livelihood.

METHODOLOGY

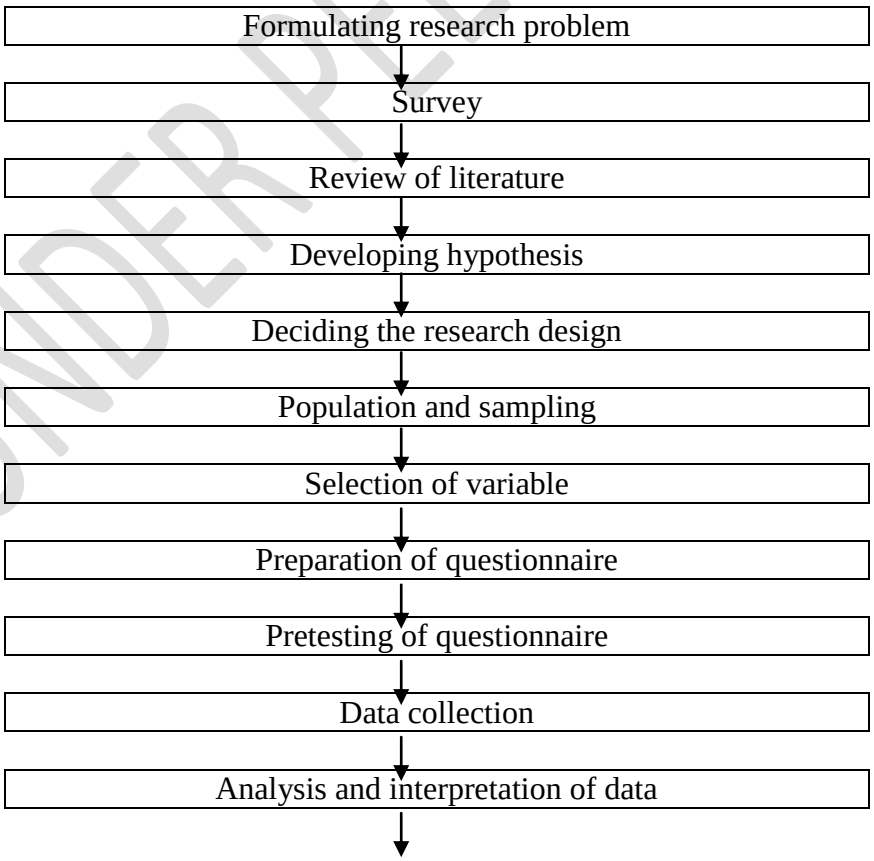
Locale of the Study

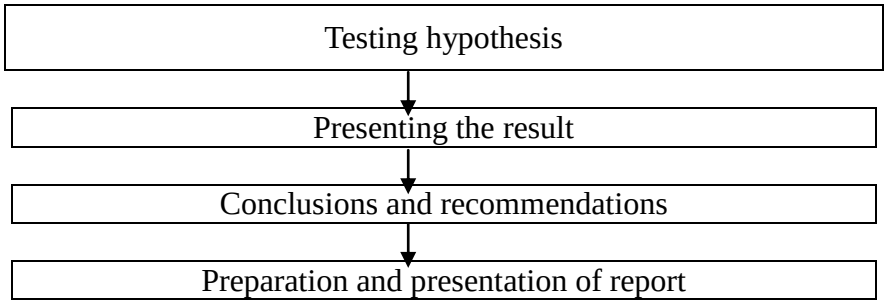
The study was carried out at Gangachara*Upazila* of Rangpur district, Bangladesh during September to December/2016 to 2012 to find out the contribution of the characteristics of the affected people to the practice of coping strategies during disaster. Historically, Gangachara*Upazila* is familiar to a habitat of fragile economy, extreme poverty and chronic food insecurity. Thisdisaster-prone (affected by flood, drought, river erosion and different kinds of storms) study area is located between $25^0$48′ and 25^0 57' north latitudes and between 89^0 05' and $89^0$21' east longitudes. The yearly averagetemperature, rainfall and humidity are found in vulnerable condition and it is 30.2^0, rainfall 244 mm and humidity 82 percent respectively.

Fig 1: Map of the study area

The following methodological design was followed to conduct the research:

Chart 1: methodological design





Research Tool

A structured interview schedule was meticulously developed based on the study's objectives to gather pertinent data. The questions and remarks in the interview schedule were straightforward and concise. The interview schedule included both open-ended and closed-ended questions. Scales were incorporated into the interview agenda as needed. The interview schedule was developed prior to being utilised for data collecting. The preliminary interview schedule was tried with 30 farmers in the research region. The pre-test helped the researcher detect errors in the draft interview schedule, leading to appropriate revisions and modifications based on the pre-test results.

Data Collection Procedure

Data was gathered from a sample of 302 respondents, chosen at random from communities impacted by disasters through both the qualitative and quantitative techniques.

Data Processing and Analysis

The gathered data was coded, assembled, tabulated, and analysed. The local units were standardised. The qualitative input was converted into quantitative data using suitable scoring methods. The responses from the interview schedule were inputted into a computer to create a master sheet. Data processing and analysis were conducted using the SPSS programme.

Pearson’s product moment correlation coefficient (r) was calculated to investigate the connection between the focal variable and the characteristics of the disaster-affected individuals. Regression analysis was conducted to identify the independent variables that contribute to improved livelihoods during a crisis period. Stepwise multiple regression analysis was conducted to ascertain the specific impact of the chosen independent factors on

the dependent variable. Path analysis was performed to evaluate the direct and indirect impacts of the independent variables on the dependent variable.

Descriptive statistical measures like range, frequency, number, percentage, mean, standard deviation, and rank order were utilised to describe the variables. Stepwise multiple regression analysis and route analysis were used to identify the factors that account for the total variation in a specific variable, based on one or more other variables. A significance level of 0.05 was employed throughout the investigation to determine the acceptance or rejection of any null hypothesis. Graphs and charts were utilised to enhance clarity and comprehension.

Results and Discussions

1. Relationship between selected characteristics of the respondents and their disaster coping strategy practice

"Fourteen out of the nineteen selected characteristics of disaster-affected individuals showed a positive and two showed a negative significant relationship with their disaster coping strategy practice. These characteristics include age, education, farm size, disaster-affected land, annual income, household assets, participation in income-generating activities, training experience, extension media contact, water and sanitation condition, environmental awareness, knowledge of disaster coping strategies". [19]

The correlation coefficient alone signifies the linear connection between two variables. It fails to demonstrate the impact and input of a certain independent variable on the dependent variable. Examining the independent factors individually did not provide a complete understanding of their impact on the level of catastrophe coping strategy practices. The many traits of the participants may interact to collectively impact the disaster coping strategies employed by a programme in a vulnerable scenario. "Linear multiple regression analysis was utilised to evaluate the impact of independent variables on the dependent variable". [19]

It was observed that there was the existence of inter-correlation among the independent variables. Such inter correlations among the independent variables violate the assumption of the classical linear regression model. Hence, there may have the possibility of multicollinearity problem for which proper influences of the

variables might not have expressed exactly and the regression results were misleading. In this context, Cohen (1975) mentioned, "When some or all of the variables are substantially correlated with each other, the coefficient obtained for the entire set may be highly misleading.''

To prevent the misleading results indicated above, the step-wise multiple regression method was used. All six independent variables were included in a step-wise multiple regression analysis. As per Droper and Smith (1981). The purpose of step-wise multiple regression analysis is to sequentially add variables until the regression equation is deemed appropriate.

Table 1. Relationship between selected characteristics of the respondents and their disaster coping strategy practice

Focus variable (Dependent variables)	Characteristics of the disaster affected people (Independent variables)	Coefficient of correlation (r)
Disaster Coping StrategyPracticed by the Affected People	Age	-.206**
	Education	.479**
	Family size	.031
	Farm size	.154**
	Disaster affected farm	.176**
	Annual income	.157**
	Household assets	.165**
	Participation in income generating activities	.343**
	Training experience	.421**
	Extension media contact	.384**
	Water and sanitation condition	-.023
	Environmental awareness	.287**
	Knowledge on disaster coping strategy	.403**
	Credit received	.123*
	Scope of work in vulnerable situation	.120*
	Awareness about social safety net program	.451**
	Risk orientation	.074
	Perception of climate change	.284**
	Perception of disasters	.123*

** Significant at .01 level, * Significant at .05 level

2.Contribution of the selected characteristics of the disaster affected people to practice the disaster coping strategies

A linear multiple regression analysis was conducted to assess how different features of individuals affected by catastrophes influence their coping mechanisms in response to disasters. Out of 16 independent variables, only six were included in the best-fitted

regression model: education, farm size, disaster-affected land, participation in income-generating activities, awareness about social safety net programmes, and perception of climate change. All six variables were found to be significant. Therefore, the null hypotheses in question were disproved(Table 2).

Table 2.Regression co-efficient of extent of practice of disaster coping strategy with the independent variables in the linear multiple regression models

Independent variables	Unstandardized co-efficients	Standardized co-efficients	t values	Significant level
	B	Beta		
Age	-.035	-.051	-.920	.359
Education	.790	.184	1.967	.057
Farm size	-16.502	-.520	-2.809	.005
Disaster Affected Farm	22.186	.629	3.498	.001
Annual income	.069	.090	1.668	.096
Household assets	-.050	-.055	-.939	.349
Participation in IGAs	.527	.190	3.368	.001
Training experience	-.006	-.004	-.055	.956
Extension Media Contact	.140	.037	.479	.632
Environ. Awareness	.104	.042	.740	.460
Knowledge of DCS	.106	.042	.522	.602
Credit received	.022	.015	.266	.790
Scope of work	.297	.038	.734	.464
Awareness about SSNP	.468	.152	2.192	.029
Perception of CC	.656	.101	1.825	.059
Perception of disasters	.147	.071	1.424	.155

Constant = 70.450, R^2 =0.354, Adjusted R^2 =0.317, F value=9.745, P= 0.000

3. Coping Strategy Model

Referring to the statistics given in Table 3 The regression model for coping strategies towards disaster is as follows:

$$Y=76.601 +0.975X_2 -15.611X_4 +20.847X_5 + 0.584X_8+0.516X_{16} +0.725X_{18}$$

Where, Y=Disaster coping strategies practices

X_{2}= Education, X_{4}=Farm size, X_{5} = Disaster affected land, X_{8}=Participation in IGAs, X_{16}=Awareness of social safety net programs, X_{18}= Perception of climate change

"Data contained in Table 3 indicated that the whole model of 16 variables explained 35.4 per cent of the total variation of disaster coping strategy practices in vulnerable situation, whereas only six variables explained 33.6 per cent of the variation. But, since the six variables formed the equation, it might be assumed that whatever the contribution was there it was due to these six variables".[19]

4.Path analysis for measuring direct and indirect effects of selected independent variables on disaster coping strategies practices

The study utilised path analysis to analyse the direct and indirect effects of six selected variables entered into a stepwise regression model on the extent of disaster coping strategy practiced by individuals affected by climate change. The correlation matrix was initially created using path coefficients (p) for six relevant parameters. The path-coefficient, p, is an intrinsic correlation possessed by the respondent automatically. The direct influence of certain qualities on the dependent variable is calculated, while the indirect effects of other characteristics are determined by multiplying the column values with the standard coefficient (β) of each variable. Variables that facilitated significant indirect effects were also investigated. The path coefficient of specific independent factors in relation to disaster coping strategy practices is shown in Table 3.

Table 3. Path coefficients showing the direct and indirect effects of selected independent variables on the extent of practice of the disaster coping strategies

Independent variables	Effect of independent variable		Variable through which substantial indirect effects were channelized	
	Direct	Total Indirect		
Education (X_1)	0.267	0.209	0.072	IGAs (X_2)
			0.113	SSNP(X_3)
			-0.022	Farm size (X_4)
			0.0018	DA. land (X_5)
			0.044	CC. per (X_6)

Income generating activities (X_2)	0.212	0.130	0.090	Education (X_1)
			0.039	SSNP(X_3)
			-0.117	Farm size (X_4)
			0.114	DA. land (X_5)
			0.0043	CC. per (X_6)
Awareness about social safety net programs (X_3)	0.167	0.284	0.182	Education (X_1)
			0.050	IGAs (X_2)
			-0.060	Farm size (X_4)
			0.070	DA. land (X_5)
			0.042	CC. per (X_6)
Farm size (X_4)	-0.489	0.643	0.012	Education (X_1)
			0.051	IGAs (X_2)
			0.020	SSNP(X_3)
			0.565	DA. land (X_5)
			-0.0048	CC. per (X_6)
Disaster affected land(X_5)	0.589	-0.414	0.0008	Education (X_1)
			0.041	IGAs (X_2)
			0.019	SSNP(X_3)
			-0.470	Farm size (X_4)
			-0.005	CC. per (X_6)
Climate change perception (X_6)	0.113	0.171	0.104	Education (X_1)
			0.0081	IGAs (X_2)
			0.062	SSNP(X_3)
			0.021	Farm size (X_4)
			-0.024	DA. land (X_5)

Data indicated that 6 variables namely education, participations in income generating activities, awareness about social net programs, farm size, disaster affected land, perception of climate change had direct positive and negative effect on the extent of practice of disaster coping strategy for their livelihood of the affected people due to climate change. Among the variables disaster affected land had the highest direct positive value (0.589) on disaster coping strategy practices and its total indirect effect was -0.414, which was exerted through education (0.0008), farm size (-0.470), participation in income generating activities (0.041), awareness about social safety net programs (0.019) and perception of climate change (-0.005). Farm size had the second highest direct negative effect (-0.489) on disaster coping strategy

practices. The total indirect effect of farm size was (0.643) which was exerted through education (0.012), disaster affected land (0.565),participation in income generating activities (0.051), awareness about social safety net programs (0.020) and perception of climate change (-0.0048).

Education, participation in income-generating activities, and disaster-affected land had a greater direct impact than indirect impact on disaster coping strategies. In contrast, farm size, awareness of social safety net programmes, and perception of climate change had a greater indirect impact than direct impact on disaster coping strategy practices.

Conclusion

Among the 16 factors those were significantly correlated with coping strategy, only six factors,namely education, participations in income generating activities, awareness about social net programs, farm size, disaster affected land, perception of climate change had significant contribution to practice the coping strategy during any disaster for their livelihood. The regression model showed that individuals with higher education levels, greater involvement in income-generating activities, stronger awareness of climate change, knowledge of social safety net programmes, concern for disaster-affected land, and larger farm sizes in the char land were more likely to engage in disaster coping strategies during the disastrous period in the study area.

Recommendations

Considering the relative contribution on the disaster coping strategies practiced by the affected people, the six variables could arrange as follows disaster affected land> education> participation in income generating activities> awareness about social safety net program> perception of climate change> farm size. Thus, it can be stated that most of the variables related to household income which play a vital contribution towards increasing effectiveness of disaster coping strategy practices by the affected people during disaster period. Both GO and NGOs can make better contribution in this area of development through dispersing soft loan, training, motivation etc.

COMPETING INTERESTS

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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