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Exploring the Interface between Poverty and Climate Change Adaptation in Coastal Communities of Bangladesh

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Abstract

Climate change is an exquisite threat for Bangladesh where population density is high, more than 50 million people still live under poverty line, many of them reside in remote, ecologically fragile coastal belts and develop their livelihood-based own adaptive strategies to climate change. The study explores the interface between poverty and climate change adaptation in coastal communities of Bangladesh. The study finds that climate change and poverty in coastal community of Bangladesh are correlated. Climate change intensifies their poverty, exacerbates their livelihood vulnerabilities, and makes them the poorest of the poor. On the other hand, poverty has devastating negative impacts on their adaptation strategies to climatic impacts on their lives and livelihood assets. Being deprived of public institutional support for adaptation to climate change, the destitute coastal people take loan from private sectors which augment their state of poverty, work as a net of exploitation instead of support-generation activities.

Keywords: *Poverty, Livelihood Assets, Adaptation, Climate Change, Coastal Community.*

Introduction

Bangladesh is one of the most climate vulnerable countries in the world and will become even more so from the perspective of its topography of flat and low-lying densely populated land (1179 per km^2), high levels of concentrated multidimensional poverty (poverty and extreme poverty rate is 18.7% and 5.6% respectively), concentration of hard core poor people in its coastal areas where a significant number of livelihoods rely on climate sensitive sectors specially agriculture and fishing, face high exposure to climate change induced calamities and develop very vulnerable adaptation strategies to it (BCCSAP, 2009; Eastham et al., 2008; Wassmann et al., 2009; IPCC, 2014; AR5, Chapter 13; WPP, UNs; BBS, 2022; Noman, ASM. 2013).

The coastal regions cover 32.0% of Bangladesh where, in spite of harsh physical condition, 35 million poor people live and developed their own adaptive strategies to the vagaries of climate change (Rabbani et al. 2013; Haque, et al. 2017; Noman, ASM. 2022).

Along the coasts of Bangladesh, a developing country, weather and climate extremes impact on a wide range of economic activities which support material life of coastal communities (IPCC, 2014, AR5, WG2, Chapter 5). Sea level rise in the Bay of Bengal, increased severity and frequency of floods along the three giant rivers-the Ganges, the Brahmaputra and the Meghna (GBM), increased severity and frequency of powerful cyclones fueled by warm waters, changing ecology of the water bodies and droughts and salinity in prime agricultural zones are the glances of the future already provided by climate change in Bangladesh (Finan T.J. and Rahman, M.A.

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2006; Crate S. A. and Nuttall, M. 2009). Moreover, due to climate change, moderate annual flooding restores the fabled fertility of the country's paddy land and replenishes the fresh water fish stocks so critical to the food security of the population, specially the poor coastal people (Finan T.J. and Rahman, M.A. 2006; Noman, ASM. 2023).

Impacts of climate change upon land availability (33.0% people landless), safe water availability and reducing production in land and fisheries are the vivid examples of correlation between climate change and poverty in coastal regions of Bangladesh (UNCCD, 1994; Schipper and Lisa, 2007). In a low crop productivity scenario for ongoing climate change, Bangladesh would experience a net increase in poverty of 15% by 2030 (Hertel et al., 2010, IPCC, 2014, AR5).

World Bank estimates the annual adaptation cost in developing countries like Bangladesh is USD 70 billion and adaptation deficit with respect to cyclones is USD 25 Billion (World Bank, 2011). Though over the last three decades, the government has invested over $10 billion (at constant 2007 prices) to make the country more climate-resilient and less vulnerable to natural disasters (BCCSAP, 2009), Bangladesh lost an estimated 5.9% of GDP to storms from 1998-2009 (Murray et al., 2012; IPCC, 2014), AR5, Chapter 5; Noman, ASM. 2021) and without changes to current global behavior, the country would experience a 2.0% GDP annual loss by 2050 due to climate change (ADB, 2014).

However, ongoing climate change will worsen the concentrated multidimensional poverty of coastal community of Bangladesh, make their adaptation strategies even more insecure, critical, vulnerable and unsustainable over the next 20 to 30 years compared to the rest of the country (Baqee, 1998:5; Khan and Seeley, 2005; Islam, Z and Shafie H, 2017; African Development Bank et al., 2003; Burton et al., 2002; Simms et al., 2004; Noman, ASM. 2024).

Objectives of the Study

The general objective of the study is to examine correlation between climate change and poverty in coastal communities of Bangladesh . Other specific objectives are to explore the state of poverty, the relationship between poverty and climate change and the impacts of poverty on their adaptive strategies to the climatic impacts on the life and livelihood assets of coastal community of Bangladesh.

Methodology of the Study

This study is basically descriptive in nature. the present study site is *Bayer Char* located in *Char Gazi* Union of Ramgati Upazila in Lakshmipur district of Bangladesh. This area is the most disaster prone area as nearest to river and near the congruence of Meghna river and Bay of Bengal. The study method is quantitative based on primary data but some secondary data are collected to compare with primary data. Systemic sampling is used. In data collection, sample survey technique is followed and a semi structured interview schedule is used as a tool. People of *Bayer Char* under Lakshmipur district are the population, heads of the households are the interlocutors and the households of the study area are the unit of analysis of the study. Data are analyzed using software of SPSS 24.0 version and the report is prepared. In this study ethical standards were maintained in every stage of the research project avoiding the biases and stereotypes in collection and interpretation of data. The result of this study is reliable and valid.

Findings of the Study

Demographic Characteristics of Interlocutors

Sex and Religion

Table-1 shows that, out of the total interlocutors, a significant number of interlocutors (78.0%) are males while 21.0% are female and only 1.0%is third sex (*Hijra*).

Sex						**Religion**			
Male		**Female**		**Third Sex**		**Islam**		**Hinduism**	
N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
78	**78.0**	**21**	**21.0**	**1**	**1.0**	**93**	**93.0**	**7**	**7.0**

Table-1: Interlocutors Based on Sex and Religion (in number and per cent)

Table-1 also points out that from religious aspect a substantial number (93.0%) of interlocutors are Muslim (Islam) while 7.0% of interlocutors are Hindu (Hinduism).

Marital Status and Age of Interlocutors

Table- 2 indicates that from age perspective, the highest number (41.0%) of interlocutors fall between 30 and 45 age group, of them 75.6% interlocutors are married interlocutors who are the 47.0% of total married interlocutors (66) and 31.0% of total interlocutors. The second highest number of interlocutors (20.0%) fall between 18-30 age group, of them, 80.0% interlocutors are married and 10.0% are divorced. A narrow figure of interlocutors (4.0%) fall at 75 age or above, of them 100.0% are married. 14.0% interlocutors' age is between 45 and 60. The number of interlocutors

		Marital Status (in number)						Raw Total
		Married	Unmarried	Widow	Widower	Separated	Divorced	
Age (in years)	<18	5	5	-		1	-	11
	18-30	16	1	1		-	2	20
	30-45	31	1	4	1	-	4	41
	45-60	5	2	3	1	-	3	14
	60-75	5	2	1	1	-	1	10
	>75	4	-	-	-	-	-	4
Column Total		66	11	9	3	1	10	100

Table- 2: Marital Status of Interlocutors Based on Age Group

Mdn (Married Interlocutors: 66) =3 5.80, Mdn (Total Interlocutors: 100) = 45.46.

fall between 60-75 age group is 10.0%. 11.0% interlocutors' age is less than 18 years; of them, 45.0% are married, which indicates that there is a practice of early marriage in *Bayer Char*. Explaining the age of interlocutors it is observed that the median age of married interlocutors (66) is 35.8 and the median age of total interlocutors (100) 45.46 while the median age of population of Bangladesh is 26.3 and the median age of global population is 30.3. In the study the median age is greater than national and global values because all the interlocutors in the study are heads of the households.

Occupation Based on Sex

Table- 3 shows that the major two primary occupations of *Bayer Char* coastal community are agriculture (42.0%) and fishing (17.0%). It is supported by the study of Mahbubullah (1996) as he found that the survivability of coastal and char people depends on agriculture and fishing.

Females engaged in agriculture and fishing are only 2.0% and 5.9%. So, agriculture and fishing are male dominated occupations. Out of the total interlocutors, 13.0% are homemakers (Housewife) and all of them are females. So, it can be imparted that in *Bayer Char*, homemaking is a gender specific activities and females have to play

		Primary Occupation of Interlocutors (in number)									Total
		Agriculture	Fishing	Day Labourer	Home maker	Business	Driver	Service	Jobless	Household worker	
Sex of Interlocutors (in number)	Male	39	16	8	-	4	5	-	2	4	78
	Female	2	1	1	13	1		1		2	21
	Third Sex	1	-	-	-	-	-	-	-	-	1
Total		42	17	9	13	5	5	1	2	6	100

Table- 3: Occupation of Interlocutors Based on Sex

role here. Data reveal that driving (rickshaw pulling, van, auto rickshaw and motor cycle driving) is a gender specific profession (5.0%, all are males) in *Bayer Char* and males play role in this profession like other parts of Bangladesh. It is engrossing that no males are related to service and no female respondents are jobless in the study area.

Household Size Based on Education

Table- 4 points out that most of the families (39.0%, 39) have more than 6 members; of them, the highest number (51.2%) of interlocutors are illiterate. Out of the total interlocutors, six-member-family is 32.0% which is the second highest member family; of them, 62.5% interlocutors are illiterate and only 3.0% interlocutors' educational qualification is masters or post-graduation. 20.0% interlocutors have five-member-family, 7.0% have four-member-family and only 2.0% interlocutors' family members are less than four. Out of total interlocutors, a significant number of interlocutors (50.0%) are illiterate; of them, 40.0% interlocutors' family members are more than six, another 40.0% have six-member-family and only 2.0% interlocutors' family members are less than four. 14.0% can sign only, 7.0% can read only, 9.0% are below class eight. Among total interlocutors, 4.0% interlocutors' educational qualification is SSC passed, 2.0% interlocutors are HSC passed and 3.0% are graduates. The interlocutors whose educational qualifications are SSC, HSC and Graduation, of them, 75.0%, 50.0% and 75.0% families

		Household Size of Interlocutors (in number)					Total
		<4	4	5	6	>6	
Educational Qualifications of Interlocutors (in number)	Illiterate	1	1	8	20	20	50
	Can Sign Only	1	2	2	5	4	14
	Can Read Only	-	-	2	3	2	7
	Below Class 8	-	-	4	-	5	9
	Below SS	-	4	2	2	2	10
	SSC	-	-	-	1	3	4
	HSC	-	-	1	-	1	2
	Graduation	-	-	1	-	2	3
	Masters	-	-	-	1	-	1
Total		2	7	20	32	39	100

Table- 4: Household Size and Educational Qualification of Interlocutors

χ^2=41.86, r=-.027 $\bar{x}$ of Household Size= 3.99

have more than six-member family. The interlocutors who passed masters are (1.0%), 100.0% of them have six-member family. Based on the study data it is visualized that, the average household size is 3.99 in *Bayer Char* coastal community which is less than the national average of 4.06 (BBS, 2016). This finding is not supported by the study of ISPAN (2000) as ISPAN found the average household size in char areas larger than the national average. These data refer that comparatively young families live here as they have to adapt to high frequency of climate change induced natural hazards. The values of χ^2 and r (41.86 and -.027 respectively) allude that there is no/ negligible relationship between education and household size in *Bayer Char* coastal community.

Shortage of Sufficient Safe Drinking Water

When all the interlocutors were asked whether they and their family members get sufficient drinking water (Table-5), a substantial number of interlocutors (65.0%) answered negatively; of them, a significant number of interlocutors (55.4%, 36 out of 65) are marginal households, 29.2% (19) interlocutors are landless and only 7.7% (5), 4.62% (3) and 3.1% (2) interlocutors are small, medium and large households respectively. 31.0% interlocutors answered positively where a substantial number of interlocutors are marginal (23.1%, 15 out of 31) and landless (18.46%, 12 out of 31) households. Here small and large households are only 6.5% each. All

		Whether Interlocutors and their Family Members Get Sufficient Safe Drinking Water (in number)			Total
		Yes	No	Don't Know	
Household Types (amount of land in acres)	Landless	12	19	2	33
	Marginal	15	36	2	53
	Small	2	5	-	7
	Medium	-	3	-	3
	Large	2	2	-	4
Total		31	65	4	100

Table- 5: Household Types and Getting Sufficient Safe Drinking Water

($\chi2$ = 3.855, df = 8, α = .05, t-value = 15.507)

the medium households answered negatively. A negligible number of interlocutors (4 out of 100) said that they do not know the matter, of them, 50.0% (2) are landless and 50.0% are marginal households. Explaining the statistical data of table- 5, it is perceived that irrespective of household types, the household heads and members of households of *Bayer Char* coastal community do not get sufficient safe drinking water. It reveals their acute human poverty caused by tidal surge, flood, land and water salinity due to climate change.

The Loss in Crops Production

Table-6 points out that a significant number (47.3%, the highest) of agricultural crops producers' most produced crop is rice; of them, 84.1% interlocutors (the highest) said they are losing and only 9.1% said they are getting profit from rice production but producing fish is more profitable (14.3%) than rice production. On the other hand, a substantial number

		Return from Production			Total
		Profit	Loss	No Profit/No loss	
Crops the Interlocutors Produce Most	Rice	4	37	3	44
	Fish	3	13	5	21
	Wheat	-	1	-	1
	Peanut	2	7	1	10
	Vegetables	2	9	2	13
	Fruits	1	2	1	4
Total		12	69	12	93

Table- 6: Crops that the Interlocutors Produce Most and Return from Production (in number)

of interlocutors (74.2%) are making loss in agricultural crops production.

Present study was informed that 94.0% interlocutors faced difficulty of less income in the last one year where 77.7% are male interlocutors who are 93.1% of total male interlocutors (78). Out of the interlocutors who faced the difficulty of less income in the last one year, 21.3% are female interlocutors who are 95.2% of total female interlocutors (21). The only interlocutor who is third sex (*Hijra*) faced the difficulty of less income (Table-7). It is perceived from the table data

		Whether They Face Difficulty of Less Income		Total
		Yes	No	
Sex	Male	73	5	78
	Female	20	1	21
	Third Sex (*Hijra*).	1	-	1
Total		94	6	100

Table- 7: Sex of Interlocutors and Whether They Face Difficulty of Less Income in the Last 1 Year

($\chi2$ = .144, df = 2, α = .05, t-value = 5.991)

that irrespective of the sexes, the households of *Bayer Char* coastal community face difficulty of less income.

At the same time, when the interlocutors who faced difficulty of less income (94) were asked to mention the season when they faced the difficulty of less income (Figure-1), the highest number of them (33.0%) said they face the difficulty of less income in autumn season and the second highest number of them (25, 26.6%) mentioned rainy season when they faced the difficulty

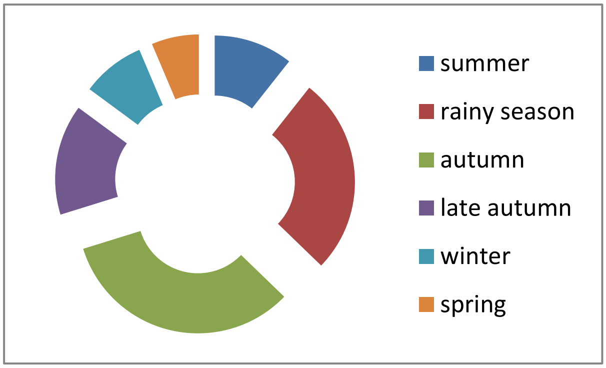


Figure- 1

The Season When the Interlocutors (Who Face Difficulty of Less Income) Faced the Difficulty of Less Income (in per cent)

of less income in last one year. On the other hand, the lowest number of them mentioned spring (6, 6.4%). 10.6% (10) and 8.5% (8) mentioned that they faced the difficulty of less income in summer and winter season respectively in last one year.

Table- 8 presents that being asked whether they faced food shortage in last 6 months, out of total interlocutors, 47.0% answered by “Often/Always”; of them, 31.9% (the highest) are 5 member-households, 29.8% are 6 member-household and 25.5% households’ have more than 6 members. 28.0% interlocutors answered by “Yes”, of them, 64.3% interlocutors have more than 6-member households and 28.6% have 6 member-households. 18.0% interlocutors answered by “Sometimes”; of them, 38.9% (the highest) interlocutors have more than 6 member-households and 33.3% have 6 member-households. On the other hand, only a negligible number

		Whether the Interlocutors Faced Food Shortage in Last 6 Months				Total
		Yes	No	Sometimes	Often/Always	
Household Size (member of households)	<4	-	-	-	2	2
	4	-	-	3	4	7
	5	2	1	2	15	20
	6	8	4	6	14	32
	>6	18	2	7	12	39
Total		28	7	18	47	100

Table- 8

Household Size and Interlocutors’ Facing Food Shortage in Last 6 Months (in number of interlocutors)

($\chi2 = 22.276$, df = 8, $\alpha = .05$, t-value = 15.507)

of interlocutors (7.0%) answered negatively i.e., they or their family did not face any food shortage in last 6 months. So, about 75.0% interlocutors said they faced food shortage in last 6 months and another 18.0% said they or their family faced food shortage in last 6 months but not always (sometimes). Statistical data of table- 8 show that, there is a significant relationship between household size and facing food shortage. It intimates that, in *Bayer Char* coastal community, the larger the household size, the greater the food shortage.

Likewise, figure-2 (bar chart) when all the interlocutors were asked whether they remain anxious about the next meal for them and their family, more than half of the interlocutors (51.0%) answered saying "Often/Always", 16.0% answered saying "Yes" and 8.0% answered saying "Sometimes". On the other hand, 10.0% interlocutors answered saying "No" and 15.0% answered saying "Never ever". Data inform that

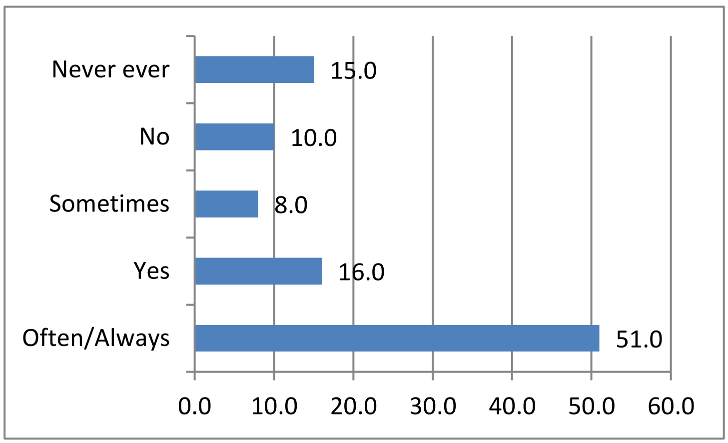


Figure- 2: Whether the Interlocutors Remain Anxious about the Next Meal (in per cent)

67.0% interlocutors remain anxious about the next meal and other 8.0% remain anxious about the next meal for them and their family but not always (sometimes). On the other hand, only 25.0% interlocutors said they do not remain anxious about the next meal for them and their family.

It was also informed that a significant number of interlocutors (67.0%) work a long period of time (daily 8 to 12 hours) in their occupation and 58.2% of them have been engaged in their present profession for 1 to 10 years. It is very alarming that, 32.8% of them engaged in their profession for 10 to 20 years (Table-9).

		Hours Interlocutors Work Daily in Occupation				Total
		Less than 4	4-8	8-12	Above 12	
Years Interlocutors Engaged in Profession	1-10 years	2	6	39	5	52
	10-20 years	1	8	22	4	35
	20-30 years	1	-	5	4	10
	30-40 years	-	1	1	1	3
Total		4	15	67	14	100

Table- 9: Number of Years the Interlocutors Engaged in Profession and Hours They Spend Daily in Occupation (in number of interlocutors)

It is a matter of more minacious that a significant number of coastal people (14.0%) work more than 12 hours daily in their profession. This finding displays the grisly income poverty of *Bayer Char* coastal community.

Poor Health Facilities

Figure- 3 points out that a substantial number of interlocutors (88.0%) do not go to Union/Upazila health centre; of them, 87.5% interlocutors are males and 19.3% are females.

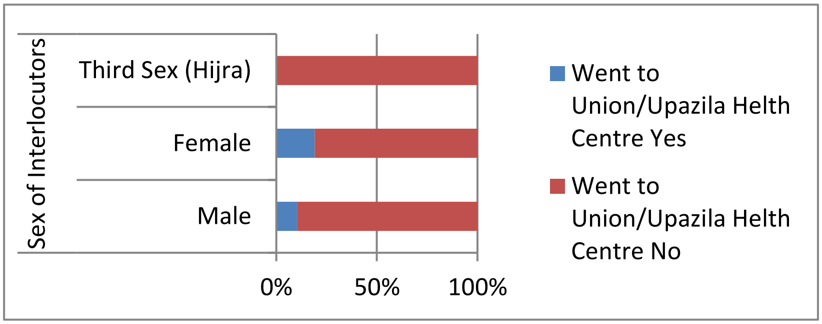


Figure- 3: Sex of Interlocutors and Whether They Go to Union/Upazila Health Centre (in per cent)

So, irrespective of sexes, a significant number of the people of *Bayer Char* coastal community do not go to union/upazila health services to take health services though they are affected by various health disorders caused by climate change. The most cabalistic reason of their not going to health centre is lack of money (32.2%, Income Poverty) while lack of knowledge (Human Poverty) is the echos of the most trivial interlocutors.

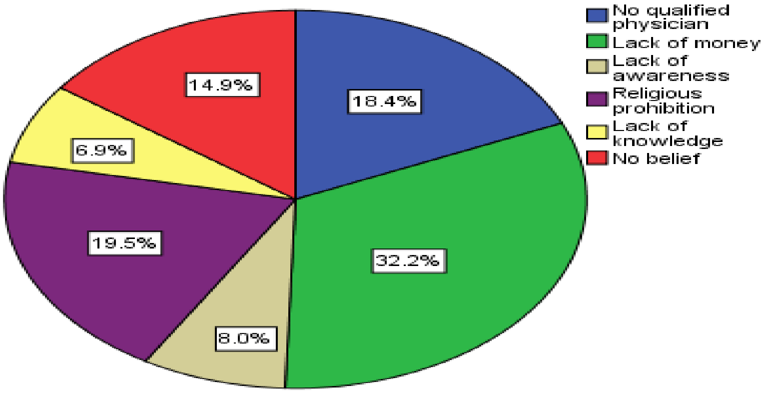


Figure- 4

The Causes of Not Going to Union/Upazia Heath Centre (in per cent)

It is a minatory connotation that 19.5% (17 out of 88) and 18.4% (16 out of 88) interlocutors do not go to health centre due to religious prohibition and lack of qualified physician (Human Poverty) respectively (Figure- 4).

From table- 10 it is investigated that a substantial number of interlocutors (92.0%) failed to manage vaccines for their offspring (92.0%) where masters, graduate, Higher secondary (HSC) and secondary (SSC) passed interlocutors are 100.0%, 66.7%, 100.0% and 100.0% of each category respectively.

		Whether the Interlocutors Managed Vaccines for Offspring		Total
		Yes	No	
Educational Qualifications of Interlocutors	Illiterate	2	48	50
	Can Sign Only	3	11	14
	Can Read Only	-	7	7
	Below Class 8	-	9	9
	Below SSC	2	8	10
	SSC	-	4	4
	HSC	-	2	2
	Graduation	1	2	3
	Masters	-	1	1
Total		8	92	100

Table- 10

Educational Qualifications of Interlocutors and Whether They Managed Vaccine for Offspring (in number of interlocutors)

($\chi 2 = 11.090^{a}$, df = 8, $\alpha = .05$, t-value = 15.507**)**

On the other hand, it is surprising that who were able to manage vaccines foe offspring, 25.0% of them are illiterates. From statistical data of below table- 10, it is crystal that, educational qualifications do not work in *Bayer Char* coastal community in managing vaccines for offspring.

The prime factor of being failed to manage vaccines is lack of money ((30.4%, Income Poverty)

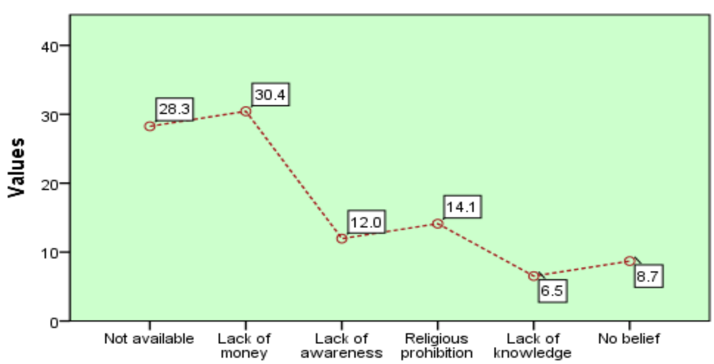


Figure- 5: The Causes of Not Managing Vaccines for Offspring (in per cent)

while the inferior factor is lack of knowledge (6.5%). Other striking causes adverted by the respondents are Likewise, unavailability of vaccines (28.3%) and religious prohibition (14.1%, Human Poverty), lack of awareness (12.0%) and lack of belief in vaccines (8.7% , Human

Poverty) (Figure - 5).

Table- 11 presents an alarming illustration that 97.0% households do not get proper health services where 42.3% respondents' daily income is only between 200 and 300 taka (around USD 2.5). The households earn less than 200 taka daily (<USD 2) 100.0% of them do not get proper health services. Even more strikingly, the households (17) earning more than 400 taka (> USD 3), 82.4% of them (14) do not get proper health services. Only 3.0% interlocutors get proper health

		Whether the Households Get Proper Health Services (in number)		Total
		Yes	No	
Daily Income of Households (in taka)	<100	-	3	3
	100-200	-	17	17
	200-300	-	41	41
	300-400	-	22	22
	400- 500	1	12	13
	>500	2	2	4
Total		3	97	100

Table- 11

Daily Income of Households and Whether the Members of Households Get Proper Health Services

($\chi2 = 33.915^{a}$, df = 5, $\alpha = .05$, t-value = 11.070)

services in coastal area of Bangladesh. Comparing the data of table-11 with those of table-8, it is all of a sudden noticed that 71.0% households' daily per capita income (Household size 6 or >6) is less than 50 taka (<USD 0.5). Comparing with the international poverty line ($2.15 per day per capita), the people of *Bayer Char* coastal community are deliberated as the poorest of the poor. From human poverty context, their deprivation of proper health services leads to prolonged illness, physical and psychological disability, death, and sudden death that deepen their poverty as explored in the study of Chakma (2005). Though good health service is far cry in *Bayer Char* coastal area, statistical data below the table display that, the households whose daily income is more, get better health services and vice versa.

Access to Information

Table- 12 describes that the highest number (31.0%) of coastal people depends on non-reliable source as their local knowledge for getting agriculture related weather forecast/information while a negligible number of people get weather information from reliable sources as radio, NGOs (13.0% each), TV (8.0%) and news paper.

	How They Get Agriculture Related Weather Forecast/Information										Total
	TV	Radio	News paper	Training	Miking	Discussing neighbors	NGOs	DAE staff	Local Knowledge	Mosques	

Educational Qualifications of Interlocutors	Illiterate	3	7	-	5	1	4	7	2	16	5	50
	Can Sign Only	1	3	-	-	-	-	3	1	5	1	14
	Can Read Only	-	1	-	-	-	-	1	1	3	1	7
	Below Class 8	1	1	-	2	-	-	2	-	3	-	9
	Below SSC	3	1	-	1	-	-	-	2	3	-	10
	SSC	-	-	2	-	1	1	-	-	-	-	4
	HSC	-	-	-	-	-	-	-	-	1	1	2
	Graduation	-	-	1	1	-	-	-	-	-	1	3
	Masters	-	-	1	-	-	-	-	-	-	-	1
Total		8	13	4	9	2	5	13	6	31	9	100

Table- 12

Educational Qualifications of Interlocutors and Media of Getting Agriculture Related Weather Forecast/Information (in number of interlocutors)

($\chi2 = 109.464^{a}$, df = 72, $\alpha = .05$, t-value = 90.531**)**

The interlocutors whose source of agriculture related weather forecast is local knowledge , 47.0% of them are illiterate while 100.0% of master degree completed interlocutor (s) get agriculture related weather forecast through newspaper. Statistical data below the table-12 show that, there is a significant relationship between educational qualifications of interlocutors and their media of getting agriculture related forecasting/information.

NGOs, the Lumpen Bourgeoisie:

Table- 13 informs that a significant number (73.0%) of interlocutors have NGOs membership and females (90.5%) are more engaged with NGOs than males (67.9%) though statistical data of this table promulgate that the people of *Bayer Char* community take NGOs membership irrespective of their sexes.

		Whether the Interlocutors Are NGOs Members or Not		Total
		Yes	No	
Sex of Interlocutors	Male	53	25	78
	Female	19	2	21
	Third Sex (Hijra)	1	-	1
Total		73	27	100

Table- 13

Sex of Interlocutors and Their Membership of NGOs (in number)

($\chi2 = 4.634^{a}$, df = 2, $\alpha = .05$, t-value = 5.991)

The cause behind it is females are more impacted by climatic hazards for their gender specific activities than males and their livelihood is more vulnerable than the livelihood of males.

The prime cause behind taking NGOs membership (Figure-6) is financial help (60.3%) which asserts finance is very crucial for adaptation to climate change induced hazards.

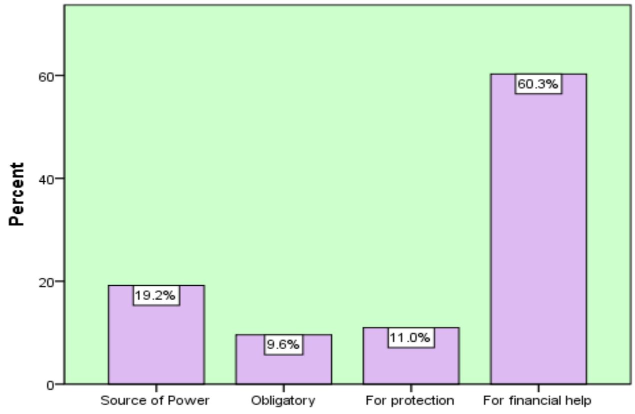


Figure- 6

The Causes of Taking NGOs Membership (in per cent)

Besides, people take loan from NGOs as it works as source of power1(9.2%), for their protection (11.0%) and as it is obligatory in coastal area *like Bayer Char. The word 'obligatory'* substantiate the vulnerability of their life and livelihood in coastal areas.

The respondents explained their livelihood vulnerability created by NGOs/local networks as it exploit them (Figure-7) instead of help (30.8%),

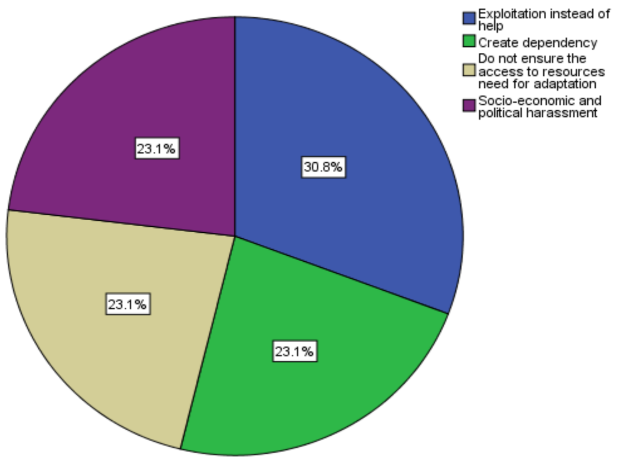


Figure-7

Major Negative Role of Local Networks/NGOs in Adaptation to Climate Change (in per cent)

cause socio-economic and political harassment, create dependency-dependency of households on political leaders, clubs or somity/association and do not ensure the access to resources need for adaptation (23.1% each). So, it can be condensed that local networks like NGOs capitalize their vulnerable situation caused by climate change. NGOs in coastal areas are playing role of lumpen bourgeoisie.

Interface between Poverty and Climate Change

Household Types, Education and Poverty-Climate Change Relation

From the table- 14, it is found that a significant number of respondents (93.0%) referred them as poor and all landless are embodied here.

		Whether The Interlocutors are Poor or Rich		Total
		Poor	Rich	
Household Types (amount of land in acres)	Landless	33	-	33
	Marginal	52	1	53
	Small	6	1	7
	Medium	1	2	3
	Large	1	3	4
Total		93	7	100

Table- 14

Household Types of Interlocutors and Whether They are Poor or Rich (in number)

($\chi2 = 50.001^a$, df = 4, $\alpha = .05$, t-value = 9.488)

On the other hand, the interlocutors who addressed them as rich (7), 42.9% of them are large households and 28.6% are medium households.The statistical data of table-14 asserts that household types of *Bayer Char* community based on the amount of land ownership plays a significant role in evaluating themselves as poor or rich and social relations of land ownership directly affect their access to other assets and their ability to innovate adaptation strategies to climate change impacts as theorized by Ahmed, Z. and Habib, A (2015) in their qualitative study. The study of Mahbubullah (1996) also found the same result as he said that social structure in rural char areas is land centered. Those who have been losing land, follow the principle of walking on two legs.

The interlocutors who noted themselves as poor, a substantial number of them (89, 95.7%) echoed that poverty and climate change are inextricably interrelated (Figure-8).

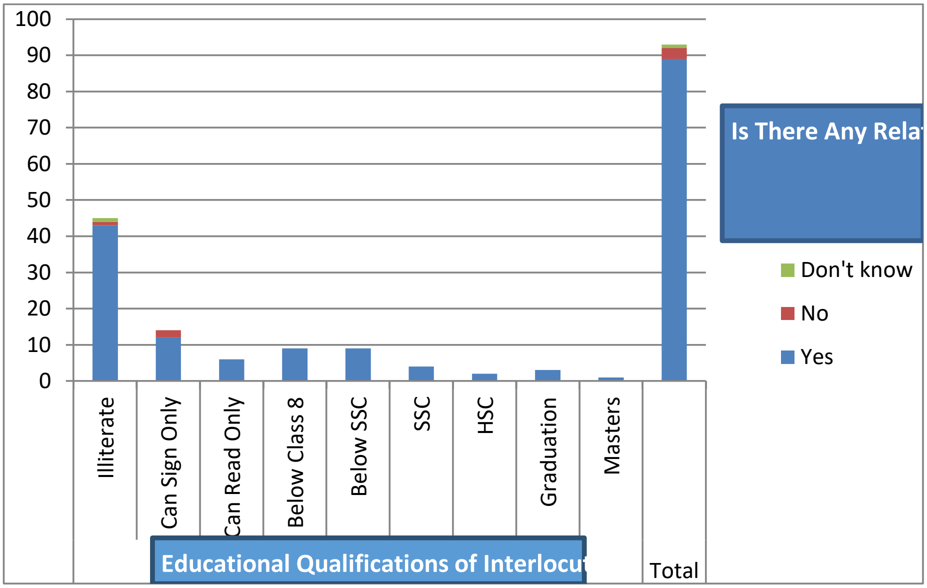


Figure- 8: Educational Qualifications of Interlocutors and Relation between Climate Change and Their Poverty

All the interlocutors except illiterate and "can sign only" types expressed that climate change and their poverty are negatively correlative. Khan and Seeley (2005) found the same findings as they explored that climate change causes poverty and worsens the poverty situation of coastal community.

The interlocutors explained the negative correlation between them (Figure- 9) as climate change causes low production (30,3%) that is the main cause behind their poverty, salinity in land and water (24.7%) that is one of the main causes of production reduction or poverty, seasonal changes (19.1%) and infertility of soil (18.0%) and lack of substitution of reduced livelihood options (4.5%).

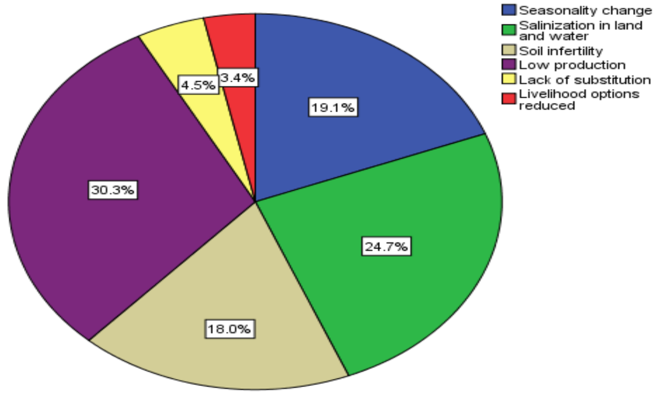


Figure- 9: How Climate Change Causes Their Poverty

So, due to climate change and their livelihood becomes vulnerable and they become poor. The findings provided by the interlocutors in present study are supported by the secondary study of Sarwar, M.G.M. (2005) as he hypothesized that, livelihood options and the natural environment of coastal communities of Bangladesh will be severely affected by the anticipated one meter sea level rise that will lead to the national food security.

Poverty and Its Impacts on Adaptation

Table- 15 presents that out of the total respondents who adopt adaptation strategies (95), a significant number (95.8%, 91 out of 95) informed, poverty has impacts on their adaptation strategies to climate change, they are 100.0% and 94.0% of landless and marginal households respectively. Explaining the statistical data of table-15 , it

		Whether Poverty Has Any Impacts on Adaptation to Climate Change		Total
		Yes	No	
Household Types (amount of land in acres)	Landless	31	-	31
	Marginal	47	3	50
	Small	7	-	7
	Medium	2	1	3
	Large	4	-	4
Total		91	4	95

Table- 15

Household Types and Whether Poverty Has Any Impacts on Adaptation to Climate Change (in frequency of interlocutors)

($\chi 2 = 8.552^{a}$, df = 4, $\alpha = .05$, t-value = 9.488)

is diagnosed that poverty impacts the adaptation strategies of all households of *Bayer Char* coastal people to climatic impacts on their livelihoods.

At the same time, 100.0% of climate impacted households described (Figure-10) poverty impacts their adaptation strategies to climate change negatively as its prime nagative impacts are low adaptive capacity for less access to resources (12, 13.2%) and very high vulnerability to climatic impacts (12.1%), failure to diversify livelihoods (11.0%), livelihood insecurity (8.8%), limitation of institutional support (8.8%), failure to secure basic needs (6.6%), weakens social networks crucial for adaptation (6.6%) and difficulty or inability to get NGOs loan to face the crises (5.5%) .

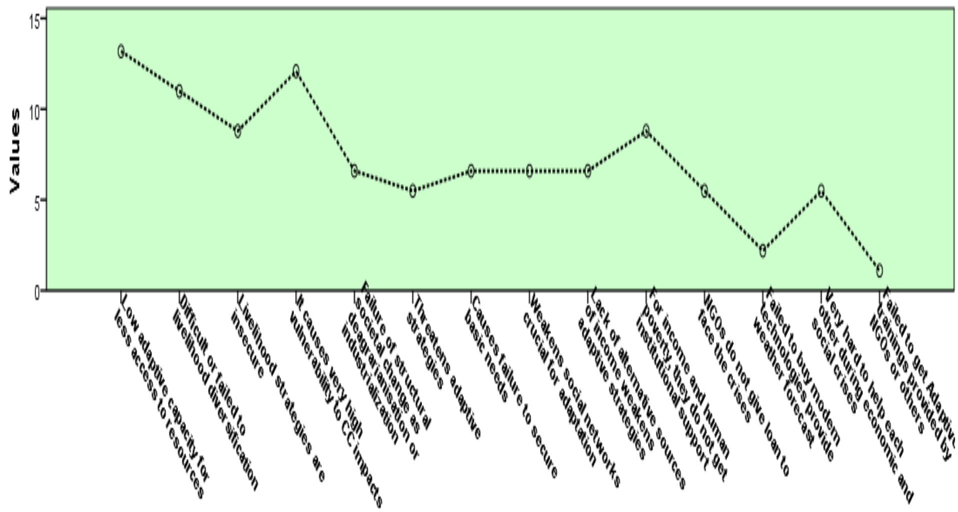


Figure- 10

Major Negative Impacts of Poverty on Adaptation to Climatic Impacts on Livelihood Assets of Interlocutors

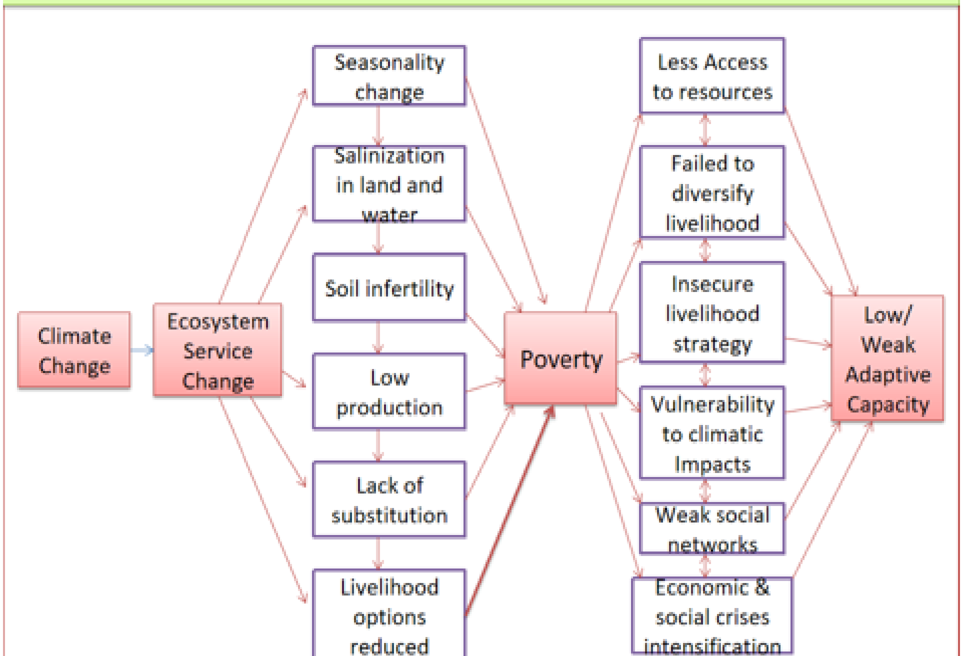
(Source: Compiled Based on Field Data, 2021-2022)

The findings of this section are supported by the findings of Khan and Seeley (2005) as they examined in their study that, climate change and poverty make adaptation strategies of coastal community insecure, vulnerable and unsustainable. The findings partially fit the findings of Islam, Z. and Shafie, H. (2017), as they examined that, the means and capacities for adapting to climate change in developing countries like Bangladesh are scarce or low owing to low levels of human and economic development and high frequencies of poverty.

Interrelationship among Climate Change, Poverty and Adaptation

Figure- 11, formulated based on field data, describes a framework of relationship among climate change, poverty and *Bayer Char* people's adaptation strategies to climate change. On the one hand, climate change causes the change of ecosystem service. For the change of ecosystem service, seasonality changes. Seasonality changes cause salinity in land and water, salinity in land and water causes soil infertility, soil infertility causes low production, low production causes lack of livelihood substitution. So, livelihood options have been reduced which results in poverty. On the other hand, poverty causes less access to resources, failure to diversify livelihoods, insecure livelihood strategies, vulnerability to resources, failure to diversify

Figure-11: A Framework of Relationship among Climate Change, Poverty and Adaptation



Source: Compiled Based on Field Data, 2021

livelihoods, insecure livelihood strategies, vulnerability to climatic impacts, weak social networks and economic and social crises intensification. So, poverty caused by ecosystem service change (Climate Change) ultimately weakens the adaptive capacity of *Bayer Char* coastal people. Here, the conception of cultural ecology theory is reflected in the framework as the interaction and interconnection among natural environmental conditions, subsistence technology or culture and poverty is vividly noticed.

Conclusion

The people of coastal community in Bangladesh are facing acute income and human poverty as severe shortage of food, cloths, land, housing, safe water, energy, proper health and education services, afforestation, embankments, family planning devices facilities and economic provisioning. People have no access to information. They are deprived of basic needs and rights. Most of the time they have to survive adapting to the devastating impacts of climate change induced natural disasters as cyclones, floods, tidal surge, and river bank erosion, thunder storm, hailstorm and insects attack on crops that cause the destruction of lives, wealth and harvests, chronic diseases. The frequency and intensity of climatic impacts are increasing due to increasing global warming and climate change which makes their adaptive strategies and livelihood pattern more vulnerable and insecure. Increasing climate change intensifies their poverty, exaggerates their livelihood vulnerability and makes them poorest of the poor by causing low production due to excessive salinity in land and water, seasonal change and soil infertility, failure to substitute reduced livelihood options. On the other hand, poverty has devastating negative impacts on their adaptation strategies to climatic impacts on their life and livelihood assets as due to poverty, they cannot respond to climate change induced hazards. Local and national NGOs are capitalizing their poverty and vulnerable adaptation strategies to climate change. As NGOs may be considered as emerging petty bourgeoisie of Marxian theory, the poverty situation of coastal community will severely be deteriorated in future and their adaptation strategies to climate change will be more insecure and vulnerable. So, the coastal communities of Bangladesh need to be provided with institutional supports from government and international communities.

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