



## Livelihood Challenges and Natural Resources Utilization of the Riverbank Erosion Displacee *Charland* Communities in Bangladesh: A Study on Jamuna Riverine Ecosystem

Shammy Islam<sup>1</sup> and A B M Nurullah<sup>2</sup>

<sup>1 & 2</sup> Department of Sociology, Begum Rokeya University, Rangpur

### ABSTRACT

Riverbank erosion displacement is a catastrophic environmental disaster that causes devastation to the livelihood of *charland* communities of Bangladesh. The present paper focuses on the livelihood challenges and natural resource utilization of the riverbank erosion displacee *charland* communities of Char Chinna village in the Jamuna riverine ecosystem of Bangladesh. The livelihood of *charland* people of Char Chinna is desolated annually by riverbank erosion and consequent displacement. This alarming situation seizes their own dwelling environment and pushes them into the world of uncertain poverty. The *uthuli* (sheltered after displacement by others without payment) and *chukani* (sheltered after displacement by others with payment) households have to face intolerable economic hardship in maintaining their familial subsistence with what their adult members earn irregularly. To reduce their vulnerability due to riverbank erosion, the *uthuli* and *chukani* households utilize different types of natural resources (land, water, air, wood, fish, soil, sand, solar energy, straw, plants, dried branches, etc.), tangible and intangible access, privileges and livelihood assets. Sheer lack of organizational supports (GOs and NGOs), inadequate natural resources, and inadequate livelihood diversification options increase their vulnerability and risk in the area. Consequently, enormous losses caused by the riverbank erosion displacement on Jamuna *charland* habitat have been noticed. The paper is primarily based on the data gathered through face-to-face interviewing with the purposively chosen *uthuli* and *chukani* household heads of the study village, observation, focus group discussions (FGDs), case studies, and informal interviews with some stakeholders. Both the qualitative interpretation and quantitative measurement of social reality are considered.

### ARTICLE INFO

#### Article History

Received  
3 January 2021

Received in revised form  
22 August 2021

Accepted  
24 August 2021

Available online  
30 August 2021

### KEYWORDS

Riverbank erosion displacement, *charland*, livelihood challenges, natural resources utilization

**Corresponding author:** A B M Nurullah, Department of Sociology, Brgum Rokeya University, Rangpur, **Email:** nurullah.soc@brur.ac.bd

## Introduction

Bangladesh is globally exposed as one of the most vulnerable countries to the influence of climate change (Hossain *et al.*, 2012). Bangladesh usually suffers from severe riverbank

erosion during the monsoon on a regular basis. It has been estimated that between 2000 to 3000 kilometres of riverbank line experience major erosion annually (Islam and Islam, 1985; Das *et al.*, 2014; Islam, 2017). Almost all the rivers of the country are susceptible to riverbank erosion. An estimated 5 percent population of Bangladesh: around 6.5 million people live on the Chars. Those habitants of the *charland* in the major river systems comprise the most vulnerable group in Bangladesh. The effects of natural disasters increase the precariousness of poor people's life as those areas are more prone to climate shocks (flood, drought, cyclone, riverbank erosion). Natural disasters wipe out their assets and push them deeper into poverty in the *charland* area of Bangladesh (Mutton and Haque, 2004; Onneshan, 2008; Rabbi *et al.*, 2013; Zaber *et al.*, 2018). Riverbank erosion has an adverse impact on livelihood such as homesteads are destroyed, cultivable lands are wiped out and employment opportunities are reduced. Wiped out of homesteads caused enormous losses of family or individual assets. Such losses push them to displace in such a place where little or no opportunity remains to survive (Zaber *et al.*, 2018). Such displacement aggravates the socioeconomic condition of the riparian people of Bangladesh. They lost their only one livelihood option with the devastating attack of riverbank erosion. Riverbank erosion displacement harshly affects many people's daily lives and damages their livelihoods in Bangladesh (Abrar & Azad, 2007). This type of displacement has long-term consequences on the livelihood of the riparian population. All these insecurities caused by forced displacement led to deprivation, destitution, fragility, and increased vulnerability of the riparian families in Bangladesh (Das *et al.*, 2014). The riverbank erosion displacee households are ruthlessly affected by such devastation. To cope up with the riverbank erosion displacement induced economic hardship, they have to undertake and formulate various types of strategies (Saifullah, 2010; Islam, 2015; Islam, 2017). They are impelled to accept alternative farm and nonfarm works with low payment. For keeping their family at least subsistence level, they are compelled to employ their children in income-earning activities at the cost of schooling (Islam, 2015; Islam, 2017; Podder *et al.*, 2020).

To continue their livelihood in the precarious riverine habitat, they utilize various types of natural resources such as *charland* for homestead and cultivation, river water for irrigation, cooking, bathing, washing utensils and clothes, cattle rearing, etc. They utilize forest resources, natural fish stock of Jamuna River, straw, grass, and so on to alleviate vulnerability and destitute state of livelihood caused by recurrent annual riverbank erosion displacement (Islam *et al.*, 2020). Nowadays, the process of natural resource utilization for fulfilling the necessity of *charland* livelihood is not sustainable because the resources are ruthlessly ruined by annual flood and riverbank erosion displacement (Islam *et al.*, 2020).

Many studies addressed the issues of livelihood challenges of *charland* inhabitants due to riverbank erosion (i.e., Islam, 2015; Baki, 2014; Das *et al.*, 2014; Chatterjee and Mistri, 2013; Uddin and Rahman, 2011). Some studies explored the human coping strategies with riverbank induced livelihood challenges (i.e., Rabbi *et al.*, 2013; Saifullah, 2010; Islam *et al.*, 2020). The findings of aforementioned studies aptly revealed the desolate state of the displacees in general but did not deal with the utilization of natural resources for survival of *charland* people specifically in Jamuna riverine ecosystem. Thus, the study deals with the *uthuli* (who are sheltered at relatives' or neighbors' or others' house and/or land without payment) and *chukani* (who are sheltered at relatives' or neighbors' or others' house and/or

land with payment) *charland* people of Char Chinna village who are annually affected and displaced by flood and riverbank erosion of Jamuna River. The present study fervently attempts to explore livelihood challenges of *charland* inhabitants of Jamuna riverine ecosystem. The study also sought to understand the scope and nature of natural resources utilization for fulfilling daily necessities of *charland* habitats as they are devastated by the riverbank erosion displacement.

## Methodology

Char Chinna is a village of Monsurnagar Union under Kazipur Upazila of Sirajganj District in north-western Bangladesh. Kazipur Upazila is one of the erosion-prone areas of the Jamuna River and thus the *charland* village Char Chinna of Kazipur Upazila is selected purposively as study locale. The present study adopted two principal techniques of social survey method, questionnaire and interviewing for collecting the primary data. The paper is primarily based on the data gathered through interviewing with the purposively chosen 110 *uthuli* and *chukani* household heads from 110 displacee households (41 *uthuli* household and 69 *chukani* households) from 280 households of the study village. Aiming to understand the displacement status, socioeconomic profile, livelihood challenges and pattern of natural resource utilization of the *charland* inhabitants, the study considered household head of displacee families as the unit of analysis. In addition to social survey, focus group discussions (FGDs), and 5 case studies of selected respondents were conducted to collect data in this research. Focused group discussions (FGDs) were conducted to understand the livelihood challenges of *charland* inhabitants extensively. The observation method also has been used to explore the real feature of livelihood challenges and natural resources utilization opportunities of the *charland* inhabitants. A total of 2 informal interviews with the Monsurnagar Union Parishad leader and community member are incorporated in this research for gathering more empirical data on activities of government and non-government organizations in the study area. The data collected and analyzed in this research are qualitative and quantitative in nature. Both the qualitative interpretation and quantitative measurement are considered reciprocally in analyzing the social reality of devastated *charland* livelihood. The collected data throughout the fieldwork are analyzed in descriptive manner. The study is aptly intended to establish the analytical and critical evaluation of the collected data. In addition to the qualitative data, the quantitative data are classified in simple and cross tables. These tables are prepared in order to show frequencies and percentages.

## Results & Discussion

### Displacement status and socioeconomic profile of *charland* household

Due to bank erosion a number of riparian displacees of Sirajganj District have migrated to Char Chinna village from their origin which was on the bank of Jamuna River. The field data attest the fact that a large proportion of displacee households have migrated from one part to another of Char Chinna village and others are from Fuljhur, Saldaha and Maznabari villages. Because of frequent attack of bank erosion of the river the displacee households of Char

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Chinna lost their original homestead and cultivable land. Their displacement statuses are categorized into four types: once, twice, thrice, and more than thrice. They have to survive by confronting with precarious situation resulted by riverbank erosion in their *charland* habitat. High magnitude riverbank erosion and flood occurred in *charland* areas are viewed as disastrous as they inundate large areas and cause widespread damage to crops, livestock and property as well as devastation to life and livelihoods of the *char*-dwellers (Blaikie *et al.*, 1994; Smith, 2013; Handmer *et al.*, 2002; Paul, 1984; Brammer, 1990; Rasid, 1993; Few, 2003; Zaber *et al.*, 2018; Islam *et al.*, 2020). The field data explore that 30.91 (n=34 of 110) and 29.09 (n=32 of 110) percent displacee households have been ascribed the displacement status of more than thrice and thrice respectively at Char Chinna village (Table 1).

**Table 1** Displacement status and place of origin of the displacee households

Displacement status	Places of origin									
	Maznabari		Saldaha		Fuljhur		Char Chinna		Total	
	n	%	n	%	n	%	n	%	n	%
Once	2	8.70	4	17.39	6	26.09	11	47.83	23	20.91
Twice	2	9.52	5	23.81	5	23.81	9	42.86	21	19.09
Thrice	5	15.63	7	21.88	5	15.63	15	46.88	32	29.09
>Thrice	4	11.76	5	14.71	11	32.35	14	41.18	34	30.91
Total	13	11.82	21	19.09	27	24.55	49	44.55	110	100

The findings of the study have empirically been supported by a study of Wiest (1991). It shows that 64 percent sample households displaced due to erosion at least once, 40 percent experienced displacement between one and three times, 24 percent between four and six times, 15 percent between seven and nine times, and 25 percent ten times or more. This is also empirically supported by the findings of Mahbub and Islam (1991). They found that each of their sample households experienced displacement 2.33 times, on an average, in their life time. Zaman (1986) also found in Kazipur that the average frequency of displacement is more than six times. The *chukani* displacee households have to pay annual rent 5000 taka for land resettlement, and dwelling house. No government and/or non-government shelter house is visible throughout the village of Char Chinna. *Charland* inhabitants use thatch as roof materials and bamboo and straw as wall materials for building their dwelling hut.

In this village the preponderant majority of the *uthuli* and *chukani* displacee parents (76.36%; n=168 of 220) are illiterate (Table 2) and at the same time about 63.33 percent (n=133 of 210) *uthuli* and *chukani* children are illiterate. Most of the families in this village are actually homeless and landless whereas 82.73 percent are landless without homestead. With the limited source of income and inadequate asset they could manage to earn a meagre or low income for day-to-day survival of their household. The monthly income structure of the parents indicates an adverse situation in continuing their familial survival. It is observed that 71.82 percent parents have opportunity to earn Taka 1000 to 11000 per month and they are recognized as lower whereas 03.64 percent upper displacee parents earn Taka 21000 to 26000 per month. It is observed that 20.91 percent lower displacee household whereas *chukani* 65.22 percent and *uthuli* 34.78 percent maintain their family by 1000 to 6000 Taka

per month. This amount is very meagre to survive and it's very difficult to maintain a family or overcome the poor economic condition caused by displacement.

**Table 2** Socioeconomic profile of the displacee household

Educational status of displace spouses		Total parents=220	
		N	%
Illiterate		168	76.36
Literate		52	23.64
	Primary	39	17.73
	Secondary	12	5.45
	Higher Secondary	1	0.45
Household landownership		Total households=110	
		N	%
Landless	Without homestead	91	82.73
	With homestead	-	-
Landownership	Marginal	5	4.55
	Poor	11	10
	Middle	3	2.73
	Rich	-	-
Monthly household income (BDT)		Total households=110	
		N	%
Lower	1000-11000	79	71.82
Middle	11000-21000	27	24.54
Upper	21000-26000	4	3.64
Pattern of latrine use		Total households=110	
		N	%
Hygienic		38	34.55
Unhygienic		72	65.45

More than 65 percent (65.45%; n=72 of 110) displacee households use unhygienic latrine (Table 2). Among some of them usually use open field, bushes side of ponds for defecation and don't maintain personal cleanliness after defecation and also before taking food. It is found that a very few of displacee households (34.55%; n=38 of 110) use hygienic latrine. In Char Chinna village only 20.91 percent (n=23 of 110) displacee households have access to use own latrine for defecation. On the other hand, 42.73 percent (n=47 of 110) and 36.36 percent (n=40 of 110) households don't have own latrine so they have to use relatives' and/or neighbours' latrine.

### **Livelihood challenges of displacee households**

#### ***Catastrophic effects on the displacee households***

The catastrophic effects of riverbank erosion displacement dismantled the *charland* livelihood of the respondent *uthuli* and *chukani* household. The households of all the *uthuli*

and *chukani* (100% of 110) lost their dwelling houses and are displaced from their original social networks (100% of 110). The devastated livelihood trapped the *uthuli* and *chukani* in indebt and in other informal loan received from relatives and/or neighbours. They are nearly 90 percent (90%; n=99 of 110) of the total and are ranked second majority. A great majority of *uthuli* and *chukani* (83.63%; n=92 of 110) lost their total homestead and agricultural land and thus they become landless (Table 3). In securing money, nearly three-quarters (72.72%; n=80 of 110) *uthuli* and *chukani* sell their valuable assets so that they can meet emergency financial crisis. It is reported that nearly 67.27 percent children are married. Their parents force their sons (22.64%; n=12 of 53) to marry in securing resources from their father-in-law, and their daughters (77.36%; n=41 of 53) to do the same as they believe the early marriage gives their daughters economic and familial securities.

Table 3 Catastrophic effects on the displacee households

Catastrophic effects	Displacee household						
	<i>Uthuli</i>		<i>Chukani</i>		Total		Majority
	N=41		N=69		N=110		
	n	%	n	%	n	%	
Homelessness	41	37.27	69	62.72	110	100	1 <sup>st</sup>
Displacement from social networks	41	37.27	69	62.72	110	100	1 <sup>st</sup>
Trapped in indebt	39	39.39	60	60.60	99	90	2 <sup>nd</sup>
Landlessness	30	32.60	62	67.40	92	83.63	3 <sup>rd</sup>
Forced engagement in odd jobs	30	33.33	60	66.67	90	81.82	4 <sup>th</sup>
Selling assets	25	31.25	55	68.75	80	72.72	5 <sup>th</sup>
Child marriage	24	32.43	50	67.57	74	67.27	6 <sup>th</sup>
Dropout from schooling	20	28.57	50	71.43	70	63.63	7 <sup>th</sup>

Note: Multiple responses considered

### *Loss of tangible and intangible livelihood essentials*

The loss assessment inventory explored that the first majority household (100%) lost their homestead land and second majority of them lost dwelling houses (95.45%; n=105 of 110) and household utensils. The third majority of them (93.63%; n=103 of 110) failed to harvest and/or cut the standing crops from their agricultural plots before the riverbank erosion attack. The fourth majority of them (91.81%; n=101 of 110) failed to save their kitchen materials before the onslaught of riverbank erosion attack (Table 4). On the other hand, the losses of intangible livelihood essentials are very significant in reshaping the status in the social hierarchy after displacement. The households of *uthuli* and *chukani* report that they lose a number of intangible livelihood essentials: social contacts (100%; n=110 of 110; 1<sup>st</sup> majority), *samaj* networks (99.09%; n=109 of 110; 2<sup>nd</sup> majority), resilience lessened by stresses and overworks (98.18%; n=108 of 110; 3<sup>rd</sup> majority), liveable environment (95.45%; n=105 of 110; 4<sup>th</sup> majority), and social care (93.63%; n=103 of 110; 5<sup>th</sup> majority) (Table 5).



**Table 4** Loss of tangible livelihood essentials of the *Uthuli* and *Chukani* household

Loss of tangible livelihood essentials	Displacee household						Majority
	<i>Uthuli</i> =41		<i>Chukani</i> =69		Total=110		
	n	%	N	%	n	%	
Homestead land	41	37.27	69	62.72	110	100	1 <sup>st</sup>
Household utensils	40	38.09	65	61.90	105	95.45	2 <sup>nd</sup>
Dwelling houses	40	38.09	65	61.90	105	95.45	2 <sup>nd</sup>
Standing crops	40	38.83	63	61.16	103	93.63	3 <sup>rd</sup>
Kitchen materials	38	37.62	63	62.37	101	91.81	4 <sup>th</sup>
Cultivable land	35	35.71	63	24.28	98	89.09	5 <sup>th</sup>
Domestic accessories	35	36.08	62	63.91	97	88.18	6 <sup>th</sup>
<i>Bairburi</i> (harvesting yard)	30	32.60	62	67.39	92	83.63	7 <sup>th</sup>
Trees	30	33.33	60	66.67	90	81.81	8 <sup>th</sup>
Garden	27	31.03	60	68.96	87	79.09	9 <sup>th</sup>
Domestic animals	25	29.41	60	70.59	85	77.27	10 <sup>th</sup>
Furniture	25	31.25	55	68.75	80	72.72	11 <sup>th</sup>

Note: Multiple responses considered

**Table 5** Loss of intangible livelihood essentials of *Uthuli* and *Chukani* household

Loss of intangible livelihood essentials	Displacee household								
	<i>Uthuli</i> =41			<i>Chukani</i> =69			Total=110		
	n	%	Majority	n	%	Majority	N	%	Majority
Social contacts	41	37.27	1 <sup>st</sup>	69	62.72	8 <sup>th</sup>	110	100	1 <sup>st</sup>
Samaj networks	40	36.69	2 <sup>nd</sup>	69	63.30	5 <sup>th</sup>	109	99.09	2 <sup>nd</sup>
Resilience	40	37.03	2 <sup>nd</sup>	68	62.96	6 <sup>th</sup>	108	98.18	3 <sup>rd</sup>
Livable environment	40	38.09	2 <sup>nd</sup>	65	61.90	9 <sup>th</sup>	105	95.45	4 <sup>th</sup>
Social care	40	38.83	2 <sup>nd</sup>	63	61.16	3 <sup>rd</sup>	103	93.63	5 <sup>th</sup>
Employment opportunities	41	40.59	1 <sup>st</sup>	60	59.40	4 <sup>th</sup>	101	91.81	6 <sup>th</sup>
Competitiveness	40	40	2 <sup>nd</sup>	60	60	14 <sup>th</sup>	100	90.90	7 <sup>th</sup>
Familial reputations	39	39.39	3 <sup>rd</sup>	60	60.60	11 <sup>th</sup>	99	90	8 <sup>th</sup>
Opportunities of satisfactory livelihood	35	36.84	4 <sup>th</sup>	60	63.15	7 <sup>th</sup>	95	86.36	9 <sup>th</sup>
Privacy and security of women	32	35.55	5 <sup>th</sup>	58	64.44	3 <sup>rd</sup>	90	81.81	10 <sup>th</sup>
Health and hygiene	30	35.29	6 <sup>th</sup>	55	64.70	1 <sup>st</sup>	85	77.27	11 <sup>th</sup>
Access to recreation	30	35.71	6 <sup>th</sup>	54	64.28	7 <sup>th</sup>	84	76.63	12 <sup>th</sup>
Security of children	30	37.50	6 <sup>th</sup>	50	62.50	13 <sup>th</sup>	80	72.72	13 <sup>th</sup>
Access to education	30	40	6 <sup>th</sup>	45	60	9 <sup>th</sup>	75	68.18	13 <sup>th</sup>
Resistance to future disasters	30	41.09	6 <sup>th</sup>	43	58.90	15 <sup>th</sup>	73	66.36	14 <sup>th</sup>
Nutrition requirements	25	38.46	7 <sup>th</sup>	40	61.54	12 <sup>th</sup>	65	59.09	15 <sup>th</sup>

Note: Multiple responses considered

### Utilization of natural resources

The *charland* riverine population of Char Chinna are widely threatened by its precarious environment and their livelihood is highly jeopardized annually by the attack of annual flood and riverbank erosion. They utilize natural resource to reduce their vulnerability due to annual flood and riverbank erosion displacement. There is sheer lack of organizational supports (GOs and NGOs), and livelihood diversification options which increase their risk and vulnerability in coping with the disaster of riverbank erosion displacement in their Jamuna *charland* habitat. The *uthuli* and *chukani* households of Char Chinna include the natural resource stocks: *charland*, river water, forest, fresh riverine *charland* air, small-scale biodiversity, natural fish stock in the Jamuna River, straw, green *kash* (long reed) plant and grass, and so on. These are their daily necessities for continuing their livelihoods.

#### *Use of natural resources for livelihood activities*

After displacement, they use *charland* plots for constructing dwelling house and homestead, agriculture, cattle rearing and forest. In this village large portion *uthuli* household (100%, n=41) use *charland* for Homestead, cattle rearing, forest and approximately 80.49 (n=33 of 41) percent and 95.12 (n=39 of 41) percent *uthuli* household use *charland* for their constructing dwelling house and cultivation (Table 6). On the other hand, maximum *chukani* households use *charland* for homestead plot and cultivation. They cultivate various *kharif* and *rabi* crops on sandy *charland*. They also produce chilli, jute, corn, lentil, *khesari*, *poronga* paddy, *gainja* paddy, wheat, sugarcane, etc. They use river water for irrigation, cooking, bathing, and washing utensils and clothes. They transport their goods and passengers by country boat in the Jamuna River. Natural fish is available in the Jamuna River which is hunted for selling or own consumption and they have free access to garner these natural resources. As Nurullah and Sarker (2020) found that 1.94% dwellers are highly dependent while 45.15% and 66.31% were dependent and slightly dependent, respectively on the natural resources of *Chalan beel*. The *charland* inhabitants use straw, green khash plants, green grass and other green plants for cattle feeding. They use dried branches as fuel, fencing material for cropping land and fencing material for homestead. They also use wild trees (*Babla*, *Gamar*, *Akasmoni*, *Mehghoni*, etc.) as fuel, timber, wall materials of house and agricultural tools (yoke and other ploughing tool, weed extracting tool).

In this village 92.68 (n=38 of 41) percent *uthuli* and 82.61 (n=57 of 69) percent *chukani* have free access to use river water for irrigation (Table 6). They have also free access to use river water for cooking, bathing, washing utensils and clothes, cattle rearing, etc. But they have no opportunity to use pure and safe drinking water. Fish is available in the Jamuna River and they have free access to hunt these natural resources. Some of the *uthuli* and *chukani* households develop their livelihood on gathering and selling of fish, and some of households develop their livelihood by driving or selling country boat.



Table 6 Utilization of *Char* land and river water for meeting various needs

Utilization of <i>char</i> land						
Utilization of <i>char</i> land	Displacee households					
	Uthuli=41		Chukani=69		Total =110	
	n	%	n	%	N	%
Constructing dwelling house	33	80.49	63	91.30	96	87.27
Homestead	41	100.00	69	100.00	110	100
Cultivation	39	95.12	64	92.75	103	93.63
Cattle rearing	41	100.00	53	76.81	94	85.45
Forest	41	100.00	69	100	110	100.00
Utilization of River Water						
Utilization of river water	Displacee households					
	Uthuli=41		Chukani =69		Total=110	
	n	%	n	%	N	%
Irrigating crops	38	92.68	57	82.61	95	86.36
Cooking	31	75.61	43	62.32	74	67.27
Bathing	39	95.12	61	88.41	100	90.90
Washing	39	95.12	68	98.55	107	97.27
Navigating country boat	41	100	69	100	110	100
Collecting natural fish	41	100	69	100	110	100

Note: Multiple responses considered

### *Use of energy in different livelihood activities*

Energy use efficiency is considered as one of several ecosystem *characteristics*, but from the viewpoint of sustainability, it is the most important because of the increasing cost and scarcity of fossil fuel subsidies (Holdren *et. al.*, 2000), and the pollution caused by energy waste (Jordan, 2013). The *char* dwellers of Char Chinna village reported that different sources of energy are used in their agricultural and household activities. All of them (100%) use natural wind to separate harvested crops from dust and other rubbishes with traditional fan (*kula*) (Table 7). They (82.72%) are used to utilize solar energy to dry harvested crop plants in the Sun. The cultivators (100%) use drum and/or other cans to make loud sound in the cropping field so that the crop damaging birds are threatened. *Char*land areas are very different from main lands in light arrangements in the dark for dwelling houses because of suffering from the sheer lack of electricity. It is found that 100 percent *char* households use the solar panel to light their dwelling houses during the dark and for household chores. The solar panel light is usually used in the following household chores: lighting dwelling houses (100%) children's reading and writing (100%). It is found that all of the households use kerosene (Goldemberg, 2000) and candle to reduce dark in their dwelling houses in absence of and/or in addition to solar panel light.

Table 7 Utilization of Energy in different activities

Use of energy	Sources of energy	Energy used in different activities	Displacee households					
			<i>Uthuli</i>		<i>Chukani</i>		Both	
			N=41		N=69		N=110	
			n	%	n	%	n	%
Use in Agriculture	Natural wind	Cleaning harvested crops	41	100	44	63.76	85	77.27
	Solar	Drying agricultural products	34	82.92	57	82.60	91	82.72
	Sound	Threatening crop damaging birds	41	100	69	100	110	100
Use in household chores	Solar panel	Lighting dwelling houses	41	100	69	100	110	100
		Reading and writing	41	100	69	100	110	100
		Meal taking	41	100	69	100	110	100
		Cell phone charging	34	82.92	53	76.81	87	79.09
	Kerosene	Lighting dwelling houses	32	78.04	37	53.62	69	62.72
		Reading and writing	32	78.04	44	63.76	76	69.09
		Meal taking	22	53.66	34	49.27	66	60
	Candle	Lighting dwelling houses	36	87.80	45	65.21	81	73.64
		Reading and writing	23	56.09	26	37.68	49	44.54
		Meal taking	12	29.27	22	31.88	34	30.90
		Cooking in the kitchen	38	92.68	55	79.71	93	84.54

N.B. Multiple responses considered

### *Use of forest in different livelihood activities*

The field data shows that approximately 100 percent households of Char Chinna village use Babla, Gamar, Akasmoni, Mehoghoni, Shimul tree for timber, fuel consumptions, wall materials of house, yoke and other ploughing tools, board of boat, weed extracting tools. They (100%) utilize straw for feeding cattle and fuel consumptions. They (100%) also use green grass and green plants for feeding cattle. Likewise, they (100%) use dried branches for fuel consumptions, fencing cropping fields and fencing homestead. They rear domestic animal like goat, cow, buffalo, etc. and graze their cattle and they collect straw, green *kash* plant, grass, and other green plants for their cattle of *charland* of the Jamuna River. They collect dried straw, dried branches and cow-dung from field for their fuel consumption.

The *charland* inhabitants utilize natural resource in reducing their vulnerability and devastated state of *charland* livelihood caused riverbank erosion displacement. It is notable that their natural resources are recurrently destroyed by riverbank erosion, flood, storm, etc. and thus their vulnerability increases in some cases as they utilize these natural capitals in this context. They use natural resources what they have in their *charland* habitat but their livelihood is found unstable and not sustainable but vulnerable as it had no adequacies to

cope with, and recover the stresses and shocks caused by riverbank erosion displacement. The hazard of riverbank erosion undermined their natural resource base and made the *uthuli* and *chukani* households fragile in maintaining and/or enhancing their capabilities and assets before and during the riverbank erosion displacement. In fact, the riverbank erosion attack and flood are found as major environmental threats to the *uthuli* and *chukani* households. They have no technological standing of preventing erosion attack of the Jamuna River as the erosion-prevention claims a large-scale structural-engineering works. They are not yet supported by any organizational (GOs and NGOs) sources or any senior or responsible members to mitigate this hazard with appropriate drainage channels and culverts as well as with the vegetation and forest resources on exposed slopes. Most of the parents have to involve their children in household and income earning activities rather than schooling in order to supplement their family subsistence exerts detrimental effects on child development and distorts their primary socialization. Most of the *uthuli* and *chukani* families get stress for past displacement, future displacement, and their uncertain livelihood. These families are not able to provide *uthuli* and *chukani* children’s basic rights and needs.

Table 8 Utilization of forest in different activities

Utilization of forest	Used in different activities	Displacee households					
		<i>Uthuli</i> N=41		<i>Chukani</i> N=69		Total N=110	
		n	%	n	%	n	%
Wild trees (Babla, Gamar, Akashmoni, Mehoghoni, Shimul)	Fuel consumptions	12	29.27	54	78.26	66	60
	Agricultural tools	34	82.92	57	82.60	91	82.72
	Household materials	41	100	69	100	110	100
	Timber	41	100	69	100	110	100
Green <i>Kash</i> plant	Feeding cattle	34	82.92	54	78.26	88	80
Straw	Feeding cattle	41	100	57	82.60	98	89.09
	Fuel consumptions	41	100	69	100	110	100
Green grass	Feeding cattle	41	100	54	78.26	95	86.36
Green plants	Feeding cattle	41	100	54	78.26	95	86.36
	Fuel consumptions	41	100	69	100	110	100
Dried branches	Fencing cropping fields	41	100	69	100	110	100
	Fencing homestead	41	100	69	100	110	100

N.B. Multiple responses considered

### Livelihood diversification options

Livelihood diversification usually aims at reducing the vulnerability and and/or mitigating the environmental hazards and it finally enables the disaster victims to cope with the desolate

state of livelihood caused by the disaster. In case of the *uthuli* and *chukani* households of Char Chinna, the livelihood diversification and options are very limited in terms of access to resources. Even though, they engage themselves in multiple occupations as none of those are adequate for continuing their familial survival; house management, day labourer, maid servant, agricultural labourer, boat driving, tailoring, rickshaw puller, fishing, nut selling, small business, and shop keeping. Most of these occupations are hard and less income earning. After and before their last displacement, they were more or less involved in such less income earning jobs that contribute insignificantly to the reduction of their vulnerability to riverbank erosion displacement from their places of origin (Islam, 2015).

## Conclusion

The present study assesses the overall scenario of the impact of riverbank erosion displacement on the aforementioned *charland* household. Uncontrollable riverbank erosion intermittently causes unsafe social reality for the total development of *uthuli* and *chukani* households in different forms. The world of uncertainties that they face economic insecurities due to low familial income and social insecurities. After the failure in preventing erosion attacks, the riverbank erosion displacements usually tend to undertake multiple corrective strategies in confronting their socio-economic hardship. To mitigate socio-economic vulnerability, they use many types of natural resources which are useable in *charland* habitat of the Jamuna River as their daily necessities. They used to utilize *charland* for constructing dwelling houses, homestead, cattle rearing, and agriculture. Likewise, they use river water for irrigating crops, cooking, bathing, and washing, navigating the country boats, collecting natural fish for selling, and own consumptions. To continue their livelihood in these precarious conditions they utilize natural wind, solar system, sound energy in agriculture and solar power, kerosene, candle in household chores. For their daily necessities, they use wild trees for fuel consumption, timber, agricultural tools, furniture, etc. They collect straw, green *kash* plants, grass, and other green plants for cattle feeding. To decrease economic hardship, they also collect dried branches and cow dung for fuel consumptions, wall materials of the house. But these natural resources are not adequate for their sustainable livelihood. All the insecurities caused by flood and riverbank erosion displacement lead to deprivation, destitution, hardship, impoverishment, and more vulnerability of the *uthuli* and *chukani* families to further disasters.

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