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## IMPACTS OF SALINITY PROBLEMS ON LIVELIHOOD IN BANGLADESH: A CASE STUDY

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### ABSTRACT

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Bangladesh is to be extremely vulnerable to climate change. The salinity intrusion (naturally and human induced) in the coastal areas increased the vulnerability manifolds. The study presents the impacts of salinity problem on livelihood in the coastal village and tries to reveal the adaptive strategies they have undertaken. In-depth interview and observation were the main tools to collect the relevant information in qualitative approach. Due to climate change, natural setting already been transformed such as rise of sea level, increasing salinity, floods and loss of land could make thousands of coastal people climate refugees. It has also been observed that both natural and man-made changes can alter the patterns of poor peoples' lives and livelihoods. Faulty development policies and economic interests of the rich, such as promoting shrimp farming in a saline-prone zone make the environmental settings more vulnerable. Communities living at Abadchandipur (Shyamnagar) have suffered severely from salinity problem which have created huge obstacles against livelihood options and economic development in the region. These changes environmental settings are threatening the food and water security of poor communities and making them more marginalized than before. Staying in lots of problems, still the coastal people are struggling to adapt changes situation.

**Key words:** climate change, salinity, livelihoods changing, shyamnagar, shrimp culture, adaptation

### INTRODUCTION

It is the universally acknowledged that Bangladesh is to be extremely vulnerable to climate change where its coastal area is the highest vulnerable due to climate change. And this climate change has exposed its great effects leaving salinity in the coastal part in Bangladesh. Saline water intrusion is mostly seasonal in Bangladesh. In winter months the saline from begins to penetrate inland, and affected areas rise sharply from 10% in the monsoon to over 40% in the dry season. Coastal districts such as Sathkhira, Khulna, Bagerhat, Borguna, Patuakhali, and Barisal are the victims of salinity intrusion. It is observed that dry flow trend is being declined as a result of which sea flow (saline water) is traveling far inside the country resulting in contamination both in the surface and ground water (DMB 1997).

The geographical location, land characteristics, multiplicity of rivers and the monsoon climate render Bangladesh highly vulnerable to natural hazards. The coastal morphology of Bangladesh influences the impact of natural hazards on the area. Especially in the South-Western area, natural hazards increase the vulnerability of the coastal dwellers and slow down the process of social and economic development. Munns (2005) had reported that over 800 million hectares of land worldwide is affected by salinity, comprising nearly 7% of the world's total land area. Currently, saline soils occur in more than 100 countries. Bangladesh is not free from this threat. South belt of coastal Bangladesh is relatively flat and prone to suffer from salinity, sea level rise, erosion, cyclone, and storm surges. Significant part of the coastal area is already facing problems related to salinity intrusion, cyclone and tidal surges, erosion, water logging, which will be aggravated further under warmer climate particularly the sea level rise.

Coastal agriculture, fisheries, livelihood activities of the poor and marginal groups and domestic water sources and uses of all are the key vulnerable sectors in the coastal area. In this area, increasing trends of salinity has affected water, soils, agriculture, vegetation, mangrove, fisheries and livelihood activities of the communities and households. The locality also faces serious health risk due to salinity resulting in scarcity of fresh water. In the coastal areas of Bangladesh, shrimp culture is another phenomenon of hardship. The total area of shrimp culture (a major component of coastal aquaculture) in Bangladesh covers about 130 thousand hectares, which is 12.7% of total global area under shrimp culture. The area under shrimp culture registered a three-fold increase over the last decade. The 750 km coastline provides an ideal natural environment for commercial shrimp culture in Bangladesh but the economic benefit from shrimp farming has mostly bypassed the common people. Instead it has brought about misery and health hazard for them and complicates any exercise to remove the expanding water logging and salinity problem (Hossain and Sanowar, 2003).

Coastal areas include coastal plain lands, tidal flats, estuaries and offshore waters. This coastal area represents an area of 47,211 km square, 32% of the country's geographical area, where in 35 million people i.e. 28% of the country's total population live at 6.85 million households (Bangladesh Population Census, 2001). In terms of administrative consideration, 19 districts out of 64 are considered as coastal districts, where the coastal region covers almost 29,000 km square or about 20% of the country. Again, the coastal areas of Bangladesh cover more than 30% of the cultivable lands of the country. About 53% of the coastal areas are affected by salinity.

According to salinity survey (SRDI 2000) findings and salinity monitoring information, about 1.02 million ha (about 70%) of the cultivated lands are affected by varying degrees of soil salinity in Bangladesh (Table 1).

Table 1. Salinity affected areas in the coastal and offshore regions of Bangladesh

| Description                               | Total cultivated Area | Saline area     | Area of each salinity class(ha) |                 |                  |                   |               |
|---|-----------------------|-----------------|---------------------------------|-----------------|------------------|-------------------|---------------|
|   |                       |                 | (dS/m)                          |                 |                  |                   |               |
|   |                       |                 | S1<br>(2.0-4.0)                 | S2<br>(4.1-8.0) | S3<br>(8.1-12.0) | S4<br>(12.1-16.0) | S5<br>(>16.0) |
| Non-saline with very slightly saline      | 4,25,490              | 1,15,370 (27%)  | 82,260 (72%)                    | 31,590 (27%)    | 1,520 (1%)       | 0                 | 0             |
| Very slightly saline with slightly saline | 4,20,420              | 3,09,190 (73%)  | 1,70,380 (55%)                  | 1,10,390 (35%)  | 29,420 (10%)     | 0                 | 0             |
| Slightly saline with moderately saline    | 2,57,270              | 2,40,220 (93%)  | 35,490 (15%)                    | 1,13,890 (47%)  | 61,240 (26%)     | 25,870 (11%)      | 2,650 (1%)    |
| Moderately saline with strongly saline    | 1,98,890              | 1,98,890 (100%) | 1,630 (1%)                      | 36,060 (18%)    | 73,400 (37%)     | 55,130 (28%)      | 32,750 (16%)  |

Source: Soil salinity in Bangladesh (SRDI) 2000

According to German watch Global Climate Risk Index (2012), Bangladesh, Myanmar and Honduras were the countries most affected by extreme weather events from 1991 to 2010. The issue of salinity cannot be ignored as it relates directly to the issue of sustainable agriculture and hence to food security. The study shows that the salt-affected areas in the coastal region of Bangladesh increased sharply, by 26.71%. Salim *et al.* (2007) had also reported that Bangladesh has about 2.8 million hectares of land that is affected by salinity i.e., a third of the 9 million hectares of total national cultivated area, and about a fifth of the total area of Bangladesh. A one-meter rise in the sea-level (anxiously inferred to take place by the end of the century) will inundate the whole of the Sundarbans (Karim 2009). If the sea-level rise is higher than currently inferred and coastal polders are not strengthened or new ones built, 6 to 8 million people could be displaced by 2050. Increased salinity is likely to result in the decline in rice and wheat production, and more pronounced shortage of drinking water. The livelihood pattern of the coastal belt society depends on exploitation of natural resources like crop production, fish, crabs, snails etc (Saha 2010). The imposed stressed conditions like resource depletion as well shifting nature of professions. Therefore, it is easy to understand that every aspect of salinity has got impacts on affected people. And this salinity problem will increase food, water and insecurity; increase social conflicts over resources (land, forest and water); severe scarcity of drinking water and health hazards due to salinity intrusion both in ground and surface water. Still, some of the impacts of salinity may be positive, such as increased opportunities for certain type of aquaculture, but most studies agree that the adverse impacts will outweigh any of the possible benefits if no action is taken. The present study has revealed some important aspects of effects of salinity which will help the concerned authority to solve the problems. It will help to take adaptation action to reduce the vulnerability due to salinity in coastal areas. In addition; it has exposed the present status of the community.

Considering the above facts, the present study described in this paper was designed (1) to obtain an understanding of the impacts of salinity on the livelihood of a coastal village people and (2) to know the livelihood adaptive strategies being undertaken by the community members in response to salinity problems. To get the specific objectives of the study, the following research questions have been addressed: (a) What is the understanding of the target community towards salinity problems? (b) How does salinity affect their village? (c) How does salinity affect their family responsibility? (d) Have they changed the livelihood? (e) If yes, what is that and why? (f) What have they done to cope with the effects of the salinity? (g) What is the role of Local Government NGOs and local politics associated with salinity problem?

## MATERIALS AND METHODS

The studied area (Shyamnagar) is the largest Upazila in Satkhira district in terms of area and second largest in terms of population. The Upazila located between 22°36' and 22°24' north latitudes and between 89°00' and 89°19' east longitudes. The distance of this place from the divisional headquarters Khulna is about 120 km and from capital city Dhaka about 400 km. The Upazila has an area of 1968 sq. km. from which 1,623 sq. km is undercover by forest. The Upazila consist of 13 unions, of which one union named 9 No. Burigualini Union was study area (one of its villages named Abadchandipur). Burigualini is situated in the Southern part of Shyamnagar upazila (Fig. 1) adjacent to the world heritage Sundarbans.

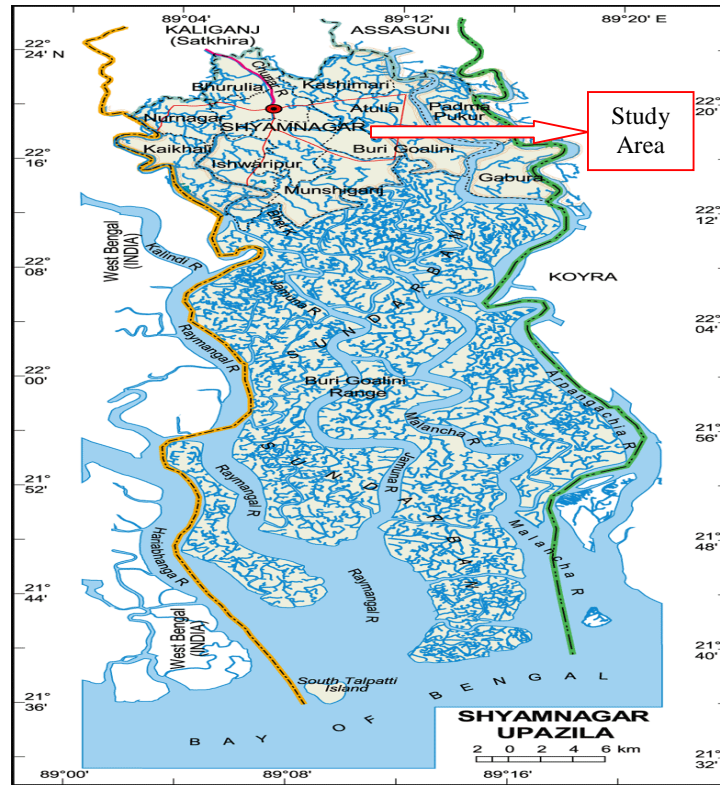


Fig. 1. Map of Shyamnagar Upazila

The methodology of this study has been selected on the basis of the research problem. The main books related to research methodology consulted during methodology selection were: Research Design Qualitative & Quantitative Approaches (Creswell 1994), An Introduction to Qualitative Research (Hancock 2002). The activity of flow chart is given in Fig. 2.

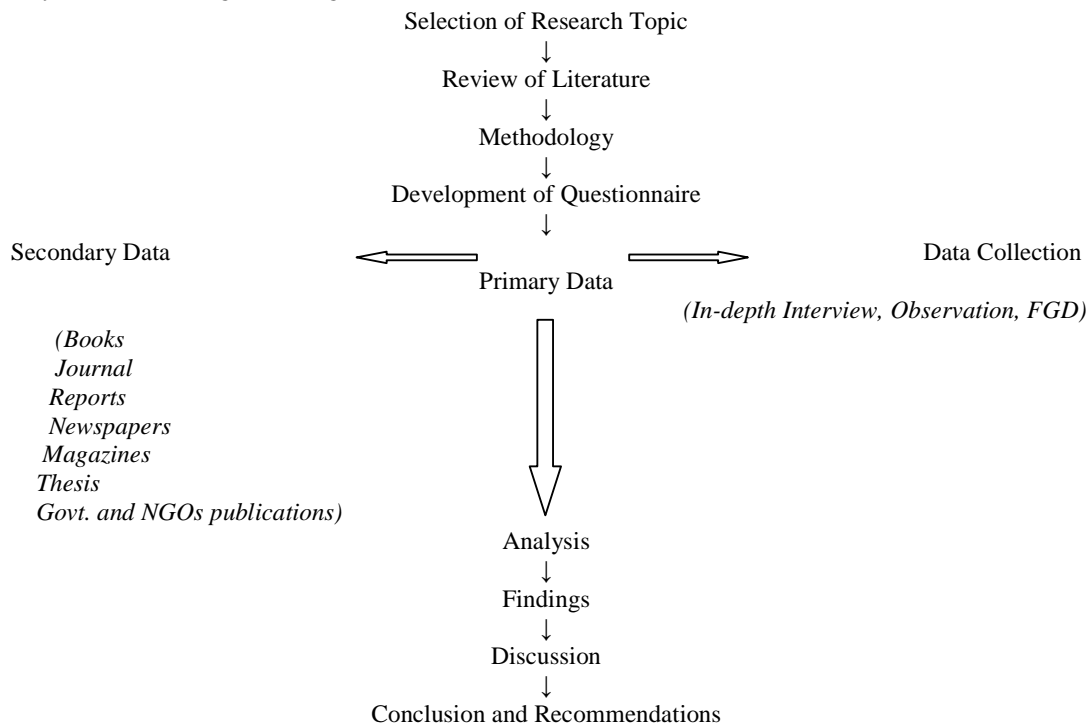


Fig. 2. Activity Flow Chart of Study

To understand the salinity problems in coastal Bangladesh and their adaptive strategies, I apply qualitative method. In qualitative research methodology rely on (Merriam 1988) six assumptions: (1) Qualitative researchers are concerned primary with process, rather than outcomes or products (2) Qualitative researchers are interested in meaning-how people make sense of their lives, experiences, and their structures of the world (3) The qualitative researcher is the primary instrument for data collection and analysis (4) Qualitative research involves field work. The researcher physically goes to the people, setting, site, or institution to observe or record behavior in its natural setting (5) Qualitative research is descriptive in that the researcher is interested in process, meaning, and understanding gained through words or pictures and (6) The process of qualitative research is inductive in that the researcher builds abstractions, concepts, hypothesis and theories from details.

As the study relies mostly on respondents' self reported feelings and knowledge, personal perspectives and experiences about the salinity problems in their daily life a descriptive and interpretive analysis was done. Qualitative research has been well established in most academic fields of study and it has a unique approach to that draws mostly on multiple sources and on people's views and opinions of specific experiences. In this study, multiple sources are data from 17 respondents (mixed age, religion, and sex), study/survey instrument that asks for opinions and judgmental well as open-ended responses, related research articles and books and personal experiences. It was important to use a qualitative research approach because of the dependence on individual perceptions of a particular environmental situation. The field work was performed in the month of April and May from 16 April to 20 May, 2011 (Table 2).

In my field work, I took interviews, observation and FGD (Focus Group Discussion) with the BRAC village organizations' members, their husbands/guardians and their fellow neighbours. For conducting interviews, I prepared an open ended type questionnaire. As it was in English version so I needed to translate into Bangla even using some local terms.

Table 2. Respondents and interview schedule

| Sl.  | Sex    | Age | Religion | Date of Interview |
|------|--------|-----|----------|-------------------|
| 1st  | Female | 50  | Hindus   | April 21, 2011    |
| 2nd  | Male   | 68  | Hindus   | April 23, 2011    |
| 3rd  | Male   | 45  | Hindus   | April 24, 2011    |
| 4th  | Female | 28  | Muslim   | April 25, 2011    |
| 5th  | Male   | 55  | Muslim   | April 28, 2011    |
| 6th  | Female | 40  | Hindus   | April 30, 2011    |
| 7th  | Male   | 49  | Muslim   | May 11, 2011      |
| 8th  | Male   | 43  | Muslim   | May 11, 2011      |
| 9th  | Male   | 35  | Hindus   | May 12, 2011      |
| 10th | Female | 37  | Hindus   | May 13, 2011      |
| 11th | Male   | 40  | Muslim   | May 13, 2011      |
| 12th | Female | 35  | Muslim   | May 14, 2011      |
| 13th | Female | 47  | Muslim   | May 14, 2011      |
| 14th | Male   | 52  | Muslim   | May 15, 2011      |
| 15th | Male   | 49  | Hindus   | May 15, 2011      |
| 16th | Male   | 32  | Hindus   | May 16, 2011      |
| 17th | Male   | 44  | Muslim   | May 19, 2011      |

### Data Collection

In qualitative research, data are considered as star\*. It means the main focus in qualitative research is the data itself, in all its richness, breadth, and depth. As Creswell (1994) mentioned "The data collection steps involve (a) setting the boundaries for the study, (b) collecting information through observations, interviews, documents, and visual materials, and (c) establishing the protocol for recording information. He further said that the idea of qualitative research is to purposefully select informants (or documents or visual materials) that will best answer the research questions. No attempt is made to randomly select informants."

In my study, I collected data from interviews, observation and visual images, FGD; and reviewed different types of documents and websites related to this study. In case of interview, I selected BRAC VO (Village Organization) member (female), next to another VO member's husband, next to fellow neighbour (male or female). By this way, I was able to take interview purposefully who were able to answer the respective research questions. At the same time, it helped me to choose a total mixed group-male-female, rich-poor, Muslim-Hindus, educated-illiterate and mixed aged interviewees. Total 17 interviews were taken. Out of 17 respondents, 11 were male and 6 were female. In case of religious context, 9 were Muslims and rests of the interviewees were Hindus. Their age range was 28 to 65 years. Interview time was not so long or so short, it took one and half hours to two hours on average.

## Data Analysis

In qualitative research, the process of data analysis is eclectic; there is no “right way” (Tesch 1990). Metaphors and analogies are as appropriate as open-ended questions. Data analysis requires that the researcher be comfortable with developing categories and marking comparisons and contrasts (Creswell 1994). It also requires that the researcher be open to possibilities and see contrary or alternative explanations for the findings. Typically throughout the data analysis process I coded data using as many categories as possible (Jacob 1987). It helped me to identify and describe patterns and themes from the perspectives of the respondents to understand and explain (Agar 1980).

## Research Design

In order to find out the impacts of salinity on livelihood of Abadchandipur village's people. Here I employ in-depth interview, observation and focus group discussion. It needs to note that I also perform case study.

## Source of Data and Validity-Reliability of Data

This study made use various data sources: for primary data, preformed qualitative interviews, observation and FGD. On the other hand, for secondary data, consultation was performed with various national and international reports on salinity problems issues in coastal Bangladesh; academic journals and books, daily newspapers, NGO publications and government records by different institution/departments and World Wide Web (WWW). Statistics related with salinity, demography and census were also consulted.

According to Lincoln & Guba (1985), the most appropriate terms in qualitative research are credibility, neutrality or conformability, consistency or dependability and applicability or transferability. To ensure reliability in qualitative research, examination of trustworthiness is important. On the other hand, McMillan & Schumacher (2006) stated that validity refers to the degree of congruence between the explanations of the phenomena and the realities of the world.

## RESULTS AND DISCUSSION

For knowing the real picture of the respective study area, I asked a series of relevant questions which already have mentioned in the introduction chapter. This chapter is mainly the answers and explanations of those questions on climate change, salinity and its effects, livelihoods and their strategic adaptations, role of Local Government and NGOs, and local politics. From those answers revealed the peoples' conditions, perceptions, believes, thinking etc which will uphold my line of arguments.

### Understanding of Climate Change and Causes of Climate Change

Whatever the definition of climate change, they (different respondents answers explored different aspects of climate change) perceive only by its external phenomenon like- high temperature, heat stress, fluctuation of flooding time (not usual, rather early, late or not all) devastating natural disasters (Aila, Sidr), everywhere high salinity and salty wind creates severe hot. It was vivid in the words of the 13<sup>th</sup> respondent- *“What can I say about the climate change? It is nothing but a madness of climate unbearable high temperature, salt in everywhere”*.

Out of 17, two were linked climate change with increasing greenhouse gases leads the climate change. It can be expressed in the words of the 11<sup>th</sup> and 2<sup>nd</sup> respondents having different point of view respectively-*“We are hitting the nature that is why God heats the land to teach us-we can say it tit for tat”*. *“We are producing carbon di-oxide (green house gas) burning fuel which absorb the sun heat eventually raise the nature's temperature.”* In this respect, UN Framework Convention on Climate Change (UNFCCC), where climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable times.

### Salinity and Its Effects:

In Abadchandipur, salinity is a very common but unbearable reality. Already it has been told that the people of this village do not know the definition, they can express their experiences, their true condition. When I categorized their answers, I have got several sides of salinity. Some of them understood salinity as high salt in water. Some other made it fun by saying ‘water in salt’. Some respondents meant it as salt in any work. Rest of them meant salinity as salted area. The 10<sup>th</sup> respondent illustrated the term ‘salinity’ *“In our boyhood we used salt in curry but now we collect salt free water for not only drinking but also other daily activities this is salinity”*.

The respondents were very concerned about rice and vegetable cultivation. They repeatedly told the different crises like drinking water, livestock and poultry water, fuel. Dying of trees (most of them already have died) and fish, increasing shrimp and crab culture, vanishing local fish, practicing mono-crop per annum and damaging housing structures were their others effects due to salinity. In this regard, the 17<sup>th</sup> respondent exemplified *“It is not so far distance when we produced enormous of rice, our pond was filled with fishes. In that time we never thought about drinking water. But today we have lost our land; we have lost our paddy field and our pond”*

where to cultivate fishes. Now we have neither present nor future and it is our curse 'salinity' that has ruined us. We can live only if we change salt water with fresh water in Abadchandipur and other surrounding villages”.

Finan (2009) pointed out in this area “Due to sea level rise related impact particularly salt water intrusion can destroy all kinds of livelihood of the coastal population where 100 million people could be affected; 10% of the fertile agricultural land could be destroyed, farming and fishing livelihoods could be completely compromised and the Sundarban mangrove forest, declared as part of world heritage could be disappeared.”

When people loss their traditional livelihoods and do not get any support to adapt the new one, then their sufferings can be assumed easily. From observation and conducting interviews, I discovered this reality. However, some of the respondents (two persons) were benefited from shrimp/crab culture. But rest of the respondents hardships were heart touching. Rice cultivation was main occupation by which they could manage their annual main food grain. Here some of them cultivated own land, some of them share cropping or worked paddy field for getting rice and money. Not only they lost their occupation but also suffering differing diseases such as allergy, dysentery, high pressure. Furthermore, they are facing critical crisis of drinking water, bathing water and poultry and livestock water. The 5<sup>th</sup> respondent drew the picture from his life and the life of neighbours, “After losing my cultivable land I lost my occupation, then my health due to different types of diseases like dysentery, allergy. Now I am always ask help from God. Nothing else can save us except Him.”

According to Borroto (1998), Sea level rise may increase the risk of health hazards like diarrhea, cholera, etc. which is common in the coastal area of Bangladesh.

### Impact on Livelihoods:

Abadchandipur village was crops and vegetables cultivated area. New dimension of salinity problem, it has turned into shrimp/crab farms area (Fig. 3). Rice/vegetables cultivators have become shrimp/crab farms owners or workers. Some cases rice/vegetables cultivation and shrimp/crab farming are practiced combined. By this way, different means of livelihood has turned into shrimp/crab farming activities. Still crops and vegetables cultivation is exist for meeting the first physiological need. The 15<sup>th</sup> respondent, middle aged man expressed his life history, “I had one acre fertile land where I produced paddy and vegetables. A lots of fruit trees were available. We had our own cattle, a wooden house and a pond for cultivating fish and supplying household water. We could feed our family with our own produced crops, fruits and fish. We could sell our surplus products and made money from that. Now I have nothing but a piece of saline land where I cannot produce anything, I just handed over it to the elite shrimp cultivator for some money. I am now a day labourer in the shrimp/crab gher (small pond like water body locally known as gher).”

The livelihoods pattern of Shyamnagar upazila is widely dependent on the aftermath of climate change and pattern of salinity. Shyamnagar was famous for rice production before the introduction of shrimp culture. In the voice of 9<sup>th</sup> respondent, “At the beginning, shrimp culture was profitable; some of us made good money from it. Shrimp farming was more than 10 times profitable than rice farming. So people got easily attracted by promising shrimp industry, and many of us converted our livelihood to this industry like me. But later we realized our mistakes.”



Shrimp Gher



Crab fattening area



Collected crabs

Fig. 3. Selected photographs of the studied area

### Livelihood Adaptation to Salinity

To face the salinity problems, the study area's people also took different adaptation measures. Cultivation of saline resistant rice and vegetables varieties, introduce early varieties. To the total change of traditional occupation is agricultural farming to shrimp/crab farming (Fig. 3). Nasimon/motorcycle driving is another livelihood adaptation. It was clear in the words of the 16<sup>th</sup> respondent, “Our forefathers were cultivating local variety of rice. Now it is obsolete in our area. We are now cultivating new varieties which are saline resistant, early ripen one. It helps us somewhat to overcome the salinity problem”.

In the voice of late fifties woman (4<sup>th</sup> respondent), *"We cannot grow the previous vegetables by the previous techniques, we need to collect saline free soil and water to nurture it properly but the production is less than the earlier time."*

Shannon *et al.* (1998) had also suggested that saline tolerant rice farming to adapt with the salinity in California, USA. To cope with the salinity problem including coastal a forestation with community focus, providing drinking water to coastal communities, promotion of research on saline tolerant varieties of crops and salt tolerant fish (NAPA 2005).

### **Roles of NGOs**

In Bangladesh, NGOs' roles are well-known in every sphere in the society. It is true that NGOs are working in the remote/backward areas in Bangladesh and contributing something for distress people. However, the study area's people are not so happy about NGOs. NGOs are disbursing loan with high interest. Other activities are digging ponds and canal, sinking tube well and providing awareness building skill development training. As the coastal village, Abadchandipur is suffering repeatedly different climatic hazards. The NGOs are doing different development work still their reputation in this village was not good which was live in the words of the 12<sup>th</sup> respondent, a young and literate person by the following way, *"Do you want to say they (NGOs) are helping us? No. They are taking opportunities by the name of our sufferings. If they help us, why they impose incremental interest?"* Very recently Sushilon, an NGO has taken initiative to organize people so that they can improve their lives. They already have established a well structured training cum rest house. Sushilan and DANIDA are helping preparing Annual Budget for development work from last three fiscal years in union basis (Burigualini Union, 2010-2011).

### **Expectations of People from NGOs/Government**

The respondents wants big loan without any interest or with minimum interest rate. They also want to get assurances of pure drinking water. Furthermore, they want to see local road construction and want to receive saline resistance crop varieties having necessary skill development training. The respondents' expectations from NGOs were opened in the expression of the 15<sup>th</sup> respondent, *"I think NGOs have come here to reduce our sufferings, not to making money from loan interest and embezzlement of foreign donation. They can provide large amount of loan having very minimum interest rate and can set up tools for supplying pure drinking water."* The 6<sup>th</sup> respondent expressed her anxiousness by the following words, *"Where we will stay when shrimp culture will not profitable because our soil already salinity polluted. The local govt. should ban further extension of shrimp/crab farming otherwise it will lead us displace any time."*

### **Local politics on Shrimp Culture and Crab Fattening**

When the farmers are unable to cultivate the rice then they leave their last hope and the rich circle and elite community takes the advantages. Finally the poor are simply the silent audiences. Most of the respondent did not want to say anything about the elite class who are controlling the local politics on shrimp/crab farming. The two respondents (8<sup>th</sup> and 14<sup>th</sup>) showed their grievance in the following way respectively, *"At first I did not agree with the 'gher' owner to lease my rice field. The following day I discovered it is merged with saline water. Then my land was useless except shrimp farming. So I had no choice to hand over it to the 'gher' owner."* They had also pointed out that *"We cannot bargain about our daily wages. If any, the owner threatens us not giving any work. We are slavers here."*

According to Hossain and Sanowar (2003) it has brought about misery and health hazard for them and complicates any exercise to remove the expanding water logging and salinity problem. However, absentee and politically backed rich farmers took the control over this process and compelled small farmers to hand over their lands for cultivating shrimp. Finally, the number of landless peoples increased gradually.

### **Drinking Water and Women/Girls**

All the women informants were very conscious for collecting drinking water and to them salinity free of drinking water is the great challenge. Unfortunately the source of drinking water far distance in average 1.5 to 2.0 km. Not only distance factor, they need to wait in queue getting serial. The 4<sup>th</sup> respondent shared her day to day misery, *"(Indicating me) you are a man you cannot understand our problem! Can you collect water from two km away twice per day? We born to serve and suffer and finally salinity makes the service and suffering double."* Drinking water is a seasonal problem (in the dry season), in the rainy season drinking water is available because the people can collect rain water using different storage tools.

The condition of women and their sufferings caused by salinity and it has a gender dimension where salinity doesn't impact on male and female equally. Before the salinity intrusion local people used to collect drinking water from pond and tube well but salt water damaged their traditional sources of water.

Even very deep tube well cannot provide fresh water as ground water is contaminated with salinity. Scarcity of fresh water made difficult their cooking and drinking jeopardizing traditional sources of fresh water. In addition to that the increasing salt water intrusion decreased the productivity of the land, pushing communities but more



so women, because of either limited work opportunity and restricted mobility, further into poverty and the women's livelihood are being put in risk in the various ways: women are displaced from their productive role, over dependence on cash crop and loss of traditional safety nets, lack of the national and community support during the transition phase. Consequently all this is exacerbating the marginalization of women.

### What NEXT?

Shrimp farming side by side crab fattening developed as response to salt water intrusion in the Abadchandipur village and those responses impacted differently to different segments of people in the society. Shrimp farming gives them money and earns foreign currency for Bangladesh but profit goes to the owners of the means of production and it creates a new class in the society that can be seen as absentee land lord known as *gher* owners. This class make money just investing capital on the other hand local land owners compelled to hand over their land for using as *gher* against their will most of the times. If someone tries to keep his land to his own adjacent *gher* owner penetrate salt water in to the land and make the land polluted so that he/she has to rent his/her land for shrimp cultivation against his will. Sometimes *gher* owners use their musclemen to capture adjacent land which leads to fierce clash and loosing lives. In this way shrimp farming earns money even foreign currency for the country but it worsen the lives of thousands of traditional farmers and a large section of the farmers lost their land and become day laborers who hardly living their lives now.

Gap between the demand and supply, production cost and selling rate, intervention of middlemen and lack of capital still found as major hindrance to this livelihood skill. But most of the informants did agree that it helped them to overcome such a crisis and allowed them easier access to resources and political system. This livelihood helped them to avoid migrate from their area.

### CONCLUSION AND RECOMMENDATION

Climate change has many negative impacts in this world. Out of many harmful impacts, salinity intrusion is one of them, where the coastal area of Bangladesh is the most sufferers from salinity problem. Abadchandipur, as a coastal village is not exception of that adversity. Due to salinity problem normal pattern of livelihood already have been changed drastically. This change has left several new phenomenons in the study area: (a) staple food (rice) cultivation has transformed into shrimp culture and crab fattening, (b) people have lost their known livelihood, (c) jeopardized shrimp cultivation in saline water has caused severe environmental problems and (d) creation of elite class and the poor has become more vulnerable. As a result a good number of them involved shrimp culture rests of them took different occupations like nashimon driver, motor cycle driver, vendor, run or work in a hotel. Still some people migrated to cities of the country including capital city, Dhaka.

In the context of the study area the concern authority can consider the following points to minimize the salinity related vulnerability and upgrade the livelihood status:

1. to introduce saline resistant high yielding crop varieties (paddy and vegetables).
2. as fruit tree already died, so it is crying needed to introduce saline resistant fruit varieties.
3. to stop invade of non-saline area.
4. to establish the shrimps culture and crab fattening zone (not jeopardize cultivation).
5. to create the opportunities for livelihood diversification.

To get a holistic picture of the problem further research could be in the following areas: Firstly, scope of alternative livelihood and its effectiveness to reduce the vulnerability of salinity problem. Secondly, NGOs and Local Government's roles to minimize the salinity impact in a coastal village.

### REFERENCES

- Agar M (1980) Speaking of Ethnography. Sage University Paper Series on Qualitative Research Methods. Beverly Hills, CA: Sage Publications, 1986.
- Bangladesh Population Census (2001) Bangladesh Bureau of Statistics, Planning Division, Ministry of Planning, Govt. of the People's Republic of Bangladesh.
- Boroto RJ (1998) Global warming, rising sea level, and growing risk of cholera incidence: a review of the literature and evidence. *Geo Journal* 44(2), 111-120.
- Burigualini Union Annual Budget (2010) Development Plan 2010-2011. Shushilan Danida. Shyamnagar. Sathkhira.
- Creswel JW (1994) Research Design Qualitative & Quantitative Approaches. London: Sage Publications.
- DMB (1997) Standing Orders on Disaster; Disaster Management Bureau, Dhaka.
- Finan T (2009) Storm Warnings: the Role of Anthropology in Adapting to Sea-Level rise in Southwestern Bangladesh in Anthropology and climate change: from Encounters to Actions edited by Crate, Susan A. and Nuttall, Mark.

- Germanwatch (2012) The German watch global climate risk index. Who suffers most from extreme weather events? Weather-related loss events in 2010 and 1991 to 2010[online]. Available from: <http://germanwatch.org/klima/crri.pdf> [Accessed 12 January, 2012].
- Hancock B (2002) An Introduction to Qualitative Research. Available from [http://faculty.cbu.ca/pmacintyre/course\\_pages/MBA603/MBA603\\_files/IntroQualitativeResearch.pdf](http://faculty.cbu.ca/pmacintyre/course_pages/MBA603/MBA603_files/IntroQualitativeResearch.pdf) [Accessed 11 January, 2012].
- Hossain AKM, Sanowar (2003) Water logging and salinity of the southwest: Needed more action for reclamation. The Daily Star, 18 January 2003.
- Jacob E (1987) Qualitative Research Traditions: A Review. Review of Educational Research.
- Karim Z (2009) Climate Change Impacts on Bangladesh Agriculture and food Security. Presentation Delivered at “Economic Approaches to Climate Change and Poverty: A Workshop for Economic Policy Makers and Researchers in Bangladesh”, 13-14 October 2009, Dhaka, Bangladesh.
- Lincoln YS, Guba EG (1985) Naturalistic Inquiry. Beverly Hills, CA: Sage.
- McMillan JH, Schumacher S (2006) Research in Education: A Conceptual Introduction. New York: HarperCollins.
- Merriam SB (1988) Case Study Research in Education: A Qualitative Approach. San Francisco: Jossey-Boss.
- Munns R (2005) Genes and salt tolerance: bringing them together. New Phytol. 167: p. 645-663.
- NAPA Final Report (2005) Ministry of Environment and Forest, Government of Bangladesh.
- Saha SK (2010) Research Planning & Proposal Writing Skill. A. H. Publishing House. Dhaka.
- Salim M, Maruf B, Chowdhury A, Shamsudoha, Babul A (2007) Increasing salinity threatens productivity of Bangladesh [online]. Dhaka, Bangladesh: COAST Trust. Available from:
- Shannon MC, Rhoades JD, Draper JH, Scardaci SC, Spyres MD (1998) Assessment of salt tolerance in rice cultivars in response to salinity problems in California, Crop science ISSN 0011-183X CODEN CRPSAY, 1998, vol. 38: p. 394-398.
- SRDI (2000) Soil salinity in Bangladesh [online]. Available from: <http://www.srdi.gov.bd/achievements.htm> [Accessed 12 January, 2012].
- Tesch R (1990) Qualitative Research: Analysis Types and Software Tools. New York: Falmer.