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Households' indigenous coping practices to face disaster-induced food and water challenges in coastal Bangladesh

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Abstract

The coastal households have been facing various climate extreme events, for example, cyclones and storm surge. These hazards result in massive damage and loss of foods and water sources of coastal households. A number of studies look at different aspects of coping strategies of cyclones-affected communities. However, many of them neglect the discussion of indigenous coping practices of coastal communities. This study aims to fill this gap. Using a qualitative approach, this study explores how cyclone-affected coastal households use their indigenous knowledge to face disaster-induced food and water challenges. Findings show that the coastal households use indigenous knowledge by taking various types of foods, searching alternative food, changing eating behaviour (e.g. changes the food intake), storing/protecting food, and sharing food to face cyclones. Due to saline water and lack of close water sources, local households often used indigenous strategies to make the drinking water safe by boiling pond water and using water purification tablets. For harvesting rainwater local households also used indigenous knowledge e.g. use of rooftop catchment to collect water and stored rainwater in relatively small containers (e.g. earthen pots and plastic drums).This study suggests that combination of indigenous knowledge and modern technology could give a better result to face disaster-induced food and water challenges in the coastal areas of Bangladesh.

Keywords: Indigenous knowledge, Cyclone disaster, Food and water sector, Bangladesh coast.

1. Introduction

Bangladesh is one of the most vulnerable countries to climate change in the world due to its geographical location, dominance of floodplains, low elevation above sea level, and high population density (Ministry of Environment and Forest (MoEF) 2005, Shamsuddoha and Chowdhury 2007). The United Nations Development Programme (2004) identified Bangladesh as the most vulnerable country in the

world to cyclones and the sixth most vulnerable country to floods. Coastal communities of Bangladesh are affected by cyclones, storm surges, and flooding that have secondary effects like coastal erosion and salinity. These hazards caused massive damage and enormous loss of lives, livelihoods, homestead, cropping lands, foods, water sources, infrastructure and economic assets of coastal people (Disaster Management Bureau 2010). To address these damage and loss and face disaster-induced other challenges, coastal houshold uses indigenous knowledge to cope with the changing situation.A number of studies have been conducted in Bangladesh that looks at different aspects of coping strategies of cyclones and storm surge affected communities. These aspects are mostly focused on the broader contexts of coping mechanisms of coastal people. However, many of the disaster literature neglect the discussion of indigenous coping practices of coastal communities. Therefore, research and literature on the indigenous coping practices are lacking. This study aims to fill this research gap by exploring how cyclone and storm surge affected coastal households use their indigenous knowledge in the food and water sectors to face the disastrous situation.

The United Nations International Strategy for Disaster Reduction-UNISDR (2009, p. 9)defined disaster as "a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources." This study considers cyclones and storm surge as disaster, which seriously interrupts the life and livelihoods of coastal communities of Bangladesh. The terms, indigenous knowledge generally refers to the knowledge that rooted in the cultural traditions of regional, local or indigenous communities. "Indigenous knowledge refers to an understanding within a given culture or society of how aspects of local environments operate. This comprehension originates within the local community and is considered unique to a given culture—it focuses on the specific locality and emphasizes the relationship between people and their natural environment" (Warren 1991, c.f. McAdoo, 2009, p. 75). This study understands indigenous

knowledge as the coping practices of Bangladeshi coastal people to save food and water resources during cyclone and storm surge.

2. Methods

The present article aims to explore the indigenous coping practices of coastal households to face disaster-induced food and water challenges. To address the aim of this study a qualitative approach was employed. This study was conducted in South Charduani and Tafalbaria villages of Charduani Union, Pathorhgata Upazilaof Barguna district, between February and July 2013.These villages were severely affected by the Cyclone Sidr in 2007. Data sources were both primary and secondary. Primary data were collected through interviews with local key informants and focus groups. Secondary data were collected from previous studies, publications, journal articles, reports and local newspaper articles. The data collection techniques were as follows. Eight FGDs with the villagers were conducted following a semi-structured open-ended checklist. The key themes (e.g. indigenous practices in food and water sectors) of the research were included in the FGDs' checklist. Each focus group consisted of 8 to 10 members. Some basic criteria were followed during group formation, for example, homogeneity, different occupational groups (e.g. fishing, farming, housewives, and students), age, education, and gender. Thirty-seven Key Informant Interviews (KIIs) took place with key local leaders including local government and NGO officials, Imams, teachers, village leaders, volunteers and so on. A checklist was used to conduct the interviews. A day-long workshop was arranged where 26 local NGOs participated. The workshop was conducted to know the stakeholders' views about key research themes, which was different from KIIs, though few NGO officials were included as the participants of KIIs. Note taking methods were used during KIIs, FGDs, and workshop. In addition, field observations were used to assist with understanding the physical settings and everyday practices of village life. Following the content analysis approach, we contextualized the content of interviews workshop, and discussion of indigenous practices of coastal households in food and water sectors. Qualitative data were analyzed by coding the interview texts and workshop notes with initial concepts and grouping data to identify key themes, and

finally analyzing the interview, focus group, and workshop notes related to each theme to draw out key findings (Islam and Walkerden 2014). The study followed the ethical issues (e.g. seeking consent of research participants and cautiously using their opinion to protect anonymity) as the Macquarie University Human Research Ethics Committee (reference number 5201200877) approved all study protocols.

3. Results and discussion

3.1 Food

The study reveals the food related habits and practices of disaster affected households in coastal Bangladesh. The coastal households usually used to using indigenous knowledge regarding eating different types of foods, changing eating pattern (e.g. changes of food intake), sharing food, storing/protecting food, and searching alternative food to face cyclones. The food related indigenous practices are discussed as below.

3.1.1 Eating different foods

During and after the disaster, many households do not have enough food in storage and are not able to buy food, therefore, they face extreme hardship (Braun and Aßheuer 2011). Because of this food shortage, and the uncertainty as to the length of the crisis, household members changed their eating patterns. For example, they depended more on dry foods like puffed rice (e.g. *chira*, *muri*), boiled sugarcane juice, bread, and cookies, though rice is the main food of the Bangladeshi people. They usually took these foods due to lack of rice and cooking facilities during an emergency. Paul and Routray (2010) also found that flood-affected households depended on dry food to survive. Cyclone-affected household members sometimes searched alternative foods. For example, they collected floating food and picked up fruits that were transported from crop fields by the surging water. Also, after the cyclone, people took whatever food was available around them, for example, wet rice, bread, sweet potato, pumpkin, green bananas, and coconuts(FGDs, KIIs, Alam and Collins 2010). They also relied on inexpensive food, and collected wild food after disaster to survive (Paul and Routray, 2010).

3.1.2 Changing eating habits

The coastal households also reduced food intake i.e. the number of meals per day. For example, they ate food twice a day (sometimes only once a day) rather than three times (FGDs, KIIs, Islam and Walkerden, 2014). A household head (a participant of the focus group) said: "about a month after Cyclone Sidr, my family members and I took a partial meal in a day rather full". Workshop and KIIs data support this reality, which is faced by the Bangladeshi coastal households after Cyclone Sidr. Paul and Routray (2010) also found in their study that Bangladeshi flood-affected villagers reduced their daily number of meals. Akter (2004) found that households have adopted their own coping strategies during and after flood e.g. change in food habit and timing, eating less, and using special *chula* (stove)for cooking etc.

3.1.3 Sharing food

Disaster victims shared food with each other (e.g. between family members, neighbors, and friends) for survival. Sharing food is a long indigenous culture and usual practices of coastal people to survive during a disaster (Islam and Walkerden, 2014). This study found the norm of reciprocity (indigenous values) was practised through sharing of food, water and shelter within the community after a cyclone (Data quoted from FGDs, NGO workshop, and KIIs).

3.1.4 Storing and protecting food

As the part of disaster preparedness, coastal households also store food to face an emergency. Households store different types of foods (e.g. wheat/flour and puffed rice). They usually preserve these foods in different containers, for example, plastic drum, and tin-made pot (locally called *jer*) (FGDs, NGO workshop). This is also evident in a research of Islam (2009) that coastal households store various foods in different places (e.g. polythene bag, plastic pot, elevated place and underground *banker* - a big hole in the underground, prepared by sand, cement, brick, and bamboo where people put their valuable and necessary goods) to face disaster challenges.

3.2 Water

Water salinity is a major problem in the coastal areas of Bangladesh. This study found the coastal villagers suffer from water salinity both in drinking and irrigation water (NGO workshop, FGDs). Basar (2012) and Dasgupta, Huq et al. (2015) found that the people of coastal regions have been facing the problem of water salinity over the past couple of decades. The study villages also suffered from a lack of drinking water because of the salinity problem (FGDs, NGO workshop). A number of initiatives have been implemented by NGOs and local government for safe drinking water in the coastal villages; for example, PSF (Pond Sand Filter – drinking and cooking water source, in which salinity tastes low) and rainwater harvesting (NGO workshop, Islam and Walkerden 2015). However, there were some issues – for example, inequitable distribution, lack of maintenance of PSFs, and lack of technological support for rainwater harvesting (FGDs, NGO workshop).

3.2.1 Water purification

Due to saline water, deep tube-wells were not suitable for the study villages. And due to lack of close water sources, local households often used indigenous strategies to make the drinking water safe. For example, they boiled pond water and used water purification tablets and *fitkari* to make the drinking water safe (FGDs). Union Disaster Management Committee (UDMC) prepares water purification technology (e.g. tablets) in the coastal areas of Bangladesh with the help of trained students, youth clubs, and volunteers. The UDMC distributes those water purifying technologies among the people at risk before being caught by diarrhoea or other water-borne diseases (Government of Bangladesh 2010). However, we have not found these initiatives of UDMC in our study villages. Moreover, Rahman and Bux (1995) found that cyclone affected coastal households prevent their tube-wells' water by using seal caps prior to the cyclones and storm-surges.

3.2.2 Collection of drinking water

This reality was observed during fieldwork, and the first author also saw villagers collecting water far from their homes. A household-head

said: “I bring drinking water from Khalifarhat, a local marketplace, where some tube-wells are available. It takes minimum two hours for a jar of water, as this place is 2 kilometres far from my home.” The coastal women spend hours every day collecting water, as they need to go many kilometres to collect a pitcher of safe drinking water (Rabbani, Rahman et al. 2013). Islam (2010) observed similar findings in another coastal district (Patuakhali), where villagers used to collect drinking water a long distance from their homes.

3.2.3 Water-borne disease and treatment

However, lack of safe water sources, their indigenous practices sometimes fail to make the drinking water safe. Therefore, a number of health problems were found in the study villages, such as diarrhoea, fever, skin disease and typhoid (FGDs, NGO workshop). Moreover, due to the small amount of water, ponds become polluted during the dry season (*Chaitra* month, mid-March to mid-April), which also causes various diseases (water-borne and skin), as pond water is often used for both cooking and taking baths (FGDs, KIIs). Morad Hossain Khan and Nahar (2014) also found in their research that due to lack of food and pure-drinking water many people suffered from water-borne diseases (e.g. acute diarrhea, gastroenteritis, typhoid, various skin diseases, hepatitis etc.).To receive healthcare services, villagers usually the pharmacies of *Khalifarhat* (nearer marketplace of Tafalbaria village) and Charduani Bazar (nearer marketplace of South Charduani village), where no MBBS doctors (basic medical degree holders, locally called *passer daktar*) were available.The villagers also receive treatment from the local healer (*kobiraj)*to come round from the health problems (FGDs, KIIs).

3.2.4 Rainwater harvesting

Rainwater harvesting (at the household level through using big drums, and at the community level through using artificial ponds) is the best option to obtain safe drinking water in saline-prone coastal Bangladesh (FGDs, KIIs, NGO workshop). Coastal inhabitants used to collect rainwater during the monsoon through their indigenous practices; for example, they usually used rooftop catchment to collect water and store in relatively small containers (e.g. earthen pots and

plastic drums) (FGDs, NGO workshop, Khan, Ireson et al. 2011). Morad Hossain Khan and Nahar (2014) also found that many disaster affected people depend on rainwater for agriculture, drinking, washing and bathing. Rainwater harvesting was largely practised on an individual basis in the study villages. Some NGOs encouraged the local people to harvest rainwater, but villagers did not have the modern technologies and reservoirs to do so. The quantity of rainwater harvesting depends on the ability of the households to organise a significant number of sizeable water-storing pots (Abedin, Habiba et al. 2013). Consequently, local households expected technical and logistic support from government and NGOs to collect and use rainwater properly.

4. Conclusion

The main goal of the current study was to explore the indigenous coping practices of households to face disaster-induced food and water challenges in the cyclone-affected coastal areas of Bangladesh. This study found that the coastal households use indigenous knowledge regarding eating various types of foods, searching alternative food and changing eating pattern (e.g. changes the food intake), storing/protecting food, and sharing food to face cyclones. After the Cyclone Sidr, many households ate dry foods, though rice was their main food. Households also reduced food intake (the number of meals per day); for example, they ate food twice a day (sometimes only once a day) rather than three times. They also relied on inexpensive food and collected wild food after cyclone. As the part of disaster preparedness, coastal households also store food to face an emergency. The households usually preserve these foods in different locally used containers .Disaster victims share food each other (e.g. between family members, neighbors, and friends) for survival.

Due to saline water, deep tube-wells were not suitable for the study villages. And due to lack of close water sources, local households often used indigenous strategies to make the drinking water safe, for example, they used boiled pond water and water purification tablets and *fitkari*. Rainwater harvesting was another indigenous practices to obtain safe drinking water in saline-prone coastal villages. Households

used to collect rainwater during the monsoon through their indigenous practices; for example, they usually used rooftop catchment to collect water and store in relatively small containers (e.g. earthen pots and plastic drums).

These findings have significant implications for the understanding of how coastal households of Bangladesh use indigenous knowledge in food and water sector to face the cyclone-induced emergency. The present study makes several noteworthy contributions to the disaster field. The current findings add to a growing body of literature on indigenous knowledge and disaster risk reduction. These findings also enhance the understanding of disaster academics and practitioners to take further actions and formulate policies in this field. This research will serve as a base for future studies on indigenous coping strategies and disaster risk reduction. However, a limitation of this study is it has not covered more important issues of coastal households e.g. shelter, livelihoods (fishing and farming), sanitation, etc., where coastal households also use indigenous knowledge during and after a disaster. A further study could explore the indigenous practices of coastal households regarding housing, early warning, and livelihoods to face disaster-induced challenges. This study suggests that combination of indigenous knowledge and modern technology could give a good result to face disasters, which will also be useful for a safe and resilient life and livelihoods of Bangladeshi coastal households.

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