



Research article

Climate Change, Cyclone AILA and Post-disaster Occupational Vulnerabilities of Fisherfolks: A Qualitative exploration in a South-west Coastal Upazila of Bangladesh

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ABSTRACT

Climate change induced environmental conditions and disasters especially cyclone continuously create hostile effects on the livelihood of coastal people of Bangladesh. Fisherfolks are front line witnesses of climate changes on the coastal area. In coastal region, Dacope upazila is one of the most disaster-prone areas so this study aimed at to understand the climate change and post-cyclone induced occupational vulnerabilities of fisherfolks. Using a qualitative approach, qualitative research methods such as in-depth interviews, focus group discussions, and key informant interviews were used to collect data through face-to-face interviews from local fishers and community experts in Dacope of Khulna in Bangladesh. Respondents were selected through purposive sampling and the total sample size was 13. The results reveal that fisherfolks are struggling with numerous and prolonged occupational vulnerabilities. Climate change induced cyclones have led to the loss of fishing boats and equipment and forcing fishers to rent boats at high prices. Additionally, many have incurred significant debt to recover from the damages caused by these cyclones. Then, due to climate change effects like decreased fishing productivity, fisherfolk are catching fewer fish and experiencing a decline in fish variety than earlier. Increased salinity in the rivers, their fishing boats and equipment frequently get damaged and leading to high repair costs. Consequently, they are not earning enough by fishing, and they are being compelled to engage in secondary occupation, change occupation, and migrating to the urban areas. So, this study concludes at, to reduce vulnerabilities, government, Non-Government Organizations and associated authorities should work according to the needs, create social securities, and long-term disaster management activities are also needed.

Introduction

Fishers are front line witnesses of changes taking place on the coastal area and sea and they are amid the primary people to be influenced by climate change (Food and Agriculture Organization, 2018). Bangladesh is one of the most climate change susceptible nations in the globe, also Bangladesh classified as sixth as the highest susceptible country among the affected countries by climate change (Islam et al., 2013; Rakib et al., 2018). The total coastal zone of Bangladesh (covers an area of 47,201 km², or 32% of the country, being the landmass of 19 districts), mainly the southwest coast (comprises the districts of Satkhira, Khulna, and Bagerhat) undergoes repeated contact to climate change induced environmental conditions and disasters specially cyclone (Food and Agriculture Organization, 2018; Mohammad, 2015; Islam,

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K. S., Xue, X. Z., & Rahman, M. M. (2009). Majority of folks' occupation in coastal zones rest on to a countless degree on natural resources which make them dependent on nature and climatic conditions (Kabir et al., 2016; Torikul et al., 2015). In southwestern coastal region, chief occupations are fishing, farming, and gathering natural assets from sea, rivers and mangrove forests (Shamsuddoha & Chowdhury, 2007; Toufique & Yunus, 2013). Livelihoods of above half a million fisherfolks depend on marine fishing and therefore, fishing is one of the key occupations in the coastal areas of Bangladesh (Hossen, 2016; Khan & Nahar, 2014). In addition, more than 3.5 million coastal folks' livings directly or indirectly rest on fisheries and associated works (Chowdhury et al., 2012; Hossen, 2016).

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Climate change has boosted the rate of recurrence and strength of natural disasters like cyclone, flood, storm surge, sea level rise etc. (Torikul et al., 2015). Repeatedly strike of climate change induced cyclone like SIDR(2007), AILA(2009), MAHASSEN(2013), FANI(2019), BULBUL(2019) in this coastal area has generated fisherfolks' occupational vulnerabilities (Khan et al., 2021; Tajrin & Hossain, 2017; Shiomi, Y., & Chakma, S. (2021). In the coastal regions, the underprivileged fisherfolks are the extreme sufferers of cyclones, as they be unable to find their fishing boats and other crucial equipment such as fishing nets, traps, hooks and lines, spears, floats and sinkers to control net depth, ropes etc. (Tajrin & Hossain, 2017; Toufique & Yunus, 2013; Islam et al., 2015). Furthermore, fish productivity, great quantity, and spreading are as well likely to be effected by climate change (Kibria & Haroon, 2017). Climate change can directly influence fishery production numerous ways such as fish breeding, growing and movement are altogether influenced by temperature, rain and hydrology (Alam et al., 2018; Kabir et al., 2016). Besides, World Fish Centre acknowledged Bangladesh as one of the most vulnerable depending on the susceptibility of countrywide Economics to the influences of climate change on fisheries (MChowdhury, 2010). Climate change is projected to reduce overall productive capacity in South Asia, motivated by growing heats, transformed rain patterns, sea level rise, ocean acidification, and variations in disappeared oxygen (Food and Agriculture Organization, 2018; Kibria & Haroon, 2017).

Therefore, climate change induced cyclones influenced harmfully the fisherfolks by harming fishing activities and properties, endangering their life in the sea, and by harming land based properties, works and facilities (Islam et al., 2013; MTH Chowdhury, 2010). As a result, climate change induced disasters generate fisherfolks' occupational vulnerabilities via intensifying fishing expenses, credit threats and indebt family, enormous influence on food safety, enormous migration, and Fishers' vast missing (Hossen, 2016; Paul, 2013). Subsequently, in south Asian Countries coastal fishers reported decreased level of availability of fish in the river and ocean than earlier (Food and Agriculture Organization, 2018). Additionally, due to climate change, increased salinity level in the water frequently damages fishing boats and equipment of fisherfolks (Israt Jahan, 2015; Shamsuddoha & Chowdhury, 2007). As a result, for these climate change induced environmental conditions like salinity intrusion and water logging, fisherfolks face occupational vulnerabilities like receiving a reduced fish yield, repairing fishing instrument, loan debt (Islam et al., 2013; Nishat & Mukherjee, 2013). Moreover, surrounded by a fishing society, wherever families are correspondingly unprotected, greater sensitivity and minor adaptive capability merge to generate greater vulnerability (Islam et al., 2013; Koya K Mohammed, 2017). When they have minor adaptive capability then vulnerabilities are increasing, which directing to dislocate additional fisherfolks from coastal regions of Bangladesh (Saroar et al., 2015; Tajrin & Hossain, 2017). Therefore, this research delivers a qualitative, primary data-based exploration of the post-cyclone occupational vulnerabilities of fisherfolks. Unlike earlier papers that primarily

concentrating on macro-level cyclone influences or fisheries statistics, this study focuses the lived experiences and ground realities of fishers.

Given the issues mentioned above, climate change and disasters are impacting every aspect of fishers' livelihoods and daily lives. Fishers' occupational patterns are shifting, and their vulnerabilities are worsening, pushing more people to relocate from Bangladesh's coastal areas. So, it is essential to assess the occupational difficulties of fishers. Because of this, this problem is chosen for this research and major objective of this research is to understand post-disaster and climate change induced occupational vulnerabilities of fisherfolks in south-west coastal region of Bangladesh.

Materials and Methods

Research Design

We applied qualitative research approach to carry out the research, as qualitative research approach confirms an in-depth understanding of research concerns out of subjective experience and thoughts (Maxwell, 2012). The main aim of this research was to understand the and climate change and post- cyclone induced occupational vulnerabilities of fisherfolks. Our method concentrated on how climate change induced environmental conditions and cyclones created the occupational vulnerabilities of fisherfolks and to comprehend this concern from fisherfolks' perspectives. Thus, to accomplish the aim of this research, qualitative research was suitable because it confirms depth understanding of data.

Qualitative methods like in-depth interviews (IDI), focus group discussion (FGD) and key informant interview (KII) were chosen to obtain in-depth data about fisherfolks. Through In-depth interviews (IDI) we collected data from individual fisherfolks, and focus group discussion (FGD) provided the group perspective of fisherfolks community who work collectively. Furthermore, key informant interviews (KII) captured the overall scenario from community experts who are government school teacher and local politician who lived in the study area over a decade. All these qualitative methods helped us to understand concerning the climate change induced occupational vulnerabilities of fishers.. In depth interviews facilitated us to explore fisherfolks individual experiences and getting much more comprehensive facts (Boyce & Neale, 2006). Focus group discussion ensured detailed data from group perspectives and key informant interviews assisted us to acquire experts understanding who know what is going on the community about fisherfolks' occupational vulnerabilities (Kumar, 1989).

Study Area

We conducted the research in Kamarkhola union of Dacope upazila of Khulna district of southwest coastal area of Bangladesh. This union is directly connected to coastal area and one of the most disaster prone areas in southwest region. Therefore, the study area was purposively chosen since this union had been severely affected by disaster *Aila* and exposed to climate change induced environmental conditions. Moreover, there are enormous number of fisherfolks in this area. The research

was conducted in the Kamarkhola union in the ward number 1 and this was purposively selected by researchers.



Figure 1: Dacope Upazila (Study area)(LGED, 2019)

Sampling and Participants

By following conditions fisherfolks had been selected as participants for In-depth interview and focus group discussion 1) Dweller of Kamarkhola union 2) The participants must be involved in fishing 3) must be subjected to disaster Aila. Chairman of the Kamarkhola union and headmaster of Kamarkhola school were selected as participants to conduct the key informant interviews. To

select participants for this study, we used purposive sampling. In this research, we conducted three in-depth interviews, one focus group discussion and two key informant interview, therefore, 3 fishers for IDI, 8 fishers for one FGD and 2 key informant interviewees were the participants. Therefore, there was total 13 participants.

Table 1: Profile of the participants

Sl. No	Pseudonym	Age	Sex	Occupation	Location	Method
1	P-1	35	Male	Fishing	Kamarkhola	In-depth interview
2	P-2	60	Male	Fishing	Kamarkhola	In-depth interview
3	P-3	70	Male	Fishing	Kamarkhola	In-depth interview
4	P-4	45	Male	Fishing	Kamarkhola	Focus group discussion
5	P-5	41	Male	Fishing	Kamarkhola	Focus group discussion
6	P-6	39	Male	Fishing	Kamarkhola	Focus group discussion
7	P-7	42	Male	Fishing	Kamarkhola	Focus group discussion
8	P-8	40	Male	Fishing	Kamarkhola	Focus group discussion
9	P-9	44	Male	Fishing	Kamarkhola	Focus group discussion
10	P-10	49	Male	Fishing	Kamarkhola	Focus group discussion
11	P-11	39	Male	Fishing	Kamarkhola	Focus group discussion
12	P-12	51	Male	Teaching	Kamarkhola	Key informant interview
13	P-13	47	Male	Politician	Kamarkhola	Key informant interview

Note: Owing to the confidential matter, participants’ names were not used.

Data Collection Tools and Data Collection

To collect data from fishers and key informants semi-structured interview schedule were formulated in English for in-depth interviews and key informant interviews and guidelines for focus group discussion. semi-structured interview is, despite its topical trajectories provided prior to the interview, enables a researcher to go deep for a discovery it allows flexibility and adaptability for

researchers to hold their track as compared to an unstructured interview, where its direction is not fully considered (Ruslin, Mashuri, Rasak, Alhabsyi, & Syam, 2022).

To develop these data collection tools a complete review of related literatures was done to accomplish the research aim of this study. In the semi-structured interview schedules and guidelines were made up of two sections, the first section was based on personal information of

respondents, fishers' earlier occupational situation, pre-cyclone occupational condition and impact of cyclone on occupation. Then, the second section was based on fishers' occupational vulnerabilities related to climate change induced environmental conditions and post-cyclone condition, occupational changes, coping strategies.

To finalize and perceive the usefulness of data collection tools, a pre-test was accomplished in September 2020 with preliminary semi-structured interview schedule. Data collection tools were finalized incorporating the pre-test observation and flow of discussion and then translated in Bengali. The fieldwork was done from November, 2020 to December, 2020 and data were collected by researchers through face-to-face conversation with the participants. In this research, we conducted three in-depth interviews, one focus group discussion and two key informant interviews. All interviews and discussion were both audiotaped and noted in written form.

Data Analysis

In this research, to analyse data and interpret the findings qualitative techniques were used. After completing data collection, the recordings were transcribed in English. Researchers read through the transcriptions to code and interpret the data into themes. Based on transcriptions, respondents' discussion, the study aim, and questions of the research codes were identified manually. Then researchers read through the codes, summed up the vital articulations and developed sub-themes and further produced themes. Thematic analysis with narratives was used as data analysis method. The results were presented in these total five themes, theme:1: Pre-cyclone occupational situation and impact of cyclone, theme 2: Post-cyclone occupational vulnerabilities: Absence of sufficient fishing equipment and loan debt, theme 3: Climate change induced occupational vulnerabilities: Decreased fishing productivity and increased salinity, theme 4: Impact of vulnerabilities on life and changing occupational patterns, and theme 5: Coping strategies of fisherfolks and solution to reduce vulnerabilities

Moreover, following each interview, relevant issues were considered to incorporate in the analysis. In the meantime, incompatible matters generated from the interviews were corrected, and in some extreme issues eradicated, after an observant valuation.

Ethical consideration

Before data collection, consent was taken from participants and the purpose of this study was told to them. All interviews were recorded with prior permission from the participants and had been kept strictly confidential. Moreover, to keep the anonymity of the participants of the study, participants' pseudo names were used.

Results

Pre-cyclone occupational situation and impact of cyclone

The results of in-depth interviews, focus group discussion and key informant interviews show that the pre-cyclone occupational situation of fishers was pretty good. Around ten years ago (2008) in the pre-cyclone period, according to fishers there was a huge number of fish in the rivers like in every try with the fishing nets they used to get fishes. they used to catch fish in the *Vodra* and *Shibsha* rivers.

Fishers used to catch a huge number of fish in a working day ensured them sufficient income to main their families. At that time, many fishers had their own fishing boats, fishing net, and other fishing equipment however some of them did not have any kind of fishing equipment. Therefore, despite not having sufficient fishing equipment fishers did not face many occupational difficulties.

All 13 respondents conveyed that cyclone *Aila* was so devastating and made tremendous adverse effects on their life and livelihood. After the cyclone, fishers with all villagers had to take shelter on the road because their houses were under the cyclone's surge water. After the disaster *Aila*, their life came to a devastating situation, they had lost everything. Respondents described so many adverse effects of *Aila* on their livelihood like they had lost their fishing boats and other fishing equipment during the cyclone. Fisher P-5 (age 41) of focus group discussion expressed how cyclone *Aila* affected their life and their livelihood had come to a challenging situation,

"Our homes were underwater and we had to take shelter with nothing on the road. We also lost our fishing boats and other fishing equipment, after some days some of us had found those but some did not"

At that time they got help from different GO and NGOs, they had to live on the road for three years and most of the respondents (09 fisherfolks) spent a lot of money at that time to repair their fishing equipment. P-12 (age 51) from key informant interviews spoke concerning this topic,

"They had no job in that area, they had to go outside to work as a day laborer in that time"

After three years of devastating AILA in 2012, the embankments were constructed and their houses came out of water. Fishers started to go back to their houses. However, they became successful to reconstruct their houses nevertheless they confronted new problems to restart their fishing work. They faced many occupational vulnerabilities such as having no fishing instrument like fishing boats and nets and they did not had enough capital to go for fishing and even now they are facing complexities for those post-cyclone occupational vulnerabilities.

Post-cyclone occupational vulnerabilities: Absence of sufficient fishing equipment and loan debt

One of the fishers' occupational vulnerabilities created by cyclone *Aila* is absence of sufficient fishing equipment. Now in the post-cyclone period, most fishers no longer own fishing boats. According to them, being a fisherman without a boat is a deeply frustrating experience. They have not enough money to make the boat due to its high cost.

In the big rivers, like the *Vodra* and *Shibsha* rivers are major rivers that flow directly into the Bay of Bengal, they require large fishing boats capable of navigating these big rivers and storing substantial quantities of fish (250 kg+). Because small boats cannot withstand the strong river currents also, they need other extra equipment, then again not having sufficient fishing equipment they cannot do that. They depend on other fishers for boats and do fishing without a boat in the canals and small river such as *Dhaki* river by swimming with the help of a fishing net (drag net which is dragged through water). However, 03 fishers have

fishing boats but they also do not have other needed equipment such as fishing nets, traps, hooks and lines, spears, floats and sinkers to control net depth, ropes etc. Key informant interviewee P-13 (age 47) stated about the complexities of not having sufficient fishing equipment,

"Around half of them usually rent a boat and go fishing in the river. For that reason, they have to pay the boat owner. After being a fisherman for many years, they could not buy a boat and boat cost a lot and they have not enough money"

Another occupational vulnerability of fishers created and extended in the post-cyclone *Aila* is loan debt. After cyclone *Aila*, all respondents had taken a big amount of loan from moneylenders and many of them could not back the loan even now. It is found that fishers of this area tend to take loans because of their occupation, when they have to go fishing, every group of fishers need a certain amount of money (15000-25000 BDT) for repairing instruments, renting a boat, and buying food for many days to stay in the boat in the river. But for not having any capital now every two months 5-7 fishers together take a loan (15000-25000 BDT) from NGOs and moneylenders. Fishers have described how this burden of loans affects their occupation; every month they pay a certain amount of money to NGOs and moneylenders by selling fish. Therefore, at the end of the month, they cannot earn enough amount of money to maintain their families properly. Fisher P-10 (age 49) participant of focus group discussion described how they fall into the loan trap,

"We tried to repay the loan but could not do that because the interest of loan increases day by day in a compound rate. So are in a loan trap"

Climate change induced Occupational vulnerabilities: decreased yield of fishes and increased salinity

For climate change, fishers of this region fronting decreased fishing productivity in the river, there is a big difference of availability of fish between past (before 2005) and present (2019 and onwards). Fishers have expressed that ten years ago there was abundant of various types of fishes in the river such as Hilsa, White Shrimp, Bhetki, Ranga bagha, Tengra, Pangas, Lote, Crabs, Bata machh, Mola, though now they think availability of fishes decreased fourth to fifth times than earlier. According to all of them, the quantity of various types of fishes in the river is decreasing day by day, now, they get less fish in a fishing day than earlier (before 2005). They use to get various types of big fishes in one fishing day at earlier (before 2005), but now that is a dream only. For decreased fishing productivity in the river, to catch fish they have to go to the big rivers and going to the big rivers always adds extra cost. In fishing occupation, if they cannot get fish in a proper amount in a fishing day then they earn very less money. Key informant interviewee respondent P-12 (age 51) described concerning this decreased fishing productivity issue and stated,

"On a fishing day, fishers get less fish now. There is a great difference in the quantity of the fish between past and present. The quantity of fish in the river is decreasing day by day. Now they get less fish in a fishing day than earlier"

Moreover, through this study another occupational vulnerability of fishers has found that is increased salinity in the river water. For climate change, the salinity of the river water is increased in the present time comparatively ten years ago. Fishers have expressed their complexities those are they facing for increased salinity in the river water for climate change. Their fishing boats and equipment always get damage by increased saline water and to repair the boats and equipment they have to spend a huge amount of money in every two months that is really hampering their fishing activities. Because they do not have enough money to repair the boats and fishing equipment. For this reason, sometimes the cost of fishing becomes higher than the selling fish price. Subsequently, sometimes fishers' fishing activities remain stop and they cannot earn money. P-4 (age 45) respondent from in-depth interview expressed his experience regarding this,

"When I cannot repair the boat or fishing equipment damages then fishing activities usually remain stop that eventually hampers my overall work"

Impact of vulnerabilities on life and changing occupational patterns

So, fishers are confronting many occupational vulnerabilities together for climate change and post-cyclone impacts. All the fishers of this study admitted that, for this vulnerable situation every aspect of their life is being hampered. The structural condition of their house is too bad and for not earning enough money by fishing they cannot run their families properly. As a result, now most of the fishers (09 fishers) are involved in secondary occupation to lead a sustainable livelihood. When they cannot earn enough money, they involve themselves in other secondary occupations like day laborers in farming (04 fishers), brick industry (02 fishers), and construction work (03 fishers). But at earlier, they were not much dependent on the secondary occupation. Fisher P-9 (age 44) described his situation and stated regarding this topic, *"At earlier I was not involved in any work besides fishing but now I cannot maintain my family by fishing. So, I work as a day laborer in other villages to earn money. Only one occupation is not enough for me to bear my family expenses"*.

Furthermore, occupational vulnerabilities also created occupational change and migration of fishers, when they could not maintain their families properly. Respondents have shared that many fishers in the Kamarkhali union already changed their occupation for facing adverse situation who used to work with them. They now work as day laborers in various districts like Dhaka, Khulna, Barishal, Bagerhat etc. Additionally, some fishers also permanently migrated from here with their families who used to work with them.

Coping strategies of fisherfolks and solution to reduce vulnerabilities

Fishers are trying for a long time to cope with these occupational vulnerabilities but could not do anything successfully, they are not understanding what they should do. Most of the fishers (08 of them) have already bought new fishing nets to catch more fish but that is not a sustainable coping strategy. Also, all of them frequently

repair boat to recover the damages caused by increased salinity in river water. Most of the fishers (09 fishers) are involved in secondary occupation to lead a sustainable livelihood. All of them take loans from local moneylenders and NGOs for repairing fishing equipment and to cope with reduced income. Therefore, major coping strategies of fishers of this study area are given below:

- Buying new fishing equipment
- Repairing fishing boat
- Taking loans

Furthermore, fishers did not get any support from GO and NGO to reduce their fishing problems. Though, government of Bangladesh introduced fishers' allowance for fishers for the time of restricted fishing activities, when fishers cannot continue fishing activities. However, surprisingly many people get fishers' allowance from government who are not fishers, but fishers in their region did not get the allowance. According to the respondents, not only they, also not a single fisher did not get the allowance. Those who get the allowance have used their political connection to avail that fisher allowance. P-11 (age 39) respondent from focus group discussion regretted about not getting fishers' allowance and stated, *"Not only us, but not a single fisher also not get the allowance. Those people have used their political connection to avail that fisher allowance"*

When fishers were asked about their perception regarding solution to reduce occupational vulnerabilities they have provided following recommendations based on their experiences. Out of 11 fishers 09 of them expressed that to overcome the lack of adequate fishing equipment, they need support from government and non-government organizations (GOs and NGOs) in the form of larger boats and sufficient fishing equipment. With such support, they believe they could access the larger rivers such Shibsha and Vodra and increase their fish catch. Then, seven of them suggested that to address the problem of loan debt, NGOs should reduce their interest rates to make repayment more manageable. Furthermore, all respondents emphasized that the government should properly reassess the fisher allowance program to ensure that financial assistance reaches the genuine fishers.

Discussion

climate change induced environmental changes and increased frequency and intensity in cyclone can bring long term devastating vulnerabilities in all natural resource based occupation including fishing (Food and Agriculture Organization, 2018; Islam et al., 2013; Rakib et al., 2018). This study reveals that before Cyclone Aila, the fishers' occupational conditions were relatively stable. They owned fishing boats, had access to abundant fish resources, and experienced minimal impacts from climate change. However, following Cyclone Aila, many lost their boats and fishing equipment. At present, most fishers cannot afford to purchase new boats or equipment, leaving them dependent on renting boats and equipment at high costs and relying heavily on others for their livelihoods. Similarly, previous researches come across fisherfolks are the extreme sufferers of cyclones, as they be unable to find their fishing boats and other crucial equipment (Tajrin & Hossain, 2017; Toufique & Yunus, 2013). Another

occupational vulnerability faced by fishers in the post-Cyclone Aila period is indebtedness. After the cyclone, all participants reported having to take substantial loans to recover their livelihoods. Even during regular fishing activities, they continue to rely on borrowed money. Each month, a portion of their earnings is used to repay loans to NGOs and local moneylenders, leaving them with insufficient income. Likewise, previous studies found out regarding this issue that disasters generate fisherfolks' vulnerabilities via intensifying fishing expenses, credit threats and indebt family (Hossen, 2016; Paul, 2013).

This current study also found that due to climate change induced environmental constraint like decreased fishing productivity, fishers face occupational vulnerability like getting a smaller number of fish and variety in a fishing day then they earn very less money. To catch fish they have to go to the big rivers and going to the big rivers always adds extra cost. (Food and Agriculture Organization, 2018) also found that in south Asian Countries coastal fishers reported decreased level of availability of fish in the river and ocean than earlier. Moreover, for climate change induced environmental conditions, fisherfolks face occupational vulnerabilities like getting decreased amount of fishes, repairing fishing instrument, loan debt (Islam et al., 2013; Nishat & Mukherjee, 2013). The current research reveals that another climate change-induced occupational vulnerability faced by fisherfolk is the increasing salinity of river water. As a result, their fishing boats and equipment are frequently damaged by the high salt content. To repair these, they must spend a large amount of money every two months; however, most do not have sufficient financial resources to cover these repair costs. In the same way, earlier researchers have found out that climate change-induced increases in water salinity frequently damage the fishing boats and equipment of fisherfolk, causing occupational vulnerabilities such as declining fish catches, frequent repair costs, and growing loan debt (Israt Jahan, 2015; Shamsuddoha & Chowdhury, 2007; Islam et al., 2013; Nishat & Mukherjee, 2013).

Research findings also depict that, for this vulnerable situation every aspect of fishers' life is being hampered, and due to not earning enough they cannot run their families properly, as a result they are involving themselves in other secondary occupations like labourers. As well as participants revealed that many fishers already changed their occupation in their area, and some fishers also permanently migrated from here with their families. Correspondingly, previous studies described that fishers have minor adaptive capability as a result vulnerabilities are increasing, which directing to dislocate additional fisherfolks from coastal regions of Bangladesh (Saroar et al., 2015; Tajrin & Hossain, 2017). We also found out that, fishers tried but could not found out to cope with vulnerabilities, some of them bought new fishing nets to catch more fish. Regarding this other researchers also found that surrounded by a fishing society, wherever families are correspondingly unprotected, greater sensitivity and minor adaptive capability merge to generate greater vulnerability (Islam et al., 2013; Koya K Mohammed, 2017). When fishers were asked about the perception about solution, they recommended giving them big boats and sufficient fishing equipment from GOs and

NGOs, to reduce the interest rate of NGOs, government should reinvestigate before giving fisher allowance to reduce occupational vulnerabilities.

Therefore, this research offers a primary data based, qualitative exploration of post-cyclone occupational vulnerabilities of fisherfolks. Comparing to aforementioned studies that mostly centred on macro-level effects of cyclones or fisheries data, this research portrays the lived experiences, coping strategies of fisherfolks. It exclusively amalgamates multiple viewpoints through in-depth interviews, focus group discussions, and key informant interviews to disclose the interrelated livelihood impacts of cyclone Aila and climate change such as increased salinity in the river, decreased fish yield, indebtedness, and shortage of fishing equipment.

Conclusion

The fisherfolks of this study struggling with numerous occupational vulnerabilities like, absence of sufficient fishing equipment and loan debt crisis due to frequent disasters, and decreased fishing productivity and increased salinity due to climate change. As a result, they are not being able to earn enough by fishing, so they cannot run a sustainable livelihood and every aspect of their life being hampered. Having lower adaptive capacity, they are being more vulnerable. As a result, fisherfolks in this region are being compelled to engage in secondary occupation, to change occupation, and migrating to the cities. They need outside involvement to cope with these vulnerabilities or else it would be difficult to secure this occupation. Therefore, it is high time for government, NGOs and

associated authorities to comprehend their vulnerabilities by further investigations and take coordinated and targeted actions according to needs to improve fisherfolks situation. Those institutions can formulate support programs for fishing boats, nets, and other equipment to lessen equipment deficiencies and indebtedness. Also launching low interest loans by government, NGOs, fishers' organization can improve the situation. Including more fishers into social safety nets and give them allowances for economic security. Also, while giving fishing allowances proper monitoring and evaluation is strictly needed as this is politically influenced. Long-term disaster management activities should also be incorporated like early cyclone warning system, cyclone resilient fishing boats, recovery and reconstruction, training and awareness program for fishers to reduce occupational vulnerabilities. Since only the cooperative activities would be a useful path to overcome these vulnerabilities, else gradually more fisherfolks will suffer from these vulnerabilities. In future, further organised, and longer continuation researches are suggested for better results.

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Conflict of Interest

The authors declare no conflict of interest.

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