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Exploring the Community-Based Adaptation Strategies: An Anthropological Study on Local Knowledge in Patharghata Upazila, Bangladesh

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ABSTRACT

The geographical location, land characteristics, the multiplicity of rivers and the monsoon climate render Bangladesh highly vulnerable to natural hazards (Kabir & Hossen, 2019). The general economic situation and cultural way of life of Bangladesh's coastal residents have been impacted by climate change. The risk of natural disasters such as cyclones, storms, floods, and salinity are the greatest in Bangladesh's coastal regions (Chowdhury, 2007). In order to comprehend how the natural disasters brought on by climate change affect people's lives, the study has taken into account the fishing and farming communities of Patharghata, a coastal Upazila of the Barguna region. Both qualitative and quantitative (mix-method) approaches were used to reach the study's objectives. The first-hand data is collected using Case Study, KII, FGD, Semi-structured Interview, Structured Interview, and observation. This study has found some local strategies followed by the people to predict and adapt the natural calamities. The govt of Bangladesh and different NGOs and INGOs are working to mitigate the climate change challenges. The study demonstrates that these activities of government and NGOs have some weaknesses, so they sometimes fail to make positive changes at the root level. The local people have their own social, political, and religious belief system and worldview, which significantly impacts disaster response. To achieve the sustainable development goal of this area, it needs to apply bottom-up policy formulation synchronizing their local social context.

Keywords: Climate Change, Adaptation Strategies, Social Inequality, Government Policies, Political Ecology Paradigm

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INTRODUCTION

The planet's climate has constantly been changing over geological time, with significant fluctuations of global average temperatures (Minar et al., 2013). It is caused by releasing greenhouse gases, primarily carbon dioxide, into the atmosphere through human activities such as burning fossil fuels, deforestation, and agriculture. These gases trap heat from the sun in the Earth's atmosphere, causing the planet to warm at an unprecedented rate. Climate change involves not only rising temperatures but also extreme weather events, rising sea levels, shifting wildlife populations and habitats, and a range of other impacts (Halliru & Umar, 2012). 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 (Kabir & Hossen, 2019). Climate change has a wide range of effects on the natural and human systems, including sea level rise, more extreme weather events such as heat waves, droughts, floods, changes in precipitation patterns, ocean acidification, and harm to biodiversity. These impacts can in turn, have significant consequences on human health, infrastructure, food security, and economic activity.

The impacts of climate change are not evenly distributed, and that marginalized and vulnerable communities are often the most affected. This study analyzes the impact of climate change on the fishing and the firming community of Patharghata district and their local adaptation strategies. Patharghata is a coastal Upazila in the Bay of Bengal, located in the southwestern part of Bangladesh. Patharghata and its surrounding areas are highly vulnerable to the impacts of climate change. This study emphasizes on the role of power relations, social inequality, government policies and activities, and NGOs activities in determining who is most affected by climate change and who has the resources and ability to adapt. This approach also stresses the need to consider the role of historical and cultural factors mainly religion in shaping the people perception of "climate change" and impacts of climate change.

METHODOLOGY

Patharghata Upazila is a rural area in the Barguna district of Bangladesh with a population of approximately 150,000 people. It is bounded by Mathbaria and Bamna upazilas on the north, Bay of Bengal on the south, Barguna Sadar and the Bishkhali river on the east, Sarankhola

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upazila and the Balaswar river in the west. It has a reserved mangrove forest named Haringhata between the Bay of Bengal and Patharghata locality, which works as a natural shield in any flood and cyclone that comes from the Bay of Bengal.

The study participants are the local inhabitants of that area. The local people are mostly farmers and fishers (both freshwater and sea-going fishers). Many of them have migrated to different cities already but are excluded from the study. Some govt. stakeholders and NGO workers were also interviewed for a detailed explanation. Due to time and resources limitation, 40 participants have been selected for an in-depth study. The sample was selected by purposive random sampling from those living there and directly or indirectly connected to fishing and farming.

The study is conducted using a qualitative approach to provide an in-depth analysis of the local adaptation strategies to climate change. The data is collected by Semi-Structured Interview, Key Informal Interview (KII), Focus Group Discussion (FGD) and Observation. Finally, several specialists in the related field are interviewed in KIIs method to gather supportive information about how the govt. and NGOs work to help people adapt to climate change. The data has been analyzed using thematic analysis to identify the key themes and patterns that emerged from the data.

THEORETICAL FRAMEWORK

In this study, the effect of climate change on fishing and the firming community and their local adaptation strategies are analyzed with Paul Robbins's concepts of political ecology paradigm. Paul Robbins, in his *Political Ecology: A Critical Introduction* (2004) examines the ways in which power and politics influence the way people understand and respond to environmental problems, and he focuses on how these factors shape the production and distribution of environmental knowledge (Robbins & Paul, 2012). He introduces the concept of environmentality that refers to the ways in which individuals and societies become environmentally aware, conscious, and responsible and how this awareness shapes their behavior and actions.

FINDINGS

Bangladesh is predominantly an agricultural country with two-thirds of the population engaged

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in farming or Agro-based industrial activity (Biswas, n.d.). In the study area, the main ways of livelihood are farming, fishing, and fishing business. Among the total population, 31.03% population is connected with farming, and the same portion of people is also connected with fishing. So, the overall impact of climate change on agricultural production and fisheries in this study area would be widespread and devastating for the country's economy. Every year a lot of people get bankrupt due to these natural disasters, fishers get lose their fishing nets and boats, fish farmers lose their fish due to rising water levels, and farmers get to lose their crops for floods, cyclones and heavy rainfall. Salinity intrusion causes a great loss to the farmers. Especially the land outside of the embankment is not arable because of salinity. And in time of the flash flood, the saline water gets into the arable land inside the embankment. So it has an impact in the long run because it doesn't ruin the contemporary crops only, it also spoils the fertility of that land for some coming years.

Another problem of salinity is the scarcity of fresh irrigation water. Due to salinity intrusion, the water of ponds and canals gets saline, and if the salinity of arable lands comes to an end by the blessing of rain, the water of ponds and canals doesn't get clean that early, so it makes the scarcity of arable fresh irrigation water.

During the time of the rainy season, the sky remains cloudy most of the time and frequent cyclones, Norwester, has to be faced by the people. The biggest problem is there is no weather forecasting signal for Norwester. So, they have to rely upon their local knowledge and experience of knowing when the cyclone would hit. Lots of fishermen get lost and die in the rainy season while fishing in the sea. Basically, they go into the deep sea (15/20 hours engine boat distance) to catch fish; normally, there is no available signal. So they hardly get any weather forecast. When they experience indicators of disaster according to their experience, they start heading to the coastline. After coming one- or two-hours' distance, they get signals on mobile phones and are able to know the weather news. If it seems like a very powerful cyclone, they come back to the seashore, or they keep fishing in the deep sea. Sometimes they can't predict the disaster in time, or they don't get enough time to come back, which costs both their lives and wealth.

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Local Prediction System

In the local area of Patharghata, people call all kinds of disasters related to water and wind like flood, flash flood, cyclone, storm is *"Boinna*". This word came from the Bengali word *bonna* (flood). The local prediction system is a way of predicting coming disasters without hearing the weather forecast. There we have found some indicators by which the local people predict the weather. But these indicators vary from person to person depending on their knowledge and occupation. The mostly used predictors are:

- Type of cloud
- Color of cloud
- Wind pace
- Wind direction
- Temperature
- Billowing sea situation
- Sound of waves
- Water level
- Getting more fishes
- Activities of certain pests and insect

Especially older people can predict the weather currently. They predict the weather by seeing the cloud and its color. Besides this, they rely on wind pace and direction. If the wind comes from the South or Nor-west side, then they think there would be a disaster. They also rely on the temperature; if the temperature increases suddenly unlike other days, they think of it as an indicator. The prediction system of the sailor is kind of different. They rely on the situation of the sea, the sounds of waves, the quantity of fish coming into their net etc. When there is a probability of a cyclone, the sea becomes turbulent, and the sound of waves changes. Normally waves come from one direction, but before cyclones and storms, waves come from all directions. The fisherman starts getting more fish; fishes come up to the coastline from the deep sea. Some people say there is another indicator which is the reaction of a particular pest locally called *Gairra Pok*. Normally this kind of pest is the inhabitant of the jungle, but before a major disaster, it comes to the locality and bites people.

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Beliefs and Rituals Centered Climate Change

According to Clifford Geertz (1973), beliefs work as a key component of cultural systems, and by examining the beliefs and values that underlie cultural practices, anthropologists could gain insight into the motivations and meanings behind human behavior. Belief systems play an important role in shaping the way people think, feel, and behave, and they provide a framework for making sense of the world and navigating personal and collective experiences. They can influence individuals' decisions, actions, and interactions with others, and they can shape the larger social, political, and cultural systems in which they are embedded.

The people of the Fishing and Firming community of Patharghata district have different belief systems and practice some rituals depending on their belief system. Most of the old people of the Patharghata district believe that there is no Climate Change; rather, this so-called climate change is a curse from the Allah (God). They believe that the modern people of the current world don't act according to God's will, and they don't practice religious life, which makes God dissatisfied. So, God gets angry and takes revenge on people through different calamities.

Depending on this belief system, they practice some rituals every year and also before and in the middle of disasters. When the fishermen become ready to go for fishing, they arrange Milad, a group praying system. In this Milad one or more religious leaders (locally called Hujur) from the mosque are invited. They recite some ritual verses, and at last, they pray to God. They ask God not to give any problems to them in the sea so that they can come back genteelly and to give them more fish. In this prayer system, people participate actively with the worship leader and give consent to what the Hujur asks to God. Besides this, people also urge personally what is in their mind to God in that same prayer. The important thing is only male persons of the community participate in this prayer. During the drought, they also arrange milad for rain. They pray for the rain to God.

In the time of cyclones, they recite different religious verses to make the wind less powerful. Sometimes they recite the Ajan (call for prayer) loudly to make the cyclone less powerful. They believe that the cyclone is something related to the devil. Some say that the devil comes from the

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sea and destroys everything in the form of wind. So they believe if they recite the religious verses, the devil would go away. Some people also believe that lightning is the weapon of God which he uses to destroy Satan.

There also work some belief mechanisms in staying at home rather than not going to cyclone shelters. As the Muslim's belief system, nothing happens without God's permission. So, if God wants to save them, none can do any harm. And another belief is if they leave the house empty, satan will enter the house. So, to destroy satan God would also destroy their houses. So, they prefer to stay at home for these reasons.

Response to Natural Calamities

The fishing and farming community of Patharghata district takes different kinds of precautions to mitigate the losses of disasters. Their responses are categorized into two types: long term responses and quick responses.

Long Term Responses: To do this, they follow a number of local strategies. To save their houses from the cyclones they stretch their house with strong rope or metal wire. It keeps the house on the basement, small cyclones can be protected by this.

In the time of flood and flash floods, their houses go under water. So, to keep their basement higher than the water level, they build their houses on high. This strategy is mostly followed by the people who live outside of the embankment. Because flood is a regular event at the outside of this embankment, even if it doesn't need to hit a flood, it could happen by a normal tide in the time of spring tide. Besides this, people use polythene to cover their basements to save them from the tide because the tidewater and rainy water both make the soil of the basement melt and finally, it gets washed by the water. People who are financially in a better position build their houses on the brick paving basement, so they don't have to take these measures. There is one more strategy for those, who are in between these two groups financially, they infix some pillars in the ground and fix their wooden house with them. So that the wind cannot move house. They plant a lot of wood plant around their houses, especially at the south side, so that they can protect the houses from the wind coming from the sea. These trees saved a lot of life in major floods and cyclones.

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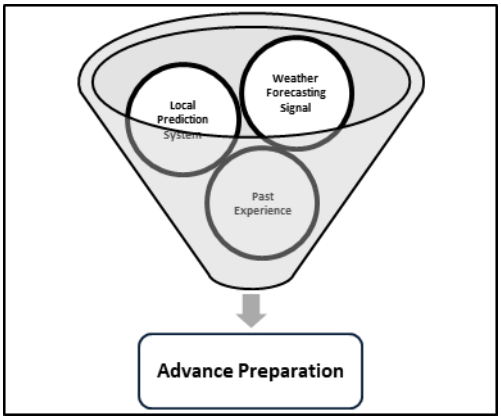
The water outside of the embankment is saline water and after major floods, the water inside also becomes saline. So, in terms of using water they have to rely on rainy water, pumps, or filters (PSF). But the pump and PSF are in long distance, so they ultimately use rainy water. They harvest rainy water and preserve it in plastic drums, pots and other available things. When the rainy water finishes, they use pond water by dipping alum in it.

Quick Responses: In the study area, people's responses to disasters are diverse. All of them don't follow the same strategies. Taking responses starts with the prediction and weather forecast. For medium to severe cyclones and floods, different NGOs, especially the Red Crescent and govt agents, try to make people aware rapidly of taking proper steps, and if the disaster seems severe, they try to take people to the govt cyclone shelter. Before the disaster starts, at first people bring every necessary thing inside their house. Some store dry food for the coming disaster. Some inform that they store dry food in their basement by digging it so that the flood can't sweep away the food if the water rises to that level. If they recognize the water level is rising, they bring their domestic animals into their house too.



Most of them don't go to the cyclone shelter before the disaster starts without experiencing its effectiveness. Only they start to go to cyclone shelter when it seems life-taking to them. Most of the time, it becomes too late to go to the cyclone shelter because it's almost three kilometers from the community. So, when they fail to go to a cyclone shelter or don't want to go there, they take shelter in a big house in their neighborhood which seems safe to them. Going to a cyclone shelter has a different mechanism related to economic and social class in this area.

People who belong to a "higher social class" and financially develop don't go to cyclone shelters for some reason. First of all, they don't want to leave their wealth behind. Normally they have lots of things like cash, gold, clothing, furniture, and other valuable things. So, it's impossible to go to a cyclone shelter with all these stuffs. On the other hand, they don't want to leave this least they could be robbed. So better they stay at their home with all these belongings. Another factor

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is this kind of people don't want to stay with marginal people in cyclone shelters. They're not used to this kind of marginal living, and there are some "prestige" issues. In the contrary, poor people don't have this problem. They don't have that much wealth, so it's easy to carry their belongings with them. Moreover, they don't have an issue with living among the "commons". They also take shelter in their neighbor's house in case they don't have the opportunity to go to cyclone shelter, or simply they don't want to go. Their neighbors provide a place to sleep and food to eat for that certain time.

Recovery Process

At the first phase, immediately after the disaster, they wait for govt. and NGOs response to the disaster. They provide them food, water, and other must-needed things. They also got helped by rich neighborhoods and political personalities. But their main struggle began after that because these kinds of support come as one-time support to save their lives. But after that, they have to build their houses again and manage their way of livelihood to maintain a regular life. For this, they take loan from the NGOs and collect wood around them. The source of wood they can make house is the Haringhata forest. But this forest is reserved by the govt. and the forest officers don't let them collect wood from there. But people said that those who are politically empowered or able to give some bribe could collect wood from the forest though it's illegal.

Sometimes the fishing boats and nets are floated away by the flood. So they lose their work both as an owner of that fishing boat or just as a laborer of that boat. Besides this, fishing activities remain closed because of rough weather. At that time, the people who worked as fishing men in other's boats start searching for alternative work such as day labor. But most of the time, they change their style and type of fishing. As the boat and net are gone, they start fishing another type of fish where there is no need for a boat or that kind of net. After every powerful cyclone, some of the families loss everything they are living depending on and migrate to another place for a fresh start.

Role of GoB and NGOs

According to the Ministry of Disaster Management and Relief (MoDMR) Program Administration (2022), to address chronic poverty and vulnerability, the Government of

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Bangladesh (GoB) is implementing a large number of social safety net (SSN) programs. These programs address poverty and vulnerability from a broad perspective: through education, health, nutrition, employment, disaster response programs, etc. Vulnerable groups, particularly the elderly, women, children, and disabled persons, are given priority in the delivery of safety net support. Programs provide benefits in the form of food, cash transfers, or a combination of the two and are administered through Government agencies and elected local governments. NGOs of Bangladesh also play an important role in the adaptation and mitigation of climate change hazards. Most of the NGO activities in the coastal districts of Bangladesh aim to contribute to poverty alleviation and community development. But they tend to limit their activities to some specialized areas. For example, some mainly address women's issues, others are involved in the financial credit program, and others in social mobilization activities (Ahmad & Rahman, n.d.). However, it seems pretty good that the GoB and NGOs have been implementing many programs for marginal and flood-affected people. But there have some critical issues regarding their way of implementation and the transparency of their activities which are focused on later in this chapter.

Plenty of NGOs have been launched in the Patharghata district, but some of them are working actively. Among these NGOs, Shushilon, Red Cross and Red Cresent, CCDB, BRAC, Sangram, and RIC are well known to the local inhabitants. They play different roles among the people of Patharghata to adapt to climate change. But they have some common attributes in overall activities. The most common activities are: Social Awareness about natural calamities, Spreading Disaster Alarms, Micro Credits, Relief donations, Sanitation, Education, Saving, and Social Activities.

Though the purpose and activities of all NGOs are not the same but most NGOs do these things. Red Crescent and Red Cros actively recruit volunteers to work in disaster response. The volunteer's aware people about the coming disaster and its effects and help minors to go to a cyclone shelter. BRAC, Sangram, and RIC play kind of different roles in disaster response activities. Their activities include allocating microcredit, women empowerment, education, and social activities.

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People's perception and experience of GoB services have shown that the selection process is heavily politicized and prone to corruption. Members of union parishads often suggest names of people who support and vote for them and demand bribes from poor people to get a VGD or VGF card. This results in a biased selection process where relatives and political supporters of the chairman have a higher chance of receiving government support. There is also evidence of misappropriation of relief, with responsible people of union parishads taking a portion of the aid. Implementation of this kind of SSN program in this way is not working as per the GoB target of removing poverty through sustainable development. People who are really in a vulnerable situation aren't got helped that much by these programs. Sometimes they have to pay a bribe to get this free relief which creates wounds on the die of vulnerable people. Food for Work (FFW) is a renowned govt safety net program where people can work in maintain and develop rural infrastructure, including renovation programs during post-disaster periods and the normal yearly cycle, usually involving manual labor for food grain. But in recent times, the local people have limited scope to get involved in these projects. Under the Coastal Embankment Improvement Project-1, the embankment of the Patharghata coastline was reconstructed by a Chinese company named CHWE CHINA. In this project, they use a lot of machineries which reduces the scope of manual labor, and the rest manual work is done by the labor imported from the northern part of the country for their low wage rate. Like this one, the local people are losing their scope to work on development projects in exchange for food grain or payment.

In the case of NGOs, the local people's experience has shown that while the NGOs do provide immediate relief after major disasters and have some social activities, the main issue lies with the microcredit system. The high-interest rate of 12-20% on credit makes the already vulnerable people more vulnerable, as they have to pay a fixed portion of money with interest every week in a repayment mortgage system. There have also been reports of harsh behavior by NGO workers if the loan takers fail to pay back the installment, and they may even seize their belongings. The respondents have also stated that the NGOs focus on creating a community of loan takers and executing projects among them, with little help provided to people outside of that community. This is likely an attempt to create interest in the microcredit system and expand its market.

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DISCUSSION

The impact of climate change on the agricultural and fishing communities in the study area of Patharghata in Bangladesh is severe. In this study, the whole adaptation strategies are analyzed in two layers: people's perceptions and responses to climate change and the govt and NGOs responses to climate change. People's perceptions, belief systems, socio-economic conditions, and social classes are very significant factors in the climate change adaptation strategy. This study, it has been shown how religious beliefs and socio-economic conditions affect disaster responses. Local people take steps according to their religious beliefs, economic conditions, social class, and prestige. So, it's needless to say, the importance of addressing socio-economic and cultural aspects in climate change study and development programs.

The government of Bangladesh (GoB) and non-government organizations (NGOs) are implementing a large number of social safety net (SSN) programs to address chronic poverty and vulnerability in the country. The programs aim to provide benefits in the form of food, cash transfers, or a combination of the two to vulnerable groups, particularly the elderly, women, children, and disabled persons. However, the implementation of these programs has been marred by several critical issues, such as corruption and political influence in the selection of eligible candidates.

From a cultural and political ecology perspective, the impact of climate change on agriculture and fisheries in Bangladesh is deeply intertwined with cultural and political factors. The cultural practices and knowledge of local communities play a crucial role in their ability to adapt and mitigate the impact of climate change. Similarly, the political and economic systems in place also shape the ability of communities to respond to climate change. For example, the local prediction system used by the people in the Patharghata district to predict coming disasters is a cultural practice that has developed over generations. It is based on local knowledge and experience of the weather patterns in the region. This knowledge is invaluable in helping communities prepare for and respond to disasters, but it is not always recognized or valued by external factors, such as government agencies or international organizations.

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Furthermore, the ability of local communities to adapt and mitigate the impact of climate change is deeply tied to political and economic factors. The lack of access to resources and infrastructure, such as pumps or filters for saline water, can exacerbate the impact of climate change on agriculture and fisheries. In addition, the economic systems that prioritize profit over the well-being of local communities can exacerbate the impact of climate change on vulnerable populations.

CONCLUSION

Climate change is a complex and multi-dimensional issue that affects different regions and communities in different ways. In the case of Patharghata, the impact of climate change on agriculture and fisheries is not only determined by environmental factors but also shaped by cultural and political factors.

However, the impact of climate change on agriculture and fisheries in Patharghata is also shaped by political and economic factors like access to resources, land tenure, and market opportunities. These factors often perpetuate vulnerability and exacerbate the impact of climate change on local communities. Addressing these structural issues requires a holistic approach that involves working with local communities, government agencies, and other stakeholders to build resilience and promote sustainable development. Acknowledging and valuing local knowledge and cultural practices, as well as addressing the political and economic systems that perpetuate vulnerability, can help build resilience and mitigate the impact of climate change on local communities.

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