DETERMINING THE IMPACT OF ROHINGYA FORCED MIGRATION ON THE NATURAL ENVIRONMENT OF TOURISM DESTINATION IN BANGLADESH

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Abstract: Rohingya forced migration has damaged the tourism destination in Bangladesh. The research focuses on the impact of Rohingya influx on tourism destination in Cox's Bazar district in Bangladesh. The environmental aspects of the tourism destination have been highlighted in this study. This research has been conducted using mixed method approaches consisting of both qualitative and quantitative data. The primary data has been collected through qualitative and quantitative approaches. Qualitative data has been collected using Focus Group Discussion (FGD) and In-depth interviews. Three distinct groups have been focused on as samples for the study, including tourist experts, host communities, and Rohingya experts. Questionnaire survey has been conducted to gather quantitative data regarding the Rohingya forced migration's impact on tourism. Key Informant Interview (KII) has also been used to check the quantitative data accuracy of this study. The study found majority (64 %) of the respondent strongly agreed that forest cover has been decreasing due to the Rohingya influx, and it has been destroying the beauty of tourist destinations. The water channel is an integral part of the environment in the tourist destination. Almost 55% of the respondents strongly agreed that Rohingya is the primary source of water pollution. Almost 45 % of people strongly agreed, and 41.5% agreed that Rohingya is the main causes for solid waste pollution in tourism destination at Cox's Bazar. In addition, more than fifty percent of the local people agree that house building materials, domestic and market waste, and solid wastes generated from Rohingya people are responsible for the destruction of the tourist harbor. The study has also identified that Rohingya are responsible for the destruction of tourism based local economy in Cox's Bazar district, Bangladesh. Research findings of this study could be used to mitigate the impact of Rohingya migrants on the tourism environment in Bangladesh.

Key words: Rohingya forced migration, Tourism destination, Cox's Bazar, Bangladesh

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INTRODUCTION

Migration is a frequently cultivated issue, where forced migration creates a new dimension in migration research (Becker and Ferrara, 2019; Cerwonka and Malkki, 2008). Currently, globally forced migration received more focus as it is a challenging issue for the world and the host community (Altindag et al., 2018; Zetter, 1991). The reason behind that the displaced person becomes not only a burden to the place of immigration but also creates trouble there by polluting air and water, destroying the forest and natural resources, and involving different social disturbances. Most of the time, local communities feel discomfort and unsafe because of their presence. Studies suggest that the effect of forced migrants has been severe on the host community (Alshoubaki and Harris, 2018). Globally, in 2009, 43.3 million people were displaced, and 10 years later (2018), 70.8 million people migrated to avoid violence and disasters (UNHCR, 2018).The world communities have noticed that around 68.5 million people forcibly migrated and left their home of origin in 2018 (UNHCR, 2018). Forced Migration is not a new dimension of migration; the research on forced migration came to light in the early 1980s. Currently, the world experienced an extensive increase in forceful migration in different parts of the world, particularly in Africa, Europe and in the Middle East countries. As a result, forced migration has emerged as a new field of research in the migration discourse (Akgündüz et al., 2018; Malkki, 1996).

Since 2107, approximately 1.1 million Rohingya arrived in Cox's Bazar district, which affected the local tourism. Tourism is one of the main source of livelihood for the local people of the Cox's Bazar. Apart from tourism, the exodus has affected the environment, particularly the natural environment, society, and economy (Zahed, 2023; Habib et al., 2018). For instance, the Rohingya influx threatens the forest and wild animals. Most of the Rohingya live in Teknaf and Ukhiya Upazila of Cox's Bazar. Recently, an elephant rampage killed several refugees near Kutupalong refugee camp, a tourist destination (UNHCR, 2019). This is because of destruction of forest and habitat of wild animals in the region. The dramatically increased population in Cox's Bazar has created the demand for housing, agricultural land, and firewood from forests by cutting trees, withdrawing and polluting surface and ground waters, and generating huge wastages intimidating human health (Hoque et al., 2021; CPD, 2018; Martin, 2005). Surroundings of the camp area in Ukhiya and Teknaf are also most vulnerable due to pollution generated from settlement constructions and domestic waste (Mendoza, 2017). In its recent report, UNICEF reported high levels of bacterial contamination in the tube wells installed in the Rohingya camps area.

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Another World Health Organization (WHO) report suggests that 62 percent of household water is contaminated (The Daily Star, 2017). Waste management is a big challenge for the local environment in Cox's Bazar district, particularly in the camp area of Teknaf and Ukhiya Upazila (CPD, 2018). Additional 1.5 million Rohingya people added to the total population of Cox's Bazar's Ukhiya and Teknaf Upazila. These vast populations live in a cramped refugee camps without waste disposal. As a result, almost 10,000 tons of waste are generated in the refugee camp each month. Generated waste include house building materials, non-disposal items like the plastic bottle for drinking water and food container, and domestic non-disposal materials (CPD, 2018). The mismanagement of solid waste has contributed to the deterioration of local environment for instance natural water bodies. The tourism of Cox's Bazar is heavily dependent on nature, which is under threat due to the influx of Rohingya people. The forest biodiversity and natural beauty have been lost because of the invasion of housing projects and the development of infrastructure by destroying local resources, for example, bamboo, collection of fuel wood, and cutting hills. The diversity of medicinal plants, mixed evergreens, and plant communities comprising various herbs, shrubs, and bamboo jungles has also been destroyed (The Daily Star, 2022) .The small mangrove forests also have a diverse ecosystem, which has been vanished by the construction of settlements. The diversified natural beauty of the destination, including the world longest sea beach, forest, and seasonal variation of weather, attracts national and international tourists. Saint Martin's Island, a coral Island, is another popular tourist destination. Cox's Bazar tourism earns money from different sectors, and many people depend on the sectors for their livelihood (Hoque et al., 2021).

The water quality has deteriorated in and around Rohingya camps because of the presence of open toilets, domestic wastage, waste from volunteers, burning wood for fuel, and transportation (Alam, 2018). In the Cox's Bazar area, sanitation is inadequate for tourists. After the Rohingya influx in 2017, the poor sanitation system spoils the tourist zone by spreading bad smells and polluted water bodies (World Vision International, 2017). Migrants along with volunteers, and visitors also pollute local environments for example water bodies like ponds, canals, and rivers by throwing solid and liquid waste (UNDP, 2018). The open latrine of the Rohingya settlement which is washed out during the rainy season also pollute water bodies (The Daily New Nation, 2017).The poor sanitation system has posed a potential health risk for the host community and tourists. The scarcity of drinking water is acute in the camp, so Rohingya people use rain and cannal water which are the potential sources of waterborne diseases (UNDP, 2018). Above 200,000 diarrhea patients were registered in camps due to poor hygiene and sanitation in 2018 (The Daily Star, 2019). With a capacity to treat waste generated by 150,000 people, a mega waste treatment plant was built up by Oxfam in Cox's Bazar Rohingya camps. This could ease the problems of excreta disposal in the refugee camp. Due to the absence of a waste management system, solid wastes are thrown here and there, polluting the environment. However, initiatives are underway to address the resulting adverse impacts on health and the environment (CPD, 2018). The local community's health is at risk due to pollution caused mainly by the influx of Rohingya people who live in overcrowded refugee camps. Refugee people are also vulnerable to health hazards as the camp is constrained by inadequate clean water, hygienic sanitation, and infrastructure facilities (Haque, 2018). The tourism of Bangladesh is destination-based tourism (Nowreen and Mohiuddin, 2021). The impact of Rohingya forced migration on natural environment of tourism destination is evident in Cox's Bazar, Bangladesh (Hoque et al., 2021; Roy and Chowdhury, 2021). This study focused on the impact of Rohingya forced migration on the natural environment of tourist destination, Cox's Bazar. In addition, this paper highlighted the destruction of main part of natural environment of tourism destination particularly forest cover loss due to Rohingya settlement; water body is polluted by Rohingya latrine and settlement; and the solid waste is another problem for the tourist and local community produced by Rohingya, volunteers and the officials appointed for supporting Rohingya community.

METHODOLOGY

The present study applied mixed method approaches: qualitative and quantitative. Both primary and secondary data has been gathered for this study. Primary data has been collected from study site using questionnaire survey, FGD, and In-depth interview. Secondary data has also been collected from different published and unpublished sources. The respondents were Rohingya experts, tourist experts, and host communities. Questionnaire survey has been conducted to gather quantitative data regarding the Rohingya forced migration's impact on the natural environment of tourism destination. Another important tools and techniques have been used during study such as Key Informant Interview (KII) to ensure the accuracy of the data for this study (Figure 1).
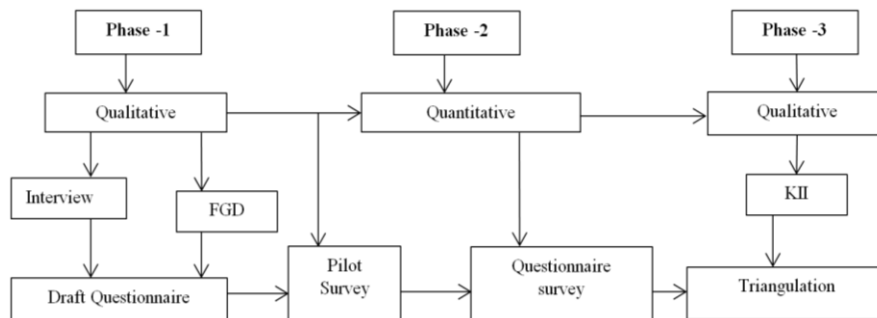

Figure 1. Mixed methods approach (Sources: Author, 2023)

The study respondents are those directly or indirectly involved in tourism sectors, particularly service providers for tourists, environment experts, hotel managers, tourism experts, refugee specialists, and policy-makers. Hence, the total

population size is unknown in the tourism study sites. The actual population numbers involved in tourism sectors in the study area are unknown. So, sample size for a large number of unknown populations is determined by the following formula (Cochran, 1963):

$$n = \frac{Z^2 pq}{e^2} \qquad\qquad n = 385$$

[n = total sample, Z = standard error associated with the chosen level of confidence 95%(where, the value is read from the normal distribution table, Z = 1.96), P = Proportion of given population (the maximum sample size P is usually 50% = 0.5), q = 0.5(1- p), e = 0.05 (error of margin = 5%= 0.05%)]. A minimum of 385 samples are enough if the population size is unknown. Therefore, the sample size of 400 respondents is required to achieve a 95% confidence level with a 5% sampling error in this research. The questionnaire reflects mainly the effects of the Rohingya influx on tourism along with environment, economy and society.. The impact of Rohingya migration on the natural environment of tourism destination has been assessed under the dimension 'environment'. A total of 24 items considered in the question with 5-point Likert scale was used to measure the impact of the tourism sector (5 = Strongly Agree, 4= Agree, 3 = Neutral (neither Agree nor Disagree), 2 = Disagree and 1 = Strongly Disagree). Missing values of the semi-structured questionnaire should be avoided (Kuvan and Akan, 2005). Six (6) more FGDs have been completed for saturation from Cox's Bazar Sadar (2), Teknaf (2), and Ukhiya (2). Lists of questions have been used in the field study.

This method worked to ensure data accuracy from various questions from different opinions. Each FGD comprised 12- 16 persons that incorporated people from diverse backgrounds within a single platform and included a moderator with a list of questions regarding the impact of Rohingya forced migration on tourism. Seven (7) more Key Informant Interviews (KII) were conducted after a semi-structured questionnaire survey from different areas, particularly Ukhiya, Cox's Bazar Sadar, and Teknaf Upazila from Cox's Bazar District. A list of questions as a tool for KII is effective for qualitative data triangulation after the questionnaire survey. The median and Inter Quartile Range (IQR) has been used, as quantitative data were not normally distributed. The percentage was used for categorical variables. Tables and a graphical presentation are also provided.

STUDY AREA

Rohingya refugee people reside in 35 temporary camps in Cox's Bazar district (UNDP, 2018). Most camps are concentrated in Teknaf and Ukhiya Upazila in Cox's Bazar district, an ecologically critical area (Imtiaz, 2018; Mukul et al., 2010; Rodríguez et al., 2011). Cox's Bazar is one of the attractive tourism destinations in Bangladesh. The District spreads over 2491.86 sq. km. The forest cover of the district is 940.58 sq. km. The location of the study area, Cox's Bazar, lies between 20°43' and 21°56' north latitudes and between 91°50' and 92°23' east latitude. The Bay of Bengal bounds the district on the south and west, the Chittagong district on the north, the Bandarban district on the north and east, and Myanmar on the east (BBS, 2011 and Figure 2). The study areas include Cox's Bazar Municipality in Cox's Bazar Sadar Upazila, Teknaf Pourashova in Teknaf Upazila, and Palongkhali Union in Ukhiya Upazila (Figure 2).
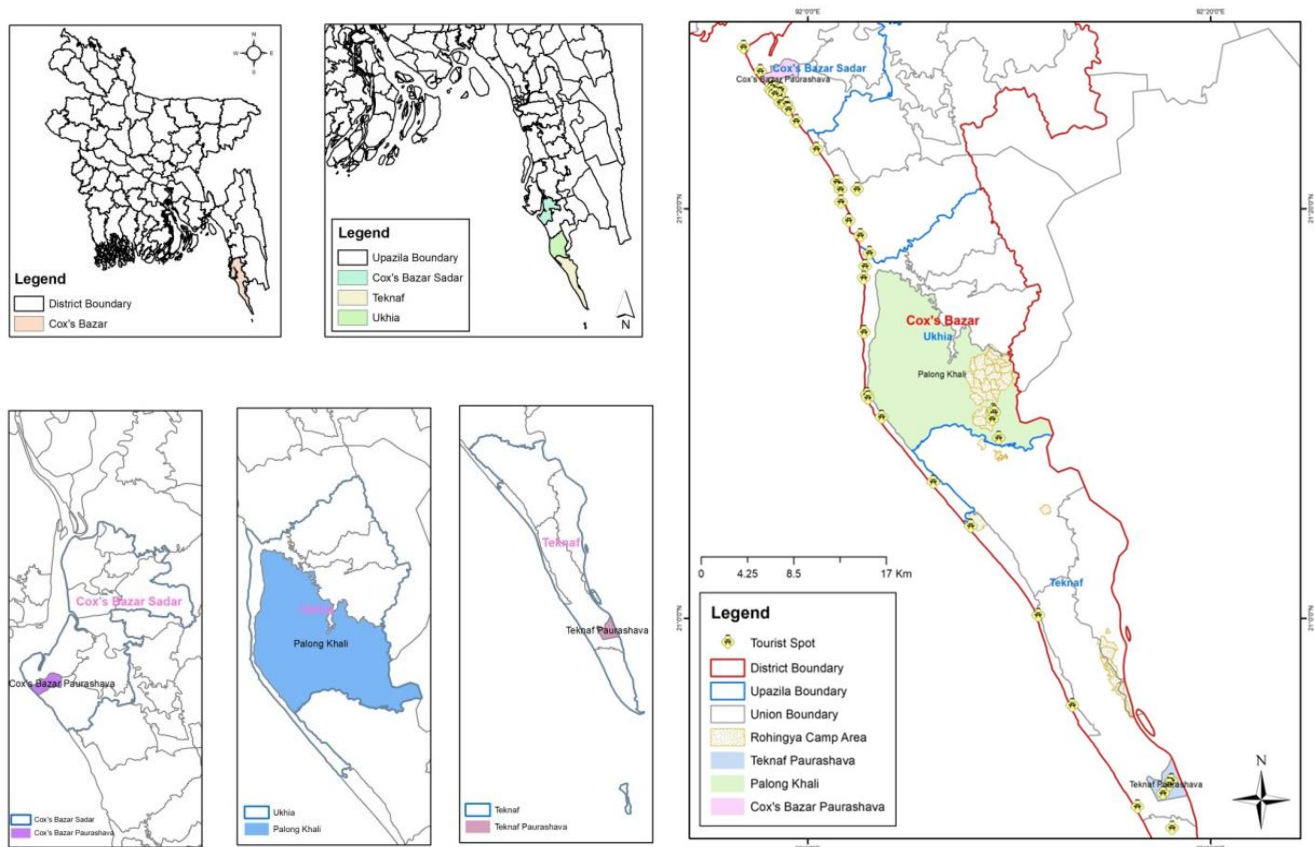

Figure 2. Study area (Sources: Prepared by author, 2023)

Theoretical framework

Andries (2000) highlighted the value of natural environment in his minimal model particularly air, water and biodiversity of the tourism destination. Butler (1980)focused on the importance of natural environment of tourism destination in Tourism Area Life Cycle (TALC) Model while Sharpley and Stone (2010) emphasized on the environmental usefulness in tourism destination in Sustainable Tourism Development Model. The models deal with the natural environment of the tourism destination. However, these models are related to the study that explored the impact of Rohingya migration on the natural environment of tourism destination, Cox's Bazar (Figure 3).
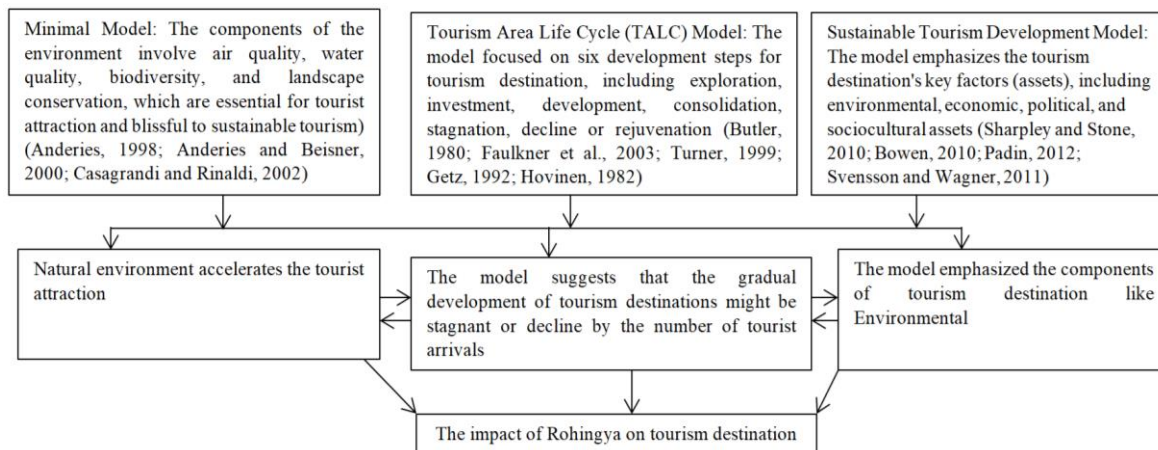

Figure 3. Theoretical framework (Source: Author, 2023)

RESULT AND DISCUSSION

A. Cox's Bazar - A tourism destination

Tourism emerges as a rising business both in private and public sector in Bangladesh (TSA, 2020). It is a growing economic sectors in the country. Cox's Bazar won seventh position for world wonder (2007). The tourism creates job and opportunities for the local community (Rahman, 2010). Bangladesh is gateway to far east countries for its geographical location that opens the potentials of tourism. Cox's Bazar is most attractive tourism destination in Bangladesh because of its enchanting natural environment. The tourism destination Cox's Bazar is unique from other areas of Bangladesh with world longest 120 kilometers unbroken longest sea beach, beautiful cannel and channel with fresh water inland, reserved forest with diversity of species, surfing wave, colorful pagodas, soft silver sand. Cox's Bazar is the prime destination for the tourist for its natural beauty such as hill, seas beach, forest (Dey et al., 2013). Income from tourism accelerates the progress of tourism industry. The total income of tourism in Bangladesh is 744,2 million USD in 2018-2019 that contributes directly to 3.02% of total GDP of Bangladesh. It also creates employment 8.07% of total employments of the country (TSA, 2020).

B. Impact of Rohingya influx on the natural environment of tourism destination

The nature based tourism destination, Cox's Bazar, Bangladesh is close to destruction by mismanagement and over exploitation of natural resources (Nowreen and Mohiuddin, 2021). Recently, the Rohingya forced migration destroyed the natural environment of the district particularly destroying forest, polluting water, and producing solid waste (The Daily Star, 2022).
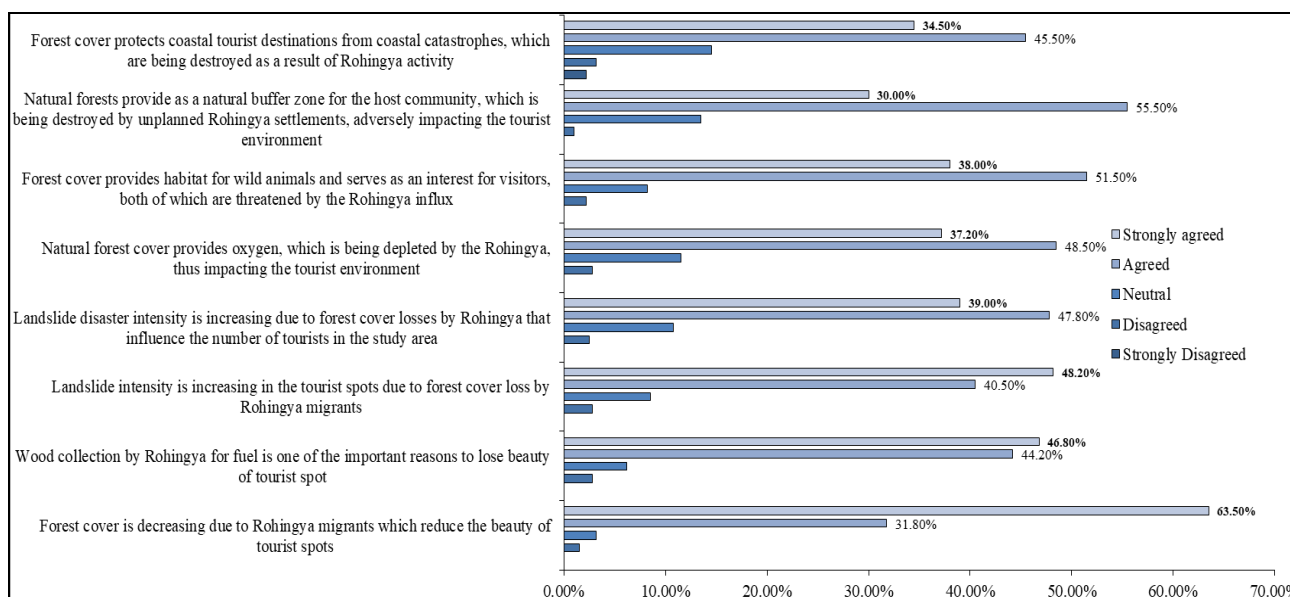

Figure 4. Forest cover change (Sources: Field survey, 2021)

(i) Forest Cover Loss

Unplanned settlements for the Rohingya have destroyed the natural forest, and the tourism environment. About 30% of respondents strongly agreed while 55% agreed that natural forest protects the mainland community from catastrophes, especially from cyclones and tidal storm surges. 38% strongly agreed, and 51.5% agreed that the natural forest provides habitats for many species living in the Teknaf and Ukhiya peninsula (Figure 4). Many tourists visit Teknaf and Ukhiya to enjoy the natural beauty, as claimed by 88 % of respondents. Landslide is another environmental issue during the rainy season in study area. This hazard happened among other factors owing to exposure of soil and deforestation.

Almost 90% of the local people agreed that the landslide occurrence is caused by deforestation. About 46.75 % of local people strongly agreed, and 44.25% agreed that wood collection is the main reason for deforestation in Teknaf, Ukhiya, and Cox's Bazar peninsula. The majority (63.5 %) of the respondents strongly agreed that tourist spots are losing their beauty due to the cutting of trees in tourist spots by Rohingya (Figure 4 and 5).

Figure 5. Deforestation by Rohingya, (a) deforestation for settlement and (b) deforestation for graveyard (Source: Field survey, 2021)

This research finds that the Rohingya unplanned settlement has caused deforestation in Cox's Bazar area. Rohingya rely on forest wood for fuel, house-building materials, and business purposes. Biodiversity loss due to deforestation in the critical ecological area, particularly in Teknaf and Ukhiya Upazila, is also evident (Hasan, 2020; IUCN and BFD, 2016). A total of 1951 hectares of forest land were lost by Rohingya influx as 750000 kg of timber is collected daily by Rohingya for fuel and business (The Financial Express, 2022). It is projected that 1.2- 2.8 million tons of wood will be collected at the end of 2023 for fuel and business (UNDP, 2018). The impact of Rohingya is felt not only in the forest but also in different natural resources (Black, 1994; Hagenlocher et al., 2012; Hugo, 1996; Rahman, 2018).

However, the forest is a natural resource that attracts tourists. Rohingya destroys natural and manmade forests in Ukhiya and Teknaf, where the high density of Rohingya are found in Kutupalong and Balukhali camps, which has led to the destruction of 607.28 hectares of forest land (Table, 1). Furthermore, the study found landslides occurring during rainfall because of exposed land. Forest loss exposes physiochemical properties that influence landslides during the rainy season (Mukul et al., 2010). Many people (38%) in Cox's Bazar area are poor and, directly and indirectly, depend on forest wood for their livelihood all year round. Forest cover losses and creating bare land occur daily in Cox's Bazar after the Rohingya influx since 2017 (Ahmed et al., 2019; Barua et al., 2018; Hasan, 2018; Moslehuddin et al., 2018; Rashid et al., 2021). A total of 1650.20 hectares of natural forest cover was lost after the Rohingya arrival in 2017(Table 1).

Table 1. Deforestation Scenarios after Rohingya Influx (Sources: Forest Department, Cox's Bazar and UNDP, 2018; Mohammad, 2020)

Location	No. of refugees at the site:	Occupied land (Hectares):	Destroyed project forest area (Hectares):	Destroyed natural forests (Hectares):	Total loss (US dollar Lac.):
Kutupalong, Ukhiya	218,000	715.6	231	484.81	1,52.8
Balukhali 1 and 2 Ukhyia	126,900	451	222.67	228.34	1,18.4
Balukhali Dhala, Ukhiya	63,000	126	61.82	67.73	14.97
TajnimarKhola, Ukhiya	56,250	183	77.93	104.66	41.91
Hakimpara Mokkarbeel, Jamtolee, Begghoa,Ukhiya	93,550	209	113.76	54.66	53.43
Shofillyakata (East and West), Ukhiya	13,000	81.4	37.44	43.32	18.87
Kerontoli, Chakmarkul, Teknaf	16,020	32.30	31.90	40.49	6.13
Putibunia, Teknaf	30,000	35.87	0.0	35.87	7.54
Nayapara, Teknaf	20,100	99.19	33.19	65.99	23.87
Leda, Teknaf	15,000	18.21	0.0	18.22	3.83
Total (1 hectare=2.47 acres)	651,820	1950.67	809.51	1181.21	447.27

Host countries have extreme pressure on the environment, mainly forests, water, air and soil, and other natural resources (Black, 1994; Chambers, 1986; Hagenlocher et al., 2012). The wildlife conservation Order 1973 focuses on wildlife.

Despite of having all laws (about 210 rules and 30 policies related to the environment), treaties, and protocols,, Bangladesh's position in the sustainable environmental index Rank-2018 is 179 out of 180 countries (Barua et al., 2018). It implies that the ecological condition of Bangladesh deteriorates after the Rohingya influx.

The government of Bangladesh declared eight areas as Ecologically Critical Areas (ECA) in 1999, including Cox's Bazar, Saint Martin Island, and Teknaf peninsula affected by the Rohingya influx (Barua et al., 2018). Rohingya has occupied many lands in Ukhiya and Teknaf Upazila, for example 51 hectares in Ukhiya and 2024.29 hectares in Ukhiya Upazila. They collect 60 tons and 650 tons' wood per day, from Teknaf and Ukhiya Upazila respectively (Table 2). The forest cover provides the tourist attraction of its beauty, wood for the livelihood of the locality, and habitats of the different species. However, the influx of people is severe on forest cover and other parts of the environment, including water resources in the study area, particularly surface water sources, which are being polluted by vast amounts of waste.

Table 2. Impact on Forests after the Rohingya Influx (Sources: Forest Department, Cox's Bazar and UNDP, 2018; Mohammad, 2020)

Upazila:	Land acquired:	Lost forest assets:	Created forest assets lost:	Daily firewood need (in camps):
Teknaf	51 hectares	BDT 50 Crore	BDT 3 Crore	50 tons
		USD 6 mil	USD 0.36 mil	
Ukhiya	2024.29 hectares	BDT 500 Crore	BDT 235 Crore	650 tons
		USD 60.2 mil	BDT 28.3 mil	

(ii) Water Quality Depletion

The overwhelming majority (90%) of the local people emphasize on severe water scarcity in the Rohingya camp. Nearly 42.75% of people of Cox's Bazar agreed water pollution is increasing due to throwing waste (Figure 6). Undrinkable water is the primary source of diseases like malaria, fevers, and skin disease (Figure 7).
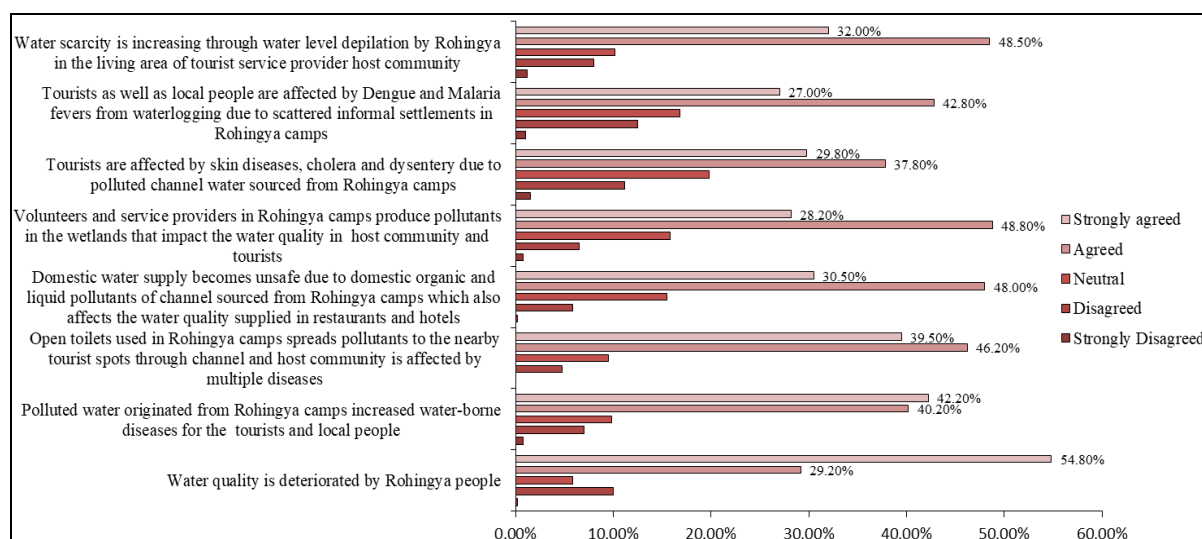

Figure 6. Water Quality Depletion (Source: Field survey, 2021)

Figure 7. Water quality depletion, (a) Uses of polluted water and (b) Open latrine (Sources: Field survey, 2021)

A significant percentage of the respondents (48.75 %) of the locality agreed that tourists, volunteers, and service providers from different organizations pollute water using their vehicles and throwing food containers. The affected communities

are not only local people but also tourists and visitors. 48% of respondents agreed that Rohingya pollute the channels, wetlands, and channels through domestic pollutants, open latrines, house building materials, and market wastages. Many respondents (46.25 %) agreed domestic pollutants are other significant sources of pollution of the local wetland that contribute to diseases. Tourists and Rohingya are affected by waterborne diseases, as 42.25 % of people strongly agreed, while 40.25 % of people agreed. More than fifty percent (54.75%) of the respondents strongly agreed that water pollution and water quality are deteriorated by Rohingya (Figure 6). This research has illustrated that water shortage in Cox's Bazar area is increasing day by day because of massive water withdrawal from the underground and other surface water sources for Rohingya use.

Lack of drinking water is evident as the water table is declining in the Cox's Bazar area due to Rohingya huge drinking water demand (The Financial Express, 2022). Rohingya have to spend more than 30 minutes for collecting drinking water, and 20% family stated that the groundwater level is declining. About 5.6 billion liters of water is needed annually, and the water demand is projected to be 16 and 26 billion liters at the end of 2023 (ISCG, 2018; UNDP, 2018). In the refugee camp, 15 million liters of water are withdrawn daily, which may cause future freshwater scarcity (ISCG, 2019). This study found the Rohingya camp is the primary source of pollution besides the tourism destination. Water pollution is severe in and around Rohingya camps due to the mismanagement of pollution sources. There are 30% latrines in Balukhali-Kutupalong camps located not more than 10 meters from the water sources. The water sources are contaminated in many ways , for example unhygienic toilet, high density of population, poor management of solid waste etc. (UNDP, 2018). The leading cause of water quality depletion is the presence of Rohingya refugee (Jaafar et al., 2020; Jacobsen, 2002).

However, this study has found that water borne diseases are spread by the open toilet that washes out by rainwater to the wetland, surface water sources, and groundwater. Tourists avoid visiting these attractive destinations due to degrading water quality. This study explained the impact of Rohingya on the quality of water. Waterborne diseases are spreading in camps and outside of the camp area in Cox's Bazar area because of contaminated water from ponds, channels, rivers, and other sources (UNDP, 2018). Rohingya use pit latrines which are located proximity to the wetland and groundwater, particularly tube-well. The tube well's water is contaminated by human waste, specifically in the rainy season, due to a lack of treatment facilities (Graham and Polizzotto, 2013; Van Ryneveld and Fourie, 1997).

(iii) Solid Waste Problem

Solid waste management is an emerging environmental issue in the tourism destination of Cox's Bazar. More than 44.25% of people strongly agreed, while 41.5% agreed that a considerable amount of waste is produced by Rohingya. Sometimes tourists and local transport system is disrupted because of the dumping of solid waste in open space produced by Rohingya, 80% of the respondents reported. Almost fifty (49.50%) percent of the locals agreed that tourists are not eager to visit the tourist spots due to bad smells from a heap of waste. Most (75%) respondents agreed that Rohingya camp visitors pollute the channels and wetlands. About 31% strongly agreed, while 49% of locals agreed that the visitor and service providers produced the waste by throwing food packets, cane, water bottles, plastic pots, and non -decomposed material.

Fifty percent of the respondents agreed that domestic and camp building materials are the sources of waste pollution, especially polythene, wood, bamboo, and sheet. A large number (40.25%) of the respondent strongly agreed, while 50% agreed that the foul smell of waste is the main reason for causing many diseases among the tourists and host communities. Almost 54% of people agreed that the leading cause of waste pollution is Rohingya (Figure 8).
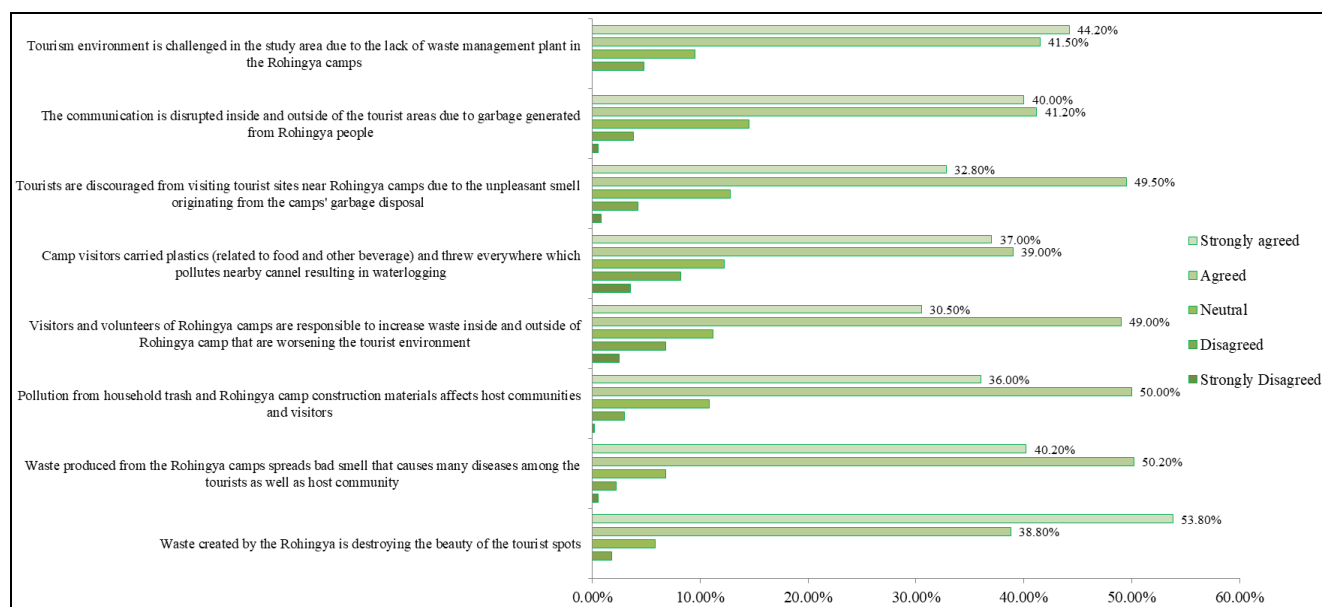

Figure 8. Solid Waste Problem (Source: Field survey, 2021)

The study's findings have demonstrated that solid waste is produced from the Rohingya settlement because no waste management plants are in place in the camp area. The settlements are scattered, and the Rohingyas are not aware of waste management (Figure 9). Approximately 10000 tons of waste is produced monthly from the Rohingya camps. It

contaminates 86% of drinking water wells. Waste disposal pollutes many water sources, including wetlands and groundwater (UNDP, 2018). The shortage of space leaves their waste thrown at night in open places elsewhere. Unhygienic toilets and polluted environments are exposed to waterborne diseases like diarrhea, cholera, and typhoid (Hsan et al., 2019; Rahman, 2019). This research has noticed that tourists are not interested in visiting these destinations due to diseases and bad smells produced by Rohingya and Rohingya-related visitors and officials. Another responsible agent of pollution is visitors for Rohingya, who are accountable for the waste pollution in the tourist spots near the camp area (UNDP, 2020).

Figure 9. Solid Waste Problem (a) Polluted Canal by the Waste from Rohingya,
(b) Polluted Road Areas by the Waste from Visitors (Source: Field survey, 2021)

C. Descriptive Statistics (Median and Inter Quartile Range among the Environmental Constructs of the Study)

The impact of Rohingya forced migration on the environment is severe, which is exposed by statistical analysis. The investigation is shown in table 3 along with three dimensions, a total of 24 items with a five-point Likert scale (5-point Likert scales are used to measure the impact of the tourism sector (5 = Strongly Agree, 4= Agree, 3 = Neutral (neither Agree nor Disagree), 2 = Disagree and 1 = Strongly Disagree). The score of the median and interquartile range of the dimension is 103±13. The minimum and maximum score of the environmental dimension is 24 and 120, respectively.

Three constructs of the environmental dimension of the study include forest cover, water quality, and waste pollution. The minimum score is 8, and the maximum score is 24 for forest cover. The score of the median and interquartile range of the forest is 35. The minimum and maximum water quality scores are 8 and 24, correspondingly. The median and interquartile water quality depletion score range is 34 ± 6. The last construct of the environmental dimension of this study is the waste pollution score; the minimum and maximum scores of the construct are 8 and 24, respectively.

The score of the median and interquartile range of the waste problem is 35 ± 5. The findings proved the impact of Rohingya forced migration on the environment is severe. In this study, three constructs of the environment have been selected for analysis based on effect, including forest, water quality, and waste pollution (Table 3).

Table 3. Result and Findings: Descriptive Statistics Source: Field survey, 2021, *IQR = Inter Quartile Range (Source: Field survey, 2021)

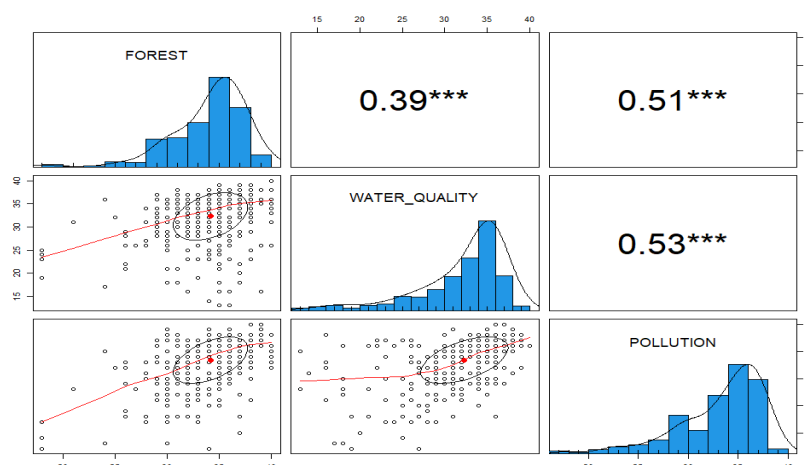| Dimensions and Constructs	Total Items	Maximum value	Minimum value	$mean \pm SD$	$Median \pm IQR$
Environment	**24**	**120**	**24**	**99.86±10.54**	**103±13**
Forest Cover Change	8	40	8	34.17±3.56	35±5
Water Quality Depletion	8	40	8	32.32±5.15	34 ± 6
Solid Wastage Problem	8	40	8	33.38±4.28	35±5

Figure 10. Relationship among the Environment Constructs of the Study (Source: Field survey, 2021)

D. Relationship among the Environment Constructs of the Study

The data is not normally distributed. So, spearman's correlation coefficient has been applied in this study. The relationship among the constructs is significant in this study (P<0.001)). The correlation coefficient between the forest and water pollution construct is 0.39 (P<0.001), a significant and positively low relation. The correlation coefficient between forest and waste quality 0.51(P<0.001) is significant and positively moderate. The correlation coefficient between water quality and waste pollution 0.53 (P<0.001) is significant and observed to be positively moderate. The relationship and consistency among the data are also significant (Figure 10).

CONCLUSION

The impact of Rohingya on the natural environment of the tourism destination is explored in this paper. According to the findings, this study found that 55.5 % of people indicate unplanned Rohingya settlements as one of the causes for the destruction of natural buffer zone and natural environment, which are considered for tourist destinations.This research also demonstrates that more than fifty percent (55.5%) respondents agreed that the forest covers are destroyed by Rohingya settlements. That forest is the sources of oxygen, natural beauty and entertainment for the tourist in the tourism destination (Figure 4). The response of forest experts echoes the same. Rohingya pollutes surface water by establishing open latrines. In the study area, 48.75% of people agreed that the Rohingya influx depletes the water quality. More than 46% of people complied that open toilets used by Rohingya are the main reason for water pollution. Experts of the environment also agreed that Rohingya are responsible for polluting water.

About 38 % of the respondents agree that different water borne diseases originated from the dirty water channels in the tourism destinations affect tourists. The water channels are polluted by Rohingya, volunteers and government and non - government officials appointed for providing services to Rohingya (Figure 6). Approximately half (49%) of respondents opined that solid waste is increasing day by day. Another fifty percent of the respondents (50%) agree that household trash is the major cause of increasing and spreading domestic waste. The research findings also reveal that about 50% respondents talked about tourist's discomfort in tourism destination due to scattered solid waste in and around Rohingya camp. The solid waste is spread by Rohingya and volunteers in the tourism destination (Figure 8). The study findings would help restore the natural environment of tourism destination in Cox's Bazar.

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