The Rohingya Refugee Crisis in Bangladesh: Environmental Impacts, Policies, and Practices

By
Shahinur Bashar

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APPROVED:

______________________________
Erika Allen Wolters, Committee Chair

______________________________
David Bernell, Committee Member

______________________________
Brent S. Steel, Committee Member

______________________________
Shahinur Bashar, Author
Abstract

The Rohingya community have faced continuous violence, discrimination and statelessness in the Rakhine State of Myanmar. In 2017, a violent crackdown by Myanmar’s army on Rohingya Muslims sent almost a million fleeing across the border of Bangladesh. They found their temporary home in the refugee camps of Cox’s Bazar, Bangladesh – now the largest refugee camp in the world. As a result of the sudden influx to Cox’s Bazar, a hotspot of enriched bio-diversity, the area is facing severe challenges to maintain the natural ecosystem. Regions like Teknaf, with a wildlife sanctuary of about 11,615 ha are now almost deserted. This paper aims to describe the major environmental effects of the Rohingya refugee influx including: deforestation, severe water scarcity and pollution, wildlife habitat loss, fragmentation, and destruction, poor management of solid and human waste, improper drainage systems, air pollution, surface water pollution, etc. Moreover, the paper seeks to analyze the policies, practices and role of the host-community government to mitigate the effects. While there are notable successful projects, like the Refugee, Relief and Repatriation Commission (RRRC) providing liquefied petroleum gas (LPGs) to meet energy needs of the Rohingya, impacts to biodiversity continues to be affected by lack of usable water and wildlife destruction. More broadly, environmental impacts from the refugee camps present challenges to the Rohingya refugees themselves, and the host-community, further exacerbating environmental concerns.

Keywords: Rohingya refugee, environment, deforestation, water crisis, wildlife
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<td>Environmental Conservation Act</td>
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<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
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<td>IDPs</td>
<td>Internally displaced persons</td>
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<tr>
<td>INGO</td>
<td>International non-governmental organization</td>
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<td>IOM</td>
<td>International Organization for Migration</td>
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<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<tr>
<td>IUCN</td>
<td>International Union for Conservation of Nature</td>
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<tr>
<td>OCHA</td>
<td>United Nations Office for the Coordination of Humanitarian Affairs</td>
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<tr>
<td>RRRC</td>
<td>Refugee, Relief and Repatriation Commission</td>
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<td>SAFE</td>
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<td>UNDP</td>
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<td>UNHCR</td>
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<td>UNICEF</td>
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1. Introduction

On August 25, 2017, the Myanmar security forces began a systematic campaign of violence against the Rohingya population in northern Rakhine State (Save the Children, 2018). In the following months, approximately, 730,000 Rohingya, over half of them children, were forced to flee the violence into neighboring Bangladesh. It was a migration of a speed and scale the world had not witnessed since the Rwandan genocide in 1994 (Save the Children, 2018). On September 28, 2018, Sheikh Hasina the Prime Minister of Bangladesh spoke at the 73rd United Nations General Assembly confirming that there were 1.1 million Rohingya refugees in Bangladesh. With this amount of displacement of the Rohingya, Bangladesh is facing an enormous threat to the environmental sector. It has been discovered that approximately 572 hectares of forest have been deforested in order to establish camp, which will accounts for an estimated loss of 365,288 GBP per year in the future (Labib, Hossain and Patwary, 2018).

This research focuses on the environmental impacts of the influx of Rohingya people from 2015 to 2019, including groundwater depletion due to excessive water extraction for the camp, groundwater contamination by changes in water hydrology due to camp activities, deforestation and degradation of protected areas due to fuelwood extraction, human-wildlife confrontations, and so on. (UNDP, 2018).

Next, I will provide context for the Rohingya refugee crisis, followed by a literature review and method. I'm attempting to analyze the issues from a socially constructive standpoint. The research attempts to identify the major environmental impacts caused by Rohingya refugee migration. It looks at the major policies and practices proposed to rectify the environmental endangerment and the role of the host community to mitigate both the environmental problems and their impact on the refugee population.
Background of the Rohingya refugees

Since independence in 1948, Myanmar has disproved the Rohingya’s historical claims and rejected the group recognition as one of the country’s 135 official ethnic groups (Albert & Lindsay, 2020). The severe chauvinistic tendencies of Myanmar after independence comes from the fears that the country will once again fall under the control of non-Burmese (Warzone initiatives, 2015). Muslim leaders and students in North Arakan (officially known as Rakhine State since 1989) began using the term Rohingya in the late 1950s to assert a distinct ethnoreligious identity for the region's Muslim community, as opposed to the region's majority Buddhist population, to which the term Rakhine usually refers (Leider, 2018). The Rohingya ethnic minority are believed to be "illegal" after being deprived of their citizenship, starting a series of forced displacement (MSF, 2017). Following attacks on police and army installations by Rohingya militias in Myanmar in 2017, state security forces began a campaign of brutal violence and terror against the Rohingya minority (MSF, 2020).

More than 1.2 million Rohingya people live in Bangladesh as of 2021, with 880000 refugees living in Kutupalong, the world's largest refugee settlement camp, south of Cox's Bazar in southeast Bangladesh (UN, 2021). Heavy monsoon rains make life extremely difficult for refugees in Bangladesh's overcrowded camps from April to November. As a result, many families are living in unhealthy, unsafe conditions, with limited access to basic services (World Vision Report, 2019). As a result, the Myanmar and Bangladesh governments are negotiating terms for repatriation to Myanmar.

Southeast Asia is one of Asia’s highest refugee generating regions, and Myanmar is the main contributor to this sector (Ullah & Ahsan., 2016). The Rohingya crisis is now one of the
critical problems in Bangladesh, and the country has been under pressure with the refugee crisis since 1978 (Khuda, 2019).

**Area of the study**

The two study sites for this research are the Kutupalong refugee camp situated in Ukhia, and the Nayapara refugee camp in Teknaf – both located in Cox’s bazar, Bangladesh. (See Figure 1) Kutupalong is the largest refugee camp area to date with an estimated 919,000 refugees coming to this area in search of shelter, food, safe drinking water and often healthcare (Mercy Corps, 2019) (see Figure 2)

Figure 1 Map of different camp location. Source: (Hassan et al. 2018)
The dark pink colored area on the map represents the refugee camp, while the green shaded area represents the forest in Kutupalong.

**Research questions**

The main purpose of this study is to understand the environmental impacts of Rohingya refugee settlement in Bangladesh. The rapid arrival of very large numbers of refugees in concentrated areas tends to accentuate the impact that populations will have on the environment, since humanitarian operators manage people and infrastructure based on short-term considerations. This leads to increased pressure on fuel, drinking water, and ecosystem services.

Bangladesh as a country is committed to have at least 25% of its land forested to maintain a healthy ecosystem. Due to Rohingya refugee camps the rate of deforestation is increasing which is a threat for the host country. Not only has the influx had an impact on the biodiversity of the study area but also the refugee population also gets impacted by the environmental threats.

This paper will address the following questions:
What are the most significant environmental consequences of Rohingya refugee migration?

What are the main policies and strategies that have been advocated to address the environmental threat?

What role does the host community play in mitigating environmental issues as well as their impact on the refugee population?

2. Literature Review

This section reviews previous research on the environmental impacts of refugee migration in a variety of countries, as well as the role of host communities in the refugee crisis. I attempted to discuss previous literature on the topic from various countries and then relate it back to the current Rohingya situation in Bangladesh. This is significant because it demonstrates how other countries' experiences are similar or dissimilar to Bangladesh's situation with Rohingya refugees.

2.1 Environment and refugee migration settlement

The Rohingya refugees are thought to have had a number of negative effects on Bangladesh's ecology. The environment, international migration along with human development are among the most urgent issues on the present-day global agenda (Hugo, 2008). Prior research on migration and environmental impacts has focused on environmental change as a cause of migration rather than a consequence. (Black 2001; Castles 2002). Fundamental to the consideration of the environment as a cause of migration is the distinction between forced and unforced migration (Fairchild 1925; Peterson 1958).The 1967 United Nations Protocol on Refugees considers a refugee as:
“Every person who is outside the country of his nationality and is unable or unwilling to avail himself of that country's protection because of a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion” (Keely 1981, 6).

The unexpected and unplanned influx of large numbers of people into a constrained area which is already susceptible to environmental degradation can have devastating environmental impacts (Stevens, 1993). As a result, refugees seeking a safe haven might have a disproportionately negative impact on the environment, because the land has not been planned for growth, water and sanitation has not been controlled, and housing has not been provided, among other things.

### 2.2 Forest Resource Change

According to UNHCR, the impact of refugees on the environment is not substantial on a comprehensive scale worldwide. As an example, in Tanzania in 1994-1996, a total of 570 square kilometers of forest was affected, of which 167 square kilometers was rigorously deforested. An environmental impact assessment carried out in Zimbabwe in 1994 stated about Mozambican refugees when they had returned to their motherlands, there were a reduction of 58 per cent in the forest cover around camps. Unlike other countries, Côte d’Ivoire and the Democratic Republic of the Congo encounter greater levels of habitat loss each year through unrestricted logging and clearance of land for agriculture - 2,900 and 1,800 square kilometers of forest per annum, respectively (UNHCR, 2001). Refugee settlements frequently have negative impacts on the ecosystem. People choose to do temporary settlements mostly in environmentally sensitive areas where there are sizable areas of “open” land, such as near national parks, forest reserves, or agriculturally marginal areas (Stockmore, 2016).
Refugee base camps are normally associated with severe environmental deterioration. Slash-and-burn agriculture and overharvesting of vegetation for fuel, forage, and construction materials results in extensive deforestation and degradation. The looting of crops and livestock by refugees leaves local population with no alternatives to the maintenance and profitable collection of bush meat and wild food plants during periods of civil trouble (Plumptre et al. 1997).

Many studies suggest that Bangladesh’s rapid expansion of refugee camps has resulted in massive forest damage and degradation. In the same time span, the Kutupalong–Balukhali site grew from 146 ha to 1365 ha, with a net gain of 1219 ha (a total growth rate of 835 percent), while the refugee camps expanded at a rapid rate, the deforestation mostly occurred by logging the forested land, degrading the forest cover surrounding the three camps by 2283 ha (Hassan et al., 2018). Approximately a total of 6500 acres of hills and forests were cut down to make temporary shelters, facilities and cooking fuel in Ukhia and Teknaf of Cox’s Bazar, threatening the biodiversity of the three ecologically critical areas of the country (IUCN, 2021). Some of the key effects are likely to become unalterable if measures are not taken immediately. A UN report (2018) stated that, from a total forest of 1502 ha, about 793 ha of natural forest land has been intruded, and around 3,000 to 4,000 acres (1,200–1,600 ha) of hilly land in the Teknaf-Ukhia-Himchari watershed area is cleared for growing vegetables. The refugee crisis has had an impact on this particular location. As previously said, the rate of deforestation is at an all-time high, and wildlife is in jeopardy. Water quality and availability are deteriorating day by day.

For livelihoods, fuelwood collection and illegal logging have become widespread since the Rohingya have arrived causing severe environmental degradation, as well as deforestation (Hasan, et al., 2020). Most of the deforestation took place from 2016 to 2018 was triggered by Rohingya migration. The dense forest cover has been essentially halved (8531 ha in 2016 to 4498 ha in 2018).
in the span of just two years while refugee settlement has amplified nine-folds (271 ha in 2016 to 2679 ha in 2018) (Ahmed, Islam, Hasan, Motahar & Sujauddin, 2018). A loss of 18 percent of the forest coverage (2,060 ha) in the areas around Kutupalong-Bulukhali, where the refugees have settled were seen in span of one year. The camp areas grown by 835 percent between 2016 and 2017 (Tallis, et.al. 2019). Most of the expatriate people are inhabiting in overcrowded temporary shelters made of bamboo frames, tarpaulin and plastic sheeting in CBD (ISCG 2019).

2.3 Wildlife risks and challenges to refugee response

The Rohingya refugees' settlement and socioeconomic practices have recently been a major source of concern for the Teknaf Wildlife Sanctuary (TWS) in Bangladesh (Khan, 2007). Asian elephants across the city of Cox’s Bazar have used the same forest routes over and over on their migration to and from Myanmar (Daly, 2018). The Rohingya refugees located in camps that happen to be right on eight vital elephant migration corridors (Daly, 2018).

A Wildlife Conservation Union analysis of animal extinction since 1600 identified that the second known cause of animal extermination to the introduced exotic species is the loss of habitat ranks (IUCN, 2004). According to a World Conservation Monitoring Centre (1992) analysis, the habitat loss contributes to 36.0% of the extinction and 39.0% is contributed by the launch of exotic species. After the 1994 Rwandan genocide, an influx of refugees to camps in Kigoma and Kagera regions were situated near protected areas (MNRT, 2006). Refugee camp’s presence near a protected area disturbs the ecosystem through increasing the risk of spreading diseases to wildlife (Kalpers, 2001), and disturbing natural behavioral patterns of wildlife. Further, populations living in close proximity to natural resources such as forests and wildlife usually depend on (illegally or legally) these natural resources for their livelihoods and for economic reasons (Kaboggoza, 2000).
Therefore, not only is habitat modified, but wildlife itself is often under direct threat due to imminent needs of refugees.

An outbreak of refugee encroachment into wildlife protected areas in Africa posed conservation concerns, with a total of 6,00,000 refugees being housed in camps around and within the Virunga National Park (Biswa and Quiroz, 1996). Around the world civil wars have caused the problem of refugee with the wildlife habitats of Lake Edward, Virunga National Park and Rwenzori Snowcapped Mountain badly affected by refugees at a large scale (Kalpers, 2001).

Modern wars and civil conflicts are associated with negative effects on wildlife and wildlife habitats. Overuse of wildlife and vegetation in war zones worsens existing constraints on the access to natural resources, intimidating both the resource base and the livelihoods of local communities dependent on these resources. (Dudley et al., 2002). For example the war in Uganda in 1979 hastened massive declines in populations of elephants (Loxodonta africana) and other large mammals (Malpas 1981; Eltringham and Malpas 1993).

Further, African elephants in the Democratic Republic of Congo comprised approximately 20% of the total continental population once. ((Said et al. 1995; Hart & Hall 1996; Hall et al. 1997; Plumptre et al. 2000). In Afghanistan and Sri Lanka wildlife populations declined significantly as the result of lasting armed conflicts within these countries (Formoli, 1995). Asian elephants in northern Sri Lanka is being killed by military and guerrilla forces since 1984 (Sukumar 1992; Santiapillai and Jayewardene, 1999).

Rohingya refugee camps were constructed by clearing the natural forests and social forestry plantations which was one of the important natural habitats and corridors of critically endangered wild Asian elephants (Elephas maximus) in Bangladesh (Rahman, 2019). In quest of
food and a natural travel route, E. maximus penetrated the camps, demolished the villages, and major human-elephant confrontations erupted, killing 13 refugees and injuring over 50 more (Rahman, 2019). It was observed that in the corridors of elephants, some Rohingya refugee camps were established (Khuda, 2020). Consequently, there is increasing clashes between elephants and humans (Gunderson & Pritchard, 2002). According to TWS management,

“A large number of wildlife could be seen in the recent past but that many species are now extinct. According to TWS, the following species have already disappeared: Python (Python molurus), Wild Pig (Sus scrofa), Monitor lizard (Varanus bengalensis), and many others” (Khan et al., 2012).

A wide variety of wildlife species may have been seen in the recent past, but many of them are now extinct. Refugee camps have a huge impact on animals and the ecosystem, resulting in severe depletion or, in the worst-case scenario, extinction of species.

2.4 Refugee migration and water crisis

The refugees are housed on the outskirts of Cox’s Bazar, with inadequate water and sanitation, leading to diseases like cholera, typhoid, and diarrhea (Akhter et al., 2020). Due to overcrowded living conditions and poor water, sanitation, and hygiene (WASH) practices at the camps refugees are under severe health risk, especially at the Kutupalong expansion sites (Akhter et al., 2020). Many literature around the world suggests that refugee crisis have negatively impacts water resources. Some case studies of different countries dealing with refugee crisis are given below.

Refugee crises around the world have imposed pressures on water resources in host countries (Black, 1994; Hoerz, 1995; Jacobsen, 1997). For example, in Jordan, growing groundwater pumping due to the Syrian crisis resulted in declines in the water table in one of the
largest and vastly populated camps (Abu-Allaban et al. 2015; UNDP 2015). Another example is of Lebanon, which before the Syrian conflict, was the 28 most water-stressed country in the world (Gassert et al. 2013). There are proofs of declining groundwater levels in multiple aquifers in Lebanon as well as a decline in spring flows that has been linked to the refugee crisis (UNDP 2014b). The unexpected increase in the need for water in refugee camps and settlements may create water scarcities for both the refugees and the host communities (Jafaar et al., 2019). Several countries have studied the impact of refugee crisis for example Tanzania (Paskett 1998), and Sudan (World Bank 2010), and the Iraqi refugee influx to Jordan in 2003 (Sassoon 2008).

The influx of Syrian refugees to Jordan has attracted international attention to the country’s water crisis (Francis, 2015). Furthermore, Syrian refugees in Jordan are massed in regions already below international and national standards regarding water resources and sanitation. In Africa, refugees have usually been living in semi-arid, agriculturally underdeveloped areas, or (as in the case of the Rwandese in Zaire) near national parks or forest reserves (Shepherd, 1995).

Timely efforts and collective responses from United Nations Children’s Fund (UNICEF), UNHCR, Action against Hunger, and other international Non-Governmental Organizations (NGOs), have greatly eased the situation (ISCG, 2019). Various waterborne diseases such as cholera, typhoid, and diarrhea, particularly Acute Watery Diarrhea (AWD), are attacking the population due to scarce sources of safe drinking water, which is very common among the refugees. Over 64,000 cases of AWD were registered in April 2019, among which over 40% involved children below the age of five (Naher et. al., 2019). No form of treatment is used in both the camps prior to drinking water. When asked if water is boiled before drinking, 51 participants (72.9%) out of 70 in Camp 2 denied it, while 23 participants (76.7%) out of 30 in Camp 4 Ext
denied it. A typical explanation for this is the belief that "the water is already clean," and that "an additional filtration step is unneeded" (Akhter et al., 2020).

2.5 Solid waste management in refugee camps

Solid waste management is a global crisis in densely populated areas. This problem increases even more during a crisis when there are large and sudden flows of people into urban areas (World Vision, 2019). Even though the volume and weight of household and market-place garbage can be significant, it is frequently not considered a problem due to the fact that most of the garbage that people generate is organic. Non-organic elements such as packaging, cans, and plastics are sometimes included, and the issue is frequently overlooked. (UNHCR, 2017).

Refugees and internally displaced people (IDPs) are likely to choose to burn or bury their waste in an uncontrolled manner if there is absence of formal or proper waste management strategy, (Oxfam, 2011). Processing and selling recyclable waste can become a sustainable livelihood for some of the refugee camp people (Sustainia, 2018). However, if not properly managed, it may be the basis for environmental and health problems but it can also be a great opportunity. The problem is even more apparent in a humanitarian crisis. For example construction debris, if properly taken care of, can become an important resource for restoration (Regattieri et.al.2015).

2.6 Refugee Migration Crisis and the reaction of the Host-State

A paper by Lischer (2017) titled “The Global Refugee Crisis: Regional Destabilization and Humanitarian Protection” examines the different roles of host states on different refugee crises. Host state reactions varies because state views refugee crises in the perspective of past
experiences with displacement and civil conflict. The 1951 United Nations Convention Relating to the Status of Refugees (or its 1967 Protocol), which compels signatories to protect refugees from harm, is ratified by the majority of governments (Savun and Gineste, 2018). States, on the other hand, do not always follow through on their promises to protect refugee populations, and incidents of violence against refugees are not unusual or limited to certain parts of the globe (Savun and Gineste, 2018). This directs to variations in security and economic concerns.

The challenges host-countries face are mostly on strain of resources, fear of power loss by the government, economic and social pressure and ethnic and religious tensions. The literature added that, in many Middle Eastern countries, past experience with Palestinian refugees has formed the responses to Iraqi and Syrian refugees. Several examples of conflicts can be elicited from past and recent experience of Syria, Lebanon, Jordan, Turkey, Afghanistan, Kenya and many more around the world. In Angola, Cambodia, and Tunisia, both rebel and government troops have carried out systematic attacks against refugees (Cuéllar, 2006). Political scientist Myron Weiner’s classic article on refugees and conflict, “Bad Neighbors, Bad Neighborhoods,” clarifies how local conflict contributes to the likelihood of refugee-related violence (Weiner, 1994) resulting in refugee camps potentially serving as safe havens for transnational rebel groups, whose operations may endanger the host country's security (Lischer, 2003, 2005; Salehyan, 2007).

3. Methods

For this research, the examination of the environmental impacts of Rohingya settlement proceeded in three primary phases. Both primary and secondary sources of data used in the analysis. First, a thorough search of publicly available information such as published articles, journals, reports from international NGOs, news articles, press releases from various organizations, was conducted to expand a general and specific sense of the important facts
surrounding the refugee situation. Initial articles were located by entering the term “*Environmental impact of Rohingya migration in Bangladesh*” in google scholar. The data accessed through at this stage included: published articles from different national and international journals, such as Sage publications, Elsevier, ResearchGate.net, thelancet.com, International Journal of Environmental research and Public Health, Journal of Immigrant and Refugees Studies, etc. Newspaper articles from international and national newspapers including *The New York Times, The Wall Street Journal, The Washington Post, and Relief web, The Daily Star, Prothom Alo* etc.

Published reports from international NGOs were also searched for relevant content including UNDP, FAO, Reach International, IOM, UNHCR, IUCN, Human Rights Watch, Amnesty International, Commonwealth Human Rights Initiative, Humanists International, and the World Wide Fund for Nature, and Greenpeace. Finally, press releases from government offices, environmental groups, and multiple international non-governmental organizations were also analyzed.

In the second phase of the research, INGO workers, government officials, experts and local people were interviewed. This is the primary data source of the research and it provided first-hand information about the environmental impacts, policies, and practices of the Rohingya Migration in Bangladesh. Individuals for interviews were chosen using purposeful sampling because the research requires individuals with specific subject knowledge. People with experience working in the environmental sector and with the Rohingya refugee crisis were specifically chosen. The initial contacts were the best resources for later useful contacts for the research. This included contacting NGO workers and experts directly through email and other online media.
A total of 3 individuals were initially contacted through email with a direct zoom interview request. These individuals were affiliated with government institutions and NGOs and Public Universities, and other organizations. These semi-structured interviews were conducted via zoom (An online video conferencing application). Additional interviews were identified using exponential non-discriminative snowball sampling where every recruited participant in the research work recruits another participant (Etikan et. el, 2015). In this situation, my first subject was recruited and then he/she provided multiple referrals. Then, each new referral is then provided with more important names for referral and so on, until there is enough number of subjects for the sample. Using snowball sampling, I was able to obtain ten interviews from various institutions.

Few interview participants requested to remain anonymous, including some locals and NGO workers. These respondents are listed below in Table 1 as part of the total sample and are not shown in an attributed sector. Since some of the respondents requested to be anonymous when quotes are used in the discussion section, I will not mention specific names and positions. However, if granted permission for their identity, names will be used for the quotes.

In the last stage of the research, video recordings from the interviews were transcribed and analyzed. The transcripts of the recordings were imported from Zoom manually since it was done in Bengali. NVivo was used to code the data. Through this software program, coding and analysis were conducted and major themes were identified. From the explicit content of the interview the major themes were identified.
Table 1: Number of respondents and their positions

<table>
<thead>
<tr>
<th>Rank of Interviewees</th>
<th>Organizations</th>
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<tbody>
<tr>
<td>1</td>
<td>The International Union for Conservation of Nature and Natural Resources</td>
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<tr>
<td>2</td>
<td>Office of the Refugee Relief &amp; Repatriation Commissioner</td>
</tr>
<tr>
<td>3</td>
<td>Arannayk Foundation (The Bangladesh Tropical Forest Conservation Foundation)</td>
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<td>4</td>
<td>Bangladesh Civil Service</td>
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<td>5</td>
<td>Reach International</td>
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<td>6</td>
<td>UNDP</td>
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<td>7</td>
<td>Helvetas</td>
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<td>8</td>
<td>Centre for Genocide studies</td>
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<td>9</td>
<td>Centre for Genocide studies</td>
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<tr>
<td>10</td>
<td>International Organization for Migration</td>
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</table>

4. Social Construction Framework

Social Construction Framework

The social construction framework encapsulates a viewpoint that is “concerned with the ways in which we think about and use categories (e.g., class, gender, race, degree of education, immigrant status) to form our experiences and analyses of the world” (Penrose & Jackson, 1993:121). By dividing people into distinct target categories and describing how policy design influences and arises from this categorization, the social construction framework lifts the veil on equity talks as Schneider, Ingram, and Deleon (2014) put it. The emphasis on social constructionism can generally be traced back to William Isaac Thomas and the Chicago sociologists, as well as phenomenological sociologists and philosophers like Alfred Schutz. Human beings produce society in a dynamic and creative manner, as evidenced by such techniques. They represent the world as created or planned, rather than given or assumed. Individuals and communities weave interpretive nets in social realms.
Perception about refugees

The matrix in Figure 4 reflects the relationship between social construction and political power. It is comprised of four major groups. The first group are the advantaged group, they are people who possess power and appreciation from society. This group is shielded from burdens without producing opposition as to whether they deserve these advantages. Business owners, elderly population, veterans are examples of advantaged groups. The contenders are poorly regarded in the society however, they contain political power. Therefore, advantages given to this group tend to be unseen although burdens are rarely implemented.

The third group is labeled as ‘dependents’ with very little political power however, is perceived positively in the society. This group receives large symbolic benefits from the state and society. The last group is the most negatively constructed social group. They are known as the ‘deviants’. They are assigned with the majority of social burdens and possess least political power and are most likely blamed for the most problems in the society.

A social construction perspective has important implications for refugee research. “Through an analysis of how concepts of immigrants and refugees are constructed, it is possible to examine how these images influence the integration, educational attainment, employment” (Fix et al., 2008) and in some cases, even the exploitation of migrants (Tyner, 1994).

In the case of Rohingya refugee social construction has serious implications. Refugees are perceived as illegal aliens hence deviant all over the world. However, the question that comes up with it is that can the idea of refugees being illegal aliens be socially constructed? Primarily, who is an “illegal immigrant,” citizens and even authorities typically do not rely on an individual’s certifications. Rather, people rely on shared categories to assign “illegality” to certain bodies, a
condition we refer to as “social illegality.” (Floresa & Schachter, 2018). The idea that refugees are deviants can be challenged by the situation of Rohingya refugees in Bangladesh. Understanding the key implications and efforts to create laws that will allow the refugee community to live a decent existence is critical to comprehending the social construction view on refugees. Furthermore, the host community's reaction is heavily influenced by their social structure. This perspective will aid in comprehending the relationship between refugees and host communities.

Figure 3 Social Construction Framework. Schinder et al. (1993)

<table>
<thead>
<tr>
<th>Social Construction</th>
<th>Positive</th>
<th>Negative</th>
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<tbody>
<tr>
<td>Strong Power</td>
<td>Advantaged</td>
<td>Contenders</td>
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<tr>
<td>The elderly</td>
<td>The rich</td>
<td>The rich</td>
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<tr>
<td>Business</td>
<td>Big unions</td>
<td>Big unions</td>
</tr>
<tr>
<td>Veterans</td>
<td>Cultural elites</td>
<td>Cultural elites</td>
</tr>
<tr>
<td>Scientists</td>
<td>Moral majority</td>
<td>Moral majority</td>
</tr>
<tr>
<td>Weak Power</td>
<td>Dependants</td>
<td>Deviants</td>
</tr>
<tr>
<td>Children</td>
<td>Illegal aliens</td>
<td>Illegal aliens</td>
</tr>
<tr>
<td>Mother</td>
<td>(Refugees)</td>
<td>(Refugees)</td>
</tr>
<tr>
<td>Disabled</td>
<td>Communists</td>
<td>Communists</td>
</tr>
<tr>
<td></td>
<td>Criminals</td>
<td>Criminals</td>
</tr>
<tr>
<td></td>
<td>Gangs</td>
<td>Gangs</td>
</tr>
</tbody>
</table>

A social construction perspective has important implications for refugee research. It is possible to study how images of immigrants and refugees are constructed through an examination of how these images influence integration, educational attainment, employment (Fix et al., 2008), and in some cases, even exploitation of migrants (Tyner, 1994).
4.2 Environmental social construction between Refugee and Host Communities

Environmental change, according to Homer-Dixon (1999), creates conflict through indirect mechanisms (Martin, 2005). It is an influential aspect that is facilitated by a host of social, cultural and economic variables (Baechler, 1999; Kahl, 1998). Martin (2005) states that “Competition for resources can be mapped onto existing perceptions of inequality, resulting in a hardening of group identities and providing a catalyst for hostility toward out-groups” (pg.: 333) The Rohingyas' interaction with the host community is examined from the same perspective. It's utilized to see how the resource dispute affects the host community's reaction to the refugees see figure 5.

Figure 4 Social Construction of resource use. Source: Martin, (2005)

‘The social psychology of intergroup conflict posits that under conditions that foster perceptions of relative deprivation and threats to self-esteem, social identity groups become less absorbent (communities become more deeply segmented). Where these conditions exist, quite trivial differences can be instrumental and fuel hostility towards outgroups” (Hewstone & Greenland, 2000; Jackson & Smith, 1999).
The major lens of social constructionism is used to theorize that the group which is called the deviants. Refugees are generally referred to as the illegal aliens hence it is hypothesized that environmental impacts related to them are not taken into consideration as it should be. Because migrants are regarded as undesirable and deviant members of society, any impact they may have is overlooked. Literature on the topic suggests that the understanding of the relationship between refugees and environment is of high importance as such scenarios are not likely to disappear and more knowledge on managing refugees is needed. To give an overview how refugee influx may affect the environment of the host country I have developed a simplified figure explaining the main features of the relationship and possible outcomes.

Figure 5 Framework of influx of refugee and environment

The figure 6 gives an overview on possible environmental impacts for the host country where the refugee camps are established. The impacts are all capable of affecting the environment for the long term. The figure also introduces the responses from different authorities to implement some policies.
Rohingya refugee influx has led to environmental degradation in the Cox's Bazar region. More than 2000 ha of forest loss in the area, with 13 human casualties so far, according to Mukul el.al (Mukul el) 2019, pg.: 138. This suggests that aside from humanitarian issues, the massive flood of Rohingya refugees has wreaked havoc on the environment, both within the refugee camps and in the surrounding areas. Forest, wildlife, and overall the biodiversity is facing massive challenge because of the influx. In addition, Local biodiversity is deteriorating at an unprecedented rate, including marine resources, the acoustic environment, and air quality.
5. Findings and Analysis

This section discusses the results of the study from a social construction framework point of view. As predicted, the refugee crisis has certain environmental impacts in the area. However, the environmental impacts are not there only because of the refugees. The Teknaf area was already struggling with environmental degradation even before the refugee influx happened. The findings suggest that the influx has exacerbated environmental threats to become severe. The policies and practices that are being implemented by the government and INGOs suggest that the refugees are not being perceived as deviants rather they are perceived as dependents. All the organizations are trying their best to help the refugees survive and live a decent life. The host-community is actively helping the refugees to protect the environment around them to ensure a better living situation.

Social Construction and Bangladesh’s response to the refugee crisis

Bangladesh is an overcrowded country with inadequate resources. As previously said, the Rohingya crisis was an unforeseen event for Bangladesh, and it initially rattled the political system. The Rohingya refugees, it was predicted, would pose a danger to resources and society. While there is still some debate about whether refugees are deviants, and the rest of the world agrees, Bangladesh has demonstrated that it is willing to approach the humanitarian crisis from a humanitarian standpoint, seeing refugees as the dependents that they are and assisting them accordingly.

The shared Islamic faith and Muslim identity of many Bangladeshis and the great majority of Rohingyas mobilized humanitarian help in two ways, according to the interviews with NGOs, and local volunteers. Bangladeshis and Rohingyas share several cultural characteristics. They communicate in a similar way because they speak the same language. Despite the fact that the
refugee settlement is causing severe environmental damage, Bangladesh has been gracious in supporting their livelihood in the country. According to Interviewee 5,

“The high refugee population has put considerable stresses on the country's infrastructure, social, economic, and environmental systems, as well as created concerns about land insecurity which is a critical issue in an already congested country. However, the government and non-governmental organizations (NGOs) are collaborating to achieve an acceptable and cooperative mindset.” (Interviewee 5, 2021).

Bangladesh, whose economy is not particularly strong, has shown great bravery in providing shelter to these people. The host community also trying to be cooperative to make the refugee survival easier.

5.1 Major Impacts

Interviewees demonstrated that the sudden migration of the Rohingya population has worsened the deforestation, soil erosion, production of massive amounts of waste, air pollution, noise pollution and wildlife destruction see figure 7 and 8.

Figure 6 Major environmental Impacts
### Figure 7 Major Impacts and respondents

<table>
<thead>
<tr>
<th>Major impacts</th>
<th>Respondents and percentage</th>
<th>Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deforestation</td>
<td>10 (100%)</td>
<td>“Natural resources were compromised. Almost 6000 acres of reserved forests were cleared for constructing housing settlements. They cleared another 3000 to 4000 acres of land for fuelwood consumption. They also cleared up the roots of the trees. Initial Major impact is deforestation and land degradation. I am land degradation because the construction of the houses used the hills to build houses and soil also lost its regenerative capacity in the process” (Aramayyk, 2021).</td>
</tr>
<tr>
<td>Wildlife destruction</td>
<td>9 (90%)</td>
<td>“The camp is established on the elephant route. As a result, there is an immediate human elephant conflict. So far 15 people have died due to the conflict with elephants. 12 people died within the Rohingya camps. We are trying to prevent the conflict. The conflict is exacerbated recently in many new areas within and around Rohingya camps” (IUCN, 2021)</td>
</tr>
<tr>
<td>Depletion of ground-water level</td>
<td>8 (80%)</td>
<td>“The underground water level is going below day by day as Thousands of tube wells, whether deep or shallow, have been installed. Too much water is collected by installing motor pumps. All natural water flow has been blocked by building structures, roads or bridges that create a very negative environmental impact in the area. As a result, flooding has become a common phenomenon during the rainy season though it is a hilly area” (Bangladesh Govt.official).</td>
</tr>
<tr>
<td>Landslide, land degradation and soil erosion</td>
<td>6 (60%)</td>
<td>“Other major impacts are huge landslides and casualties. Because the forest area was destroyed, the unplanned building of shelters and the amount of landslides was noticeable during 2019 and 2020. We took some initiative for minimizing landslide and soil erosion. The houses which were in the valley were impacted because of the heavy rain and soil erosion” (Helvetas).</td>
</tr>
<tr>
<td>Solid and human waste management</td>
<td>4 (40%)</td>
<td>“Sanitation and human waste management is also a major challenge. We worked making toilets for the use of camp people. We used this to produce biogas which later was used in the Rohingya camps kitchen. We are trying to provide cylinder gas to the population” (IOM, 2019).</td>
</tr>
</tbody>
</table>
5.1.1 Deforestation in Teknaf and Ukhiya

The Teknaf Wildlife Sanctuary has an area of 11,615 hectares that contains 538 species of plants and 613 species of wildlife, including Asian elephants (Mannan, 2017). In various ways, forests and trees contribute to community resilience and reduce vulnerability to climate-related stresses (Fedele et al., 2016). Ten out of the ten interviewees mentioned deforestation as the first and foremost impact of the refugee settlement. Six Thousand, five hundred acres of reserved forest land was cleared to settle the refugee population, to construct houses and roads, and to collect fuelwood. An interview from a senior officer of International organization for Migration reveals that:

“*It includes the protected Teknaf Wildlife Sanctuary, one of Bangladesh's oldest reserve forests. This vegetation is critical to the region's climate change adaptation and mitigation efforts. Migration of millions of people and the establishment of refugee camps can have a serious impact on local ecology, as well as on the welfare of nearby communities*” (Interviewee 10, 2021).

When he was asked about the situation of deforestation around Teknaf and Ukhiya due to the refugee camps. He answered that:

“*Of course deforestation is happening... The camps are made from the reserved forest of Teknaf and Ukhiya. A lot of trees and forest areas were cut down to make roads and settlement. Added to that, they started cutting down the trees for fuel. Because fuel for cooking is a daily necessity here people started using the forest tree for fuel for cooking. It was one of the biggest challenges for them to collect fuel for their cooking in the beginning. In early stages they used to use the nearby trees for fuel, however with time they made it to the deepest in the forest to collect wood. Even they went 5 kilometers inside the forest to collect wood*” (Interviewee 10, 2021).
I interviewed the executive director of The Arannayk Foundation (AF), also known as the Bangladesh Tropical Forest Conservation Foundation. He expressed that:

“The area where refugee camps are located there were many different kinds of trees, for example, Dhakijam, Chapalish, Gorjon, Gamari, and other trees. However, after the settlement there is not a single tree left in the entire area. They used tree roots to use those as fuel. The whole forest land is destroyed in the process” (Interviewee 3, 2021).

From the ten interviewees I found that, destruction of reserve forest is a first and foremost impact due to the Rohingya refugee settlement. The change is the climate in the area is a major effect that happened because of the deforestation. Both host community and refugee population are severely vulnerable to natural disaster because the protection from forest is lost. Moreover, the bio-diversity is compromised due to the massive influx.

*Major Reasons for Deforestation in Teknaf and Ukhiya*

All of the interviewees agreed that the main reason for deforestation was resettlement of the refugees (See figure 9). Five of the interviewees identified fuelwood consumption as the second reason for deforestation.
There are a few factors that are contributing to the rate of deforestation in the study area. They are:

1. Resettlement of the refugee population

2. Construction of houses and roads for the Rohingya

3. Collection of woods from the forests for fuel purpose

4. Establishment of economically profitable businesses by locals for meeting the increased demand for housing by the INGO and NGO employees

Due to the high rate of deforestation, other environmental impacts are noticeable in the area too. For instance, the rate of soil erosion, increase in temperature, increase rate of natural disasters like cyclones and flooding.
5.1.2 Depletion of deep groundwater level

Water security is a condition where water of ample quantity and standard quality is available at affordable prices for sustaining human health, social and economic growth, and ecosystems (UNESCO, 2012). The Rohingya refugees are facing the challenges of water scarcity and lack of sanitation systems among their other multitude of challenges (See figure 10). The refugees are exposed to significant scarcity of water resources which in turns exposing them to bigger health issues.

Figure 9 the long queues of empty water jars in the camp. Source: The Daily Star, 2021

Nine out of ten interviewees brought up groundwater level depletion as the second most important impact. Not only groundwater but also surface level water pollution was mentioned by 2 interviewees. Due to distance and the number of hours spent waiting in lines, 56 percent of households in the Rohingya refugee camps had difficulty accessing water delivery points (ISCG, 2020). The Rohingya refugee camps are already facing serious water scarcity due to the daily withdrawal of roughly 15 million gallons of groundwater. Between August and December 2017,
around 5731 tube wells were built to give water to the refugees, with 21% of them had broken down by the end of January 2018. (ISCG, 2020). Below, figure 11 shows the primary sources of water for the Rohingya refugees.

Figure 10 primary sources of water in the camp. Source: (Reach, 2020)

<table>
<thead>
<tr>
<th>Primary Water Sources</th>
<th>Drinking Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved Water Sources</td>
<td>&gt;99%</td>
</tr>
<tr>
<td>Tubewells/boreholes/handpumps</td>
<td>73%</td>
</tr>
<tr>
<td>Tap stand/piped water</td>
<td>20%</td>
</tr>
<tr>
<td>Water tank</td>
<td>5%</td>
</tr>
<tr>
<td>Protected dug well</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Cart with small tank</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Unimproved Water Sources</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Unprotected dug well</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

The water levels throughout the camp areas lowered between 5–9 m as reported. (UNDP, 2020). 29% of refugees now use piped distribution systems to access chlorinated water, the rest get their water from tube wells, and however, recent water quality analysis shows that 52% of tube wells still contain traces of E. coli contamination (Akhter et. al. 2020).

In an interview the country representative of IUCN Raquibul Amin said:

“They (Rohingyas) are extracting water from the ground for everyday living purposes. Some studies are showing that there is a lack of ground water level. Some locals and Rohingya are saying that surface level water sources such as the fountain and river are now being polluted.”
In another interview with the project officer of Reach International referred that:

"Underground water level depletion is another impact of the excessive use of water by the refugee population. Before we used to get water on level two but these days we have to go up to level five to get water" (Interviewee 1, 2021).

The Rohingya population along with the host community are facing challenges arising from the lack of water resources including groundwater. As a result, they are more vulnerable to various diseases including Typhoid, Cholera, Diarrhea, Dysentery etc.

5.1.3 Habitat loss, fragmentation, and destruction

The findings from the data suggest that loss of Habitat, fragmentation, and destruction of wildlife animals are other major impacts of the refugee settlement. Eight interviewees out of 10 pointed out wildlife destruction as the third major impact. In 2017, Rohingya camps were built in Bangladesh’s Teknaf and Ukhiya upazilas, where elephants wander freely (Prothom Alo, 2020), see figure 13 for the map. Bangladesh contains roughly 268 resident wild elephants (ranging from 210 to 330), 93 migratory elephants (ranging from 79 to 107) and 96 captive elephants (IUCN 2016). According to government officials in Bangladesh, roughly 40-42 elephants are trapped in the Cox’s Bazar woods of Ukhiya and Teknaf.
Concerning the situation of wildlife, a government official interviewee stated:

“Before the settlement of the Rohingya, wildlife from different species lived in this reserved forest. Elephants, especially, have been affected by the settlement because this forest was the safe habitat and way of the species. They were forced to leave the place. Birds from about a hundred species
lost their nest. As a result of this, the imbalance of the ecosystem accelerated. It impacts the pollination system of the locality severely” (Interviewee 4, 2021).

“Elephants travel back and forth between Myanmar and Bangladesh every year, grazing on local vegetation,” says Paul McCallion, a UNHCR senior energy and environment officer in Cox's Bazar, added. However, as the Rohingya refugee camps have grown, settlements have encroached on places where elephants used to graze, preventing them from accessing alternative grazing sites.

Figure 12 Elephant's in Cox's Bazar. Credit: Tanjimul Islam Arif FAO (2021)

Raquibul Amin, Bangladesh representative for the IUCN said that:

“Due to the shrinking forest area and a blocked migration path, the elephants are in veritable danger, since being confined to a small area could cause a shortage of food as well as conflicts. Elephant-human conflicts arise because of the blocked migration path, which the elephants have been using for centuries” (Interviewee 1, 2021).
Along with the destruction of Asian Elephant Corridor, other species of wildlife, for instance, snakes, and different types of small cats are also under severe threats. Several types of wildlife animals are completely extinct after the refugee migration.

5.1.4 Land degradation, landslides and soil erosion

The fourth major impact of the Rohingya refugee settlement is the severity of land degradation and soil erosion. A study by Hasan and others revealed that 3,130 ha of forested lands of different categories were transformed into either refugee camps or Rohingya influenced degraded forests between 2017 and 2019. The same study predicted that around 5,115 ha of forest cover may experience loss from 2019 to 2027.

Seven out of the 10 interviewees revealed that land degradation and soil erosion is a major threat for the areas where refugees are located as well as the nearby areas where host communities are located.

The executive of Arannayk foundation mentioned that:

“Natural resources were compromised. Almost 6000 acres of reserved forests were cleared for constructing housing settlements, they cleared another 3000 to 4000 acres of land for fuelwood consumption. They cleared up the root of the trees also. Initial Major impact is deforestation and land degradation. I am emphasizing land degradation because the construction of the houses used the hills to build houses and soil also lost its regenerative capacity in the process” (Interviewee 3, 2021).
According to four of the interviewees, landslides and soil erosion are happening because of the fact that when the influx of Rohingya population crossed the border, only temporary housing was available (see figure 15) within a few days and no planned housing or hill-cutting was involved in the process. Furthermore, the slopes were not maintained when the houses were built. This lack of awareness about slope maintenance is leading to more occurrences of landslides than usual. Anthropogenic activities have also had an impact on the highest elevated area of the Kutupalong camps (estimated to be 41 m). Several camps have gradually increased their risk of landslide and inland flood as a result of wholesale cutting of the slope and street and stair building (Quader et al, 2020). This particular event is not only a threat for the environment, it is as much of a threat for the population that are living in the area. Their safety and security is under threat and this can even cause death among the refugee population.
5.1.4 Mismanagement of solid and human waste

The Rohingya population in Cox’s Bazar generates 10,000 tons of waste per month, resulting in harmful impact on environment and health (Zaman, 2019). Researchers are not aware of how much waste is produced at the camps daily, but a 2018 survey at Teknaf’s Leda makeshift camp, housing 21,000 forcibly displaced Myanmar nationals, provides some idea about the extent of the problem (UNB. 2019). Polythene bags and plastic bottles are the major concern as they clog the drain in the camps. Especially during the rainy season since that leads to flood and in turns major challenges for sanitary lifestyle.

5.1.5 Rohingya refugee crisis and Role of the Host-community (Environmental Perspective)

Cox’s Bazar, hosting over a million Rohingya refugees from neighboring Myanmar is one of the most climate-vulnerable and economically disadvantaged regions of Bangladesh, (Khan and Dempster, 2019). While the ultimate goal is to return the refugees to Myanmar in a safe, voluntary, and dignified manner, realistically, considerable numbers of Rohingya will remain in Bangladesh for more than ten years (UNDP, 2018). Ten out of the interviewees mentioned that the country's performance to handle the Rohingya crisis is satisfactory given the country has limited resources and ability to take care of a sudden influx of refugees. The executive director of Arannayk Foundation stated that:

“The Bangladesh government created an environmental working group to build better collaboration among government and private and International organizations. Government played a tremendous role in the settlement. They cooperated with all the international organizations. This is a success story for the Bangladesh government. They were very serious during the COVID situation. Their dedication is exemplary to the world” (Interviewee 3, 2021)
An assistant director of Bangladesh Forest department disclosed that:

“Government is initiating tree plantation projects. The Department of forestry is much more active in dealing with the related issues than before. Government has started to relocate 1, 00,000 Rohingya to another district (Bhashanchar, Noakhali) to decrease the pressure on the reserve forest area of Ukhiya/Teknaf. The host community is supporting the partial relocation of Rohingya from Cox’s Bazar to Noakhali” (Interviewee 2, 2021)

The host community is actively helping the people to relocate to Bashan char. The host community and the refugees are collaborating to replant the nearby areas. While the collaboration for the environment is visible and commendable, social, economic and political tensions still remain between the communities. Government officials say that refugees who relocate will enjoy better services, security, and livelihood opportunities (primarily agriculture and fishing) than in the Cox’s Bazar camps. Prime Minister Sheikh Hasina has made this relocation project her defining mission, allocating $276 million to the navy to build shelters and other infrastructure on the cyclone-prone island. An estimated 100,000 refugees would be able to stay at the facility (RFA, 2018). However, it is difficult to assess these claims since no study has been conducted about the safety and security of the location.

The social construction framework suggests that refugees are illegal aliens hence the members of the deviant group. However, in the case of Rohingya refugees, it is understood that they are mostly seen as the dependent group rather than the deviant group. There may be some restrictions regarding keeping control of the refugees, the government and host- community are trying their best to help the refugees to survive.
6. Policies and practices to safeguard the environment

Bangladesh is uniquely positioned at the confluence of the Ganges, Brahmaputra, and Meghna river systems, the world's second biggest river system, which drains an area of 1,086,000 square kilometers from China, Nepal, India, and Bangladesh (Gorana, & Kanaujia, 2016). Due to this unique geophysical location, the country has been endowed with rich biological diversity, hosting a variety of species superbly evolved to populate the ecosystems of the country. Originally designated as the Teknaf game reserve in 1983, the Government of Bangladesh in December 2009 enhanced its status to a Wildlife Sanctuary protecting 11,615 hectares. It is located in the Teknaf Upazila of the Cox's Bazar District and consists of a series of high hills aligned north-south and surrounded by the Bay of Bengal to the west, a thin strip of lowlands and towns along the Naf river to the south and east, and the Inani reserve forest to the north (Nishorgo, 2018). This sanctuary contains extensive tropical mixed evergreen forest, wildlife, and many other natural resources. However, after the Rohingya migration most of the sanctuary has been lost.

In 1992 the National Environmental Policy was formulated with the aim of providing protection and sustainable management of the environment. The National Environment Policy 1992 adopted a number of related sectors including agriculture, industry, health, energy, water, land, forest, fisheries, marine, transport, housing, population, education and science. Bangladesh introduced several salient environmental policies like environmental impact assessment and the Bangladesh Ministry of Environment and Forest (MoEF) is responsible to implement those policies.

In the Environmental Conservation Act (1995) it is said that the government can declare any “ecologically critical areas” in any area to face environmentally critical conditions and also can specify operations and processes that can't start or continue in those areas.
Almost everyone who arrived during the inflow has been housed in and around the Kutupalong and Nayapara refugee camps in Bangladesh's Cox's Bazar region, and the vast volume of the influx is putting enormous strain on the Bangladeshi host community and existing infrastructure and services (UNHCR, 2019). The Bangladesh Government and many international and national organizations are trying to provide some help to Rohingyas to safeguard the environment for betterment of both the population and the environment.

**Reforestation program**

Bangladesh environment policy prohibits activities that cause or result in land erosion, salinity and alkalinity, and loss of soil fertility. Beneficial land use systems for different ecosystems, environmentally safe management of newly accreted land are recommended.

Ten out of 10 interviewees agreed that a massive reforestation program has been initiated to maintain the balance in nature. The FAO has just completed an intensive two-month watershed area reforestation program (see figure 17) in which nearly half a million tree seedlings were planted near Rohingya camps in Cox’s Bazar, Bangladesh, in conjunction with the Cox's Bazar South Forest Division, the SAFE Plus initiative was launched. The SAFE Plus (Safe Approaches to Fuel and Energy (FAO, 2019). IOM, WFP, and FAO have collaboratively initiated a project called Landscape restoration and Livelihoods. In October and November, they planted 475 000 tree seedlings and cleared undesired vegetation and undergrowth across 571 hectares. This was in addition to the 25 000 tree seedlings planted around the camps and the half million trees planted within the camps, for a total of one million trees planted (FAO, 2019).
The IUCN country representative said that:

“If we talk about mitigating forestry we have a group called energy and environmental technical working group and through this IUCN, FAO and other Organizations have done huge plantations in the camp areas. It was mostly social forestry, we planted mostly native species for instance exotic trees. The camp was on a hilly area and unplanned settlement was there in the slope areas so slope stabilization also became an issue. At that time we did a study and found out that a huge proportion of the camp's houses were at the risk of landslides. It was mostly in the beginning of 2018. The camps are fully green these days before there were no signs of greeneries. The plantation by RRRC is really striking. Things are systematically working right now” (Interviewee 1, 2021).

The experts also suggest that several plantation programs are being initiated by many other organizations too. They are also trying to keep the nurseries available so that people have easy access to trees if they want to plant.
Alternative fuel resources

In the environment policy it is mentioned that there should be reduction in the uses of fuel-wood and agricultural residues. Protection of forest fuel and development of better-quality energy saving technology are suggested. EIA made it mandatory before executing projects for exploration and extraction of fuel and mineral resources.

The enormous demand for firewood in the Kutupalong settlement, which is home to almost 620,000 people, is difficult to comprehend: 730 tons every day, equivalent to at least four football fields (UNHCR, 2018). The UNHCR and others began giving liquefied petroleum gas (LPG) to Rohingya refugees, which proved to be a huge success in terms of finding alternate fuel sources. A research on the impact of the switch to LPG was done by the UNHCR, the International Union for Conservation of Nature (IUCN), East West University in Dhaka (EWU), and the Energy and Environment Technical Working Group (EETWG). The analysis found that LPG distribution has resulted in an 80% decrease in demand for firewood in the Rohingya households in the camps, reducing deforestation to well within sustainable forestry rates, while the overall demand for firewood in the area has fell to well below pre-influx levels (UNHCR, 2021).

A report from UNHCR proposed that, in collaboration with joint reforestation and conservation efforts and the Bangladesh Forest Department, has had a visible impact throughout the refugee camps. The pre-pilot project on pressure cookers has also been resumed. 394 families are now cooking with a pressure cooker and are monitored daily.

The country representative of IUCN stated that, they are conducting a study on the use of pressure cooker in Rohingya household and how does it impact on gas or energy saving. Their
result suggests that if the pressure cookers are used according to the family size then almost $2 million can be saved on fuel per year.

**Initiatives to increase vegetation**

The Government of Bangladesh along with many other national and international organizations undertook vegetation projects to create a source of greenery and fresh vegetables to help Rohingya refugees survive. When Mongabay visited after the 2017 influx, evidence of deforestation was all over the place. In rare event when the refugees were not clearing space for the still-expanding camp, others were hiking hours into the rapidly disappearing forest to gather valued firewood by cutting down trees and even ripping roots from the hills (Ahmed, 2019).

According to the experts, limited scale vegetation is in progress in the Rohingya refugee camps. Bangladesh Forest Research Institute uses this technology called SALT (Sloping Agricultural Land Technology) to cultivate vegetation in the slope areas. UNHCR and BRAC run projects together where they provide Rohingyas with plants, seeds and Bamboo to cultivate vegetables. In April 2018, the U.N.’s Food and Agriculture Organization (FAO) administered giving out 25,000 micro-gardening kits (Mongabay, 2019).

**7. Long-term Environmental challenges**

Bangladesh's government, as well as various non-governmental organizations and international organizations, are working hard to ameliorate the worst effects. Some environmental initiatives have been demonstrated to be effective. The reforestation program, alternate fuel resources, and vegetation, for example. However, there are some long-term difficulties that must be addressed. Even if steps are done, there is no guarantee that the problems will go away. These long-term issues are described in this section.
Protecting Elephant Conservation and refugees from Elephants

Conservation and expansion of forest zones, conservation of wildlife and biodiversity and conservation of wetlands are given the utmost importance and priority. In the Bangladesh Wildlife Preservation Act, 1974, it specified policies against hunting, killing of wild animals.

Elephants in the refugee camps have already made huge damage to the camps and property, while killing and injuring people in encounters (Rahman, 2019). As a result of the elephants surrounding them, refugees were unable to live regular lives, a phenomenon known as the "hidden elements of warfare" (Thekaekara, 2017). IUCN and UNHCR implemented a plan to ensure ‘safe coexistence’ between animals and refugees. In the project they train volunteers to teach people how to systematically react when there is an invasion from the wild-life. The curriculum began to enhance awareness, 56 watchtowers and 30 volunteer ERTs are working to warn residents when elephants go into the camp (Rahman, 2019). People were made aware of what they should do if they come across an elephant as part of the project (McVeigh and Peri, 2018). However, this is not an ultimate solution to the problem. Conserving wildlife still remains as a long term threat to be handled properly.

Water resource conflict

Environment friendly water resource management is recommended for utilizing and developing water resources, constructing irrigation network and embankments, dredging of watercourses and as well as in taking measures against river pollution. EIA should be done before undertaking projects related to water resource development and flood control measures.
Even before the Rohingya influx the area in Cox’s Bazar went through water scarcity. More than a million Rohingya refugees as well as the host community are facing water scarcity on an everyday basis. Because of the location of the refugee communities in southern Teknaf, boreholes are not accessible. All water must be preserved by capturing rainwater in small reservoirs – something that is now depleted (UNHCR, 2019). Some new projects have been initiated by different organizations in response. According to UNHCR, they are working to establish reservoirs and more advanced and sustainable facilities for rain capture that can be an asset for host communities in the area, and assist in the resolution of some of the area’s persistent water issues that have existed since before the migrants came. Motorized wells and pumps are now powered by renewable energy sources such as solar and wind. Novel techniques for access to water that were once thought to be out of reach are also being employed. Converting ocean water, or even fog, into safe, dependable drinking water sources, for example (STW, 2019). Other innovative methods use satellites and remote sensing to find water undetectable to human eyes in water-scarce locations such as deserts (Rahman, 2019). However, even if there have been new projects being initiated, lack of safe drinking water is a long-term challenge that needs to be dealt with more caution.

Camp resource management after relocation and repatriation

The Bangladesh government is trying to relocate the Rohingya refugees. Their ultimate goal is to find a way where the Rohingya refugees repatriate. The concern of dealing with the debris of the camps will become a long-term threat for the host community. As the IUCN stated:

“The rehabilitation process will happen gradually. So there will be times we have to think about the protocol for camp closure in future. Because the camps themselves have created lots of foreign objects like plastics, infrastructure materials. There will be a need to remove a lot of environmental
debris and that will be another challenge. We have to decide on whether we should take it back to its old protected reserved forestry or we should keep it as it is” (Interviewee 1, 2021).

Current influx management experience demonstrates that when asylum seekers are returned or integrated, funding are tight for the closure and reclamation of abandoned camps and associated facilities, as well as replanting of degraded lands and animal habitat conservation (UNDP, 2020)

**Solid and human waste management**

In the Bangladesh Conservation act (1995) coastal and marine eco-systems are identified as potential areas for intervention, where all internal and external polluting activities should be stopped. Fishing in coastal and marine environments within regeneration limits is suggested.

Two of the government officials and 4 of the experts interviewed expressed concern about the management of solid and human waste in the Rohingya camps. According to the WHO and the Ministry of Health and Family Welfare, more than 200,000 cases of acute diarrhea were documented in the Cox's Bazar camps in 2018. Various projects are ongoing to minimize the negative effect of the generated waste In Cox's Bazar, which is now home to almost a million Rohingya refugees, Bangladesh just erected the world's largest human waste management plant. This industrial-scale mega plant, dubbed "the largest among refugee camps in the world" by UNHCR and Oxfam, can handle the waste generated by more than 100,000 people every day (Rahman, 2019). WASH (Water, Sanitation and Hygiene) is also working on some projects focusing on health and sanitation. However, these projects are not sufficient to cover the majority of the population in the community.
8. Recommendations

The findings and analyses in this study suggests that the following measures should be given priority to minimize the negative impact of the environment on the refugee population and the host community.

1) The ultimate solution for many of the adverse environmental impacts is to expedite the process of repatriation. This process can be fastened when the international community collaborates together to pressurize Myanmar to let the Rohingya population get back to their own country.

2) For the host community, a better management plan for relocating the Rohingya refugees will lessen the pressure effect on the environment of the coastal city Cox’s Bazar. Relocating the Rohingyas from critical landscapes like the hilly slopes should be taken into consideration. The Government of Bangladesh needs to be more considerate when thinking of relocating them to ‘Bhashan char.’ they need to ensure the humanitarian rights are followed when they are relocating the refugees.

3) Despite the fact that numerous forestry efforts are underway at the same time, organizations should consider planting trees that will benefit the environment in the long run, such as Bohera, Haritaki, and Amloki. More projects for tree plantation should be launched. The Government of Bangladesh should spend at least 15% of the total fund for afforestation and other environmental related issues. This will help protect the topsoil of the areas which should be a major priority.

4) Government and international and national organizations must take appropriate action to conserve the wildlife. Both Bangladesh and Myanmar must collaborate to create and safeguard the elephant corridor for Asian elephants. More initiative needs to be taken by
the refugee and host community to train themselves about dealing with the wildlife so that both parties remain safe and secure.

5) All the organizations should emphasize new and efficient water technologies so that communities are provided with safe drinking water. Community awareness should be raised so that they do not take more than their fair share of water as well as they don’t waste water in any way.

6) Drainage systems all around the Chittagong district should be given importance. Cox’s Bazar should get the utmost attention to get a better drainage system, this way the Refugee population will be less harmed by the natural disasters and waste management would be much easier.

7) It is necessary to impose restrictions on the usage of environmentally damaging materials. Use of polybags and other non-biodegradable waste, for example. Both the refugee and the host community should be encouraged to use recycled materials.

8) Long-term planning and the closure and reclamation of the abandoned camps is essential. Both the government and aid organizations should come together to generate a sustainable and effective plan to restore the natural environment of deserted camps.

9. Limitations of the study

There are few limitations conducting the above study. First of all, the study undertook an ambitious effort to look through the environmental policies of Bangladesh. This field is enormous and the study only mentioned a few of them. Secondly, the vast amount of projects that are implemented by international, national, and governmental organizations is difficult to analyze during this time period. Thirdly, due to COVID, the interviews were conducted through zoom and in person field research was not possible. This is why the study is not representative of all the
experts and officials' opinions. Only 10 people were interviewed. However, it was kept in mind that the experts are well-known in their respective field of work.

10. Conclusion

Cox’s Bazar is a city in Bangladesh, which was known as one of the most naturally resourceful cities in Bangladesh. However, recently this city is known as the home of the world's largest refugee settlement. The city does not have enough wealth and resources to maintain this large number of refugees. The rich biodiversity is under severe threat because of the settlement. Before the Rohingya influx the city was facing challenges related to peace and sustainability. In recent years, the region is facing an even more complex situation to maintain the environment. This is further exacerbated by the risk of climate stress. Experts are projecting that the entire Bay of Bengal will face severe weather patterns and pollution in the coming decades because of climate change. The majority of tropical storms that make landfall in Bangladesh in recent years have been in this area, and current IPCC estimates indicate that the region will see rising severity and frequency of tropical cyclones in the future. (IPCC 2014).

The Rohingyas were always a community where they had to be victims of severe violence and underprivileged life. Keeping their safety and security in mind, the Bangladesh government and other organizations should undertake extensive environmental management and long-term monitoring programs. The main key is to work with collaboration and sustainability. Building awareness between the host and refugee community is also important. The Bangladesh government is visibly trying their best to handle the crisis however, international cooperation is a must to achieve a long-term solution.
11. Appendix

Interview questions:

Experts:

- What is your organization’s assessment of the major environmental impacts due to the Rohingya migration?
- What are the policies and practices your organization would expect to be implemented to diminish the environmental impacts?
- What are some other reasons of the environmental impacts in the area?
- To what extent the wildlife is impacted because of the settlement (food sources, deforestation).
- What are the main reasons the refugees were settle destroying the forestry?
- What can be done to help reduce the environmental impacts the area?
- What are the future threats if environmental degradation is not under control?
- What are the assessments or impacts on the environment when people return to Myanmar?
- Is there anything of importance you think we haven’t covered?
- Is there anyone else I should be talking to?

Government/NGO Officials:

- How much forest exists? Why is it so important?
- What is the amount of deforested land since 2017?
- What can you tell me about the socio-economic condition of the migrated Rohingya’s?
- Are they using the forestry for making a living?
- In which ways they are using the forest for income or living source?
• What role the government playing to safeguard the forest land?
• How are the host community reacting to the plan?
• What is the role of International organizations to safeguard the forest land?
• Is there anything of importance you think we haven’t covered?
• Is there anyone else I should be talking to?
12. References


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