

## **A Situation Analysis on the Livelihood and Biodiversity Conservation Situation in Hakaluki Haor of Bangladesh**

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### **Abstract**

*Haors, recognized for their diverse flora and fauna, are classified as freshwater wetlands. The haor's socio-economic, ecological, and commercial significance makes it a critical element for human livelihood and biodiversity. The primary aim of this study was to examine the livelihood and biodiversity challenges in Hakaluki Haor. Employing a qualitative methodology, the research utilized five distinct data collection tools. The study was carried out in three villages—Khoriatilla, Moimora, and East Judhistirpur—within the Ghilachora union of Fenchuganj upazila in Sylhet district. Demographic data indicated that the economic livelihoods of residents around Hakaluki Haor are heavily reliant on it. These villagers lack access to essential health and education facilities. The findings on livelihood and biodiversity issues were split into two main categories: socio-economic and ecological/biodiversity. Concerning the socio-economic aspect, poverty emerged as the primary issue, impacting education, debt, power inequality, and more. In terms of biodiversity conservation, the majority of residents, both young and old, lack awareness of its importance. Societal issues like poverty and power inequality contribute to a general disregard for biodiversity conservation. The absence of proactive measures by government, NGOs, and the private sector results in systemic stagnation, endangering long-term ecological balance and biodiversity.*

**Key Words:** Haor, Socio-economic, Livelihood, Biodiversity, Conservation

### **Introduction**

Bangladesh, teeming with diverse flora and fauna, enjoys nature's bounty like a child cradled in its mother's lap. Its rich biodiversity encompasses forests, freshwater wetlands, and coastal and marine ecosystems. For example, Bangladesh features protected areas that have international recognition, like the World Heritage site in the Sundarbans, the haors in northeastern Bangladesh, and tropical forests in the Chittagong hill tracts (Foster-Turley et al., 2016).

The term "biodiversity" is used to refer to the broad range of life forms on the planet, including the genetic diversity, the variety of species, and the variety of marine, land, and aquatic environments, as well as their associated developmental and ecological processes (DK, 2015). It is also known as the "library of life" which encompasses all forms of life,

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from bacteria to plants, fungi to invertebrates, and from land to sea and freshwater (Ibid, 2015). Biodiversity is essential for the health of human beings and functioning of the ecosystems that comprise the Earth (Museum, 2016). Without biodiversity, our societies would not be able to function (Ibid, 2016). Since 1999, Bangladesh has declared 13 biodiversity-rich areas as Ecologically Critical Areas (ECAs) under the Environment Conservation Act. Among these 13 biodiversity-rich areas, 8 sites are in the Sylhet division and 5 are in the Khulna division. Among the 13 ECAs in the Sylhet division, Hakaluki Haor is a marshland that becomes inundated seasonally and is very important for mother fish breeding and swamp forests. It is a habitat for migratory birds and many native fish species.

The present study was conducted to know about the situation of livelihood dependence on the Hakaluki haor as well as the present status of the biodiversity conservation situation in Hakaluki haor. 'Hakaluki Haor' is a wetland of great natural beauty. In winter, the loud chirping of the guest birds from different parts of the world, the melodious melody of the shepherd's flute, the free flight of butterflies on the sunflowers, the green beds, and the water playing with the waves filled with monsoons, the calls of the sailors and the leaping of the fish in the fishermen's nets are a wonderful picture of natural beauty.

## **2. Significance of the Study**

According to the Global Standard for the Identification of KBAs based on the World Database of Key Biodiversity Areas (WDKBA), there are 11 criteria that are clustered into five categories; such as threatened biodiversity; geographically restricted biodiversity; ecological integrity; biological processes; and irreplaceability (SCBD and UNDP, 2021). Sites that meet one or more of these 11 criteria are regarded as the KBAs. Considering these criteria, nearly 16,000 KBAs have been identified globally among which 20 KBAs are in Bangladesh (Ibid).

Given the importance of biodiversity conservation, this study serves as a valuable resource for policymakers to initiate training and awareness programs within local communities. These efforts aim to highlight the necessity of conserving biodiversity and encourage community involvement in planning, decision-making, and conservation activities. This study underscores the significance of integrating local populations into biodiversity conservation efforts, especially since their socio-economic lives heavily depend on areas like Hakaluki Haor. It advocates for collaboration among government, private sector, and community stakeholders to implement effective biodiversity conservation measures, ultimately protecting the livelihood sources of the local people.

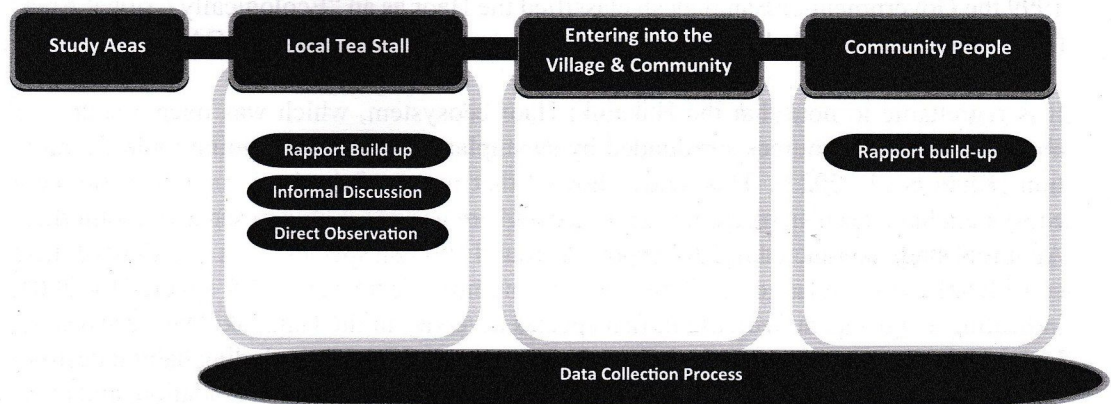
## **3. Objectives of the Study**

The main objective of this study was to understand the livelihood and biodiversity issues in the Hakaluki Haor. This assessment also concentrates on the engagement of the youth as well as the stakeholders from the government, private sector, and communities in biodiversity conservation activities.

#### 4. Methodology

This analysis was done following a qualitative approach. Five types of qualitative data collection tools were used for qualitative data collection; such as informal discussions, village transit, case study, direct observation, and photography. The fieldwork of this study was conducted during the month of July 2023. The researcher built relationships with the local people to gain their trust and ensure their participation in the data collection process. As an outsider, the researcher first visited the local tea stalls where local people gather and share their thoughts through their normal behavior in an uncontrolled environment. During the observation, the field researcher also tried to build rapport with these local people which helped the researchers enter into the community.

*Figure: 01 Methodology of the Study*



#### 5. Sources of Data

In the present research, the primary data were collected directly from the local people of the three studied villages (Khoriatilla, Moimora, and East Judhistirpur) of Ghilachora union under Fenchuganj upazila of Sylhet District. The secondary sources are different newspapers, periodicals, previous research works, official statistics, mass media information, government reports, web information, and social research journals.

#### 6. Literature Review

Kozeill's (2001) study determined multiple values of biodiversity which include direct use (subsistence and tradable), indirect use (environmental services, information, and evolutionary and non-use value (future options and existence). Bangladesh's unique geophysical location is exceptionally rich in biological diversity (Barua et. al. 2001; Hossain, 2001; Nishat et. al. 2002). Hakaluki Haor is one of only four major "Mother Fisheries" of Bangladesh (FAP, 1995). This freshwater wetland is an important habitat and breeding ground for various species of fish and aquatic species (ibid). Local people have traditionally

used the resources of haor for various livelihood purposes for centuries (Karim, 1993; Ahmed et al., 2008). This is the country's largest freshwater wetland ecosystem (Sunny et al., 2022). Their study showed that in the dry season, the haor covers an area of about 4,400 ha. During the summer rains, the entire Haor floods to about four and a half times this size (18,386 ha) and stays underwater for about five months. All the beels unite as one large lake or haor during this period, making the haor the largest freshwater wetland ecosystem in Bangladesh. This study also investigated that in the past, the haor supported abundant wildlife and aquatic resources, and was covered with swampland. However, in recent times, the haor has rapidly deteriorated and is now facing increasing pressures and threats from various sources, including the over-exploitation of its reeds by local people. About 200,000 people are living around the Haor, and all of them are more or less dependent on the Haor's resources for their livelihood. Due to these threats and the rapid degradation of its resources, and due to the need to protect the Haor's unique ecology and biodiversity, in 1999 the Government of Bangladesh classified the Haor as an "Ecologically Critical Area" (ECA) under the Bangladesh Environment Conservation Act, 1995 (BECA).

It is regrettable to note that the Hakaluki Haor ecosystem, which was once a source of abundant aquatic resources surrounded by swampland, is now undergoing rapid degradation (Khan et al., 2022). This study showed that many of the beel species in the haor ecosystem have been significantly degraded and are no longer able to serve as motherfish. An initial study conducted in 2005 reported around 100 fish species, with one-third of them considered to be endangered. However, this number decreased to 75 species by 2009, indicating a significant decrease in fish species diversity in the Hakaluki Haor ecosystem. Fish species composition may be affected by a variety of factors, including habitat destruction due to agricultural intensification, urbanization, environmental degradation, and over-utilization of resources (Ibid, 2022).

The Hakaluki Haor is a highly productive wetland habitat for a variety of wetland plants and animals (Uddin et al., 2013). This study revealed that due to human and environmental pressures, the habitat has seen a significant decrease in its true structure over the past few decades, resulting in a significant decrease in the number of species. Additionally, the population of the area is leading to a rapid depletion of natural resources, resulting in a range of environmental issues. This study showed that Hakaluki Haor is experiencing a significant amount of siltation in its waterways, with the main sources being the Yuri River and the Sonai River. It is also noteworthy that the Sonai River and its canals are carrying silts from the nearby Kushiara River, while the Yuri River is carrying large amounts of silt from the surrounding hills. This siltation is occurring in the southeast and northwestern parts of the haor, leading to the consumption of land for settlements and cultivation, which in turn reduces the natural biodiversity of the wetland. Floodwater is a major factor in the siltation process, as it fills up the depth and reduces the carrying capacity of the water bodies, thus impeding the area's multidimensional development. This study showed that during the dry season, the inhabitants of the Haor and surrounding areas are destroying the

stems of the swamp trees to meet the demand for fuel wood, which worsens the erosion of the habitat. The reduction of the swamp forests results in the loss of habitat for the migration and spawning of migratory birds, which results in the degradation of biological production. In recent decades, there has been a rapid expansion of agricultural activities within the wetland area, which has harmed the wetland ecosystems in both qualitative and quantitative terms. Human activities associated with farming in the swamp wetlands during the winter months disturb the migratory birds, and the increasing human settlement of the haor ecosystem has not only occupied the natural habitat but has greatly disturbed the wildlife in the area. Biodiversity and biological production have been declining for the past couple of decades.

Islam et al. (2011) showed the economic activities in Hakaluki haor and their impact on haor ecosystem. According to their study, most of the local people were poor. Among them, more than 90% were dependent mostly on the Hakaluki haor for their livelihood. More than half of their household income came from fish capture, fish culture, and fish trading. This study also showed that about 47% of households collect fuel wood from haor. This study revealed that over-exploitation of resources and existing management systems are the main threats to Hakaluki haor.

Choudhury (2005) showed that Hakaluki haor has become a rapidly eroding landscape and has faced increased pressure and threats from various sources, including over-exploitation of its regeneration by local populations which was once supported by abundant wildlife and aquatic resources. A survey conducted by FAP (1995) showed that there were 125 bird species in the Hakaluki haor regions. Another study conducted by IPAC in 2009 revealed that there existed only 41 bird species in the Hakaluki haor regions (IPAC, 2009). That means about 33% of bird species were decreased within 17 years. More than 40% of the freshwater fish species are classified as threatened with natural extinction as a result of wetland depletion (IUCN Bangladesh, 2000).

Mukul's (2007) study on the Hakaluki haor showed a rapid reduction of biodiversity in the Hakaluki haor. This study also revealed some causes for this rapid reduction, such as increasing population density, rural poverty, and lack of employment. He added illegal poaching, environmental pollution and degradation, replacing natural plantations with the monoculture of short rotation and fast-growing species, absence of proper institutional arrangements, frameworks and monitoring, lack of true political commitments and willingness, and lack of people's awareness as underlying factors related to the threats to the biodiversity. He blamed unplanned and rapid urbanization as well as the commercial mentality of the people which includes encroachment, shifting cultivation, introduction of high yielding varieties, transformation of land use patterns and agricultural expansions, change in cropping patterns, commercial shrimp cultivation, expansion of road networks, and unplanned embankments.

Rana et al. (2010) conducted a study in Hakaluki haor situated in Moulovibazar and Sylhet districts on the socio-economic status of the haor-dependent people who lived in the nearby areas of haor. The haor-based economic activities of the respondents included fishing and related activities (32%) followed by duck rearing (29%), cattle rearing (28%), firewood collection (6%), sand extraction (3%), and reed collection (2%). On average, about 15% of the respondents were completely dependent on the Hakaluki haor, 32% were moderately dependent, while 53% were less dependent. It was also noticeable that the extremely poor were entirely dependent on the resources of haor. This study also chalked out some reasons for haor protection which included protecting haor as the main source of livelihood (85%) followed by the sources of foods (55%), source of firewood (51%), increasing the number of fishes (34%) and so on.

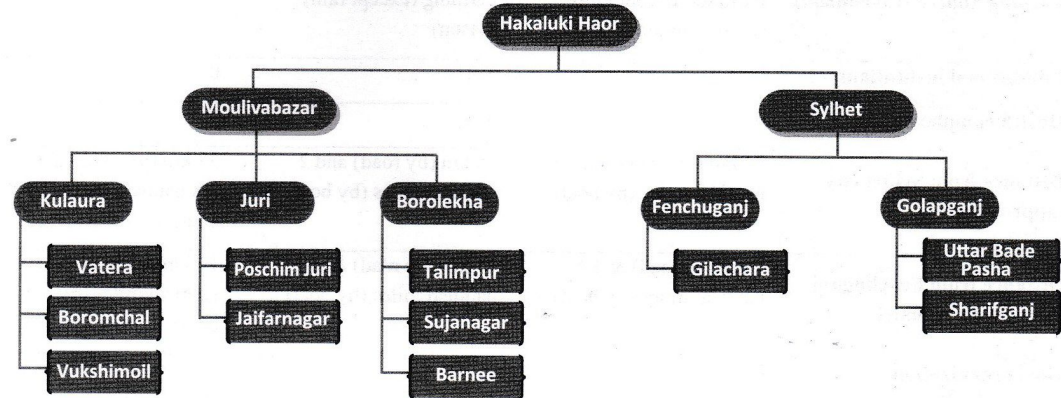
The study by Ahmed (2007) estimated that one-third of (more than) 100 fish species of the Hakaluki haor are listed as nationally endangered. This study showed that most of the people in the haor areas are directly or indirectly dependent on the haor and its resources. For that reason, the number of fishermen and farmers was the highest among the haor inhabitant people. This study identified three types of stakeholders in this haor. Firstly, the primary stakeholders which include farmers, fishermen, bird hunters, cattle grazers, tea garden laborers, fuel wood collectors, bamboo and cane product producers, traditional healers (Kabiraj), aquatic weed collectors, and local ultra-poor who collect various resources from the haor. Secondly, the secondary stakeholders are people who are indirectly dependent on the haor; such as fisheries lease-holders, boatmen, fish cooperative society members, net owners, boat owners, insecticide traders, and mediators (Faria). Thirdly, institutional stakeholders who are engaged in the conservation of haor and its resources. Such as GoB officers, projects, institutions, and NGOs. This study identified some causes for the degradation of wildlife in the Hakaluki haor, e.g., hunting, lack of proper nesting places for birds, lack of food for birds, lack of hiding places, lack of awareness, and preyed by other wildlife. For the degradation of the plant species, this study determined some threats, e.g., over extraction of plants for fuel wood, cattle ranching destroying the natural seedlings of hizol and other plants, shrubs type of plants also collected for fuel wood, ecosystem destruction, conversion into agricultural land, and lack of government initiative. More importantly, this study argued that due to population growth and less availability of resources in the haor, most of the people had to change their traditional occupation which was mostly dependent on fishing and farming.

A study conducted by Choudhury and Faisal (2005) also disclosed that once covered with abundant wildlife and aquatic resources, the Hakaluki haor is now a rapidly degraded landscape facing increased pressures and threats. Forest resources (wetland and reed land vegetation) of the haor region are also slowly disappearing due to a lack of proper conservation as well as management strategies. Mukul et al. (2018) showed that a major threat to Bangladesh's aquatic biodiversity is (increasingly) soil and water pollution. And thus the biggest victim of this pollution is the aquatic ecosystem.

## 7. Selection of the Study Area

The Hakaluki haor is particularly a good example of such type of water resources that have great ecological, economic, and commercial values. It is one of Bangladesh's largest and one of Asia's largest wetland resources. The haor is spread over Kulaura, Juri, and Baralekha upazilas under the Moulavibazar district and Fenchuganj and Golapganj upazilas under the Sylhet district.

**Figure: 02 Hakaluki Haor**



Source: Ahmed (2007)

The total area of this haor is about 39322.422 hectares or 97166.78 acres but in the rainy season, its total area turns into 18,000 hectares. Surrounded by Patharia and Madhav in the east and Bhatera hills in the west, Hakaluki, Asia's largest freshwater haor, is spread over 11 unions of 6 upazilas of Moulavibazar and Sylhet districts. About 70% of Haor is spread in Baralekha, Juri, and Kulaura of Moulavibazar district, 15% in Fenchuganj, 10% in Golapganj, and 5% in Biyanibazar upazila of Sylhet district. This study was conducted in the three villages (Khoriatilla, Moimora, and East Judhistirpur) of Ghilachora union under Fenchuganj upazila of Sylhet District.

## 8. Demographic Discussion

Based on a brief discussion with the local people of the villages, demographic information of these villages is given below:

**Table: 01 Demographic Information of the Study Area**

| Particulars                                        | Study Areas                                                            |                                                          |                                                  |
|----------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------|
|                                                    | Village 01                                                             | Village 02                                               | Village 03                                       |
|                                                    | Khoriatilla                                                            | Moimora                                                  | East Judhistipur                                 |
| <b>Population</b>                                  | 300                                                                    | 250                                                      | 2500 - 3000                                      |
| <b>Numbers of families</b>                         | 40                                                                     | 25 to 30                                                 | 150 to 200                                       |
| <b>Earning Source (Livelihood)</b>                 | Fishing (rainy season),<br>Farming (except rainy season), migrant work | Fishing (rainy season),<br>Farming (except rainy season) | Fishing, Labor work                              |
| <b>Educational institutions</b>                    | 0                                                                      | 0                                                        | 0                                                |
| <b>Health complex/other</b>                        | 0                                                                      | 0                                                        | 0                                                |
| <b>Distance from Sylhet city (approximate)</b>     | 32 km (by road) and 1.6 nautical miles (by boat)                       | 35 km (by road) and 2 nautical miles (by boat)           | 37 km (by road) and 3.8 nautical miles (by boat) |
| <b>Distance from Fenchuganj town (approximate)</b> | 9 km (by road) & 1.6 nautical miles (by boat)                          | 11 km (by road) & 2.7 nautical miles (by boat)           | 14 km (by road) & 3.8 nautical miles (by boat)   |
| <b>Gov. organization</b>                           | 0                                                                      | 0                                                        | 0                                                |
| <b>Private/NGO office</b>                          | 0                                                                      | 0                                                        | 0                                                |
| <b>Literacy</b>                                    | Mostly Illiterate                                                      | Mostly Illiterate                                        | Mostly Illiterate                                |
| <b>Drinking water</b>                              | Unhealthy                                                              | Unhealthy                                                | Unhealthy                                        |
| <b>Sanitation</b>                                  | Unimproved                                                             | Unimproved                                               | Unimproved                                       |

Demographic data shows that large families predominate in the studied villages. The economic life of the residents living around Haor is largely dependent on this Haor. Also, many people are involved in tourism, transportation, and daily wage-based work. Residents of these villages are deprived of essential health facilities and education facilities.

The majority of the people have not yet learned the three R's. To get these facilities, they have to travel long distances, which is time-consuming and expensive. Other needs such as literacy, clean drinking water, and sanitation facilities are in poor condition in these areas. Neither government agencies nor private/NGOs were seen to take any effective initiatives for the development of these areas nor did the local residents mention any such issues. This can also be attributed to the low literacy rate, non-availability of clean drinking water, and poor sanitation in these areas.

## 9. Case Studies

***Salam*** (Fictitious name), **Village:** Khoriatilla

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Young and smiling *Salam* (20) is a boatman and fisherman in the area. Today, apart from fishing, Hakaluki Haor also offers boat tours to tourists. As a child, he could not complete his primary education as he had to take responsibility for the family. He and his fellow fishermen have not been catching fish as expected for the past few years. It is quite worrying that the problem has worsened this year. As a result, their livelihood is getting worse day by day. *Salam* alleges that this is happening due to the ill will of local powerful people to use *magic* (electric) nets.

***Nazrul*** (Fictitious name), **Village:** Khoriatilla

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*Nazrul* (70) has used fishing as a family occupation since childhood. He moved to Dubai as a migrant worker in his middle life and returned to Bangladesh in 2004. He now fishes in Hakaluki Haor. According to him, the Bengali month from Baishakh to Bhadra/Ashwin is a critical moment for fishing. He has a small boat for fishing. But during the rainy season, when the volume of water in Haor increases, fishing with this boat becomes very difficult. However, he is more concerned about the fact that the amount of fish in Haor is decreasing day by day. While fishing, he observed that the number of different species of fish has already reduced surprisingly. If this continues, the ecosystem will be severely damaged. *Nazrul* and his young colleagues are very concerned about using of *magic* (electric) nets by the powerful in the area and have not seen any government, private, or local-level initiatives in his area to address these issues.

***Samsuddin*** (Fictitious name), **Village:** Moimora

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Moimora is a small island-like area surrounded by Hakaluki Haor. *Samsuddin* (35) and his family live in this village. *Samsuddin* has been fishing for almost 18 years. His 65-year-old father gave up nearly 30 years of fishing career due to illness and physical disabilities. *Samsuddin* could not complete his primary education. He fishes during the rainy season and earns his livelihood by cultivating the land during the rest of the year. As his father is no longer able to fish, their family income has decreased and they are now living a struggling life. Both he and his father are very concerned about the decline in fish numbers in Hakaluki Haor. This village is a flood-prone area of Hakaluki Haor. During floods, their houses are submerged under water and their livelihood becomes miserable. As there are no shelters in this village or nearby, they cannot take shelter during floods.

When his father used to fish, he (his father) used to catch a lot of fish of different species. But now the amount of fish that *Samsuddin* gets from Haor is very little. *Samsuddin* expressed dissatisfaction with the use of the *magic* (electric) nets by some people in the area. The use of these nets threatens the survival of any fish. He feels that it is possible to bring back the lost days of Haor by curbing the use of *magic* (electric) nets, expanding afforestation in Haor, and dredging Haor.

**Amit** (Fictitious name), **Village:** Judhistirpur

One of their largest fishing communities resides in East Judhistirpur. About 200 families live here. One of those families is that of *Amit* (30). Due to poverty, his family sent him as a child laborer in Uttara, Dhaka. At the age of 17, he returned to his community and started his family profession (fishing).

Besides catching fish, he also sells fish in the small market of East Judhistirpur. He has not been able to catch freshwater prawns for the past few years. Even in the local market, it is not seen much. He claims that these challenges are due to the use of *magic* (electric) nets by some selfish individuals. He has a very small engine boat. But rising fuel prices and lack of enough fish have made his poor and miserable life even more miserable these days.

**10. Findings of the Study**

Data obtained from case studies, informal discussions with community members including youth and women, and above all direct observation can be divided into two broad aspects; firstly socio-economic aspects and secondly ecological and biodiversity aspects.

**Figure: 03 Findings of the Study**

| Socio-Economic Aspects | Ecological & Biodiversity Aspects            |
|------------------------|----------------------------------------------|
| Poverty                | Deforestation                                |
| School dropout         | Using of illegal <i>magic</i> (electric) net |
| Illiteracy             | Flood                                        |
| Child labor            | Sedimentation of the Haor bottom             |
| Lack of permanent work | Absence of VCFs/VCGs/CPGs                    |
| Indebtedness           | No evidence of youth engagement              |
| Migration              | No evidence of GOV engagement                |
| Poor infrastructure    | No evidence of NGO/private sector engagement |
| Power inequality       |                                              |
| Lack of awareness      |                                              |

The figure above shows that in terms of the socio-economic aspect, poverty is the main problem which also affects other aspects like education, debt, power inequality etc.

For example, in the three villages studied, young people who are supposed to attend school and college are directly and indirectly involved in different sources of income. On the other hand, as they are dropping out of education, they are also getting away from the means of acquiring knowledge about the importance of protecting biodiversity. And from this, it can be said that poverty and power inequality in a society are more likely to make the people of the society uncaring of environmental aspects.

Lack of initiative by governments, NGOs and the private sector creates stagnation in the system, which threatens the ecological balance and biodiversity in the long run. During the village transit of the field researchers, no visible initiative of any government or private organization was seen. A banner of the Upazila Fisheries Office regarding fish habitat development was found in poor condition. This is the overall picture of the diversity situation in the Hakaluki area.

### **11. Recommendations**

Considering the analysis, some recommendations are given below:

- i. Stopping the use of illegal fishing nets should be strengthened to protect the remaining fish species. In this regard, 1-2 village-based youth groups should be formed, that will monitor these issues.
- ii. Afforestation, dredging, and similar activities should be implemented in Hakaluki Haor for ecological balance and biodiversity.
- iii. The respective government bodies should ensure an eco-friendly leasing system.
- iv. Necessary and effective steps should be taken for the socio-economic and healthy living of the people of the community.
- v. Relevant GoB should take necessary steps to recover encroached lands.
- vi. The existing law enforcement sectors of GoB should take necessary measures to control over-extraction of haor resources, wildlife killing, and using of harmful fishing gear.
- vii. Youth campaigns and related initiatives will be needed to create awareness about biodiversity.
- viii. Necessary vocational training should be introduced for the local people especially for the youth to create alternative sources of income and to decrease the unemployment rate.
- ix. Although it is unusual, no initiative has been taken in these areas either at the public or private level. Therefore, these organizations should play a more active role in this regard.
- x. The GOs and NGOs should arrange awareness-raising seminars and community-level meetings. In this case, the organizers should engage the local people.

## 12. Conclusion

Environmental sustainability and regeneration are important goals of sustainable development after economic well-being and social and human development (Dalal-Clayton and Bass, 2012). In this sense, development and biodiversity are interlinked (McNeely, 2002). The findings of the study and the literature review reveal that most of the people living near the Hakaluki haor are mostly dependent on this haor and its resources. But the natural resources of the haor have been decreasing day by day for various reasons. Some of the threats are over-extraction of resources, land encroachment, non-eco-friendly leasing systems, unplanned irrigation systems, bird hunting, conversion of agricultural land, cattle grazing, lack of law enforcement, excessive uses of insecticide in the crop field, sedimentation, lack of alternative income sources and lack of awareness of the local people. But it is necessary to conserve the biodiversity of the Hakaluki haor to maintain the natural ecosystem. It is also essential for the local people to save their main source of income.

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