



CHALLENGES OF CONSERVING AND CO-MANAGING KHADIMNAGAR NATIONAL PARK AND RATARGUL FRESH WATER SWAMP FOREST IN BANGLADESH

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ABSTRACT

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National Parks are protected areas conserving all types of flora, fauna and their habitats regardless of generic diversification. In Bangladesh, protected area managers face difficulties to conserve these areas. This study is formulated to find out those existing difficulties against effective co-management of natural resources based on the local people's perception. A purposive sampling is followed by a semi-structured interview to gather data from the field level of Khadimnagar National Park and Ratargul Fresh Water Swamp Forest from September 2019 to December 2019 by interviewing 100 local people for RFWSF and KNP on the basis of a qualitative research method. Both inhabitants and the Forest Department are found to be responsible for inhibiting the effective management of the subjected areas meanwhile difficulties related to motivation, cordiality, alternative job generation, financial support to management authority, tourism management and resource extraction from forests mainly prevail. To ensure substantial sustainability, both of the actors should come forward to find out a way to get rid of this devastation and to ameliorate the socio-economic condition of these areas. Arranging more conferences to raise motivation, awareness about the forest offenses and generating alternative sources of income can be counted as a strategy to reduce pressure on both forests.

Contribution/Originality: This study is one of very few studies which have investigated the causes of prevailing drawbacks of co-management in two ecologically valued forests and it will be supportive to forest management and policy makers for ameliorating the status of co-management in the regarded and other protected areas in Bangladesh.

1. INTRODUCTION

In spite of holding colossal environmental and financial values, cumulative loss and deterioration of forest resources and biodiversity have expedited at an alarming rate in recent years [1]. In the period of 2015-2020; the significance of forest deforestation was calculated to be 10 M ha/year. From 1990 the forest area has shrunk by approximately 80 M ha; agricultural, large-scale commercial farming is counted to be the cause for 40 percent of tropical deforestation from 2000 to 2010 [2]. In the cases of most developing countries, it is found that the poor people living in and surrounding the forests are somehow responsible for deforestation [3]. Protected areas (PAs) are the primarily best-suited approach to conserve biodiversity [4]. While establishing any PA the ingenious behavior needs to be changed so that conflicts due to the restriction on the use of natural resources so that negative

interaction between both participants (forest department & local people) remains minimum. In the last 10 years, numerous developing countries have significantly acquired land under their Pas [5]. Inhabitant surrounding and living in forest influences the ability of the PAs to conserve biodiversity. The establishment of PAs has generally been known to fail due to focusing just on ecological points or not considering the local people's rights, dependency [6]. Co-management is one of the strategies which enables the local people especially the local community surrounding or living in the forest to participate in the PAs management up to a certain limit and benefits them as well [7]. Community behavior and visions of PAs have changed the interactions of people towards PAs therefore on conservation effectiveness. Bangladesh is one of the densely populated countries in South Asia having approximately 1239 people/sq. Km [8]. From 1990 to 2000, the forest cover (%) was consistent at 14.75% from but later on, the graph has moved downwards to 14.46% [9]. Recently the destruction has been holding the driving seat due to the refuge (Rahinga) influx [10]. Currently, there are 18 registered PAs which include one game reserve, seven wildlife sanctuaries and national parks under the jurisdiction of the forest department (FD) (27,28) [11]. In the British period, Bangladesh had about 20% of forest cover and used to be home to nearly half of the bird species and one-fourth of the mammals and recently many species have lost their existence locally [6]. That's why it is mandatory to be familiar with the challenges and its probable solution keeping to local people's perception under consideration if PAs have to meet it's effectiveness [12]. Protected areas are established to protect the major bio-diversities around the world. Therefore, these areas significantly playing a vital role in conserving lives [13]. It is an ironic fact that these ecologically precious resources are under-evaluated and threatened due to the population boom and increasing need of forest resources [14]. A large number of people are living adjacent to protected forest areas in Sylhet and they are dependent on that ecosystem for their livelihood. Co-management is considered an important strategy for good governance to ensure forest conservation and a sustainable way to find out an alternative to mitigate the local people's dependency on the forest thus making the conservation more effective. The pre-existing rural community surrounding the protected areas and their dependency are making it complex to limit their usage of these resources. A circumstance suited collaboration of these elements (parks, local communities, biodiversity and conservation) can form a better tactical way to conserve the system naturally. Thus it demands a better negotiation between the crucial elements which influences both the management and conservation of National Parks along with the local communities in Sylhet.

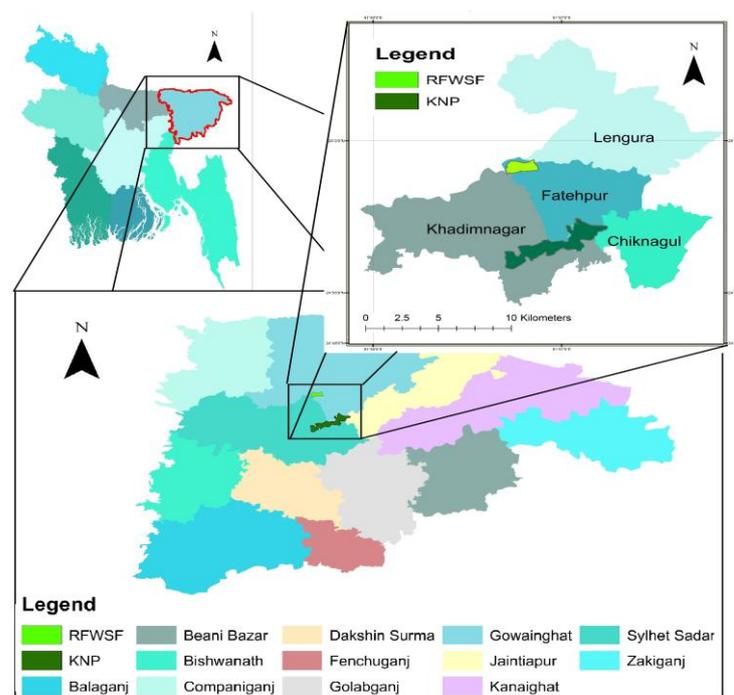


Figure-1. Location map of Study Areas (A: Bangladesh; B: Upazilla Map of Sylhet Division; C: KNP and RFWSF).

Likewise, co-management has been long known to practice in Sylhet since 2005 but the performance is debatable, therefore, a survey was required to screen out those existing constraints which are choking up the management efficacy. Consequently, this research focuses on identifying the major challenges influencing Co-management of two National Forests (Khadimnagar National Park and Ratargul Fresh Water Swamp Forest) of Sylhet division in Bangladesh.

2. MATERIALS AND METHODS

2.1. Area of the Study

Khadimnagar Forest was declared a National Park in 2006. This study site covers approximately 678.81 ha of mostly gentle sloppy land [15]. This National Park is bordered by tea gardens and Sylhet cantonment and located about 15 Km away from the Sylhet city in the south-eastern direction under Sylhet Sadar Upazila Figure 1. Khadimnagar National Park (KNP) holds greater ecological value including conservation of approximately 298 tons carbon-di-oxide per ha, a habitat of more than 200 plant species and 150 bird species and also universally endangered *Trachypithecus pileatus* and *Lophura leucomelanos* [16]. This National Park was selected as a study area due to its biological richness, habitat of universally endangered species and distinctive geological feature. Ratargul Fresh Water Swamp Forest (RFWSF) is located 45 Km away in the north-western region of Sylhet division under the upazila Goyainghat Figure 1 [17]. The river Goyain is the life-stream of this swamp forest which was declared as a conservation area of biodiversity in May of 2015 by the Government of Bangladesh that covers approximately an area of 204 ha; one of the biodiversity-rich areas in Bangladesh and locally called as “The Sundarbans of Sylhet” [18]. This has turned into one of the most eye-catching spots of eco-tourism which contributes to our finance and also influences the local environment and culture [19]. This forest was selected as a study area due to its higher biological status, being one standing freshwater swamp forest and one of the most valuable eco-tourism spots of Bangladesh.

2.2. Sampling Design and Sample Size

Purposive sampling was manipulated as a sampling technique to interview respondents such as local people only having dependency on forest or a close relation to it. Consequently, a total of 100 people were interviewed of which 50% was from Khadimnagar and rest from Ratargul.

2.3. Methods of Data Collection

To conduct this study a qualitative research method was used having an open-ended questionnaire developed; following it 100 semi-structured interviews were executed to gain information about the existing challenges. At first, a brief speech was delivered by the interviewers to the intendants so that they could realize the topic well and could provide sufficient usable information. The interview was frank, spontaneous and not deceiving to make the respondents feel easy, afterwards, that was flexibly followed by the key issues that were brought forward by the respondents to obtain a clear concept about the challenges, weaknesses and threats against achieving sustainability of forests co-management at the research areas ensuring their identities will remain anonymous. Secondary data has been collected by reviewing different related reports, research papers, websites and other published and unpublished documents of governmental and non-governmental organizations.

2.4. Data Processing and Analysis

By following the objectives of the study, adequate data were collected, compiled, tabulated and analyzed. After collecting data from study areas, it was transferred to a master sheet to extract information from raw data using appropriate data management packages such as Microsoft Xcel to calculate and transform data into percentage (%)

values so that charts can be built up in order to identify the existing problems conveniently, which lead to formulation of a suitable report.

3. RESULT

Information was collected through face-to-face interviews of the randomly selected local people to identify the most existing challenges faced to manage the protected areas at the grassroots level. A large proportion of the respondents was occupied by adolescents and young people who possess a minimum education level of Junior School Certificate or Secondary School Certificate though majority of them were student by profession. However, either all the respondents were dependent on the forests to some extent or have a close relation with these two forests. Hence, background information of the respondents [Table 1](#) is provided below.

Table-1. Demographic profile of the respondents from the study areas.

Stratification Classes	Categories	Percentage (%)
Sex	Male	82
	Female	18
	Total	100
Age	15-20(Adolescent)	39
	21-28(Young)	32
	29-40(Middle Aged)	20
	41-above(Old)	9
	Total	100
Education	Illiterate	29
	Class 8-SSC	37
	HSC	23
	Honors/equivalent	11
	Total	100
Profession	Student	35
	Shop keeper	11
	Farmer	21
	House holder	12
	Housewife	16
	Others	5
	Total	100

In both cases, the lack of funding topped the list based on 62 % and 69.66 % (respondent's opinion) respectively for Khadimnagar National Park and Ratargul Swamp Forest and the list is followed by dependency on the forest by (47%), lack of knowledge about the forest offenses (42%), lack of motivation (35%), conflict among different groups of FD personnel was identified by 31% opinion, lack of cordiality of FD (30%), lack of alternative job opportunities prevailed according to 30% opinion made during the survey. Then it comes to governance, 22% of people opined that it's not apposite here now as they had seen the forest at its peak. 20 % opinion shows that there is a lack of personnel in the community management committee (CMC) and about 14% of the total people mentioned there is a lack of modern technologies in field management. around 15% of the opinions show that wildlife hunting has been going however it hasn't stopped yet and there are some other issues like political pressure, local people's attitude towards the FD, lack of first aid boxes and dress codes for the local FD personnel those belong to around 10% which means only 10 person in 100 people counts that as an obstacle in the way of better management of the national park as shown in [Figure 2](#).

Khadimnagar National Park

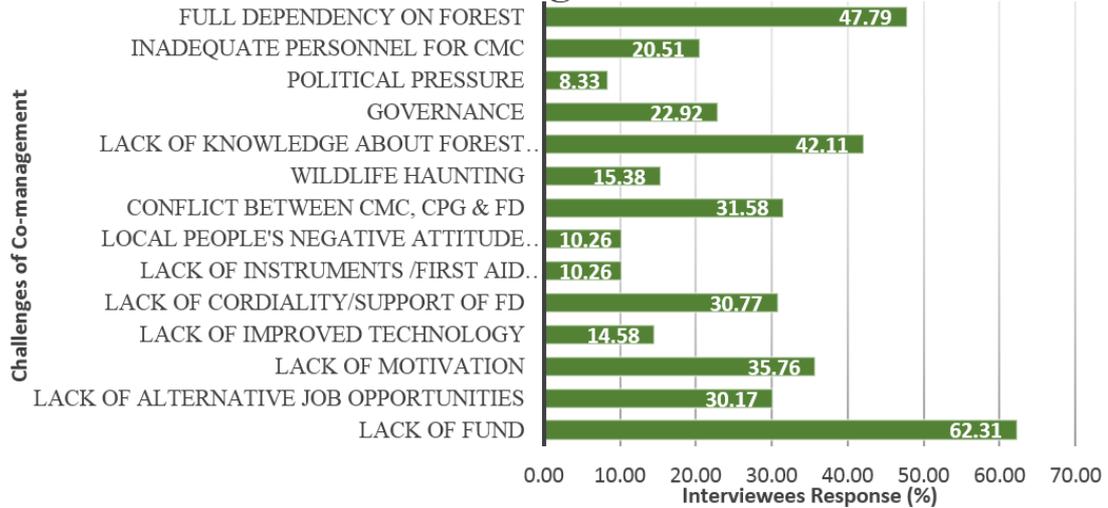


Figure-2. Existing Challenges of Co-management in KNP.

However, the scenario is different for Ratargul Swamp Forest which is located on the bank of the river Goyain. Except for the value representing the lack of funds being high, several factors are quite different from those of Khadimnagar National Park. For instance, inappropriate tourism holds the second-highest place with a value of 62% then followed by lack of alternative job opportunities (55%), lack of motivational activities (52%), most interestingly grazing is one of the dominant challenges in the way of managing this swamp forest which is opined by 50% of the total respondents and 48% people reported illegal fishing within this protected area. Lack of knowledge about the forest offences (45%), lack of cordial assistance was felt by the 43% of the total respondent, the necessity of first aid boxes are more dominant in Ratargul than Khadimnagar by approximately 31% as it has been known to be the habitat of several poisonous snakes and a well-renowned tourist spot too which exposes human to these species of snakes [17], governance-related issues (34%), people’s negative attitude towards CMC and other patrolling groups (31%), lack of weapon and conflict between CMC, CPG and FD (27%) then it is followed by dependency on forest and lack of improved technologies respectively mentioned by 23% and 21% of the interviewees as illustrated in Figure 3.

Ratargul Fresh Water Swamp Forest

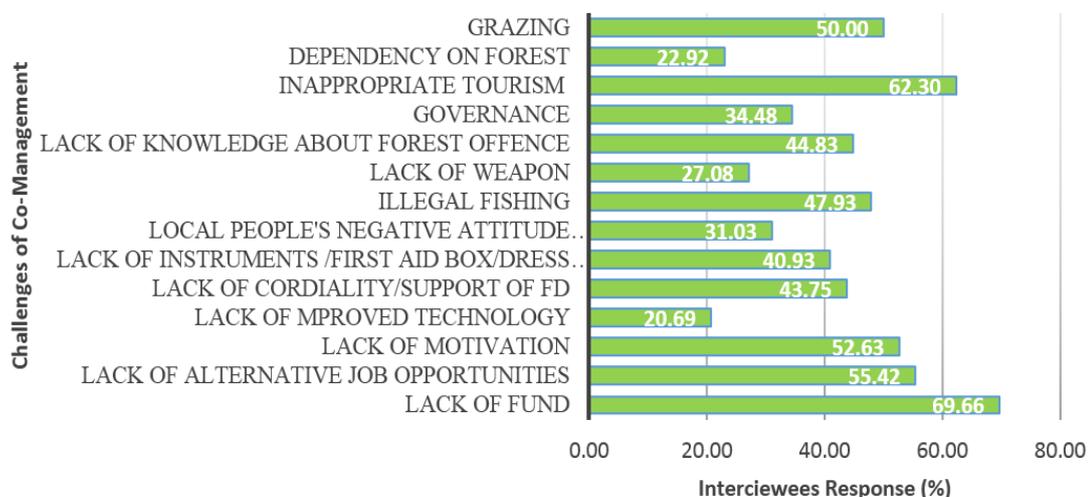


Figure-3. Existing Challenges of Co-management in RFWSF.

For the feasibility of the study values exceeding or equal to 30% in the case of Khadimnagar National Park and exceeding or equal to 40% in the case of Ratargul Swamp Forest has been considered to be the intended subjects for this study.

3.1. Lack of Motivation

Motivating people is one of the key steps to manage any protected area. Therefore, creating awareness must be the surface level activity to conserve any protected area [20]. It indicates that the local people must be aware of the environmental, economic and social significance of the areas [21]. However, Khadimnagar National Park and Ratargul Swamp Forest in Bangladesh are facing difficulties because the community settled near these parks have lack of awareness about their part in conserving these areas. Lack of motivation doesn't let them feel why they should move forward on their own to protect or manage these resources.

3.2. Finance

PA managers go through varied economical complexities that impeditment the effectiveness of management. The amount allocated in a budget is crucial for managing PAs effectively. There are several other reasons which interfere with the PA economical sustainability, the quantity of subsidy matters most. Despite raising or allocating more funds there can be alternatives too as it doesn't always mean that will direct to sustainable conservation. Sometimes official flaws may inhibit PA authorities from spending the allocation in a proper way which may lead to better conservation of biodiversity. Though the effectiveness of PA management determines the extent of biodiversity conservation and financial sustainability which underlines the importance of PA financial administration and management effectiveness [22]. Now, in the cases of both Khadimnagar National Park and Ratargul Swamp Forest, the lack of funds holds the top position by 62 % and 69.66% respectively which specifies the urgency of allocation funds to those national parks as a way to achieve better conservation.

3.3. Dependency on Forest

Conventionally, the inhabitants collect a varied type of resources from the Khadimnagar National Park and different adjacent forests. Local sawmills and carpenters depend on timber from the nearby forests though their living does not rely on the timber from Khadimnagar National Park. People who were involved with clear-felling, are not also dependent but the local people who were employed by the "Moholders" in the illegal cutting of trees are totally dependent on the forest resources for earning their livelihood [23]. Villagers especially those living surrounding the tea estate are fully dependent on the forest for collecting fuel-wood and housing materials. Therefore the dependency on KNP (47%) was identified by the local people's opinion and inhabitants of RSF are dependent on the forest resources mostly for tourism, agriculture and fishing thereby opined by 23% of the respondents.

3.4. Lack of Alternative Job Opportunities

This implication shows that the local people possess a tendency to switch jobs to some recorded alternative jobs which are more income-generating. The majority of the respondents opt for tourism but there were other jobs enlisted during the study period such as handicraft jobs, agriculture, shrimp farming, vegetable cultivation and poultry farming, stone industry. These are the alternative jobs available to inhabitants but the opportunity to get one is less, as a result, people have to be dependent on free natural forest resources available therefore 55% of the respondents opined it as a constraint to the way of co-managing the swamp forest efficiently, the scenario for KNP is similar but less acute than the Ratargul Fresh Water Swamp Forest a portion of local people and a community goes by the name "Patra" depends on the forest, there are jobs like carpentry, sawmill workers alternatively available to the inhabitants living adjacent the KNP [24], therefore, 29% of the total respondents mentioned to

make alternative jobs more available to their community so that they can divert their needs from forest to alternative jobs as a mean to earn their livelihoods.

3.5. Inappropriate Tourism

In this study, we found that environmental issues have emerged since the introduction of ecotourism. The result shows that around 1000 visitors visit this area which is putting much pressure and creating disturbance significantly in the forest ecosystem as the forest area is much lower to divert this amount of difficulty. The interviewees stated that during the weekends and government holidays or any kind of religious festival and rainy season are the time when the number of tourists visiting the forest exists almost 2500 [25]. About 62% of the total respondents mentioned that tourists are mainly responsible for plastic and sound pollution as there is no dumping zone and loose governance to prohibit the sound pollution made sometimes by electronic speakers (music) and human. The existence of overloaded tourists is causing a significant negative effect on the ecosystem of RFWSF including a dramatic decrease in the number of migratory birds in recent years [26].

3.6. Lack of Cordiality

During the study period throughout the survey, cordiality was mentioned to be an issue as an impediment in the way of co-managing KNP and RFWSF and was opined by respectively 30% and 43% of the total respondents. Some of them stated that in terms of providing funds, latest logistics (like communicating devices, vehicles, torch lights), new improved technology aren't made available to them as they need to move whenever there is a call for restraining forest offenses or some official duties, as being remote areas mobile networking system isn't good enough too. The CMC personnel mentioned these are necessary and after making this sure they would be able to perform to their peak. The local people as well as other patrolling groups think this would be of great help for them if they were provided with those equipment and logistics.

3.7. Lack of Knowledge about the Forest Offences

A few incidents were mentioned by the interviewees in KNP like illicit felling, cultivation and illegal fishing activities which were not good for the environmental status of these two forests. The local people tend to collect fuel, fodder and sometimes construction wood by intervening in the forest ecosystem. There has always been a group of vicious people cutting trees for their daily needs and to earn money by selling them. These depict the lack of awareness about the forest offenses and motivation among them. In the case of RFWSF, the scenario is a bit different as the type of offenses varies. Mostly collecting a type of plant locally known as "Patipata", illegal fishing (opined by 48% of the respondents), grazing and light excavation activities to extend the water route to facilitate the boat movement keeping the tourism fact in mind during the summer and winter season. Thereby mentioned by 45% of the total interviewees. So this shows a clear deficit of knowledge about the forest offenses and motivation among the inhabitants to cooperate the regarding authority to manage these forests efficiently.

3.8. Conflict among Different Groups of FD personnel

The respondents opined that there have been a few conflicts among different patrolling groups especially on making decisions at the field level or obliging their duty to the forests which have affect the management of the forest adversely. Sometimes the authority has run their jurisdiction to mitigate this problem but it hasn't been enough.

3.9. Grazing and Illegal Fishing

One of the dominant challenges in the way of managing this swamp forest which is opined by 50% of the total respondents and 48% people reported illegal fishing within this protected area though in the near past this swamp

forest was considered to be the safe house for fish and other aquatic creatures. Local people who live on and below the poverty line catches fish as a daily need to meet their nutritional value as they have limited resources to buy fish from alternative sources. People living surrounding the forest usually have cattle or cows or other types of domesticated animals they depend on the forest to gather fodder and other fuel woods. This intercepts the ecosystem of the forest both terrestrial and aquatic which impediments the efficient management of RFWSF.

4. DISCUSSION

The objective of this study was to identify the constraints to ensure better management of these two forests through a participatory approach. It is difficult to let everyone win the competition, this was an endeavor to find out the most existing challenges prevailing in KNP and RFWSF so that both ends (the FD and the inhabitants) can come to a stage through which everyone's need and ecological status of the forests can be maintained sustainably.

Co-management is meant to be legitimate when it comes to making decisions fulfilling an individual's necessities and can formulate a mutual learning ability but an efficient application must be ensured before that [27]. It is known that in 2009, the participatory approach was introduced in KNP recruiting members to form CMC from the adjacent 22 villages. On the other hand, the government of Bangladesh as a response to a local protest by civilized citizens introduced a new management approach under the CREL project in 2014 to manage RFWSF cooperatively with the local people, however, that wasn't a success [18].

In this study, we have been capable of disclosing lack of motivation, finance, dependency on the forest, lack of alternative job opportunities, inappropriate tourism, lack of cordiality and knowledge about the forest offenses, conflicts among different groups of FD personnel, grazing, illegal fishing and other forest resource extraction as the most existing problems in the way of ensuring better conservation from the local people's perception.

People living adjacent to the forests are known to rely on not only for collecting daily needs like fuel wood, fodder, sometimes food and construction materials but also to collect drugs and a tribe "Patra" depends on this forest for seeking shelter, nonetheless, approximately half of the people from adjacent villages are dependent moderately on this national forest [24]. People are still dependent on forest to fulfill their demand, in this way the forest is left disturbed on a regular basis that is contradictory to sustainable management. Hence, it is necessary to reduce this type of dependency on forest to let it grow naturally.

Though the global community committed usage of sustainable funding in the world's forestry sector, it wasn't a success. A balanced strategy was suggested to attract the non-governmental organizations to invest in forestry by providing infrastructure, information, and technological support. Moreover, improved technologies and planning are crucial for sustainable forestry [28]. Conserving forest sustainability is an imperative task to ensure the existence of mankind and earth. Therefore, lack of funds affects the management negatively as it is also found in this study.

Not only a majority of people are left behind while it comes to awareness raising or motivational works and doesn't have access to participatory management specially people who are living more adjacent to the national parks while only 17% people were reported to be informed of their entitlements and obligations and about the extent of forest laws but also an uncertainty about types of awareness training prevails in people oriented forest management [29]. Consequently, creating awareness about conserving forest resources and the way of sustainable resource extraction through more motivational voluntary conference at the grassroots level has turned into a must. People who received incentives in the form of startup logistics instead of being provisioned with money tend to get less involved with illicit logging again, additionally, former loggers who were incentivized with training to establish themselves as tour guide or with fisheries activities and nursery activities were restrained from felling trees illegally again [30]. Circumstance is pretty similar here too as lack of alternative jobs are forcing the local people to depend on the nearby forest resources to earn livelihood. Therefore, providing incentives to the vulnerable people surrounding the PAs with association of vigilant monitoring is counted to be a wise way to mitigate the

augmenting pressure on forest and diverting them to a proper and legitimate life style. Improving tourism management must be considered as an elementary task to work on for initiating the biological conservation especially at RFWSF. Moreover, a portion of tourists now a days intend to spend leisure being close to nature except causing any harm. This kind of tourists is in fact makes it our sole responsibility to develop the rising tourist spots as eco-friendly spots [25]. Therefore, both local people and the regarded authority should come forward and work hand in hand with a view to preserve sustainability of those national forests.

Simultaneously, generating alternative sources of income is necessary to divert the dependency of marginal people from forests. In this case, establishing farms or other eco-friendly factories can be a way out of this dilemma that will assist to reduce the poverty of the local people along with minimizing grazing and illegal fishing that lead to unmonitored resource collection from these forests and in solving every riddle mentioned above, cordiality of the FD is truly an essential alliance to make all the factors function properly as the data interprets. Therefore, forming adaptive co-management by collaborating cooperative management and Adaptive management together which capitalizes on both their pros. Considering adaptive co-management to manage protected areas and sustainable tourism is believed to be best as it works on the basis of experiences and feedback received from natural resource management and tourism [31]. Additionally, authorizing indigenous people in decision-making calls for strong assurance from government and from indigenous communities to understand both the limitations of not working side by side and advantages can be achieved from working collaboratively [32].

5. CONCLUSION

As, Bangladesh has a long history of practicing co-management, however, it hasn't been a total success. Hence, adaptive co-management can be introduced in the system to enhance the efficacy of sustainable forest management along with developing the socio-economic condition of it's adjacent communities as this study has been capable of identifying issues such as motivation, cordiality, alternative job generation, financial support to management authority, tourism management and resource extraction which are inhibiting the management, that is imposed, since a decade has passed. As, Bangladesh is a developing country, people nearby the forests are reliant on PAs to meet their daily necessities; they are the community of people who are suffering from the establishment of PAs. Therefore, it is mandatory to find out more flexible ways to manage these PAs which can be achieved by arranging meetings with the local people to understand their present situation based on which a fixed amount of resource can be allowed to be extracted over a period of time and from a certain area of the forest which has the potentiality to present a win-win situation. As a response to that both of the actors should be aware of their obligation, responsibilities and should possess a high ethical value that will help them to perform better.

Overall, governance is the key to make all of these initiatives work properly as Bangladesh has been facing a wide pattern of ethical and corruption-related difficulties in the implementation level of the administration system of Bangladesh as well as of Forest Department which has been working as the main barrier in the way of development in all sectors from the birth of Bangladesh [33]. Therefore, a transparency assessment is prescribed through this study except which no strategy can ever be able to bring out the best from these forests and surrounding communities with a view to achieving the sustainability for which the nature urges. However, co-management as well as adaptive co-management are the most prominent ways to solve all the impediments to achieve sustainability.

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