



**PhD Thesis**

**Forest Management in Bangladesh: A Critical Analysis**

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**Submitted to:**

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**Dedicated to my parents**

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## **Abstract**

Natural forest in Bangladesh is on the decline for various anthropogenic reasons. Maintaining forest health is essential to generate forest products and ecosystem services. Sustainable forest management is necessary to maintain forest health. Systematic forest management in Bangladesh initiated during the British period. During those days, the forest management was primarily focused to maximize profit, which continued during Pakistan and even Bangladesh period. Vast tracks of the forest were declared reserve during the British period. People had no access to the reserve forest. No one could even enter in the forest without permission of the Forest Department. The forest products generated revenue for the government. Declaration of reserve forests; denied people from access to the forests.

Historically, the focus of the forest management was sustainable yield. Clear felling and artificial regeneration approach were practiced in many cases to plant valuable timber species instead of indigenous tree species to maximize the revenue. This practice continued till the 1980s in Bangladesh. During the last couple of decades, the population of Bangladesh has been increasing rapidly. Subsequently, demand for the forest produces increased manifold to meet consumption need and to meet the livelihoods of the increasing population. Since community didn't have access to the forest legally, they didn't have the sense of ownership for the forests. Community rather grabs whatever they can, to meet their needs. Overexploitation and unwise forest management approach and practice degraded and denuded forests in Bangladesh. Concern for forest protection and conservation has been growing globally during the last couple of decades. Consequently, there has been a shift in the forest management paradigm in many countries including Bangladesh. Accordingly, Bangladesh forest policy has been re-casted, the law amended and a new law has been enacted. In the growing complexities of the forest management, however, competency of the legal and policy regime requires further improvement. The capacity of forest management institutions didn't increase at the desired level; as such implementation of the prevailing policy and enforcement of the law fell short of desired expectation. The result is deteriorating forest health in terms of extent, quality and biodiversity. In the context, the specific objectives of this research are to:

- i) critically analyze the underlying causes of forest degradation and deforestation
- ii) examine the existing approaches and practices in managing forest resources

- iii) understand and outline the legal and policy regime of the forestry sector, and
- iv) generate knowledge on sustainable forest management practices to redress the forest degradation and enhance the forestry sector governance in Bangladesh

To realize the objectives, this research investigates: i) The forest management approach and practice, ii) Legal and policy regime, iii) Capacity of the forest management institutions, iv) Community participation in forest management, v) Governance and vi) Forest health in terms of extent, quality and biodiversity. This research also looked into, i) drivers of deforestation and forest degradation, ii) people's dependence and the interaction of the community with the forest, iii) probes the historical forest management and the legacy, iv) evaluates forest management in a National Park (Protected Area) as a case.

Qualitative and quantitative approaches have been used to collect data and information. Insights were gathered from the experiences of the community, forestry sector professionals, practitioners, and policymakers. The desk review revealed the forest extent and quality; legal and policy regimes over time; and capacity of the forest management institutions in Bangladesh. Success in the forest management in the regional countries has been studied. The shift in forest management paradigm is clearly mentioned in the relevant policy and guiding documents of many countries including Bangladesh.

There are 30 villages near the Lawachara forest, which is the case forest for this research. Focus Group Discussion (FGD) has been conducted with the Lawachara Co-Management Committee and in 11 randomly selected villages out of these 30 villages. A total of 600 randomly selected households from these 30 villages have been surveyed for quantitative data collection. The FGD and the household survey, participant's observation and literature review provided insight of the forest management in the case forest. Forest health, participation, capacity of the forest management institutions, legal and policy regime, governance and sustainable forest management for Bangladesh have been critically analyzed using collected data, information, and knowledge.

Findings of the study reveal that colonial regime left behind the legacy of the economic efficiency focused forest management. Forest policy and legal regime of Bangladesh is a continuation of what was enacted and practiced during British and Pakistan period. Research findings show that the natural forest extents are on the decline and forest quality are degraded. Wildlife availability

is decreasing because of habitat loss, forest degradation, and poaching. Native tree species are decreasing. Major reasons for forest degradation are poor management, over-exploitation of fuelwood, illegal tree felling, poaching, and grazing to some extent. Major causes of deforestation are the extension of settlements, increase in small holding agriculture; use of forest land for development infrastructures, industries; government allocation of forest land for other uses; and lack of good governance. The government allocated forest land for military installations, economic zones, roads and highways, railways, rubber plantations and others. Underlying causes for forest land conversion and forest degradation are the scarcity of land and opportunity cost of the forest land compared to other emerging land use; huge demand for forest produce, high dependence of poor people living near the forests on the forest resources for consumption and to meet their livelihoods.

Social, economic and ecological conditions have changed substantially around the world and in Bangladesh during the last couple of decades. The forest management paradigms are shifting globally, regionally and in Bangladesh. New forest policy is necessary to accommodate and address contemporary issues and to support shifting forest management paradigms. Implementation of new forest policy will require amendment of forest laws. In addition, a new law enactment will be necessary. For example, forest land tenure system needs to be streamlined and Forest Land Protection Act needs to be enacted. The Forest Department is the custodian of forest land in Bangladesh. The organogram of the department must be reformed taking emerged approaches and paradigms into consideration. Forestry education institutions must be capacitated to ensure sustained supply of forestry educated skilled professionals. The capacity of the Bangladesh Forest Research Institute needs to be increased to support the generation of much-needed knowledge for the forest management.

Effective community participation in the forest management needs to be ensured for Co-Management in the Protected Areas, Social Forestry in other reserve forests and Community Forestry in the CHT. Capacity building of the Co-Management Organizations, the Social Forestry Committees and orientation of the Forest Department professionals in this regard will be necessary. The practice of good governance in the forestry sector is of crucial importance for sustainable forest resources management. Effective participation of the stakeholders, coordination, transparency, accountability and capacity, all these basic principles of good governance must be in practice religiously to stop forest land conversion, illegal tree felling, and poaching and thereby maintain the forest extent, quality, and

biodiversity. Monitoring and evaluation must be an integral part of the forest management. Modern technology must be used to ensure real-time monitoring of the forest extent, canopy cover, tree density and forest carbon. Evaluation and feedback process to the management process must be streamlined.

The ecological value of the forests need to be incorporated in the national accounting system to justify adequate fund flow into the forest sector to ensure development and maintain forest health. Climate resiliency for forests could be factored in the national developmentpersuasion. Payment for Environmental Service (PES) and conservation financing could be provisioned in the national budgeting system. There is the success in sustainably managing forests in the regional countries, particularly neighboring countries which could be examined critically and can be tried in the Bangladesh forest management considering the local context.

## **Acronyms**

ACCF	Assistant Chief Conservator of Forests
ACF	Assistant Conservator of Forests
ACL	Assistant Crew Leader
Ag	Permanent Agriculture
BD	Soil Bulk Density
BDT	Bangladesh Taka
BFRI	Bangladesh Forest Research Institute
C	Carbon
CCF	Chief Conservator of Forests
CF	Conservator of Forests
CFCI	Consultant Forest Carbon Inventory
CL	Crew Leader
Cm/cm	Centimeter
CMGC	Co-Management General Committee
CMEC	Co-Management Executive Committee
COP	Chief of Party
CREL	Climate Resilient Ecosystems and Livelihoods
Cum/cum	Cubic meter
CV	Coefficient of variation
CWS	Chunati Wildlife Sanctuary
DAB	Diameter above buttress (0.3 m above upper end of buttress)
DBH, dbh	Diameter at Breast Height
DCCF	Deputy Chief Conservator of Forests
DCF/DFO	Deputy Conservator of Forests/Divisional Forest Officer
DCOP	Deputy Chief of Party
DF	Degraded forest
F	Forest
FRMP	Forest Resources Management Project



G/g	Gram
GBH	Girth at Breast height
GOB	Government of Bangladesh
GPS	Global Positioning System
Ha, ha	Hectare
Haor	The depressed land scape in the northwest of Bangladesh, remain inundated for 6 months
HNP	Himchari National Park
IPAC	Integrated Protected Area Co-Management Project
IUCN	International Union for Conservation of Nature
Khash Land	Land that is recorded in record no1, government owned land
KHNP	Khadimnagar National Park
KNP	Kaptai National Park
LNP	Lawachara National Park
LRS	Long Rotation Species
LUS	Land use class
M/m	Meter
Mg	Mega gram (Metric Ton)
MNP	Modhupur National Park
MRV	Measurement, Reporting and Verification
NFI	National Forest Inventory
NRM	Natural Resources Management
OC	Organic Carbon
OD	Oven Dried
ODA	Overseas Development Agency
PA	Protected Area
PF	Peoples Forum
PSP	Permanent Sample Plots
REDD+	Reducing Emission from forest Deforestation and forest Degradation
RKWS	Rema-Kalenga Wildlife Sanctuary
Rohingya	An ethnic community lives in Rakhain Province of Myanmar
R-PP	Readiness Preparation Proposal
Sag	Shifting agriculture

SG	Stump Girth
SNP	Satchari National Park
SOP	Standard Operating Procedures
SRF	Sundarban Reserve Forest
SRS	Short Rotation Species
T	Ton
TL	Team Leader
TOR	Terms of Reference
TSP	Temporary Sample Plots
UN	United Nations
UNDP	United Nations Development Program
UNREDD	United Nations Reducing Emission from Degradation & Deforestation
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USFS	United States Forest Service
VCF	Village Conservation Forum
WI	Winrock International

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## **Chapter 1: Introduction**

## Introduction

Natural forests exist in Bangladesh, since time immemorial. Landscapes, like hills, high flat-land, depressed *haor* basin and coastal plains are usually characterized by forest-cover. Hassan (2011) and Rahman (2011) report that this part (Bangladesh) of the then Indian sub-continent was covered with dense forest in the 18th Century. Most of the Chittagong Hill Tracts (CHT), Chittagong and greater Sylhet District and the Northern part of Sundarbans was predominantly forest areas until 1850s (Hassan, 2011).

The British colonial regime established control over all lands of India that included forests. The British regime permanently leased out land to the *Zamidar* under the provisions of the *Permanent Settlement 1793*. Those leased land included forests in most cases. Through this leasing process the privatization of the forests was initiated in the then India that includes present day Bangladesh. Later in 1950, the Permanent Settlement of 1793 was abolished and then replaced by the State Acquisition and Tenancy Act, 1950. This Act declared forest land as non-retainable by the private owners. Forest Department on behalf of the government became the custodian of the forest lands. The State Acquisition and Tenancy Act 1950 has re-established government ownership over forests (Hassan, 2011).

However, the forest management and resource extraction during the Pakistan period (1947-1971) remained a state function like the British period. The Pakistan regime exploited forest resources more than the sustainable limit to patronize forest-based industries and maximize economic return (Khan, 1998). Later, since its inception in 1971, Bangladesh continued economic efficiency focused natural resources management; and therefore, exploited resources (including forest resources) for immediate economic benefit till 1980s (Khan, 2011; Khan, 1998).

Meanwhile, extreme population density associated with tremendous growth put pressure on the forest resource. Poor people living nearby the forests area largely depend on the forest resources for their livelihoods and consumption. Forest is the state resources by law in Bangladesh and people do not have access to the forest legally. People do not have sense of ownership on the forest. The community participation in the management of forest was not there. Capacity of the Forest Department is limited. Coordination and collaboration with the wider stakeholder is not there. Corruption is there. Over all governance is poor. As such, illegal tree felling, poaching, over-extraction of fuel-wood continues and degrades the forests. And such degradation eventually leads to deforestation which leads to encroachment, forest land grabbing and ultimately conversion of forest land to other land use.

Land grabbing by some people in the absence of good governance is a driving force for deforestation and forest land conversion. Forest land encroachment for settlement, small hold agriculture by the landless people has increased over time compared to the Pakistan period. Forest land use for infrastructure and other non-forest use by the government is a regular practice (Choudhury, 2011). In the 1950s and 1960s, the government leased-out forest land for other uses. There is a large forested land area that is administered by the Government (Khash land); not under the control of the Forestry Department. Thus, a large quantity of those forested lands was leased-out for agriculture, and horticulture. Again, in the 1970s, vast areas of state forests, especially in Chittagong Hill Tracts (CHT), were leased out for establishing rubber gardens. So far 64002.80 hectares of forest land has been allotted to various government and private organizations for settlement, industries, infrastructure, military installations and other purposes (Forest Department, 2018).

Bangladesh has over 2.52 million hectares (MH) of forest land that covers 17.4% of the country (Forest Department, 2018). Out of this 2.52 MH, Forest Department (FD) has jurisdiction over 1.52 million hectares. The forest land in CHT has not been vested to the Forest Department rather termed Unclassed State Forests (USF) and (Forest Department, 2017) Ministry of land controls 0.73 million hectares of USF; and the remaining 0.27 million hectares are under tree covers in the village (Forest Department, 2018). However, according to Global Forest Resources Assessment (2015), there were 1.468 m ha of forests in 1990 and has been decreasing steadily since then by 2,600 ha/year (0.2%) and only 1.429 m ha of forests (11% of land area) was there in 2015 (FAO, 2015 b).

The Agenda 21, adopted in the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, 1992 enunciated the Sustainable Forest Management (SFM) principles. Following the adoption of SFM, Bangladesh shifted its forest management practices from maximizing yield towards ecological sustainability – a paradigm shifts in forest management approach of Bangladesh. The paradigm encouraged meaningful participation of the local people in forest management. This response by locals resulted in enhanced capacities of the forest management institutions, and improved management practices -- which eventually helped addressing climate change issues and maintaining forest ecosystem services (Ahmed, 2008; Rahman, 2011). In fact, local people have been involved in the community forestry since 1980s through FD initiative – evolving ultimately as social forestry. However, the Rio Conference, 1992 inspired Bangladesh forest policymakers; consequently, they framed up a 20-year Forestry Master Plan 1995-2015. A major suggestion of the plan was to open-up Co-Management mechanisms to manage the Protected Areas (Hassan, 2001; Rahman, 2011).

The Social Forestry approach engages local people and shares benefit with the beneficiaries. On the contrary, benefit sharing out of the forest produce is not an option in case of Co-Management approach (for the PAs). However, Protected Area Management Rules 2017 created provision of sharing of revenue from ecotourism, minor forest produces and other earnings from the PAs. These earnings are shared with the Co-Management Committees (CMCs). The scope of a CMC includes supporting dependent people for diverting livelihoods. In addition, CMC is the platform for the community to raise their voice in the decision-making process. However, the rural people are yet to influence the decisions significantly.

Other approaches in which forests are managed in Bangladesh are: Community managed forests and Agro-forestry; Plantation (homestead, along with the roadside, embankments); and afforestation of mangroves in the accreted land (Akhter and Shaheduzzaman, 2013). Despite all such management mechanisms and approaches, the process of forest management is not transparent; the influential people are engaged in illegal tree felling, poaching and land grabbing (Ahmed, 2008; Hassan, 2013; Fox et al., 2007). Meaningful participation of resource-dependent people in the management is necessary to sustainably manage forest resources (Rahman, L., 2011; Islam et al., 2015; Ali, Uddin and Chowdhury, 2015), which calls for governance reform to empower the poor. It is envisaged that competency of the forest policy and legal regime and adequate capacity of the forest management institutions enable implementation of forest policy and enforce the relevant law (Alam, 2009; Muhammed, et al., 2005; Ahmed, 2008)), which must be competent to respond to the contemporary issues and easily enforceable.

Khan et al (2004) point out that there are barriers to put such laws and policies into operation as the FD suffers from inadequate staff (one staff is to administer around 500 ha of forest land). Again, bureaucratic bottle-necks contribute to the inefficient forest management. FD is responsible for enforcing the Forest law. Again, Deputy Commissioner also acts as the District Collector (or ADC, Land) on his behalf) is designated as 'Forest Settlement Officer'. Thus, the authority and role to manage the forests of respective district is shifted to DC or ADC, who indeed plays the key role in reserve declaration process. Therefore, the lack of coordination and collaboration among the Forest Department, local administration and the Ministry of Land and vested interest of the powerful actors affect the sustainable forests management (SFM) efforts. For example, the State Acquisition and Tenancy Act 1950 declared forest land as privately non-retainable. The land survey following the Act, the State Acquisition (SA) survey recorded the Sal forest land of the Gazipur district as forest land. These forest land should have been reserved and land entitlement must be to the Forest Department to comply with the provisions of the State Acquisition and Tenancy Act 1950.

The survey was completed in 1954. However, in last 72 years out of 65,000 ha of Sal Forests, only 20,000 ha has been declared Reserve (Forest Department, 2016b). Forest policy implementation and law enforcement are limited (Alam, 2009).

There are issues emerging in the contemporary period like climate change which is relevant for the forest management. Similarly, there are transboundary issues that impact forest and management. Climate change is directly linked to the forest in two ways: i) climate change has potential to adversely impact the health of the forest ii) a healthy forest stocks more carbon compared to a degraded one. The transboundary issue like fresh water flow from the upper catchment of the Ganges river is a major factor for keeping the Sundarbans ecosystem functional. Withdrawal of water from the upper reach of the Ganges system reduces fresh water flow below the required level for Sundarbans ecosystem. This is a transboundary issue that depends on the political relationship with India and Bangladesh. Another transboundary issue is the cross-border wild life trafficking.

Against such background, this research critically analyzes the forest management in Bangladesh over time. The analysis includes competency of the legal and policy regime, the capacity of the forest management institutions, the effectiveness of the community participation and governance in the forestry sector, efficacy of forest management approach leading to sustainable management that results healthy forests. An inductive approach that is concerned with the generation of new theory emerging from the data. The aim is to generate a new approach based on the analysis of the gathered data. As such, I have used inductive approach for deciding on data collection and analysis. Examples of successful forest management cases in the regional countries, particularly neighboring countries have been considered for comparison or as a recommended replication model.

## **Country Setting and Context**

Bangladesh has three broad physiographic regions: floodplain, terraces, and hills; of them, however, floodplains constitutes major land mass. Bangladesh is a sub-tropic and enjoys the favor of nature. The crisscross of rivers, alluvial soil, nutrient-rich sediments, moderate temperature, rain and freshwater flow from the upper catchment supports biodiversity in Bangladesh. Geographical location and the climate regime endowed Bangladesh with diverse forest ecosystems. Bangladesh has natural forests in the hills, plain land and in the coast. Hills and terraces host tropical moist evergreen and semi-evergreen forests, the mangroves are in the intertidal zones and Sal forests in the central high plain land (FD, 2015). The

natural setting and location blessed Bangladesh with the life-giving monsoon in one hand and made her vulnerable to weather extremes and climate change on the other.

Bangladesh supports more than 1100 people per sq.km. Only Singapore, Hong Kong, Gaja Strip and Bahrain has more population density than Bangladesh (World Atlas, 2017). Despite high population density and natural calamities, Bangladesh has been witnessing steady growth in GDP. Since 1971, the development of various growth indicators is noteworthy, such as, installed generation capacity of electricity was only 200 MW in 1972 and has increased to 11,532 MW in 2015. GDP in the then East Pakistan was 4.30 Billion USD in 1960 and reached to 173.82 Billion USD in 2014 in Bangladesh. Per capita GDP was 1,273.57 USD in 1990 and 2,991.33 USD in 2014, when adjusted by Purchasing Power Parity (PPP). UN has declared Bangladesh, a developing economy in March 2018; however, Bangladesh must maintain relevant indicators through to 2024 to finally graduate. GDP contribution of agriculture is 18.40 %, however, employ 47.4% in agriculture; forestry occupation and forest sector contribution to the national economy is decreasing gradually from 1.43% (2007-8), 1.38% (2008-9), 1.34% (2009-10), 1.28% (2010-11), 1.23% (2011-12), 1.19% (2012-2013) (BBS, 2014).

Meanwhile, the full-time employment equivalent in the forestry sector has also been reduced from 1.65 million in 1990 to 1.5 million in 2010. However, women employment increased from 0.15 million to 0.6 million during the same period. Nonetheless, agriculture remains important even in the face of rapid urbanization and transformation of the economy towards medium-sized industrialization. The forest ecosystem has a vital role in maintaining the hydrological regime that sustains the wetlands and agriculture in Bangladesh. Biodiversity-rich forestecosystems provide environmental services to the wider community and livelihood and other support to the resource dependent population (Sharma and Banik, 2011).

## **Forest Resources of Bangladesh**

The deciduous Sal forests in the north-west and central Bangladesh covered more than 0.12 million hectares (Champion, et al., 1965) of these over 68 thousand hectares are reserved, 31 thousand hectares are acquired forests and around 3 thousand hectares are protected forests and 20 thousand hectares are vested forests (FMP, 1995). There are 41 tree species in the Sal forests of them Sal (*Shorea robusta*) is around 70-75%, possesses excellent coppicing capacity; and there are Koroi (*Albizia procera*), Azuli (*Dillenia pentagyna*), Sonalu (*Cassia fistula*), Bohera (*Terminalia belerica*), Haritaki (*Terminalia chebula*), Kanchan (*Bauhinia acuminata*), Jarul (*Lagerstroemia speciosa*), Jam (*Syzygium spp.*) and others; and these

forests support high number of climbers and woody perennials of medicinal value (Ahmed, 2008). The Sal forest is the home to around 230 animal species (Ahmed, 2008).

The Hill Forests have numerous plant and animal species. The tree species include, Garjan, Chapalish, Telsur etc., other than bamboo and cane (Islam, 2016).

Natural mangroves, the Sundarbans is a world heritage site. It spreads over parts of Bangladesh and India. Bangladesh part constitutes 601,700 hectares (ha) including 317,950.08 ha as PAs. The designated PAs are: Sundarbans West Wildlife Sanctuary with 119,718.88 ha; Sundarbans East Wildlife Sanctuary with 122920.90 ha.; and Sundarbans South Wildlife Sanctuary with 75310.30 ha. (FD, 2017). Sundarbans is a unique habitat for many wildlife including Bengal Tiger, Gangetic Dolphin, Monitor Lizard, Estuarine Crocodile Green Turtle and Rock Python; Gewa, Baen, Passur and Sundari are abundant tree species in Sundarbans, however Sundari (*Heritiera fomes*) spread more than 73% of the Sundarbans Reserve Forest; Golpata, honey, fish etc. are non-timber Sundarbans product (Islam, 2016).

Ratargul Swamp Forest located in Sylhet district is the only remaining natural freshwater Swamp forest in the country and one of the few remaining freshwater swamp forests in the world. The area of the Ratargul Evergreen Forest is 204.24 ha (GoB, 2015 b) covered mostly with Hizol and Koroch and is a home to snakes, monkeys, lizards, insects, birds and is a reliable source of fish.

Since 1960, the Forest Department has been implementing afforestation programs on the coastal embankments, newly accreted coastal char lands and offshore islands, along with the 710 kilometers (km) of coastline. Till 2014, over 0.17 million hectares of embankments, chars, and islands have been planted. These planted mangroves provide a natural protection against weather extremes. In 2015, the GoB has undertaken an afforestation project with World Bank funding to establish plantations of mangrove on 12,355 ha, non-mangrove on 400 ha and strip plantation along 678 km coastal areas (Islam, 2016). Currently (2015) a total of 26,379 ha. of forest lands are under rubber cultivation. (Sylhet-3418ha., Chittagong-8121 ha., and Tangail-14840 ha. (BFIDC, 2015).

The final type of forest is homestead forests. Throughout Bangladesh in all villages and almost in all homesteads, there are fruit trees, timber trees, bamboos that provide fuel, food, fodder and medicines (Rahman, et al., 2006). Researchers in a study in the villages of the central region of Bangladesh found 58 woody species of them 29 timbers, 25 fruits and 4 bamboos (Rahman et. al., 2006). The homesteads produce around 90% of fuelwood and bamboo (Singh, 2000) and most of the other forest produce available in the market (GoB, 1998).



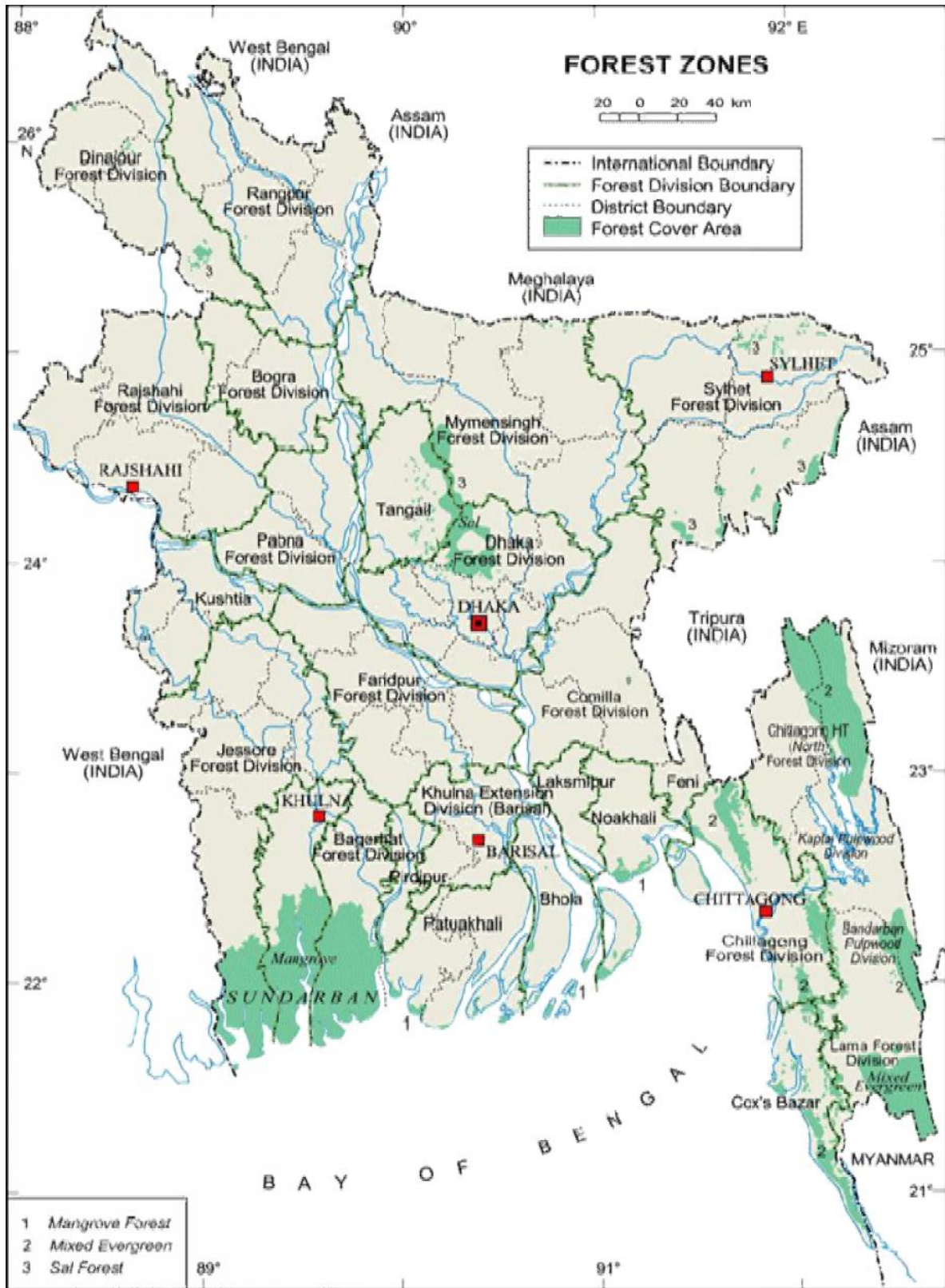


Figure 1: Map Showing the forest zones of Bangladesh

## **Statement of Problem**

The tree densities and extent of forests are reducing for many reasons. Overall, the direct drivers of deforestation in the South-East Asian region can be divided into five main categories (in order of importance): a. Agricultural Expansion (Deforestation); b. Wood Extraction (Deforestation); c. Infrastructure Expansion (Deforestation); d. Natural Disasters (Degradation); e. Exploitation of Natural Resources, such as mining activities (Deforestation /Degradation) (EC, 2010). Following are more specific problems in Bangladesh:

- Forest land encroachment and conversion: Leasing forest land for various non-forest use, settlements, conversion by the state for development infrastructures and industries
- Forest degradation: Overexploitation of fuelwoods, illegal tree felling and poaching.
- Lack of good governance: Political influence, corruption, capacity of the forest management institution, effective community participation

## **Objectives of the Research**

This research seeks to understand the management of Bangladesh forests, and the drivers or causes of: their degradation and disappearance. To this end, it will examine the forest management approaches and practices, effectiveness of legal and policy regime, capacities of the forest management institutions and, the other underlying forest governance issues. The specific objectives are to:

- v) critically analyze the underlying causes of forest degradation and deforestation
- vi) examine the existing approaches and practices in managing forest resources
- vii) understand and outline the legal and policy regime of the forestry sector, and
- viii) generate knowledge on sustainable forest management practices to redress the forest degradation and enhance the forestry sector governance in Bangladesh

## **Research Questions**

Following are the research questions to realize the objectives of the research:

What are the major reason for forest degradation?

What are the main reason for deforestation?

What are the reasons for conversion of the forest land?

What forest management approaches Forest Department exercised over the years?

What management plans were prepared and implemented by the Forest Department?

What forest management practices are used by the Forest Department over the years?

Is the existing Forest Policy guides the forest management addressing contemporary forest management challenges and issues?

Are the existing Forest Acts adequate in terms of forest protection and biodiversity conservation? Are the existing Forest Acts enforceable in the current context?

Are the Forest Management Institutions capable of managing the forest?

Are the people's participation in the forest management effective?

How far the forest management are coordinated among relevant agencies and wider stakeholders?

## **The Rationale of the Research**

After Rio 1992, UN Millennium Development Goals (MDG) 2000 emphasizes to “ensure environmental sustainability” in Goal # 7. MDG is replaced by Sustainable Development Goals (SDGs) in 2015 that has 17 goals covering a broad range of sustainable development issues including protecting forests. The Millennium Ecosystem Assessment or MA (2005) finds 15 out of 25 vital ecosystems services are degrading globally. The forests are the major source of most of these services.

The outputs of these momentous events are the repository of contemporary knowledge on various aspects of natural resource management including forest management. The repository also archives expressed needs of the society, people's perceptions, and aspiration on forest management. Such consensus-based guidance helps shifting paradigms of management practices. Both MDG and SDG points about the demand of the time to review and adjust various forest management policy tools and instruments.

In Bangladesh, we have Forest Policy, 1994 in place as a major tool to manage the sector. However, critique argues the policy has narrow focus and lack of conservation initiative; as such a new forest policy formulation is the demand of time (Ali and Morshed, 2011). A new Forest Policy, 2017 has been submitted for approval. New Legislation in the light of National Forest Policy is inevitable to prevent the non-forestry use of forest land (Rahman, 2011).

Bangladesh Forestry Sector Master Plan was developed in 1993 and approved in 1995 for 20 years which has expired in 2015. Development of the next Forestry Sector Master Plan has already been initiated in February 2016 by the Forest Department under World Bank-supported project. Forest management in Bangladesh is in its trajectory; practiced different

models including clear-felling and natural regeneration, clear felling and planting valued species, selection-cum-improvement felling, Community Forestry, Social Forestry, and Co-management. Rahman (2011) suggests rationalizing human resource planning to enable the Forest Department to retool its workers to effectively protect forests (Rahman, 2011).

Bangladesh constitution provided safe guard to forests; Forest policy and Forest Acts are in place; century old Forest Department is a devoted for the forest management. Nonetheless, the natural forest extent and quality are gradually declining. It is evident that forest management in Bangladesh requires improvement to sustainably manage natural forest resources. Forest management has reached a level of efficiency around the world and in the regional countries. Bangladesh has ratified relevant Conventions and Treaties which have a direct bearing on forest management. It is necessary to capitalize the knowledge, experience and technology emerged through these milestone conferences, conventions, and studies. The policy makers should realize contemporary forest management standard, practices and expectations. Therefore, the forest management policies and principles of Bangladesh should interpret and integrate such standards and practices. This research attempts to delineate such practices, principles, and standards of sustainable forest management with a view to contribute towards an enhanced forest governance regime of Bangladesh.

### **The Scope of this Research**

Literature review sets the scope for this research. The review includes published books, articles, working papers, management plans, project reports, academic research works, government reports; and websites of global, regional and Bangladeshi forest sector institutions. The research scope includes review, assess and analyses:

- historical and contemporary management of forest in Bangladesh
- management approach and forestry practices
- the drivers of degradation and deforestation
- community participation in management
- the capacities of the forest management institutions
- forest law and forest policy
- the trends and status of forest health including the extent, quality, and biodiversity
- governance issues

The Scope includes conducting a case study on a selected forest; the collection of primary and secondary data to review, assess and analyzes above-mentioned elements of the forest

management. Revealing the relation of the forest resource-dependent communities with the case forest in terms of drawing from the forest for subsistence and livelihoods; explore perception and aspiration of the dependent community remains within the scope of the research. The resource-dependent communities have been identified in 30 villages near the Lawachara forest during 2008 to 2013 by the IPAC project. The project facilitated the formation of Village Conservation Forum (VCF) into each of the 30 villages with the resource-dependent households as the members. A total of 2,982 households are dependent on the Lawachara forest, of the 1,191 household members have received support for alternate livelihoods from Climate Resilient Ecosystem and Livelihoods (CREL) project and 1,791 VCF members did not receive any support. This research conducts:

- Focus Group Discussion with randomly selected VCFs and the CMC
- Survey randomly selected supported and non-supported households

The scope also includes gathering knowledge, experience, and perceptions of the researchers, forest management professionals, practitioners, policymakers, and administrators. Forest management success in the Asia and the Pacific regional countries, particularly neighboring countries has been explored to draw suitable measures for Bangladesh contexts.

### **Limitations of this Research**

Forestry has become more multi-dimensional after the Earth Summit in 1992 (Ali and Morshed, 2011). However, authentic data on different dimensions of the forest; their relevance and bearings on the livelihoods; and for the economy is rarely available for Bangladesh. FAO, the UN organization that works for the forestry sector data gathering, analyzing, archiving and dissemination for the nations around the world to support to manage their forests sustainably. For example, FAO analyzed the national forest sector published data in this regard and published “Contribution of the Forestry Sector to National Economies, 1990-2011” in 2014, Global Forest Resources Assessment 2015: How are the world’s forests changing? Global Forest Resources Assessment 2015: Desk reference; the desk reference includes Bangladesh chapter. These publications draw data and information from the Bangladesh Forest Department which is not always updated. Primary data collection for this research is limited to one case forest only and collected data using household survey, FGD, and KII for the case forests. Forest extent, canopy coverage, and encroachment data have been used from secondary sources. Extraction data collected from the resource extractors.

## **Content of the Following Chapters**

This research, the Forest Management in Bangladesh: A critical Analysis has been conducted at National level and into the Lawachara forest which is a National Park and Protected Area. Besides the introductory chapters, the contents have been presented in to two parts. Part 1 presents national level study (chapter 4, 5, 6, 7 and 8) and part 2 presents Case Study of a National Park and Protected Area, the Lawachara forest (chapter 9) and then the Part 3 includes chapter 10 that presents discussion and critical reflection and chapter 11 presents key findings of the case study, national level forest management and concluding remarks for the forest management in Bangladesh.

Chapter 1 introduces the research topic including the forest coverage, historical forest management, forest resources, degradation, deforestation. This chapter also includes a brief description of the country context including socio-economic conditions. This chapter added problem statement, research questions, the rationale for the research, objectives, scope and limitation of the research.

Chapter 2 sets the theoretical framework and accordingly develops an analytical framework for the analysis. Indicators and corresponding diagnostic questions used provide answers to the research questions in accordance with the analytical framework. The indicators and corresponding diagnostic questions are included in the annex.

Chapter 3 describes the methodology including the approach, data collection, sample size, and methods of analysis.

Chapter 4 describes Forest Management in Bangladesh including history, forest management plan, forest management approach, forest management practice, monitoring & evaluation and emerging issues like climate change and the transboundary issues.

Chapter 5 portrays the Forest Management Institutions in Bangladesh including the controlling ministry, Ministry of Environment and Forests and Forest Department, Forest Research Institute, Forest Academy, Forest training Schools and Forest Industries Development Corporation. This chapter elaborates the role, functions and capacity of these forest management institutions in regard to forest management.

Chapter 6 reviews Forest Law and Policy regime including land tenure law and international protocol and treaties.

Chapter 7 reviews the governance in the forest sector focusing community participation, capacity, coordination, transparency, and accountability of the forest management institution and efficacy of the legal and policy regimes.

Chapter 8 describes forest health including degradation, deforestation and conversion and biodiversity.

Chapter 9 presents the case study of a National Park and Protected Area, the Lawachara forest.

Chapter 10 presents critical reflections and discussion on forest health, forest management approaches, community participation, forest management institutions, legal and policy regime and the governance drawing inference of the case study.

Chapter 11 presents key findings and concluding remarks.

## **Chapter 2: Theoretical Aspects and Analytical Framework**



## **Theoretical Aspects and Analytical Framework**

Large bodies of interrelated theories provided underpinning to develop the analytical framework to realize objectives of this research. Traditionally, the objective of forest management was to maintain a sustainable yield. Large-scale commercial forestry including plantation still do manage forests for yield maximization and sustenance. However, there is a major shift in managing natural forests or at least some of the natural forests for social, environmental and economic benefit throughout the world. Moreover, various qualification has been applied on forest lands declaring e.g. Protected Area (under different nomenclature like National Park, Wild Life Sanctuary etc.) throughout the world for the conservation of forests and wildlife and preservation of threatened species. The sustainable forest management concept as it stands now has evolved over the decades to ensure ecosystem services and products; combating challenges emerging because of changes in the economy, society, and the environment. For example, till the last decade of the last century forests are either not managed or managed for sustainable harvest. Whereas since the Earth Summit held in 1992 and adoption of globally consensual Forest Principles, the forest management is shifting paradigms. Theoretical underpinning is available for different philosophies of management that have bearing in shaping the forest management to sustainability and providing much needed social, environmental and economic dividends.

## **Theoretical Aspects of Sustainable Forest Management**

The theoretical underpinning for the forest management finds Yield Table as the basis for various Forest Yield Models. Since evolved, the Forest Yield Models ruled the forest management for more than 150 years. The models are still in use; updated with contemporary technological development and digitization. However, few more consideration evolved and gained access to the arena of forest management. During the mid of the last century, the philosophers, scientists, and sociologists initiated a discourse on common property management, e.g. Garrett Hardin in his masterpiece “Tragedy of the Commons” (1968). This was followed by the development professionals, environmentalists, anthropologist and economists among others. Many of them started thinking and delivering the various piece of research results on the discourse. Large bodies of scholar denied Hardin’s metaphor and argued participatory management of common property has been and is a solution for sustenance. Only during the eighties of the last century gradually various forest management theories other than the Forest Yield Models emerged. This research has drawn from

management theories of Common Pool Resources, Sustainable Forest Management, Co-management, Political Ecology and Cultural Ecology other than the Forest Yield models.

## **Forest Yield Models**

The sustainable forest management till the 1990s was meant to be able to harvest sustainably. The Forest Yield Model evolved from the first yield tables developed by Hundeshagen in 1825 (Hundeshagen, 1825 cited in Pretzsch, 2000, p.1). The yield table provides the harvest prediction considering the growth, mortality, and dynamics of the forest stands. The forest managers can decide on silvicultural options like cutting and harvest limit. The Forest Yield Model provides growth value for different aged forest stands; prescription for thinning, separate yield tables for thinning and standing trees; and unthinned stands is shown in another table that also shows a summary volume lost due to mortality; shows values of stand age, top height, trees per ha., breast height mean diameter (dbh), mean volume per tree, basal area per ha., volume per ha., mortality % for unthinned stands and mean annual increment (MAI) (Vanclay, 1994).

The yield models have advantages of the simplicity; however, the assumption of the constant site index is increasingly unacceptable because of changing natural endowment (Johnsen et al., 2001). The static inventory multiplied by net area provides resource estimates; applying a dynamic inventory using growth models provide future stands, and assuming area estimates and multiplying on the stand provide resource forecasts (Vanclay, 1994). However, yield tables are basically for the even-aged silvicultural system and have limited application to complex forest stands; this subject requires further research and development (Forest Research, 2017). There are six classes of forest models commonly mentioned by the reviewers. However, these models have structural shortcomings: for example, considering environmental conditions constant; not considering the nutrient cycle, climatic parameters and moisture regime (Monserud, 2003).

The empirical yield based model when merged with physiological model resulted in the Hybrid model which has the potential of providing better results (Johnsen et al., 2001). Polycyclic system and Monocyclic system are two general approaches to Sustainable Natural Forest Management (SNFM) in the tropic. The polycyclic system maintains multi-layer, multi-age structure following selective logging based on minimum harvest diameter. The monocyclic system is for a homogenous forest age structure. The polycyclic approach is widely used and reduced impact logging is accepted widely (Grulke, M., et.al. 2016). Of the

various planning techniques, sequential simulation is relatively the easiest of all, to implement and interpret that, however, requires an in-depth knowledge of the problem domain to be able to generate reasonably reliable results (Nurullah, 2011).

## **Common Pool Resources**

Forests, fisheries, rangelands and other environmental resources are traditionally managed as common property. These ecosystems are not divisible by individual ownership; however, over-extraction and other unwise use to benefit privately (Robbins, 2004) necessitates management for maintaining productivity. Entrance of coercive state and new market into social economy, appropriates handing over of the common property ownership to elites and nonresidents (Robbins, 2004). During the 1960s, Garrett Hardin pursued a research on common property resources; and has written a book on the common property management titled “Tragedy of the Commons” in 1968. The system of management by a group of common people is not economically efficient and resources management turns to tragedy, as such strong role of formal institutions are necessary to avoid the tragedy of the commons (Hardin, 1968). Soon after expressed, numbers of scholars challenged this view and advocated decentralized collective management of the common resources (Feeny, et al. 1990; Ostrom,1990; Ostrom et al. 1999). Exclusion is difficult for commons resources, however involves sub-tractability (Ostrom,1990; Feeny et al. 1990). Elinor Ostrom (2002) offered following eight principles for sustainably and equitably manage commons based on her extensive research work:

- The group boundary must be clearly delineated
- Rules for governing common resources must consider local needs and conditions
- In modifying rules affected persons must participate
- The outside authorities must respect rule-making rights of local communities
- There must be system to monitor the behavior of the local resource user by themselves
- There must be sanctions for the Rule violators.
- Dispute resolution means must be low cost and community access must be ensured
- It is necessary to build a mechanism for shared responsibility of the governance for the common resources nested from the lowest level to the entire interconnected system

Hoole (2008) mentioned emerging new paradigm include, local people as participants, partners, or beneficiaries in management. Until recently the subject forestry was not made

public, common people are yet to understand the necessity of knowing forestry (Jalil, 2011). Features for successful collective action in defined forest resources are agreed on rules for access and use, sanctions for violating rules, mechanisms for resolution of conflict, local rights recognized and nested enterprises (Ostrom,1990; Hoole, 2008). Resource-dependent poor people's engagement in decision-making process yields the outcome that favors them (IFAD, 2015). It is necessary to consider multiple interests and actors within and among communities; and an understanding of how they influence the decision making, taking internal and external institutions into account (Agrawal & Gibson, 1999).

### **Sustainable Forest Management Concept**

The concept for managing forest resources sustainably, as it stands now, is comparatively new and is emerging. There is no globally accepted definition of sustainable forest management (Kruk and Kornatowska, 2014). Sustainable development concept (Keiner, 2004) is considered in forestry like other sectors (Kruk and Kornatowska,2014). The Brundtland Commission in the report titled "Our Common Future" in 1987 defined sustainable development that supports present generation's need not limiting resource base to meet the needs of the future generation; this definition has so far been widely accepted (Keiner, 2004). The social and cultural dimensions have been incorporated along with economic and environmental dimension in the concept of sustainable forest management in line with the Forest Principles agreed in 1992 (Castaneda, 2000). The World Conservation Strategy (IUCN 1980), Our Common Future (World Commission on Environment & Development, 1987), Caring for the Earth (IUCN; UNEP; WWF: 1991), the United Nations Conference on Environment and Development (UNCED) 1992 and Agenda 21 have successively emphasized environmental integrity while human development need must be realized (Hoole& Milne 1995). For conservation of Protected Area and biodiversity there in sustainably, requires consideration of biophysical landscape and the complex socio-political situation surrounding the Protected Area (Gbadegesin & Ayileka 2000).

### **Co-Management Theory**

Co-Management is a partnership among government agencies, local communities and resource users, non-governmental organizations and other stakeholders to share the authority and responsibility to manage given area or resources (Viné, et al.,2009; Borrini-Feyerabend et al, 2007). The concept of Co-Management in the literature is explicitly for natural resources management (Carlsson and Berkes, 2005). Government overcoming protectionism

collaborates with the community for conservation (Western & Wright 1994) in community-based forest management. Collective Action approach highlights the principles and rules that institutions shape for sustainable management within the commons (Ostrom, 1990; Ostrom, et al. 1994). Co-Management offers right to local communities, encourages performing relevant duties and discharge respective responsibilities by the various stakeholders (Carlsson and Berkes, 2005; Parr et al., 2013; Berkes et al., 1991). Co-Management uses traditional and scientific knowledge in resource management. Different actors play respective roles in Co-Management that promotes consultations, participatory learning, local planning, devolution, and biodiversity conservation (Borrini -Feyerabend et al., 2004; Berkes et al., 1991).

### **Political Ecology**

Ecological risk mitigation by efficiency is a major focus of the political ecology; first introduced by Eric Wolf, in 1972; however, many precursors were found with a slight variation in meaning, e.g. Peter Alexeivich Kropotkin's critical social ecology; many others like Alexander Humboldt, Elisee Reclus, Russel Wallace, Mary Fairfax Somerville, George Perkin Marsh worked on critical approaches (Khan, 2013). The carrying capacity concept uncritically assumed limits to human density (Robbins, 2004). The materialists view the changes in the society is due to changes in the production mode and the social organization that is rooted in the production system; combination, recombination, and interrelations of different elements of the production system direct different means of making living from nature (Robbins, 2004). The unequal power relation and biophysical nature of the forests, and the macro interests of the exogenous actors like the donor, and endogenous actors like state and local NGOs mutually interact in the context of a common interest that create a 'politicized' environment (Khan, 2013). Musquito Indians have specialized in hunting turtle; they do not have access to expensive instruments or mastery of knowledge for production. Monetization of the local economy resulted in more hunting and trading and breakdown reciprocity; materialists believe that environmental degradation is inevitable in capitalism (Robbins, 2004).

The economy and the political will had always influenced forest land tenure and management during colonial British India, during exploitative Pakistan period and now in the independent Bangladesh. The British colonial regime wanted control over all lands of the India that included forests. The Court of Directors of British government issued a ten-year

(Decennial) settlement to lease land to the Zamidars in 1790, which was made permanent in 1793, famous as Permanent Settlement. Crown Land (Encroachment) Ordinance, 1840 targeted forests in Britain's Asian colonies, and vested all forests, wastelands, unoccupied and uncultivated lands to the Crown. The ownership was asserted through the Indian Forest Act of 1865. However, British regime acquired control of all wastelands (includes forests) enacting Forest Act of 1878. Under the provision of the 'Permanent Settlement 1793' land was leased out permanently to the Zamidars that in most cases included forests. Thus, forests became private property. Forest was converted to agriculture land to increase profit which enables leaseholder to pay tax to the Crown against leased land (Hassan, 2011). British regime commercialized forestry and harvested timbers for shipbuilding industries, railways, and others. Revenue generated from the forests was used to meet the costs of the First and the Second World War among others. During the Second World War, colonial ruler felled excessive trees (Bandopadhyay and Hasan, 2009).

The permanent settlement of 1793 was abolished enacting State Acquisition and Tenancy Act (SATA) 1950 that bring back forests to government ownership (Hassan, 2011). This Act declared forest land non-retainable by the private owner. Forest Department on behalf of the government became the custodian of the forest lands. However, forest management and resource extraction during the Pakistan period (1947-1971) remain like that of British period i.e. forest managed by state maximizing economic return (Khan, 1998). Bangladesh continued Economic Efficiency Focused (EEF) natural resources management exploiting resources for the immediate economic benefit (Khan, 2011; Khan, 1998). Customary user right was denied in the Protected Area established before the 1980s; directed by the Wildlife Preservation Act 1974 (GoB, 1974). The political ecology approach facing many more complexities accommodates importance of environmental changes and stress of political economy in determining human-environment relationships (Biersack, 2006).

## **Cultural Ecology**

Culture in the society drives mode of livelihood persuasions, means and ways to do so, for example, hunting or grazing. On the other hand, needs of the society divert culture as well. For example, the protein provision (ecological value) and traction power to agriculture made cowsacred in India (Robbin, 2004). Wolf assessed and reflected on the cultural ecology; the degree to which small societies developed culture attributes depending on the environmental endowment possibilities (Butzer, 1989). Local knowledge in the society that has generated over the years and becomes a part of the culture, supports Co-Management(Raman, 2011).

Ikalahan indigenous community successfully restored and managed Kalahan Forest Reserve in Pangasinan Province, Philippines by incorporating Ikalahan culture; Government Order in 1998 recognized the customary rights to manage Kruidamar agroforests, Sumatra, Indonesia that restored century-old excellence through well-defined traditional management practices of Krui people; Indigenous People's Rights Act (1997) provided land tenure to Ifugao people that helped establish Muyong system, a time tested traditional system of patch forests adjacent to Ifugao settlement; the Fasak community gained forest management capacity and instead of selling harvesting rights manage forests on the island of Espiritu Santo, Vanuatu (FAO, 2005).

### **Analytical Framework**

The traditional forest management was for sustainable yield and profit maximization. As such approach was to clear fell and artificial regeneration through a plantation of the valued timber species. Historically the forest resources were a common pool and were managed by the commons. During last around 40 years (Brundtland Commission report in 1987 “Our Common Future”), the concept of sustainable forest management emerged accommodating environmental and social considerations along with economic benefit. Social and environmental considerations call for the political and cultural ecology since the driving force for the economy is political and culture is an integral part of the society. This research has drawn from the analysis of i) the traditional and historic Forest Yield Tables to Forest Yield Models, ii) the theory of common pool resources management, iii) sustainable forest management concepts that accommodates social, economic and environmental considerations, Co-Management theory, i.e. collaborative approach to resource management, v) political ecology which defines the role of the political regime on forest management in this instance, and vi) cultural ecology, since culture of the people who live in the forest has bearing on the forest health.

Forests and forest management in Bangladesh inherits the legacy from the Mughal period and beyond. During last couple of centuries, the forest management varied because of the change of the political regime and the changes globally occurred on socio-economic and cultural paradigm. Before the British colonial regime that started in India in 1757, the forests were generally were openly accessible and used as common properties. Till today, the mindset of the dependent people feels that way and are allowed collection of the NTFP. British colonialist initiated formal forest management when they have gone for production forestry and harvested following different logging practices. Sustainable forest management concept is

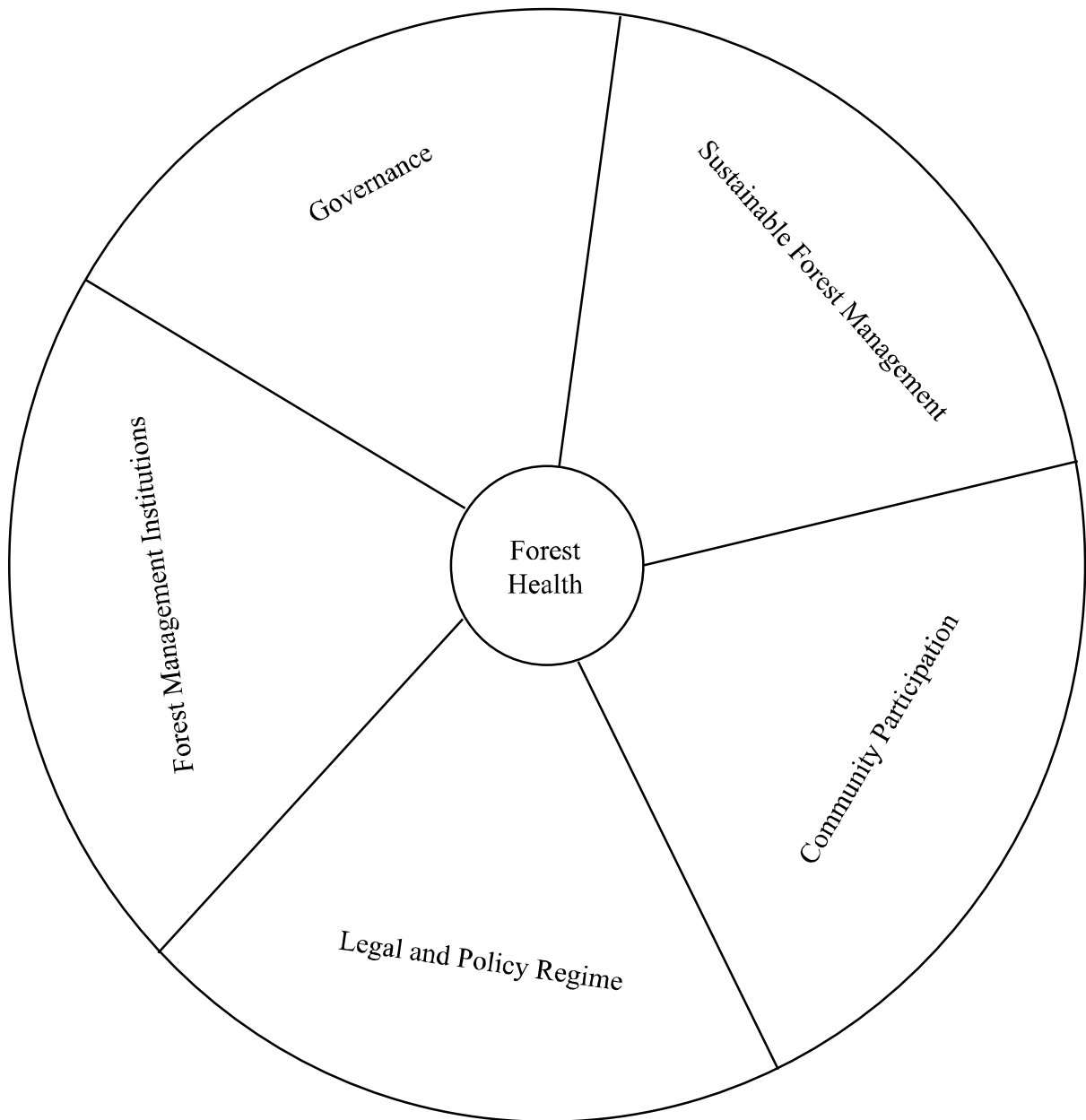
very much pertinent in recent years throughout the world and is considered the way to protect the remaining forest resources. In the market economy driven world, the forest management must consider the political ecology and cultural ecology is highly relevant in the forest management consideration, because the people living in the forest since long are culture based societies. As such, the research has integrated these multiple theories to critically analyze the forest management of Bangladesh.

Setting criteria and indicators (C&I) for sustainable forest management was originally conceived through the Forest Principles and Chapter 11 of Agenda 21 of the Rio Declaration on Environment and Development (Mendoza and Prabhu, 2000 cited in C.E. Haque et al., 2012); Bangladesh Forest Policy 1994, which still governs Bangladesh Forest management reflected these criteria and indicators (C.E. Haque et al., 2012). Indian Institute of Forest Management in collaboration with ITTO and DAFS, USA with support from FAO and UNEP, organized a workshop in Bhopal in 1999 that worked on SFM criteria for the regional countries (FAO, 1999 cited in C.E. Haque et al. 2012). Learning from this workshop, Ten Asian countries including India and Bangladesh, under the auspices of the 'Dry Forest in Asia Process' identified 8 criteria and 49 indicators for dry forests in Asia applicable at national level; the criteria includes extension of forest, conservation and enhancement of biodiversity, ecosystem function and vitality, conservation and maintenance of soil and water resources, forest resource productivity, optimization of forest resource use, Maintenance and enhancement of social, cultural and spiritual benefits and Adequacy of policy, legal and institutional framework (C.E. Haque et al. 2012). Globally agreed country-level criteria for sustainable forest management are: i) forest health (forest extent, biodiversity, vitality, productivity, protective function), ii) forest policy and legal regime, iii) Forest management institutions in accordance with the country setting, and iv) economic, social and cultural needs; a set of quantitative or qualitative indicators are to be determined for each criterion to monitor the effects of forest management (Castaneda, 2000). Since the adoption of Agenda 21 and the CBD principles, the conservation of the natural resources become governance issue (Craig and Jeffery, 2008). The governance issues vary considerably based on the context and the scope of work. The development agencies like UNDP, WB, OECD and the Commission on global governance and Institute of Governance and many others defined governance. The basic elements of governance per the OECD are transparency, openness, fairness, accountability, efficiency and effective services (Bosselmann, et.al 2008). Governance comprises of the way of power exercised by the institutions through processes abiding by the conventions to make important decisions for the society accommodating various interests



(Institute on Governance, 2003). Governance is the way of power exercise to manage economic and social resources of a country (World Bank, 1997). Governance is the arrangement for sharing authority, responsibility among government and non-government actor through a process that allows raising the voice of each stakeholder, responsive, accountable and fair decision making to protect the interest of the society and ensure fair benefit distribution (Nath and Inoue, 2008). Good governance ensures engagement of the dependent community in the resource management decision making (Berkes, 2009). Governance guides participation and process of decision-making whereas management addresses implementation and outcome (Rashid, 2012).

Conflicts between the actors and resolution of the conflicts, coordination among agencies and organizations involved and collaboration among them are important governance element. Issues for sustainable forest management are to be assessed considering transparency, participation, accountability; coordination and capacity of the government, non-government and community actors and the efficacy of legal and policy regime; and the status of policy implementation and enforcement of law and monitoring (Brito et al., 2009). In line with globally accepted principles of good governance and the actors and issues considering the context of Bangladesh, this research has developed following analytical framework to critically analyze the forest management in Bangladesh.



**Figure 2: Analytical Framework to forest management**

Forest health refers to maintaining forest extent, biodiversity, vitality, productivity, and ecosystem services. A healthy forest would mean the physical extent of the forest remain unchanged i.e. the forest has not been encroached and or converted to other land use. The forest has not been fragmented allowing roads or railways or any other infrastructures inside the forest area. The vitality of the forest resources means the capability of regeneration naturally; the productivity of the forest remains as expected. The healthy forest offers usual ecosystem services and goods; biodiversity is maintained and the forest can offer the protective function against natural hazards.

Governance for this research refers to competent and enforceable legal regime, implementable policy in place that helps keeping the forest healthy responding to the contemporary issues; encouraging devolution of the forest management authority to the community, i.e. effective engagement of the community in the management of the forest; The competent forest management institution must implement forest policy and enforce law in coordination with the stakeholders; must ensure accountability and transparency. Governance is of critical importance to result in a healthy forest.

A policy is the intention of the government. It changes over time with the change in the context. Policy determines whether the forest will be protected or deforested for other land use, whether there shall be a moratorium or sustainable harvest and so on and so forth. To keep the forest healthy many things are necessary. The policy is the document that raises all these issues and declare the government position on these issues.

The Forest law provides legal support for the implementation of the policy. Forest law has the provision to treat the forest offenses, provisions for declaring reserve to ensure ecosystem functionality and maintain ecosystem services. Rules, once enacted under the provision of the Act, are as good as law and guides the implementation of the provisions including, for example, community participation in planning and implementing the plans.

Since the beginning of the human civilization people has direct interaction with the forest for several purposes including the collection of food, house building material, thatching material, fuel and for livelihood. The forest provides protection from the extreme weather events. Communities dependent on the forest historically are conservation oriented and harvested wisely. However, once the communities were segregated from the forest, they disowned forest resources and for many other reasons unsustainable harvest begun. It is widely accepted in recent years that without the effective engagement of the community, the forest cannot be managed sustainably and forest health must deteriorate. Policy and law must have provisions for community participation in forest management. Community participation is also a basic pillar for ensuring governance.

Forest management Institutions play a key role in forest management. The capacity of the institutions is very important. Forest Department is the custodian of the forest resources including forest land. The ultimate responsibility of maintaining healthy forest remains with the Forest Department and the associated other institutions like Forest Research Institute,

Forest Education Institutes and others have their respective roles in keeping the forests healthy.

Sustainable Forest Management considers forest management practice, develop a balanced working plan, yield prediction, control over other technical requirements and must include political, social and economic criteria. To offset the environmental and management problems, understanding of socio-political influence and scientific knowledge on the environment are necessary. The environment and social costs of forest degradation must be internalized. Technical and financial capacities of stakeholders on sustainable forest management and harvesting are an integral part of sustainable forest management. In other words, for sustainable forest management legal and policy regime, governance, community participation, competent Forest Management Institution are necessary. Sustainable forest management would result in a healthy forest. All these components of the analytical framework are interlinked and collectively provides the tool to analyze forest management.

The forests of diverse types in Bangladesh are at different state of health. i.e. extent, degradation, deforestation, encroachment, wildlife availability etc. There are set of legal and policy regime for the management of forests. Forest Management Institutions with different level of competence are mandated to operate under the auspices of the legal and policy regime. These institutions are responsible for implementation of the policy and enforcement of the law, conduct research and train forest professionals. The good governance (effective community participation, coordination, capacity, transparency and accountability) is essential to manage forest sustainably; which necessitates participation of local forest resource dependent communities. Sustainable Forest Management technically involves developing and implementing management plan, deciding on approach, silvicultural practice, monitoring and evaluation. To critically analyze the forest management in Bangladesh, the components of the analytical framework are synonymous to criteria. For each of the criterion a few indicators and corresponding diagnostic questions has been used to get answers of the set research questions (Annex 1).

## **Chapter 3: Methodology**

## **Methodology**

This chapter describes the approach taken and data collection from the primary and secondary sources using quantitative and qualitative methods. This research collected data and information from both the national level and the local level. The local level data and information collection has been from a selected National Park and Protected Area. The selected National Park and Protected Area has been considered as a case forest to make inference for the analysis. The primary sources include quantitative data collection from the household survey. Qualitative data has been collected through Key Informants Interview (KII), Focus Group Discussion (FGD), Participant Observation and Case Study. The secondary data has been collected through Desk Review.

### **National level Study**

- i) Desk Review
- ii) Key Informant Interview

### **Lawachara Forest Empirical Study**

- i) Desk Review
- ii) Household Survey
- iii) Key Informant Interview
- iv) Focus Group Discussion
- v) Participant's Observation

The Analysis has been made separately for the national and local level and then inference has been made from the local level to national level. This chapter presents the approach taken, data collection, sample size determination, Key Informant Interview, Focus Group Discussion and participant's Observation. This chapter concludes describing methods of analysis.

## **Approach**

This research has been designed combining both qualitative and quantitative methods to gain a better understanding and in-depth of the socio-ecological aspects. Forest is an ecological unit and the human society has a dependence on services from the forests; while community living near the forests are dependent on forest products for their consumption, if not for livelihoods. Both the social system and ecological systems are complex and are linked; growing attentions are there to understand these systems for adaptive management and conservation (Berkes, et al., 2003). The primary data for this research has, therefore, been gathered using both quantitative and qualitative methods. Secondary data and information

have been gathered from the existing literature. For the analysis, an inductive approach has been taken. The analysis is done at a case forest which is a National Park and Protected Area and at the country-scale. The analysis assumes forest health as the result of sustainable forest management which requires other criteria (components of the analytical framework) functioning appropriately. In generating data and analysis, questions at various level like at national scale and at the local level has been used and then inference has been made.

## **Data Collection**

Data and information for this research have been collected from both primary and secondary sources.

### **Primary Data Collection**

Quantitative and qualitative data has been collected from primary sources.

#### **Quantitative**

Lawachara National Park has been selected as the case forest. High population density exerts heavy biotic pressure on the forest resources and degrades forests (Ahmad, Sharma and Merrill, 2011). However, right for livelihoods cannot be ignored and to reduce pressure sustainable and relevant alternatives are necessary. The research intends to look deep into the matter and structurally unfold the livelihood profile of the dependent community and quantitatively analyze the extraction by the community.

Forest Department identified 30 villages near the Lawachara forest. In each of these villages, Forest Department facilitated the formation of Village Conservation Forum (VCF) of forest resources dependent households during February to May of 2010. A total of 2,982 households are the member to these 30 VCFs. CREL project (October 2012 to September 2017) of the Forest Department, funded by USAID, facilitated VCF members to divert and diversify their livelihoods to non-detrimental to forests. By December 2015 in these 30 VCFs, a total of 1,191 households (supported HHs) members have received support for alternate livelihoods from CREL project and 1,791 (non-supported HHs) VCF members did not receive any livelihood support. Household Survey (HHS) has been conducted using semi-structured questionnaires (Annex 2) to collect quantitative data into these supported and non-supported HHs. The research analyzed the resource extraction and efficacy of the alternative livelihoods on reducing extraction pressure from the forest; the non-beneficiary group has been used as a control population while the livelihoods supported households are the target population.

### **Sample size determination:**

For determining a sample out of the population that statistically represent the population, following formula has been used:

$$n = de \times (Z^2 P(1-P)) / e^2$$

Where n = sample size, P = the proportion that still extracts resources even though received alternate livelihood support, Z = the standard normal distribution, e = error margin and de = the design effect of the sampling method. Since sampling has been designed for simple random sampling, design effect is 1. So, the formula is:  $n = (Z^2 P(1-P)) / e^2$

The p has been considered 0.5 which means 50 % of the population has been considered still extracting even though received alternate livelihood support. This will give the biggest sample size and will be robust in representing the population. Here,  $p=0.5$ , with 95% confidence interval  $Z_{( /2)} = 1.96$  and considering 5% margin of error  $e=0.05$  our sample size  $n=384$ .

Since our population is finite and known livelihood beneficiaries  $N=1,191$ . Using the finite population correction factor our sample size of livelihood beneficiaries:  $n = nN / (n + (N-1)) = 291$  For non-livelihood beneficiaries  $N=1,791$ , after using finite population correction factor our sample size of non-livelihood beneficiaries:  $n = nN / (n + (N-1)) = 316$

### **Qualitative**

The qualitative method such as Key Informant Interview (KII), Focus Group Discussion (FGD), Participants Observation and Case Study has been used to gather qualitative data for the research.

#### **Key Informant Interview (KII)**

Key Informants Interview is a major method to gain comprehensive state of art knowledge and information on the subject matter for this research. A total of 36 respondents have been interviewed using a checklist. The Key Informants includes current and former Chief Conservator of Forests, Deputy Chief Conservator of Forests; Secretary, MOEF, Director of the Forest Academy, Director of BFRI, Chairman of BFIDC, Forestry Professionals and practitioners; Professors from the Public and Private Universities, NGO leaders working in the forest conservation, Member of Parliament, representative of development partners who funds in forestry sector, Country Representative of the UN agency that has specialization in facilitating Forest Management, Chairman of the Parliamentary Standing Committee on Forests and Environment, community leaders and dependent community representatives.



### Focus Group Discussion (FGD)

Focus Group Discussion (FGD) conducted to selected forest-dependent communities. Lawachara National Park is the case forest. There are 30 villages in and near the forest. Many households collect forest resources for consumptions and to meet livelihood needs. Forests are degrading because of extraction of forest resources more than the sustainable limit. The degraded forest cannot maintain ecosystem functionality. Focus Group Discussion held to gather collective perspective of the resource-dependent villagers on Forest Management, drivers of forest degradation, deforestation, the status of enforcement of forest laws, governance, the relation between the protected area and the forest-dependent Bengali community, ethnic community, and Tea garden village community in respective FGDs.

One focus group was the Lawachara National Park Co-Management Committee (CMC), the CMC has been formed for Protected Area Management through government gazette notification. The Protected Area Management Rules, 2017 has formalized the Co-Management Committees. Forest Range Officer acts as the Member-Secretary and elected civil society member chairs the committee and members are from relevant local level government officers, local community (selected member of VCFs represent local community in the CMC), resource users and representative of LGI. An FGD has been conducted with Lawachara CMC.

The 30 VCF in and near the Lawachara Forests can be categorized in 3 major categories like “Bengali dwelling village”, “Tea Garden labor dwelling village” and “Ethnic people dwelling village”. FGD conducted into more than 30 % randomly selected villages. Table 1 shows the numbers of villages by category and the Table 2 shows the name of the selected villages by category for FGD.

**Table 1: Villages by category and numbers of villages selected for FGD**

Types of Villages	Total No of Villages	No of FGD Conducted
Bengali dwelling village	19	07
Tea garden labor dwelling village	06	02
Ethnic people dwelling village	05	02
<b>Total</b>	<b>30</b>	<b>11</b>

**Table 2: Name of randomly selected villages by category for FGD.**

VCF	Category
Noorjahan Tea Garden Village	Tea Garden
North Baligaon Village	Ethnic
Ballarpar Village	Bengali
Birampur Village	Bengali

Magurchara Punji	Ethnic
Shonachara Village	Tea Garden
Kalapur Village	Bengali
Chatokchara Village	Bengali
Bongaon Village	Bengali
Verachara Village	Bengali
Kalachara Village	Bengali

### **Participant's Observation**

The observation was drawn from the Lawachara Trail Walk, FGDs, Household Survey and 'day out' in the Lawachara National Park trails and talking to the villagers living inside the forest. Participants observation unfolded untold messages and walk through trails of the forest revealed the information on the forest degradation, deforestation, encroachment, and conversion. Participant's body language has been observed (PO) that helped to unfold untold messages.

### **Case Study**

A case study is a methodological approach that employs many data gathering technics, however qualitative and emphasize inductive research process (Gray, 2004). The selection considers a forest where the community is living in and near the forest and are drawing resources from the forest for their livelihoods and consumption. A case where the forest is managed and the dependent community is organized and has a stake in the management. To consider the relation of the extraction and prevailing livelihood opportunities, a forest was taken as a case where, a section of the dependent community has access to livelihood support (external, e.g. project) and others those were not included in the livelihood support programme.

Such a case site allows the research to consider the national policy and its implementation level, national/local forest institutions and its competency, involvement of local community in management, linkage of livelihood dependence and conservation, linkage and bearing of livelihood support for conservation and finally the governance situation and their impact on the forest conservation. Lawachara National Park in North-Eastern Bangladesh met the perceived criteria and has been selected. The forest has community villages of different ethnicity living in and near the forest. The resource-dependent communities are organized into Village Conservation Forum (VCF) who draws resources from the Lawachara forests for their livelihoods

and consumptions. Village Conservation Forum (VCF) participate in the Co-Management of the forests and some of the dependent community received support for livelihoods from a project and others didn't.

## **Secondary Data Collection**

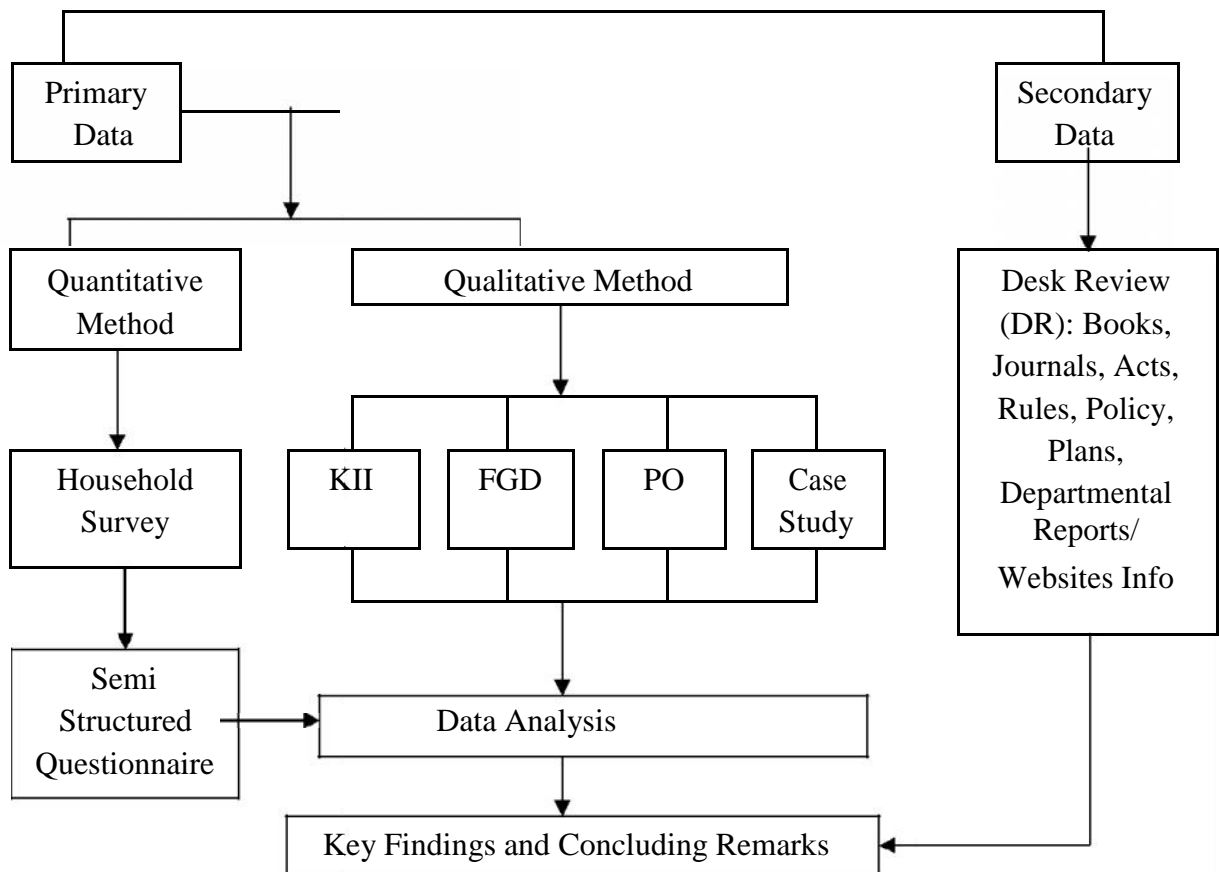
Secondary data and information have been collected screening the existing literature on the forest management of Bangladesh and in the regional countries. Secondary sources include Desk Review (DR) of books, journal articles, published articles, project reports, project documents, Forest related Acts, Rules and Forest Policy, related Conventions, Protocols, Treaties, and study and research findings. Desk Review provides the impacts of the policy and legal regime, Forest Management approaches and practices, the capacity of the Forest Management Institutions, Governance issues and impacts and reveals forest extent and biodiversity conservation trends.

## **Methods of Analysis**

Different statistical methods have been applied for analyzing quantitative assembled data. Data analysis, synthesis and triangulation have been done for the qualitative data. The directives and provisions of the legislation and enforcement and results have been analyzed in accordance with the intention declared in the policy. The review focused on the forest management goals and objectives, how policy and legal regime enables to realize them. The aspiration depicted by the Key Informants, collective aspirations by the local level forest resource users and practitioners and the examples success in the regional countries have been cross-checked. In the discourse analysis of the information obtained from the Key Informants, interest and the experience of the respondents have been considered. For example, the policy level, professional and practice level. There are perceptions, experience, knowledge, aspirations, recommendations are in the response, which has been considered in analysis. The response of the Key Informants specific to the Lawachara forest and response in the FGDs have been analyzed and relation of various levels of Forest Management Institutions and community-based conservation has been identified. The institutional capacity assessment was analyzed in the political economy realities. The governance issue has been analyzed through the lens of effective community participation, capacity of the FMIs, coordination, transparency, accountability, competency of the law and policy regime, enforcement of law and effectiveness.

The data gathered through quantitative and qualitative methods have been analyzed separately and the findings and recommendations have been cross-checked through desk review. The schematic framework below shows the steps and stages and flow of the data gathering, analysis, synthesis, and validation process. For analyzing Forest Management in Bangladesh and look deep and critically, the analytical framework has been followed. Informants Interview provided qualitative information and insights. Respective perception, aspiration, experience, and knowledge on the Forest Management focusing objectives, success, failure, constraints, flaws in the legal regime, need for an amendment, basic and broad assessment of the relevant institutions and their recommendations for sustainably manage forests of Bangladesh. The findings from the KII on overall Bangladesh’s Forest Management has then been cross-checked and referenced through Desk Review that analyzes relevant Acts, Policies, strategies, plans, research findings and published and gray literature on the Forest Management in Bangladesh and in the Asia Pacific. Household Survey collected quantitative data that has substantiated the findings of Forest Management into the case forest site explicating the dependent community’s interaction with the forest. Participant’s observation revealed the untold messages and verified told messages.

Data Collection



**Figure 3: Schematic framework for data collection and analysis**

## **Part 1: National Level Study**

## **Chapter 4: Forest Management in Bangladesh**

## **Forest Management in Bangladesh**

This chapter describes the forest management in the Indian sub-continent that includes present-day Bangladesh. The description includes forest management plans, forest management approaches, forest management practices, monitoring and evaluation, and the relation of the climate change and the forests and transboundary issues in the forest management.

### **Forest Management History in the Indian Sub-Continent**

History of Forest Management is as old as the known history of human civilization. In ancient times, there were plenty of forests that provided adequate ecosystem service and forest products. Ancient travelers like Fa Hain's of the 5th century, Houen Tsang of the 7th century and Ibn Batuta of the 11th century described the natural beauty and resource richness of Bengal. The Forest Management history can be described dividing into ancient time management (till Mughals invaded); medieval time management (Mughal era and till 1865) and recent time management that could be considered after 1865 when, first-ever Forest Act for India was enacted (Ahmed,2008). However, for this research the history of forest management will be described dividing into pre-colonial forest management (Till 1757), colonial forest management (1757-1947), Pakistan period (1947-1971) and during Bangladesh (since independence in 1971-present).

### **Pre-colonial Forest Management (Till 1757)**

During the ancient period, the caste system, religious scripts, symbolic functions of trees were the driving forces in the Indian forest management (Ahmed, 2008). Before the formal documentation of forest management, informal or customary management practices by the community were there following their hereditary management system. Present-Day Bangladesh was a part of the Bengal province of the then greater Indian sub-continent. Bangladesh inherits main stayed religious and cultural history of greater India. Muslims are the majority; Hindus are 2nd large groups followed by the Buddhist in Bangladesh. Many ethnic communities are also living in Bangladesh. Muslims believe that whoever plants a tree and looks after it with care, until it matures and becomes productive, will be rewarded in the hereafter. Buddhists strictly conserved shade trees, particularly Pipal or Ashwattha (*Ficus religiosa*), below which Buddha, the founder of the religion, is said to have achieved his divine wisdom. Sects of the Hindu religion consider forests as the place of God and places of worship (Ali, et al., 2006). Protection of trees will be rewarded with martial gain and religious blessings,says the Agni Purna (written about 4000 years ago); Artha Shastra of Kautilya (Chanakya) (350-275 BC), Inscription of Ahsoka, Pal dynasty



Forest Administration (800-1400 A.D.) was in place at various times (Ghoshal, 2011; Ahmed, 2008; Hassan, 2011).

The mundane directives of the religions had enough force to the believers, to be compiled; the guidance and incentives inspired the believers. Ashoka suggested protection and preservation of wild animals and forests (Dhammika, 1993). Selected forests were reserved for the king for hunting and some other forests were donated to the priests, however, most of the forests had unrestricted access for the common people during the Mauryan Empire (Aravindakshan, 2011; Dwivedi, 1980). Mughal dynasty in India didn't own the forest land either imposed tax, however hunting reserves were there that prohibited hunting for the commons, though the local population could gather other materials (Aravindakshan, 2011). Numbers of independent Bengal Nawabs (King) owned the forests during the transition of Mughal and British regime (Chowdhury et. al., 2009).

### **Colonial Forest Management (1757-1947)**

The first instrument guiding the policy issues, the Charter of Indian Forests was promulgated in 1855 recognizing the importance of reserved forests (CPD, 2002). Forest conservation in Bengal was initiated with the appointment of M. T. Anderson as Conservator of Forests for the Lower Province, i.e., Bihar, Orissa, Bengal, and Assam in 1864 (Mustafa, 2002; Chowdhury et al., 2009). The Imperial Forest Department was established in 1864 (Rangarajan, 2003) and Dr. Dietrich Brandis, a German Forest Officer was appointed Inspector General of Forests in India in 1866 (Indian Forest Service website; accessed 26th December 2015). The forest resources were open to the commons with few exceptions till 1865 (Hassan, 2011; Guha, 1983; Rahman, 2011). Promulgation of Act VII of 1865, enabled the administration to declare Reserve Forests where local people had no access; however, local people had restricted rights as a privilege in the protected forest. The Sundarbans, forests tracts of greater Sylhet and Chittagong and CHT (Sitapahar) were declared Reserved in 1875 (Ahmed, 2008; Hassan, 2011; Guha and Gudgil, 1989). The Forest Policy, 1894 classified forests into a) Forest, for the preservation of climate and physical grounds, b) Forest for valuable timber, c) Minor forests, and d) Pasture lands (Rahman, 2011). The forests of Bangladesh, based on the ecological characteristics has been classified in early twentieth century into the wet evergreen forest, semi-evergreen forest, moist-deciduous forest, mangrove, and freshwater swamp forests (Mazumder, 2011).

The Forest Act, 1927 establishes three categories of forests: Reserve Forest, Protected Forest, and Un-Classed State Forest (Rahman and Mannan, 2011). The Act also defined accessibility to the

forests. Protected Forests and Unclassified State Forests was declared under the provision of the Forest Act, 1927. Early management of Sundarbans after the declaration of the reserve, adopted a felling system of 40 years and exploitable girth limit for the main species. The first ever plantation was initiated in 1871 and first ever Participatory Forest Management in Bengal had been initiated in 1912 by the participation of the Jhumia Community to manage the forest in Taungiya system. The Sal forests were managed by private owners till 1917.

Forest Management plan known as working plans had been developed for ranges during the British regime; working plans was the management of forest for 10 years (Biswas and Chowdhury, 2007). Annual prescriptions for tree felling and plantation were provided in the working plans. Clear felling of forests and plantation was introduced in the 1930s (FAO, 2000). Forest management focus was to reserve Teak trees to supply timber for British Royal Navy. However, at later stage Teak reserve concept shifted to forest conservation. Forest Department started functioning in Dhaka during 1925 when a Zamidar approached the Government to manage his forest lands. It is interesting to note, Zamidars paid tax to the government for the land and some Zamidars vested the forest land management to the Forest Department and Zamidar got a fee. Forest Department accepted the offer and started managing the Forest in Dhaka, Tangail, and Mymensing in 1925. For example, the Forest Department was paying 2,000-4,000 BDT per year for Bhawal Forest.

Natural resources were managed to maintain a balance of the exploitation and conservation to maximize economic returns ensuring sustained yields (Colby, 1991) during the British period. British regime harvested massively and commercialized timber; and realized a huge economic gain (Guha and Gudgil, 1989). The forested land was converted to farmland at large scale during British period to maximize revenue, (Merrill, 2011, Ahmed, 2008; Rahman, 2011; Hassan, 2011). The local people and the forest managers were in conflict during British period; many communities who were living in the forests were separated from the symbiotic relationship with the forests (Aravindakshan, 2011); however, large-scale conversion of forests to agriculture was evident (SAWTEE, 2002). The British rulers exploited forests resources quite heavily and ruthlessly for shipbuilding and railway sleepers (Mustafa, 2002).

### **Forest Management during Pakistan Period (1947-1971)**

Pakistan regime (1947-1971) inherited the economic efficiency focused forest management from the colonial regime. However, adopted Forest Policy in 1955 and revised the policy in 1962. The State Acquisition and Tenancy Act 1950 has abolished private ownership of natural forests. The management responsibility of the Sal forest (privately owned by

Zamidars before enactment of the Tenancy Act) had been vested to Government (Forest Department). Forest Department employed Taungiya system for Sal forest management. The management practice taken was a clear felling and natural regeneration. The degraded blank spaces in the Sal forests were cleared and natural regeneration from coppice with a rotation of 25 years was followed. The government of Pakistan enhanced forest resources harvest during the 1950s to support forest resources-based industries. In 1950s Sundarbans management adopted 20 years felling cycle to support Khulna-based forest industries including Khulna Newsprint Mills Ltd. (KNM) established in 1959 (Ahmed, 2008). Wildlife Sanctuary had been established in Sundarbans in 1960. The first Forest Inventory in the then East Pakistan, now Bangladesh was conducted in 1961 and Forest Extension had been started in 1963. The Government established Madhupur National Park in 1962. Coastal Afforestation had been started in 1966. During 1950s Forest Department has initiated rubber plantation. FAO experts investigated potential and recommended extensive rubber cultivation in 1959. The then East Pakistan Forest Development Corporation was mandated to get a lease of forest land in 1963 for rubber cultivation.

### **Forest Management (1971-present)**

Bangladesh has a long history of scientific forest management. Forest management system evolved modifying from the traditional approach to realize present objectives of forest management (Ahmed, 2008). The production forestry in Bangladesh continued following similar practice and approach since British regime till the declaration of a moratorium on tree felling in natural forests in 1989. The aspirations and objectives of forest management shifted as the new boundaries and political regime emerged and context of the society changes. Matching the emerging needs, legal and policy instruments have been enacted and adopted. By land use classifications, ICIMOD classified forests into Hill Forests, Sal Forests, Mangroves, freshwater Swamp Forest, Mangrove Plantation, Rubber Plantation, Bamboo and Shrubs (Akhter and Shaheduzzaman, 2013). Bangladesh Forests Department manages forests in accordance with the legal status. Reserve forest land entitlement i.e. Right of Record (ROR) are in favor of Forest Department. Reserve forests are managed with various approaches and approach also changed over time. Protected Areas have also been declared out of the reserve forest land to provide a special qualification to promote sanctuaries for wildlife as well as to protect the forests. Protected Area includes wildlife sanctuary, National Park, and Special Biodiversity Conservation Area. Unclassed State Forest (USF) land entitlement is recorded in the Khash Khatian, ROR in favor of state and Ministry of Land controls the ownership, same is for

Vested, Acquired or Protected forests; Tea Estates and homestead trees are owned privately (Hassan, 2011).

Per Forest Department records 1,200,000 hectares are reserve forests in Bangladesh (Chowdhury and Hossain, 2011), total Hill Forests are 13,77,000 ha, of these, Forest Department entitlement is of 6,80,000 ha. Forest Department develops plans, undertake programs, and implement projects for implementing Forest Policy over time. The culmination of the legal provisions, policy guidance, research findings, and lesson learned to implement programs, projects and drawing from global knowledge and experience, forest management in Bangladesh assumed status.

After the liberation of Bangladesh in 1971, the tropical evergreen hill forests management emphasis was on raising valued timber, even abandoned regeneration plots and the process ultimately converted hill forests into plantations (Ahmed, 2008). During the 1970s, Forest Department planted commercially valued species like Teak, Chapalish, Dhakijaam, and Champa. However, in 1974 planted fast-growing species like Gamar, Moluccan albizia, and Kadam. Other than these commercial species, during the 1970s the department also tried cashew, oil palm, mulberry, and rubber, however, results were not encouraging but rubber; later, exotic species like Eucalyptus, Acacia and Sisoo were planted with success (Mazumder, 2011). Forrestral plan designed by a Canadian company in 1960 remained as the traditional forest management in Bangladesh till sanction of tree felling moratorium in natural state forests in Bangladesh in 1989. The hill forest in the CHT has different land tenure system than the other hill forests in the country (Nurullah, 2011). Historically the 700,000 ha forests in the CHT land was used by the indigenous community for shifting cultivation (agroforestry). However, in recent years, CHT forests have lost shifting cultivation capacity because of short rotation. Now CHT land ownership belongs to the government and termed Unclassed State Forests (USF) and is controlled by the District Administration (Ahmed, 2008).

Sal forests can be categorized into pure Sal and mixed Sal (FAO, 2000). Sal forests were regenerated using coppice was a simple system (FMP,1995) and assisted natural regeneration of Sal forests from coppice was a standard system (Hossain, 2015). Ethnic communities like Garo, Koch, Hajong, and Mandhais were living since long in the Sal forests (Khan, 1998). During the 1950s, Sal Forests management were for i) conservation and timber that was decided to grow for 70-80 years and ii) grow Sal forests for 25 years from coppice. Since the Government sanctioned moratorium in 1989, there is no legal tree felling, however, collection permits were being used to allow Golpata Palm leaves exploitation in Sundarbans.

Sundarbans is difficult for patrolling and due to limited logistics, forest guards and enforcement ability hinders sustainable management of Sundarbans (FAO, 2000).

Participatory Forestry (social forestry /agroforestry) initiated during the 1980s (Forest Policy 1994). However, Protected Area Management Rules have been enacted in 2017. The Wildlife Preservation Order 1973 was enacted to protect the wildlife, converted to Wildlife Preservation Act 1974 and after review converted to Wildlife (Conservation and Security) Act 2012. This Act provided guidance for managing Protected Area under a management plan and employing Co-Management approach. Ratargul Swamp Forest has been declared as Protected Area (special biodiversity conservation area) in 2015 (39th Protected Area of the country) and as guided by the Wildlife (Conservation and Security) Act, 2012 Forest Department has developed Ratargul Forest Management Plan.

The government has taken serious rubber plantation effort in the 1970s and in the 1980s. There are more than 10, 000 ha of rubber plantation. BFIDC, Standing Committee, CHT Board, Tea Estates and small-scale planters manage rubber plantation. However, commercial feasibility of rubber production in Bangladesh was found not encouraging, for example, over 2.5 million saplings of rubber were planted in Modhupur Forest Area in 1987, whereas, only 1.5 million survived till 1999 due to poor management; rubber trees that reached tapping stage, are not viable to tap due to higher cost of production compared to international market price of rubber (BFIDC, 2015) and again land use in Bangladesh is highly competitive.

The government plan is to establish a 500-meter width mangrove afforestation along the coastline as a cost-effective method to protect embankments in front of sea-facing polders; however, approximately 60 km of the total 957 km of embankments along sea facing polders are protected by mangrove forests, though some forest belts are degraded (World Bank, 2013). The Forest Policy, 1979 provided a general framework for Forestry in Bangladesh. In the 1980s, procedures for forest management planning were reviewed by the assistance to the Forestry Sector Project (UNDP/FAO) resulting in a Forest Management Plan Manual. Since the first Forest Policy of Bangladesh adopted, following milestone (Table 3) development happened in the Forest Management in Bangladesh:

**Table 3: Timeline Milestones of Forest Management in Bangladesh**

1979	The Forest Policy 1979 adopted
1979-1980	Betagi-Pomora Social Forestry Project to Pilot rehabilitation of deforested lands with landless people
1980	Himchari forests declared as National Park (Protected Area)
1981	Char Kukri Mukri declared as Wildlife Sanctuary (Protected Area)
1982	Bhawal forests and Modhupur forests declared as National Park (Protected Area)
1983	Pabla Khali forests declared as Wildlife Sanctuary (Protected Area)
1986	Chunati forests declared as Wildlife Sanctuary (Protected Area)
1988	Balmforeth forest manual; Private sector starts nature-based tourism operation in Sundarbans
1995	Forestry Sector Master Plan 1995-2015
1995	Environmental Conservation Act
1996	Rema Kalenga forests, Sundarbans East, Sundarbans West, Sundarbans South declared as Wildlife Sanctuary (Protected Area) and Lawachara forest declared as National Park (Protected Area)
1997	Environmental Conservation Rules enacted; ECA declared
1999	Kaptai forest declared as National Park (Protected Area)
2001	Ramsagar forests and Nijhumdip forests declared as National Park (Protected Area)
2003-2008	Co-Management in 5 Protected Areas piloted through Nishorgo Support Project (NSP)

2004	Social Forestry Rules, 2004
2005	<p>NBSAP</p> <p>Nishorgo Vision 2010 - Forest Department commitment to Co-management in PAs</p> <p>Satchari forests declared as National Park (Protected Area)</p> <p>Government sanctions tour guides in Lawachara National Park</p> <p>5 PA Management Plans approved</p>
2006	<p>Government Order issued (Amended 2009) and 8 CMC formed in 5 PAs</p> <p>Khadim Nagar forests declared as National Park (Protected Area)</p> <p>Started Community Patrol Group (CPG) at PAs</p> <p>Nature Interpretation Centre at Lawachara through Public Private Partnership (PPP)</p>
2007	Fashiakhali forests declared as Wildlife Sanctuary (Protected Area)
2008	<p>Medakacchapia forests declared as National Park (Protected Area)</p> <p>Expand Co-Management in 18 PAs, (22 CMCs)</p>
2009	Sharing Entry Fee Revenue with local community via CMCs introduced in 5 PAs
2010	<p>Compensation for Wildlife and Forest Conservation; Compensation for victims of wildlife attack</p> <p>Integrated Resource Management Plan (IRMP) for Sundarbans</p> <p>State of Protected Areas Report of Forest Department</p> <p>Dudpukuria-Dhopachari, Hazarikhil, Sangu, Teknaf, Tengragiri forests declared as Wildlife Sanctuary (Protected Area)</p> <p>Bariadhala, Kuakata, Nababganj, Shingra, Kadirgarh forests declared as National Park (Protected Area)</p>
2011	<p>REDD Finance; Bangladesh REDD+ ARR Protected Areas Project</p> <p>Alta Dighi forests and Birganj forests declared as National Park (Protected Area)</p> <p>Sonar Char forests declared as Wildlife Sanctuary (Protected Area)</p>
2011-2014	Livelihood development to support Ecosystem Productivity and Co-management (SEALS Project)
2009-2015	Support to Livelihoods, Forest Restoration and Co-Management in Chunati Wildlife Sanctuary (MNCRF Project)

2012	Co-Management incorporated into legislation; Wildlife Preservation Act, 1974 (amendment 2012) Dudmukhi, Chandpai, Dhangmari forests declared as Wildlife Sanctuary (Protected Area)
2012-2016	Wildlife Protection Strengthened Complementing Co-management; Strengthening Regional Cooperation for Wildlife Protection Project
2012-2018	Expand and Strengthen Co-Management in 22 PAs, (27 CMC); Climate-Resilient Ecosystems and Livelihoods (CREL) Project
2013-2016	Community Engagement in Forest Management; CRPAR project
2014	Resident Bird Monitoring in 15 PAs; Climate Resilient Ecosystems and Livelihoods
2014-2019	Tiger Conservation and Co-Management (Sundarbans); Bengal Tiger Conservation Activity (Bagh)
2015	Ratargul Swamp Forests declared as Special Biodiversity Conservation Area (Protected Area)
2015-2019	Utilizing improved institutional and organizational framework conditions for a sustainable and climate change adapted Management of the Sundarbans
2016	Formalize participation in forest PAs and benefit sharing with communities;
2017	Forest Protected Area (Co-management) Rules, 2017

## Forest Management Plan

Sustainable nature conservation requires management plan (Alexander Mike, 2015). Forest of this part of the Indian subcontinent that includes present-day Bangladesh has been scientifically managed since long. Working plans guided division specific forests for day to day management. The working plan determines annual allowable cut and includes prescriptions for the managers to manage the forest. However, since government sanctioned tree felling moratorium, the working plans became irrelevant and are not prepared. Most of the hill forests including bamboo forests are traditionally managed (Mazumder, 2011). Formal management plans cover around 46% of Bangladesh forests (FAO, 2007). There is 'Integrated Resource Management Plan 2010-2020' for the management of Sundarban. Projects implement few forest management aspects on an ad hoc



basis, however real forest management is yet to initiate in Bangladesh (Chowdhury, 2011). Conservation agencies including IUCN support Protected

Area (PA) Management Plan development that costs considerable time and resources, however, the management plans are not implemented (IUCN, n.d)

Forest Department developed management plans for the Protected Areas in 1997; however, didn't consider ecosystem sustainability and were scanty prescriptive though the recent concept is to ensure sustainability (Chowdhury, 2011). Following plans have been developed at various time, some of which are perspective plans and some others have specific focus: Forestry Sector Master Plan (1995-2015), Wildlife Conservation Master Plan (2015-2035), Integrated Resource Management Plan for Sundarbans (2010-2020), Bangladesh Tiger Action Plan (2009-2017), Protected Area Management Plans and Working Plans for Divisions. Village forests were never guided or supported by management plans (Ahmed, 2008).

### **Forestry Sector Master Plan**

Forestry Sector Master Plan 1995-2015 expired, however during its tenure, all Forestry Sector Program were aligned to the Master Plan. Forestry Sector Master Plan development for 2016-2035 has been initiated and the Inception Workshop held during the last week of March 2016. To develop the Master Plan numbers of surveys and studies has been commissioned that includes i) climate change projections for Bangladesh ii) climate change impacts iii) resilient ecosystem and forest-dependent communities to enable adaptation to climate impacts. For enhancing resilience, the study developing forest vulnerability index, resilient forest management practices, plantations, and mangroves, livelihood vulnerability index, strategies and programs, the resilience of communities to climate risk and resources, policies, institutions and capacity required to promote resilience.

### **Wildlife Conservation Master Plan (2015-2035)**

Biodiversity policy provided the frame for the Wild Life Conservation Master Plan. The plan has been developed aligning NBSAP 2016-2021 with an overall goal to ensure sustainable conservation of the wildlife for current and future generations (GoB, 2015 a).

### **Integrated Resources Management Plan for the Sundarbans (2010-2020)**

Sundarbans, the natural mangrove forest is different from the highland forests and is considered as wetland is an interface between land and saline coastal front. Sundarbans wildlife and plant communities include both aquatic and terrestrial organisms that call for integrated

resourcesmanagement. The first Working Plan for Sundarbans was developed in 1892 after Reserve declaration in1875. Early Management of Sundarbans after the Reserve declaration adopted a felling system of 40 years and exploitable girth limit for the main species; however, in the 1950s adopted 20 years felling cycle (Ahmed, 2008). The Forest Inventory of the Sundarbans Reserved Forest (SRF) was carried out during the 1980s by Chaffy et, al., (1985) and by Revilla and his group during1994-1996 generated data and information which was used to develop the Integrated Forest Management Plan in 1998 for a period of 12 years. However, the current Integrated Resources Management Plans (IRMP) 2010-2020 is a comprehensive plan that has vision, mission, goals, and strategic management programs for the Sundarbans and interface landscape. However, limitations of this 10-year plan, for instance, it describes harvesting trees but tree felling moratorium is in place. IRMP visions are:

- The Sundarbans shall continue to provide subsistence resources including forest produce and fish at a level in which the sustainability of the resource is ensured, though emphases will be on reducing dependency and improving current resources management practices;
- Traditional users will acquire a greater awareness and shared responsibility and a share in the financial benefits because of co-managing the resources and will act accordingly to help conserve them;
- The Forest Department (FD) will involve local people in the SRF Co-management, and other relevant government agencies such as the Department of Fisheries and the Department of Environment (DOE) will be consulted, whenever required;
- The FD will develop its capacity including infrastructure, logistics, and technical capacities and seek technical assistance where appropriate in the SRF Management;
- Development and efficient operation of alternative income enterprises in the landscape will help adapt the local community to climate change;
- Wildlife and fish resources will prosper throughout the SRF where populations will thrive at optimum carrying capacity. The SRF landscape will be managed to ensure that essential ecological services are maintained and terrestrial and aquatic ecosystems are well adapted to
- climate change. The Wildlife Sanctuaries and Wetlands will be managed to provide secure habitat for Wildlife and Fish Resources;
- Specific sites, infrastructure, and routes in designated areas of the SRF will be developed and/or maintained to provide for quality ecotourism experiences;

- To take advantage of the increasing nature of tourism, the Forest Department will seek public-private partnerships, consistent with the guidelines and principles established by the GOB to improve the ecotourism services and facilities;
- The effects anticipated to result from climate change will be recognized, mitigation and adaptive management strategies developed and implemented to ensure the maintenance of ecosystem goods and services;
- Restoration and maintenance of essential ecological functions including restoring stream flows will be recognized.

### **Bangladesh Tiger Action Plan,2009-2017**

The Bangladesh Tiger Action Plan (BTAP), 2009- 2017, has taken a structured approach for Tigers conservation in Bangladesh. The Plan has the vision of protected tiger habitat so that wild tiger population increased to the level of the carrying capacities of the forests and provide essential ecological services (FD, 2009).

### **Management Plan for the Protected Area**

Currently, there are 39 Protected Areas, out of these 17 are National Parks, 17 Wildlife Sanctuary, 1 Special Biodiversity Protection Area, 3 Dolphin Sanctuaries and 1 Marine Protected Area (FD,2016). Wildlife (Conservation and Security) Act, 2012 provided directives to manage Protected Areas (PA) under a management plan. CREL project (2012-2018) of Forest Department and funded by USAID, facilitated and supported developing Co-ManagementPlan for the PAs considering conservation, ecosystem services and climate change ensuring governance (Ali, Uddin, and Chowdhury, 2015). Management Plan has been developed for 14 National Parks and 3 National Parks do not have any Management Plan. Out of 17 Wildlife Sanctuaries, 12 have Management Plans and Ratargul, the Special Biodiversity Conservation Area also has a Management Plan.

The plans were developed for 10 years span complying guidelines for management planning of Protected Areas of the World Commission on Protected Areas and considering contemporary forest management practice. Protected Area Management Plan identified issues, set visions, and management objectives, management prescriptions including a five year work plan that includes management of the physical environment (zoning, boundary demarcation, resolving tenure and encroachment issues); management of biological components(biodiversity conservation, livestock control, the release of animals in the park, surveillance); sustainable resource management in landscape (conservation awareness, implementation of Co-management,

landscape development fund, reduction of dependency on forest resources, sustainability and resilience to an environmental hazard, reduction of wildlife-human conflict, capacity building); responsible tourism development (tourism management, entry fee collection, facilities and infrastructure, tourism impact reduction, promotion, and awareness); reinforcement of protection administration (improving mobility, office facilities and staff accommodation, equipment, staff capacity and performance) and monitoring and review.

Diverse types of zones are applied in protected areas in different countries like special zone for protection of biological, cultural, geological features; primitive/wilderness zone for the full preservation; limited development zone; intensive development/services zone; traditional and indigenous use zones and rehabilitation zone for restoring degraded habitats. Bangladesh Wildlife (Conservation and Security) Act, 2012 through its provision defines and distinguishes 'corridor', 'core zone', 'buffer zone' and 'landscape zone' as follows: "corridor" is the passage for wildlife to move from one forest or area to another; "core zone" is the most biodiversity rich area within a protected area where all kinds of forest produce extraction are prohibited and entry of visitors are also regulated for safe reproduction of wildlife; "buffer zone" is the area, not core zone but lies in between the margin of protected area and human habitation where raising short rotation participatory forestry in harmony with plant species of the protected area may ensure the protection of biodiversity; "landscape zone" is outside the protected area and could be private or public land and are to manage to biodiversity conservation of the protected area.

The landscape is defined as a holistic, dynamic and opens the system in CBD which is a bit different to the Bangladesh Wildlife Act definition (Brown et al. 2005; Sayer et al. 2013). Protected Area zoning is helpful to maintain and ensure connectivity of the core areas (Lausche and Burhenne 2011) and different tenure and operation can be accommodated in different zones. The Climate Resilient Ecosystem and Livelihoods (CREL) Project of the Forest Department has developed Management Plan for a total of 14 Protected Areas viz. Khadimnagar, Chunati, Dudpukuria-Dhopachari, Himchari, Fasiakhali, Medakachapia, Lawachara, Rema-Kalenga, Sathchari, Kaptai, Modhupur, Ratargul, Tengragiri, and Sundarbans (East) Wildlife Sanctuary. World Bank funded SRCWP project of the Forest Department developed management plans for Alta Dighi National Park, Bhawal National Park, Dudpukuria-Dhopachari, Nijhumdip, and Sundarbans (West) Wildlife Sanctuary.

## **Management Plan for Forest Divisions**

Forest Divisions of the Forest Department, historically developed and implemented working plans to manage forests. Working Plans guided Forest Managers on a day to day activity and secure a sustainable yield. Working Plans for Sundarbans was developed in 1892, the first comprehensive Working Plan for Chittagong and CHT (1922-23 to 1942-43) was developed separately in 1920. After that, a 10-year term Working Scheme (1943-44 to 1952-53) was developed in 1941 separately for Chittagong and the Chittagong Hill Tracts. Vast untapped natural forests of CHT attracted the attention of relevant stakeholders in newly emerged Pakistan. Mr. A Z M Zahiruddin prepared a Management Plan from 1953-54 to 1972-73 to exploit at large scale and reforestation in the area (CHT a, 1973).

The Forestal, Forestry Engineering International Limited of Canada conducted an aerial survey and prepared inventory report for CHT during the early 1960s. Using available data and contemporary knowledge and information new Working Plan was prepared for CHT South Division for 1968-69 to 1988-89. The working plan includes general features of the ground configuration, map references, area, boundaries, geology, rock, soil, climate, water supply, legal position, composition, and condition of the crop, causes of damages, degradation, and deforestation, utilization of produce, staff and labor supply, general history of the forests specific milestone reference points for management including past system of management and results. The working plan mentions Cowan's Working Plan (1922-23 to 1942-43) that has working circles, Professor HG Champion's, Mr. Shebbeare's observation, Banerjee's Working Scheme (1943-44 to 1952-53) that describes all working circles. Working Plan of Zahiruddin that considers Working Circle I or Conversion Working Circle, Working Circle II or Conversion Working Circle II, Working Circle III, Working Circle IV for small reserve and Working Circle V or Bamboo (overlapping) Working Circle. The management are felling and regeneration either natural and or supported regeneration and includes increment data, volume table, stand table and stock table. The working the plan included a list of plants, wild animals, and birds of Chittagong Hill Tracts in Part I (CHT a, 1973). Part II of the working plan discussed future management and prescriptions with general objectives and treatment required to adopt. Three working circles was constituted; Working Circle I was for the short rotation fixed at 30 years for economically feasible harvesting that includes soft hardwood which are fast growing like Simul Kadam, Chaitan etc., Working Circle for long rotation fixed at 60 years for Teak, Garjan, and other hardwood, and Working Circle III for bamboo forests fixed for three-year cutting cycle. Separate working plans for short rotation, long rotation and

bamboo circles has been prescribed that includes a general constitution, the character of vegetation, the value of the crop drawing from the inventory that includes stand table, stock table, summaries of volumes and weights, and prescriptions of treatments, that includes silviculture the system of clear felling and artificial regeneration. Periodic blocks for short rotation, working circle prescribed felling series, cutting sections, blocks, and compartments, productive and unproductive areas by range (CHT b, 1973). The methods for executing felling including exploitation procedures, general rules to be followed, natural regeneration strips, and sequence of felling checking procedures, subsidiary regulations, plantation techniques, nursery practices and calendar of operation is included. It is mentioned in the Working Circle I and II, there are bamboo forests has been prescribed under other regulations. Similar working plan for Working Circle II and working plan for the bamboo working circle is also included.

Regulations for miscellaneous minor forest produce includes cane, Patipata, Khurushpat, Pitali leaves etc., Garjan oil, grazing, wildlife management, wild elephant, felling of trees for departmental use, roads and other lines of export, improvement of waterways, improvement of water supply, improvement of methods of exploitation, forest industries, buildings, maintenance of boundaries, survey and maintenance of maps, inspection path and name boards in plantations, fire protection, forest villages, experimental work, and research, preservation plots, flora, need for volume table and yield table, grading of timber, medical and educational facility, plantation of submerged areas and security of staff. Working Plan for the Sangu and Matamuhuri Reserve Forest developed for the period from 1967-68 to 1986-87. The working plan constituted hardwood timber working circle and two third of the total area has been put under this circle with a 60-year rotation and the rest area under softwood timber working circle with a 30-year rotation and bamboo was overlapping working circle all over the Reserve (Sangu, 1970a; Sangu, 1970b). Contexts, contents, concepts and prescription philosophies are same for all the working plans that were prepared by the Forest Department.

Bhawal Forest Management Plan has been developed during 1917. The management plan for Atia Forests has been developed during 1934. However, after 1947, during the Pakistan regime these forests management were divided into i) timber and conservation working circle for a 70 -80 years of rotation ii) coppice working circle maintained a 25-year rotation. The Management Plan for the forests of Rangpur, Rajshahi, and Dinajpur were prepared in 1959 and prescribed conservation, coppice, and Afforestation Working Circles. These circles were revised in 1976. However, since the moratorium has been sanctioned in the Sal forests in 1972 which was

extended for natural forests throughout the country in 1989, there is no felling of trees in natural forests by the Forest Department, as such the working plans are no more developed.

## **Forest Management Approach**

Forests have been categorized into reserve forests, protected forests and unclassified state forests under Forest Act 1927 for management. Forests were declared reserve for various purpose, e.g. few reserves is for ecological service and most others are for ensuring sustained supply of timber for revenue generation and use of the timber for railway and shipbuilding. Management of reserve forests prohibits anything unless permitted by Forest Department while minor forests and pasture lands were declared protected forests where everything was permitted unless prohibited (Rahman, 2011; Rahman and Mannan, 2011). State agencies are reliable and as such take the main responsibility for the management of the national parks (Ludwig, 2001).

Bangladesh Forest Department manage forest in accordance with the legal status including Reserve Forest, Vested Forest, Acquired forest, Un-classified State Forest (USF), Protected Forests and Protected Areas (Uddin and Alam, 2015), however the ownership of only reserved forests vested with Forest Department and ownership of other types of forests vested with land administrations and tea states and homestead forests owned privately, unclassified state forests ownership and management both vested with district land administration (Hassan, 2011). By the provision of the Forest Act, 1927 more than twelve lac hectare forests were declared reserve and the land entitlement remain with the Forest Department. District Administration controls 0.224 million ha of Notified Forest (some tree species are declared Reserved), 0.037 million ha of Protected Forest (leasing ceased for certain period), 0.008 million ha of Acquired Forests (Non-retainable under SATA), 0.003 million ha Vested Forest and 0.730 million ha Unclassified Forest (ethnic people enjoy right of Jhumchash). Besides, there are homesteadtrees covering around 270000 ha and 70,000 ha of Tea Estate Forest (Hasan,2016; Personal Communication).

The Earth Summit enunciated the Forest Principles for sustainable forest management in 1992. The Forest Principles has been adopted in the context of massive deforestation throughout the world. Natural forests in Bangladesh during those days were facing degradation and denudation. Following adoption of the Principles, Bangladesh initiated a paradigm shift in the management of the natural forests. Ecological sustainability has been given priority instead of more yield. Participation of the communities in the management has been encouraged. Policy for capacity enhancement of the forest management institutions was

taken. Management practice has been improved considering the climate change promoting biodiversity conservation (Ahmed, 2008; Rahman, 2011).

Last two decades' forest management in Bangladesh followed Forestry Sector Master Plan (FMP) that was finalized in 1993, approved in 1995 and completed its 20 years' tenure in 2015. Legal and policy instruments have been enacted and adopted at various times to realize set forest management goals and objectives and accordingly management approaches emerged that remained functional in the changed socio-economic and environmental conditions and political realities. Forest management in Bangladesh gradually shifted towards participatory management approach. Different forest management approaches have been employed in Bangladesh since the scientific management initiated. Changes in the environment, political boundary, and regime, country perspective of forests and context, changes in the forest management paradigm globally and in the country, were the driving force for the adoption of these approaches.

Agroforestry has been in the practice since long in the CHT engaging ethnic communities and the system was termed Taungiya system (CHT, 1973a). However, in the recent years, the participation of the community in managing forests has been initiated in the early 1980s. Different models, such as Community Forestry, Social Forestry and Co-Management have been explored over the years. The Participatory Forest Management includes social, political and economic actors along with forest administration. During the mid-90's the Forestry Master Plan for 1995- 2015 suggested Co-Management approach for Protected Area management. Collaborative natural resources management approaches initiated in Bangladesh in the wetlands through MACH (1998-2008) project under the stewardship of Department of Fisheries and engaging local resource user communities with support from the USAID.

Co-Management for the forests was initiated through Nishorgo Support Project (2003-2008) under Forest Department stewardship; IPAC (2008-2013) project promoted Co-Management both in Wetlands and Forests and under the collective stewardship of Forest Department, Department of Environment and Department of Fisheries (Merrill, 2011). During last two decades, Co-Management spreads to 21 PAs and supported through the Wildlife (Conservation and Security) Act, 2012 and guided by draft PA Rules 2016 (Ali, Uddin, and Chowdhury, 2015). Social Forestry Rules, 2004 institutionalized Social Forestry (Sharma and Banik, 2011). Currently, Forest Department has very small production forests other than Social Forestry. Contemporary



Forest Management approaches in Bangladesh includes Social Forestry, Co-management, Community managed forests and Agro-forestry, Plantation (homestead, along with the roadside, embankments) and mangrove plantation (Akhter and Shaheduzzaman,2013).

### **Community Managed Forests and Agro-Forestry**

The Chittagong Hill Tracts (CHT) cover about 10 % of the total land area of Bangladesh and around 73% of the region is forests and hosts around 12 ethnic communities (Rasul, 2007). There were tradition of community managed village common forests in CHT (Tiwari, 2003; Halim and Roy, 2006). By the provision of the State Acquisition and Tenancy Act 1950, the mouza reserves or community managed forests of CHT has been categorized as Unclassed State Forests (Khisra et al. 2006). However, few traditional communities managed Village Common Forests in the CHT are still there, though subjected to degradation leading to deforestation (Halim and Roy, 2006). In one instance, a customary committee of an ethnic group living in the Chimbuk area is managing a 400 ha Village Common Forests (VCF) since 1955 (HF, 2011). However, the institutional arrangement has recently been developed for village common forest management. The village common forest management group formed with at least one member from each household of the village and the group has at least two women. The village common forest management group formed nine-member executive committee through discussion with the members (Miah and Ahmed, 2014).

There is a history of Agroforestry supported by the Forest Department termed Taungiya system which was also participatory forestry. However, in the recent years, Agro-forestry initiated in 1979 in 'Betagi Promo' project, Chittagong was the first one after the independence of Bangladesh. The landless farmers were given a 1.62 ha. plot on a temporary lease for Agroforestry. In another occasion in 1981, landless tribal families in Bandarban, Sharon Para was allocated 2 ha of land and other benefits including a share of the 5-ha plantation, cropping opportunities in between rows and employment as labor (FD,2015). Agroforestry in Sal Forest is going on for decades and continuing with the participation of the community and benefits besides the reforestation are being distributed as stipulated in the agreements. A recent development is Coastal Agroforestry which promotes fish in a ditch and fruit and forest trees in the dyke (Banik, 2014).

### **Social Forestry**

Participatory production forestry in Bangladesh has been termed Social Forestry. The Social Forestry Rules has been enacted in 2004 and amended in 2010 (Sharma and Banik, 2011).

Forest Department introduced Social Forestry in 1982 under ADB supported Community Forestry Development Project in 7 Northern Districts drawing lessons from experience of a teak plantation in 1873 engaging indigenous community under Taungiya system (Banik, 2014). Social Forestry uses following production technologies: Agroforestry; Woodlot; Village Woodlot; Homestead Agroforestry; Tree Farming; Multi Productive Forests; Strip Plantation; Bamboo Plantation; Cane Plantation; Patipata Cultivation; Hogla Cultivation; Agar Plantation; Sericulture; Apiculture; Lac Culture; Private Nursery Establishment; Jhumia Rehabilitation; Participatory Sal Coppice Management and Training on Social Forestry assisted plantation on roads, feeder roads, high ways, embankment, railroad, woodlot, riverine islands, foreshore and canal bank plantation (Banik, 2014).

Social Forestry Rules ensured benefit sharing for afforestation of degraded and encroached forest land (Ali, Uddin, and Chowdhury, 2015). Bangladesh so far practiced following Agroforestry models in Social Forestry: Date Palm (*Phoenix dactylifera*), Pulmyra Palm (*Borassus flabellifer*); Jackfruit (*Artocarpus heterophyllus*); Shishoo (*Dalbergia sissoo*); and Babla (*Acacia nilotica*) based Agroforestry (Banik, 2014). The benefit of the Social Forestry plantations is shared as follows: Agroforestry and Woodlot Plantations: FD. -45%, Participants-45% and TFF-10%; Sal Coppices: FD-65%, Participants-25% and TFF-10% (Social Forestry Rules, 2004).

To rehabilitate Jhumia community, Forest Department allotted 2 ha. of Unclassed State Forest (USF) land in the CHT under Social Forestry program and following options have been offered:

- Model 1: 0.2 ha. for household and agricultural crop, 0.2 ha. for bamboo and cane, 0.1 ha for pineapple, 0.4 ha. for banana, 0.08 ha. for lemon, 0.4 ha. for jackfruit, 0.1 ha. for guava and 0.53 ha. for miscellaneous (Tejpata, Papaya, Jalpai, Kul, Amra, Batabi-Lebu, Bel, Sat Kara, Cassava and Cashew Nut);
- Model 2: 0.2 ha. for household and Kitchen garden, 0.4 ha. for Fruit garden, 0.8 ha. for Teak, 0.61 ha. for Gamar Plantation;
- Model 3: 1 ha for housing and Kitchen garden and 1 ha for Agri-Horti-Silvicultural garden;
- Model 4: Participatory Forest Development (PFD) is a combination of wood, agroforestry, and cane at the flat-topped ridge, upper slope, middle slope and lower slope and fruit trees on the boundary. Upper Slope: Garjan, Acacia Hybrid, Gamar, Silkori, Chapalish, Cane as under crop, Vegetables as intercrop. Middle Slope: Teak, Chikrassi, Cane as under crop, vegetables as intercrop. Lower Slope: Sal, Telsur, Neem, Chikrassi, Cane as under crop, vegetables as intercrop (Banik, 2014).

Forest Department facilitated and supported following for sustainably manage Social Forestry: Social Forestry Training; Participatory Benefit Sharing Agreement (PBSA); Appointment of NGO; Coordination Committee at District and Sub-District Level; Established Social Forestry Wing; Amendment of Forest Act, 1927, Adoption of Forest Policy, 1994, enacting Social Forestry Rules, 2004; Established Tree Farming Fund (TFF); Established Benefit Sharing Agreement; Establish Social Forestry Management Committee; Social Forestry Advisory Committee; and Tree Farming Fund Management Committee (FD, 2015; website).

### **Co-Management of the Protected Area (PA)**

Institutional arrangements, organizational capacity for conservation of forest Protected Area and the landscape area and livelihood program are necessary for the sustenance of the Protected Area and the biodiversity (Hoole, 2008). Some Protected Areas around the world are well managed, about 42% of the Protected Areas are not well managed and 13% are inadequately managed (Leverington et al., 2010). Yellow Stone in United State was declared national park in 1872, first 'Protected Area' in the world to protect unique natural features and wilderness of the area, use for recreation and tourism; Yellow Stone become a model in protected area used throughout the USA and other parts of the world (Hoole, 2008).

Protected Area (PA) in Bangladesh is declared within the reserve forests under the provision of Bangladesh Wild Life (Preservation) Act, 1974 and since 2012 under the provision of the Wildlife (Conservation & Security) Act 2012, to enhance and ensure protection under different qualification (Wildlife Sanctuary, National Park, Eco-park, Botanical Garden and Safari Park). Commission on Environment and Development recommended 12% Protected Area globally, however, the Wildlife Task Force in 1986, set a target of 5% PA for Bangladesh (FAO, 2000). Skilled management of Protected Area (National Park) addresses integrated conservation in the wider landscape; merging local and scientific knowledge increasingly serving local needs and concerns (Hoole, 2008). Sustainable Protected Area management requires appropriate institutional arrangements and legal support (Thomas and Middleton, 2003). The government set rules for access and use National Park (Hoole, 2008). During mid-1990s Bangladesh Forestry Sector Master Plan (1995-2015) suggested Co-Management of the Protected Areas. Co-Management approach among others is employed in PA management that engages shared governance (Rashid and Mukul, 2016).

Zoning within protected area is suitable to maintain and ensure connectivity of the core areas (Lausche and Burhenne 2011) and different tenure and operation can be accommodated in different zones. The Wildlife (Conservation and Security) Act, 2012 Bangladesh through its provision defines and distinguishes 'corridor', 'core zone', 'buffer zone' and 'landscape zone' as follows: "corridor" is the passage for wildlife to move from one forest or area to another; "core zone" is the most biodiversity rich area within a protected area where all kinds of forest produce extraction are prohibited and entry of visitors are also regulated for safe reproduction of wildlife; "buffer zone" is the area, not core zone but lies in between margin of protected area and human habitation where raising short rotation participatory forestry in harmony with plant species of the protected area may ensure protection of biodiversity; "landscape zone" is outside the protected area and could be private or public land and are to manage biodiversity conservation of the protected area. The landscape is defined as a holistic, dynamic and open system in CBD which is a bit different to the Bangladesh Wildlife Act definition (Brown et al. 2005). There is no universal definition for landscape; some authors use ecosystem approach and landscape approach interchangeably (Sayer et al. 2013).

Protected Areas can be better maintained with Management Plans (Thomas and Middleton, 2003). Preservation, resource use and development activities in a park without management plan will be haphazard; irreversible damage of the park resources could happen because of influence by politicians (Thomas and Middleton, 2003). The Wildlife (Conservation and Security) Act 2012 provides the legal footing for declaring Protected Area. The Act provides directives to manage Protected Areas developing and implementing management plans. However, the conservation plans do not yet explicitly analyze cost and benefit (Naidoo and Ricketts, 2006) as such Forest Department does not get political support for conservation.

The Himchari National Park was the first declared 'Protected Area' on 15th February 1980 in Bangladesh. Bangladesh has declared a total of 17 National Parks covering 45746.53 ha, 20 Wildlife Sanctuaries covering 398475.40 ha, and 2 Special Biodiversity Protected Area covering an area of 221.59 ha. Altogether the Protected Area, as of 28 December 2017 is 23.59% of the Forest Department controlled forest land (BFD website, visited on 28 December 2017). Worldwide over 177,547 protected areas cover more than 12.7% of land surface of the world (Bertzky et al., 2012). The Protected Area Management Rules 2017 has been enacted. However, Co-Management is yet to root deep into the mindset of the forest sector professionals in the department; political and individual interests at the local level are

still a deterrent for selection of members and functioning of Co-Management Organizations. Co-Management is progressive in Bangladesh and is encouraging women to join all other stakeholders in co-managing forest PAs.

Gainful partnership with community and multi-stakeholder engagement successfully regenerated denuded reserve forests (Rahman, 2011; Islam et al., 2015; Ali, Uddin, and Chowdhury, 2015). Co-Management is different from the Social Forestry. Co-Management is for the natural state-owned forest that is declared Protected Area and trees can't be harvested, so, the benefit sharing is not possible. As such, volunteerism, social responsibilities are the basic philosophy and influencing philanthropic activism along with support to the resource dependence is the key to success. Forest resource-dependent communities and Forest Department in Bangladesh are practicing Co-Management and Social Forestry which reveals its efficacy in the protection of dwindling forest resources (Ali, Uddin, and Chowdhury, 2015). However, the complex institutional structure of the Co-Management Organizations and limited mainstreaming of the approach into the Forest Department, political influence, uncertain financial flows, and dependency on the project remain challenges of Co-Management in Bangladesh (Chowdhury et al., 2014; Mukul, et al., 2012).

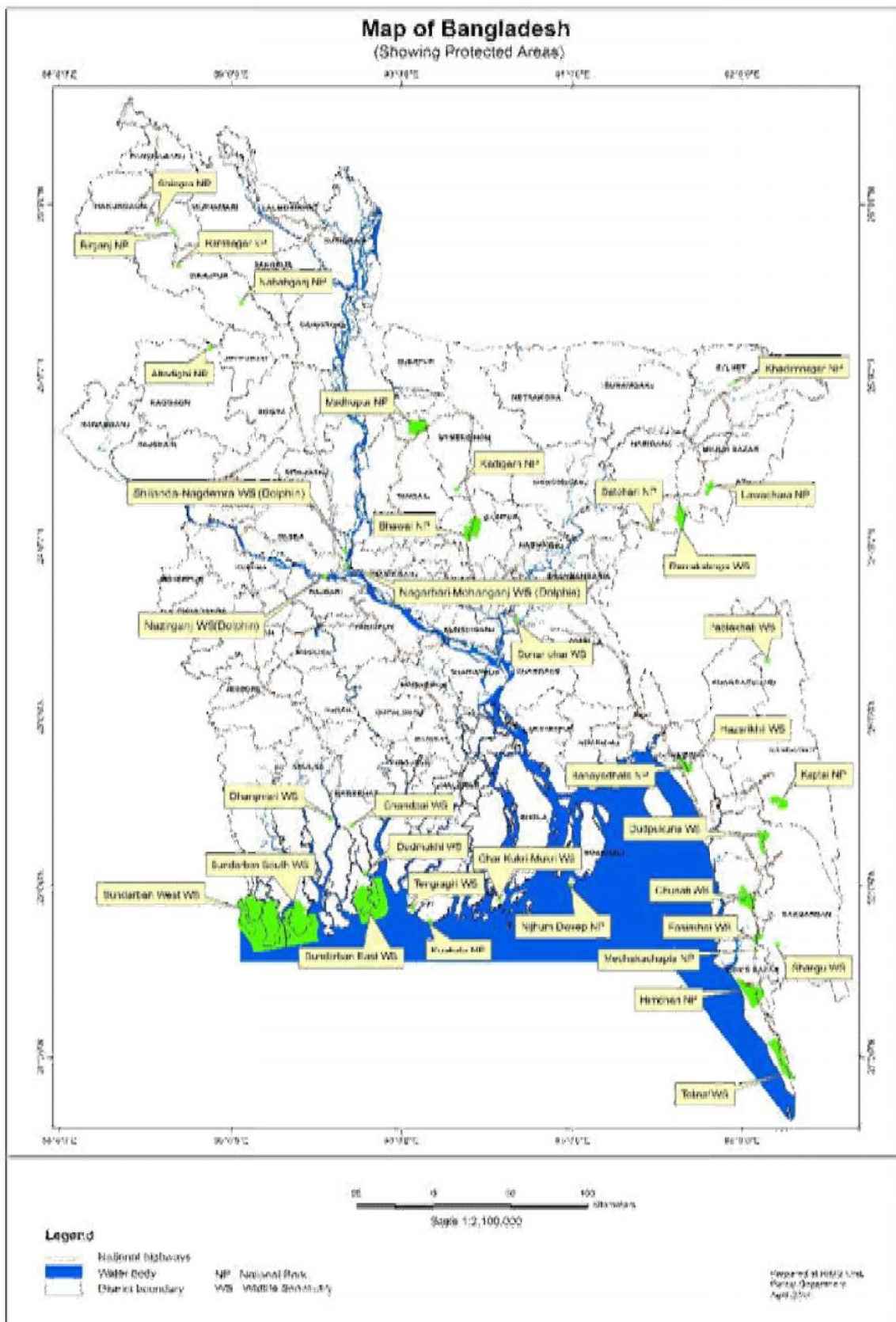


Figure 4: Protected Areas of Bangladesh

## **Forest Management Practice**

Once Forest Department practiced clear felling, selection felling, natural and artificial regeneration which has been stopped imposing moratorium. The harvest is only from the plantation, either government commercial plantations or the social forestry. In both cases the philosophy is to clear felling of the planted trees, keeping the naturally grown trees within the stand. The policy is to keep the naturally grown trees for three consecutive rotation of 10 years, i.e. after 30 years, those trees could be cut. The Social Forestry Plantations all trees are clear felled after the rotation period of 10 years. The government commercial plots which are matured are not felled till the department secure a funding for the plantation to prevent potential encroachment (Mia, 2017; Personal Communication).

Assisted Natural Regeneration (ANR) is forest management practice suitable to regenerate the degraded forests. The ANR is a less costly and an effective technique for restoration of the degraded forests and could be utilized at the landscape level (Ganz & Durst 2003; Shono, et al., 2007). Assisted Natural Regeneration (ANR) methods support regeneration reducing barriers of natural succession like competition from weedy vegetation, recurring disturbances like fire, grazing, sapling removals etc. (Shono, et al., 2007). It is necessary to identify forest land that has the potential for regeneration. The potential depends on the availability of mother trees in the vicinity and soil at least contains required moisture. Assistance to regenerate is mainly protection from stresses from weeds and other natural reasons and from the dependent communities. Local communities engaged in management are to ensure fire protection to protect regeneration (Friday, et al., 1999). The pressing technique can be used to control weeds between rows and beside fuel breaks in ANR. Enrichment planting can be combined with ANR where there is lack of mother trees within identified ANR Area (Friday, et al., 1999).

The natural regeneration extent in the forests of Bangladesh is not known. Dense regeneration in the level hilltops, foothills and in gentle slopes and moderate dense regeneration in Sitakunda Echo park in the Chittagong Hill forests were observed, however, most of the tree species were not at their regeneration phase (Rahman, 2011). The mother trees are inadequate and vegetation density is low in many areas in the west Sundarbans; in the East, however, plenty of seedlings appear but not established (Safi, 1982). ANR has potential and can play a key role in seedling establishment and growth performance if completed before the rainy season and fruit dispersal and fruiting season (June-August) of mangrove species (Rahman, 2011). The Forest Department

in recent years, emphasizes on assisted natural regeneration (ANR) in the protected area. Forest Department introduced Assisted Natural Regeneration (ANR) in Sundarbans East Forest Division; removed unwanted weeds, climbers, creepers including Bhola (*Hibiscus Tiliaceus*), Kewakanta (*Pandanus Foetidus*), Hantal (*Phoenix Paludosa*), Hoddo Fern (*Acrostichum aureum*), Sundry Lota (*Dalbergia spinosa*) and dead, dying, moribund trees (Rahman, 2011). Forest Department Assisted Natural Regeneration in natural forests of the Baraitali Rain Forest of Chittagong (Hossain, et al., 2004). Taungiya system was adopted in assisting natural regeneration to afforest the blanks following clear felling in the Sal Forest (Ahmed, 2008).

### **Monitoring and Evaluation**

There are many tools for supporting forest management including periodic inventory, GIS technology, aerial photography, remote sensing imagery, cartography and carbon inventory. To support the forest management, Bangladesh Forest Department has established GIS-based 'Resource Information Management System' (RIMS) in 1984-85 under the auspices of IDA funded Second Forestry Project. RIMS support producing reports, maps, silvicultural prescriptions, present yield, predicted yields from relevant operations. Forest inventory is an essential proponent of Forest Management. The inventory provides basic information on the species diversity, individual numbers, concentrations, growth, maturity, and the basis for calculation of allowable harvest for a healthy forest ecosystem and indicates degradation and assist in taking measures for recovery in case of degraded forests. Inventory of major forest was carried out at various times, as such, volume and yield functions for plantation species and natural forests has been done.

Global Forest Resources Assessment, 2015 desk reference drawing from country report, Bangladesh reports: forest policy, legislation and regulations are supportive to sustainable forest management; total forest area is under remote sensing coverage and was last inventoried in 2012; there are Permanent Sample Plots (PSP) visited every 4 to 5 years while 10% of the Temporary Sample Plots (TSP) visited every year to collect data used for planning the sustainable forest management; a total of 60% of the forest area (0.871m ha) under Forest Management Plan in 2010 of which 0.435m ha production forest, 0.436 m ha conservation forests; Bangladesh forest management considers soil and water management, highconservation value forests assign special management categories; the stakeholders are involved in planning phase, operation phase and in review of operation (FAO, 2015).



## **Forest Inventory**

The Sundarbans Forests Inventory records back to 1892. However, during the contemporary period, the first detailed Forest Inventory of Sundarbans (Forestal, 1960) and inventory for Chittagong Hill Tracts (Forestal, 1964) was carried out during 1959 to 1963; the inventory of the village forests was carried out by Hammer Master and others in 1981. In the recent years, the Sundarbans Reserved Forest (SRF) inventoried during the 1980s by Chaffy et al (1985), Revilla and his group during 1994-1996 and by FD with USFS technical support in 2009 adopting five circular clustered plots sampling design. Forest Department conducted National Scale Inventory in 2005-2007 with FAO support. A total of 299 plots gridded at 10 minutes' longitude and 15 minutes' latitude intervals measured carbon pools above and below ground including tree, seeding, saplings, non-tree vegetation, litter, and soil. The inventory found 96 t C/ha, 9t C/ha, 72tC/ha, and 46t C/ha in the forest, cultivated land, village and urban area respectively and 1tC/ha in inland water. The inventory was not forest-focused and didn't stratify forests in accordance with the degradation rather simple grid was followed.

Forest Department conducted inventory in Teknaf Wildlife Sanctuary (TWS), Inani Reserved Forests (IFR), Medakachapia National Park (MNP), Fasiakhali Wildlife Sanctuary (FKWS), Dudpukuria-Dhopachari Wildlife Sanctuary (DDWS), and in Sitakunda Eco-Park in 2010 and Khadim Nagar National Park (KNP), Lawachara NP, Satchari NP, Rema-Kalenga WS at Habigonj, Modhupur National Park (MNP) at Tangail, Kaptai National Park (KNP) at Rangamati, Chunati wildlife sanctuary (CWS) at Chittagong and Himchari National Park (HNP) at Cox's Bazar in 2014 using similar approach and techniques.

Sundarbans Inventory (2009) estimated mangrove carbon stocks (497Mg CO<sub>2</sub> ha<sup>-1</sup>) and the 2014 inventory estimates for Sal forest (247Mg CO<sub>2</sub> ha<sup>-1</sup>) and Hill Forest (325Mg CO<sub>2</sub> ha<sup>-1</sup>), and Agricultural Fields (5.8Mg CO<sub>2</sub> ha<sup>-1</sup>), Plantations (232Mg CO<sub>2</sub> ha<sup>-1</sup>), Rubber Plantation (210Mg CO<sub>2</sub> ha<sup>-1</sup>), Village Forest (142Mg CO<sub>2</sub> ha<sup>-1</sup>), and Tea Garden (37Mg CO<sub>2</sub> ha<sup>-1</sup>) (Netzer, et al., 2014). The inventory and associated activities facilitate generation of status, growth, the yield of forests, volume & yield functions. This basic information is very useful in preparing centrally coordinated Management Plans for different forests and Annual Plan of Operation prepared by the Divisional Forest Officer.

## **Emerging Issues**

The global and the country context are everchanging. However, in the recent last couple of decades, the environment is changing at a higher pace than the forests and environment of the

planet can possibly adapt. Climate change has the bearing on forest health in one hand and on the other, healthy forests can reduce the pace of the climate change. Forests protect against the extreme climate. Transboundary issues are also emerging due to the complexity in the power relation that includes for example flow of fresh water from the upper catchment, for instance, to keep the Sundarbans healthy. The market for the cross-border illegal trade of wildlife and different body parts of wild animals is the driver for poaching and threats to the wildlife, e.g. Bengal tigers.

## **Climate Change**

The long-standing interrelated issues of the forest management and biodiversity conservation are becoming pronounced louder with climate change. In the changing climate the species movement in the landscape and maintaining viability, for example of the last remnant of intact forest patch remains a challenge (Hoole et al. 2009). Carbon dioxide, methane, water vapor, nitrous oxide, sulfur hexafluoride and ozone are greenhouse gas (GHG). Carbon dioxide, the prime GHG are released in animal breath among others and are sequestered in trees transforming into biomass. As such, more the trees, more the biomass and more carbon stock, thus less free carbon dioxides in the atmosphere. Increased concentration of the GHG gas in the atmosphere is responsible for global warming which is changing the climate of the planet. There is a consensus among everyone concerned that the climate system is warming and is revealed by the data available since the 1950s, on the concentration of GHG, warming of the ocean, sea level and snow and ice; since 1850, the decades are warmer than the preceding ones (IPCC, 2013).

UNFCCC developed and support REDD+ program for promoting carbon stock into the forest and thereby keep atmospheric GHG within the limit. Bangladesh forest classification system and GHG inventory fulfilling basic IPCC requirements for the land use, land use change, and Forestry (LULUCF) sector are consistent to the representation of Bangladesh land base (Akhter and Shaheduzzaman, 2013). Climate Change is the main driver for degradation of the Protected Areas of Bangladesh (Merrill, 2011). Vitality may increase having a favorable climate for growth and CO<sub>2</sub> fertilization; however, forest health will suffer due to increased insect population and pests following favorable temperature (Lucier et al., 2009). Climate change resilience of species are different, some species will better adapt to climate change resulting change in forest composition (Breshears et al., 2008). The phenological cycles may change

affecting pollination, flowering and fruit setting (FAO, 2012) which reduces forest growth (Feeley et al., 2007; Clark et al., 2003).

Natural disturbances decrease forest area, climate change influence insects range expansion and pest spreads and disease outbreaks (Jepsen, et al., 2008); damage standing crops and reduce productivity (Chakraborty et al., 2008; Nepstad, et al., 2008) climate change influence insects range expansion and pest spreads and disease outbreaks (Jepsen, et al., 2008). Insect range expansion, pest infestation and predicted frequent cyclone and storm surges with high intensity and magnitude will damage forests in Bangladesh. The devastating and long-lasting effects of climate change will degrade young forests and lead to conversion into agricultural land and pastures (FAO, 2012). Pests, diseases and fire outbreaks may increase because of warming due to climate change; unless changes in the ecosystem and their services are identified and adjusted to the local social and economic system, the changes will be disastrous (FAO, 2012). The people near the forests often depend for emergency supplies like the pole, fuelwood, food items and they used to collect from forests (Osman-Elasha, et al., 2009); the necessity of maintaining the supply will further increase with the loss of crops following such extreme events (FAO, 2012).

Changing climatic conditions like rising and fluctuations of temperature and seasonal shifting and increased numbers of dry days and torrential rains may go beyond the threshold of the growth and survival of the forest of species. Burton et al., (2010) attributed the spread of beetle in Boreal forests to the absence of consistently low temperatures over an extended period and predicted damage of coniferous forests in Finland (Burton, et al., 2010). However, in Bangladesh, no such research has yet been done. Climate conditions including temperature, precipitation, and humidity determine forests composition and diversity which is reflected in the Holdridge ecological life zones (Holdridge, 1967). Reduction of the uncertainties of the climate change and dealing unexpected impacts in forest management and making forestry profitable in the changing conditions compared to other land use considering the high opportunity cost remains a challenge (FAO, 2012). For informed management decisions, the forest managers require monitoring data on flora and fauna, climate and non-biological as such a robust monitoring system needs to be in place, which is challenging for Bangladesh Forest Department with available logistics, manpower and budget provision.

Sundarbans in the South West Coast of Bangladesh is exposed to rise in sea level and will be impacted by the increase in the salt density as well as salinity intrusion into the countryside.

Intense cyclone and increased height of storm surge in the context of the increased level of the sea, people will lose livelihoods, shelter and suffer disease and will be forced to migrate. Many of these people will move to nearby cities or other rural areas (Gemenne, 2011; Martin, 2010). On the other hand, the hill forests on the south-east are exposed to the devastating cyclones and storm surges. People living along the coast, losing asset due to weather extremes, migrate to the higher altitudes. For example, following the devastating cyclone in 1970, hundreds of people took shelter in the reserve forests in the high altitude and subsequently settled there.

### **Forestry Related Trans-Boundary Issues**

The ecosystem does not align political boundaries. For example, 60% of the Sundarbans is within political boundaries of Bangladesh and rest is in India. Forest in the Chittagong Hill Tracts continues across the political borders to India and Myanmar, same was true for the Garo Hill Sal Forests though fragmented over time. Poaching and illegal trafficking of wildlife happen across the country borders to their final destinations beyond South Asia. Criminal groups control the trafficking and trade of wildlife including price control and transaction between poachers and carriers. Tiger poaching and trafficking from Bangladesh along with some other wildlife is a major threat to the icon species 'Bengal Tiger'. The market for body parts of tiger and other wild animals is mainly external. Tiger traffickers in Sundarbans are wealthy and well connected to the international wildlife crime networks and they use poor people, fisher to hunt and trade (Haque and Islam, 2011).

There is a limited political commitment to trans-boundary biodiversity conservation (Haque and Islam, 2011). The consistency in the enforcement of legal regime to protect wildlife remain challenging in the region; e.g. Nepal is the staging post for wildlife trafficking, so effective control in Nepal with corresponding efforts in India are necessary to stop trafficking. The traffickers use Bhutan as the safe route, because the border between Bhutan and India, Bhutan and China remain open. Bhutan does not have an anti-trafficking law for wildlife. The criminal gang take opportunities of limited institutional capacities including scanty numbers of staff and having no skill in these countries. There is only limited and different level of political commitments for trans-boundary biodiversity conservation depending on the regime in power in respective countries and their interrelation (Haque and Islam, 2011). The elephants crossing political boundary often enters Bangladesh, e.g. Gajni, Sherpur district, and damage forest adjacent paddy field and some cause damage to settlement and people. The elephants' habitat has been destroyed and human settlements in their movement corridors forced elephants to venture into the paddy fields and engage in conflicts with human (Rahman et.al., 2011).

Other than the wildlife trafficking, withdrawal of fresh water from the Ganges system, pollution of rivers from upstream point sources, pollution from water transportation, cross country wild elephant expeditions are major ones. Salinity intrusion in Sundarbans because of less freshwater flow from upstream is due to the withdrawal of water from Ganges system by India. Uncontrolled industrial effluent into the upstream river systems pollutes freshwater regime of Bangladesh that cause damage to Sundarbans. The river transport, oil tanker, coal and cement clinker transportation pollute rivers and thus associated forests across the borders. Pollution by the oil spill from the ships and fuel tanker runs across the countries are responsible for degradation (Haque and Islam, 2011).

## **Chapter 5: Forest Management Institution**

## **Forest Management Institution**

Formal and informal institutions facilitate to access natural resources and play key role in forest management (Khan, 2011), however inadequate capacity is a big issue (Alam, 2009). Ministry is the controlling body for associated agencies as per the Rules of Business (1996). Ministry of Environment and Forests (MoEF) controls forest sector agencies in Bangladesh which are: Bangladesh Forest Department (BFD), Bangladesh Forest Research Institutions (BFRI), Forest Academy (FA), and Forest Schools (3), Forestry Development and Training Centre, Bangladesh National Herbarium and Bangladesh Forest Industries Corporation (BFIDC). Forest Department is the mandated and responsible organization for forest management in Bangladesh. There are some other institutions that have relevance in forest management. For example, Department of Livestock, Department of Agriculture Extension, Department of Environment and Ministry of Land among others have relevance with forest management. The Co-Management of forests has been legitimized in Bangladesh under the Protected Area Rules, 2017. The organizational structure of the Co-Management includes Co-Management General Committee, Co-Management Executive Committee, People's Forum (PF) and Village Conservation Forum (VCF).

## **Ministry of Environment and Forests (MoEF)**

MoEF is a regulatory ministry. Department of Public Health initiated environment protection in Bangladesh under the Water Pollution Control Ordinance, 1973. On 15th September 1987, Agriculture Division and Forest Division were created under the Ministry of Agriculture. The Forest division was transformed to a ministry and named Forest Ministry on 19th July 1989. The Pollution Control Department under the Local Government Division has been named Department of Environment on 3rd August 1989. The newly named department has been vested under the Forest Ministry and the ministry has been renamed as Ministry of Environment and Forests. Goal and Objectives of the MoEF are: to ensure a livable environment for current and future generation, expand forested land, improvement of forest and forest resources, conservation of biodiversity, poverty eradication, environmental pollution control, combat climate change and ensure a sustainable conducive environment. A cabinet minister leads the ministry and a deputy minister assists the minister. In accordance with the Rules of Business, the minister is the chief executive of the ministry. Secretary is the administrative head. Total manpower of the MoEF is 123 staffs that include 1 Secretary, 4 Additional Secretary, 3 Joint Secretary and 9 Deputy Secretary.

## **Forest Department**

Indian Forest Department was established in 1862. The Forest Department started functioning in Dhaka during 1925. This department was named as East Pakistan Forest Department when Pakistan came into being in 1947 and became Bangladesh Forest Department after the independence of Bangladesh in 1971. The vision of the department is conservation of biodiversity and environment through modern technology and innovation, and socio-economic development. The mission is forest extension, biodiversity conservation, poverty eradication and wildlife conservation through direct people's participation. Following are the goal and objectives:

- Maintain a balance between ecosystem and environment.
- Implementation of the international convention, treaty, and protocol on forest, biodiversity, and wildlife.
- Wildlife conservation
- Biodiversity conservation
- Extension of ecotourism
- Coastal and wetland biodiversity management and development.
- Carbon sequestration and carbon trading.
- Climate-resilient forestation, afforestation, forest resource harvest.
- Sustain land-based production.
- Natural and social development.
- Forest and social forest extension.
- Management of protected area including wildlife sanctuary, botanical garden, national park, eco-park and safari park.

Forest Department took following forest management strategies:

- Protection and conservation of reserve forest and Protected Areas and maintain forest classes.
- Finalize forest settlement operation employing permanent Forest Settlement Officer.
- Ensure forest conservation through maintaining a devoted record of forest land and do not lease out forest land.
- Afforestation of coastal islands and conservation.
- Recruitment of human resources, capacity building and logistics for the department as suggested in Forestry Sector Master Plan.



- Achieve set target of forest coverage through Social Forestry, reforestation of degraded and deforested land.
- Bring Unclassified State Forests under Social Forestry;
- Conservation of forest, fisheries, and wildlife of Sundarbans through the implementation of Integrated Resources Management Plan (IRMP) for Sundarbans.
- Ban fuelwood in brick kiln and gas and coal supply to brick kiln.
- Strict ban on the handover of forest land for any other purpose.
- Agroforestry in CHT, Barind Tract, and Modhupur Garh.
- Rehabilitate Jhum Farmer to a certain village to protect the forest.
- Encourage Natural Regeneration.
- Plant appropriate indigenous species in case of afforestation and reforestation.
- Biodiversity reach and naturally sensitive area identification and declaration of Protected Area.
- Management Plan for each Protected Area.

Currently, Forest Department has 10124 positions under 91 categories. Forest Department in 2011 has proposed a new organogram that suggested 19635 positions under 116 categories (removed 9 old categories and add 32 new categories). However, the proposed organogram has been declined and suggested to review. The Forest Department accordingly has revised and proposed following positions in June 2016 (Table 4):

**Table 4: Existing and proposed positions by type for Forest Department**

<b>Post type</b>	<b>Existing post</b>	<b>Proposed post</b>
Cadre post	251	398
Other Class I	46	112
Class I	297	510
Class II	424	834
Class III	5,351	7,430
Class IV	4,168	5,048
<b>Total</b>	<b>10,240</b>	<b>13,822</b>

## **Bangladesh Forest Research Institute**

Forest Research Laboratory has been established in 1955 to research for better technology and for appropriate use of forest resources. The laboratory has been converted to National Institute for Forestry Research in 1968. The institution has been named Bangladesh Forestry Research Institute (BFRI) after the independence of Bangladesh in 1971 and has been operated under the MoEF (Merry, 2011). BFRI was a branch of Forest Department at the beginning. Later, the institute has been included into 'National Agriculture Research System (NARS) in 1996 for technical advice, however, MoEF remained the controlling ministry. BFRI is engaged in research to support conservation, sustainable forest management including identification and testing of technologies and extension of such technologies. The BFRI has following activities:

- Research to increase plan land and hilly forest resources productivity.
- Develop new and improved technology to maintain the supply of raw materials to the cottage, cane, bamboo industries and ensure diversified use of cane and bamboo.
- Conduct Agro-Forestry research engaging small and marginal farmers, women and poor community.
- Develop production model for Social Forestry using appropriate technology.
- Develop ways to best utilize the coastal accreted land, planted mangroves, and natural mangroves.
- Extension of the invented technologies to the user community.

BFRI pursue following program area for research:

- Produce improved and quality planting materials (seed, seedlings etc.).
- Forest management and raising gardens.
- Regeneration and development of trees.
- Bamboo and minor forest resources.
- Biodiversity conservation.
- Inventory of forest resources and increase production.
- Conservation of forest soil and watershed management.
- Research on Social Forestry and agroforestry systems.
- Forest disease and pest management.
- Physical and chemical use of forest resources.
- Transfer of training and technology.

BFRI developed following technologies:

- Branch cutting technique for bamboo propagation.
- Tissue culture and nursery.
- Propagation and plantation techniques for mangrove species (Golpata), Tal, medicinal plants, cane, and Patipata.

The Institutions also work on pests and diseases, different cultivation techniques for Agro-Forestry, volume tables, biomass tables, diameter increment, field level taxonomic identification, improvement of latex production of rubber etc.

### **Forestry Education Institutions**

Forestry education is essential to educate forestry professionals so that, this sector can comply with legally binding commitments, engage multiple stakeholders in Forest Management and increase the quality of products and services (Jalil, 2011). There is higher level academic forestry education in few universities in Bangladesh. School and College education in Bangladesh is yet to include forestry. However, for this research only technical and implementation level forestry education has been discussed. The Forest Academy has been established in compliance of the Forest Act, 1927. The Academy provides training to the newly recruited officers and facilitate them to complete their 1-year Master's Degree (it was 2-year before) in Forestry under Chittagong University. The forestry sector is supported with i) Training Academy at Chittagong, ii) Bangladesh Forest School, Sylhet iii) The Forest School, Rajshahi iv) Bangladesh Forest College, Chittagong, and v) Forest Development and Training Centre, Kaptai (Nordin, 1993). All these institutes suffer from the inadequate staff which is a barrier to the development of forestry sector. Forestry as a subject is not popular with common people. There is hardly any debate on forestry, forestry budget allocation, development potential in forestry, protection mechanism of forest resources, etc., in the Parliament, in the tea stall or on the street corner like it happens with other issues (Jalil, 2011).

### **Bangladesh Forest Industry Development Corporation (BFIDC)**

The Government of the then Pakistan established the Forest Industries Development Corporation in 1959. This corporation has become Bangladesh Forest Industries Development Corporation (BFIDC) in 1972; and general direction, administration, and affairs of the corporation have been vested on a Board appointed by the Government. Board of Directorsexercise all authority and performs all activities of the corporation under the guidance of MoEF. The chairman and another 3 members constitute the Board. BFIDC was set up for using forest resources as raw materials for the forest resource-based industries and produce value-added products. Mechanical felling was

introduced in Cox's Bazar and Sylhet forests to support these industries. Since inception, the corporation harvested around 30 thousand hectares of reserve forests in Kassalong, Reingkhong (extraction started in 1960) and Sangu Matamuhuri of Chittagong Hill Tracts (extraction started in 1963). The corporation is not engaged in forest management, however, has the relevance since it was harvesting until the tree felling moratorium has been sanctioned to natural forests. BFIDC established 19 industries, however, 12 of them disposed of; the 7 remaining units are producing furniture and treating woods (BFIDC, 2016). BFIDC manages 13,221 ha. of rubber plantation established in degraded forests. The corporation also provides support to the private rubber grower.

### **Forest Co-Management Organization**

Participation of the community in forest management has been initiated in the early 1980s. Gradual development during the last couple of decades shaped up and reached to Co-management. The national biodiversity strategy and action plan have included Co-Management of Protected Areas in Bangladesh (GoB, 2005). The Wildlife (Conservation and Security) Act, 2012 has provisioned community participation in Protected Area management. The Government has notified Co-Management approach for managing Protected Areas through a gazette that guides the formation of Committees (Ahmad, Sharma and Merrill, 2011). Other related organizations of the Co-Management Committee are: Village Conservation Forum (VCF) and People's Forum (PF) and Community Patrol Group (CPG). Nishorgo (2003-2008) and IPAC (2008-2013) projects have developed a consistent approach over a longer period for sustainable natural resources management. These projects formed Co-Management Council and Committees for several PAs engaging stakeholders and successfully influenced government to issue gazette (FD 2015). Climate Resilient Ecosystem and Livelihoods (CREL 2012-2018) project has worked for Co-Management Organizations to strengthen their capacity. This project advocated and facilitated MoEF to support the Co-Management Organizations with legislative framework. Accordingly, the Forest Protected Area Co-Management Organizations has been instituted by the legal basis of the Protected Area Management Rules, 2017. Following are the description, procedure of formation and functions of the various tier of the Co-Management Organization as per the Protected Area Management Rules 2017:

## **Co-Management General Committee (CMC)**

This committee is the apex Co-Management Organization for forest Protected Area supported by the forest Protected Area Management Rules, 2017. The general body of the committee is formed with the representation of the relevant government agencies, civil societies, and community representative of the impact area. The Co-Management General Committee has following members:

- Upazila Nirbahi Officer (UNO)
- Upazila level officers from the Livestock, Agriculture, Fisheries, and Social Welfare departments.
- Assistant Conservator of Forests (ACF), Range Officer, Beat Officers, Station Officers (where relevant).
- Representative of Police and RAB, BGB, Coast Guard (if the position is there in that Upazila)
- 2 representatives from Union Parishad (UP) of them one will be a woman (selected by UNO)
- 2 representatives of civil society (selected by UNO)
- 10 members from People's Forum (PF); of the 4 will be women, 4 CPG (in case of presence of any other response team, 1 of the member will be included), 2 representative of forest resource user organization (selected by DFO) and
- 1 ethnic representative, if relevant (selected by UNO).
- In case of Sundarban, one fisherman representative and three representatives of minor forest product collector (selected by DFO).

The UNO is the president of the Committee and DFO and Union chairman will be the advisor. If any Protected Area is situated within 2 Upazila, then the larger Upazila will provide representative accordingly. The Range Officer is the member secretary of the Committee. The Co-Management General Committee have a tenure of four years. The Co-Management General Committee will meet at least once in every six months. The committee has following roles:

- To approve annual development plan prepared by the Executive Committee and recommend approval of the budget to the DFO.
- To monitor and evaluate the activities for the PA and the adjacent area.
- To provide necessary support to the Executive Committee.
- To advice for management and conservation of biodiversity and NRM.
- To advice relevant authority in developing the policy to share benefit generated from the

Protected Area among the stakeholders.

- To effectively resolution of the conflict is there any.
- To provide instruction for settlement of accounts and audit.
- Any other activities as instructed by the relevant authority of the government.

The Executive Committee of the Co-Management Committee (EC-CMC) has following members:

- Upazila level officers from the Livestock, Agriculture, Fisheries, and Social Welfare departments.
- Assistant Conservator of Forests (ACF), Range Officer, Beat Officers, Station Officers (where relevant).
- Representative of Police and RAB, BGB, Coast Guard (if the position is there in that Upazila)
- 2 representatives from Union Parishad (UP) of them one will be a woman (selected by UNO)
- 2 representatives of civil society (selected by UNO)
- 6 members from People's Forum (PF); of the 2 will be women, 2 CPG (in case of presence of any other response team, 1 of the member will be included), 1 representative of forest resource user organization (selected by DFO) and
- 1 ethnic representative, if relevant (selected by UNO).
- In case of Sundarban, one fisherman representative and three representatives of minor forest product collector (selected by DFO).

Relevant range officer acts as secretary of the committee. The president, 2 vice presidents (one woman) and 1 Treasurer are to be elected by direct vote by the general committee members. President must be a member of the relevant VCF. The members of the Executive Committee will be for 2 years and any person cannot be a member of the executive for more than 2 consecutive terms. The Executive Committee of the Co-Management Committee (Ex-CMC) has following roles and functions:

- Develop Annual Development Plan and budget preparation.
- To take all efforts for NRM and biodiversity conservation.
- To prepare and update the list of the VCF members.
- Encourage participation of the local community in Protected Area conservation.
- Take sustainable economic development activities.

- Ensure patrol by the Community Patrol Group (CPG).
- Take necessary activity for CPG remuneration and AIG for CPG members.
- Ensure collection of the fund as directed by Protected Area Management Rules 2017.
- Infrastructure development and protection.
- Buffer and adjacent area plantation and protection.
- Play an effective role in the conservation and protection of the PA and adjacent forests.
- Assist Forest Department in managing Fisheries resources in PA and adjacent areas.
- Sensitize local community for climate change adaptation.
- Assist the wildlife victim in preparing their application for the compensation.
- AIG activity for the resource-dependent communities.
- Provide training to the VCF, PF, and CPG.
- Assist Forest Department in the eviction of the encroachers.
- Assist Forest Department in identifying wildlife corridors and forest resource management.
- Ensure account and audit for the committees.
- Any other activity as instructed by the government.

As of December 2017, a total of 27 Co-Management General Committees and Executive Committees have been formed and are functional to protect 21 Protected Areas.

### **Village Conservation Forum (VCF)**

Formation of Village Conservation Forum (VCF) has been provisioned in the Protected Area Management Rules, 2017. However, many VCFs has been formed prior to the enactment of the Rules will remain functional as per the Rules. VCFs are formed with the forest resources dependent people living in the villages situated within 5 kilometers from the boundary of the Protected Area. If even a part of the village lies within the given 5 km boundary, then the entire village could be eligible to form VCF. Village Conservation Forum (VCF) is the lowest tier platform of Co-Management process. Subject to other provisions of the Protected Area Management Rules 2017, the following are roles of the Village Conservation Forum:

- (a) Assist in development and implementation of protected area management plan.
- (b) Raising public awareness on forest resources and wildlife conservation.
- (c) Encourage people to abide by laws and Rules related to environment and forest conservation.
- (d) Assist in Social Forestry programs implementation.

- (e) Assist Co-Management Executive Committee in constituting and administering Community Patrol Groups.
- (f) Assist Co-Management Executive Committee and Forest Department in suppressing: illegal tree felling, stealing forest resources, forcible occupation of forest land, other forest offenses and to prevent degradation of wetlands.
- (g) Assist Co-Management Executive Committee in developing and implementation of the Annual Development Plan.
- (h) Raising awareness on climate change and responsive action.

### **Community Patrol Group**

Co-Management Executive Committee in consultation with Divisional Forest Officer shall constitute a required number of Community Patrol Groups from the members of Village Conservation Forums. The formation of the CPG will be as per the provision of the Protected Area Management Rules, 2017. Community Patrol Group shall be administered by the overall guidance of Forest Department. Co-Management Committee shall provide the honorarium to the Community Patrol Group at a rate determined by the Forest Department. The functions of the Community Patrol Group shall be as follows, namely: -

- (a) Joint patrolling of the Protected Area with Forest Department's local staffs.
- (b) Aid in the reclamation of encroached protected area land.
- (c) Other tasks scheduled from time to time by Divisional Forests Officer.

A total of 1,550 community members formed 74 patrol groups guard nearly 44,000 hectares of Protected Area (Ali, Uddin, and Chowdhury, 2015).

### **People's Forum (PF)**

The People's Forum is formed by an election of representatives from VCFs within the Protected Area landscape. People's Forum will have an Executive Committee. The members of the forum will form the Executive Committee electing the President, Secretary, Treasurer and 8 members. If the election is not possible than the Range Officer will select office bearer and members from the PF members. The People's Forum and the Executive Committee both will have 50% women representation, however, if enough women are not there, man will cover. The Executive Committee of the People's Forum will be for 2 years, however, will continue functioning till new committee is formed. People's Forum will maintain updated members name and lists and fill any vacant member position from the respective VCF. People's Forum will meet at least once in every three months. Executive Committee of Peoples' Forum shall perform the



functions of Peoples' Forum and the other members of the Peoples' Forum provide the assistance. The functions of the Peoples' Forum are:

- (a) Raise public awareness on biodiversity conservation.
- (b) Assist in developing Protected Area Management Plan and ensure effective participation of poor forest resource-dependent people in the implementation of the plan.
- (c) Assist resource dependent poor members of the Village Conservation Forums in taking alternate livelihood opportunities and thereby improve wellbeing.
- (d) Assist Co-Management Executive Committee.
- (e) Sensitize people to abide by the Forest and Wildlife Acts, Environment Conservation Act and Rules made thereunder and to assist Forest Department in proper enforcement of the law.
- (f) Assist Village Conservation Forum and the Executive Committee of the Co-Management Committee (EC-CMC) in the selection of beneficiaries and implementing Social Forestry programs.
- (g) Assist in implementing eco-friendly agroforestry/plantation program in the uncultivated fallow lands adjacent to the forest protected area.
- (h) Assist EC-CMC in constituting and administering Community Patrol Groups.
- (i) Assist CMC in selecting beneficiaries, creating a plantation in buffer zone/landscape zone and in monitoring and distribution of benefits among the participants according to concerned Rules and procedures.
- (j) Assist in raising awareness on climate change.

## **Chapter 6: Forest Policy and Legal Regime**

## **Forest Policy Regime**

Thomas Dye (1972) defines policy as whatever governments choose to do or not to do. The policy is the intention of the government in the given context; may include broad statement; or may even include detail prescription of specified objectives; or course of action for a defined field in Forest Resources Management (Rahman, L., 2011). Present-Day Bangladesh was an integral part of the then Indian sub-continent which was a British colony from 1757 to 1947. British regime introduced Forest Policy over time in the then India. The first Forest Policy in the then India was first introduced in 1894. The focus of the Forest Policy 1894 was on revenue generation ignoring forest resource-dependent people (CPD, 2002; Mustafa, 2002).

The early forest administrators of the then India considered forests as an obstruction to agriculture. Charter of Indian Forests, 1855 was the first policy outline for forest resource conservation; the first Forest Policy was adopted in 1894 (Rahman, L., 2011). The Forest Policy 1894 promoted clearing of forests to meet the demand for agriculture land (Khan, 2001). However, directives were there in this policy for conservation of the forests on the hill slopes to reduce soil erosion, siltation, and impact of floods and torrents (Mustafa, 2002; Ahmed, 2008). Forests were reserved for soil conservation, maintaining climate and for timber; however, pasture and minor forests though declared Protected Forest were usually unrestricted access and the policy recognizes village forest and un-demarcated forests (Rahman, L., 2011).

## **Forest Policy during Pakistan Period**

Forest Policy adopted during the Pakistan period followed British spirit (Khan, 2001; Rasul, 2005) through the purpose and drive for the forest management practically changed a great deal. However, it took a while for the Pakistan regime to develop and adopt forest policy. Pakistan came into being in 1947 and the first forest policy for Pakistan was adopted in 1955 and the second forest policy was adopted in 1962.

## **The Forest Policy 1955**

This policy provided importance of conservation and classified forests according to utility; suggested forestry as a high national development priority; directed managing forests under working plans; provided emphasis on wildlife habitat protection and conservation; suggested land use ensuring soil conservation and avoiding erosion; and proposed a properly constituted forest service with trained staff (Chowdhury, et al., 2009; Muhammed et al. 2008; Hussain, 1992; Khan, 2001); and suggested adequate forest research, education and sound management of private forests (Rahman, L.,2011).

## **The Forest Policy 1962**

This policy stressed commercial motives of forest management, intensifying use of forest products, bring public wasteland under tree cover, reduce rotation, promote regeneration; encourage fast growing commercial/industrial wood species and farm forestry; legislation for private land acquisition and increase harvest in CHT and Sundarbans (Khan, 2001; Rahman, 2011; Chowdhury, et al., 2009). However, soil conservation in forests and private land remained a priority of the 1962 Policy; Wildlife Enquiry Committee was constituted in 1968, the government invited World Wildlife Fund (WWF) in 1966, Mount fort 1967 and Poore missions in 1968 (Chowdhury, et al., 2009). Both the Forest Policy of the then Pakistan were biased towards the former West Pakistan (now Pakistan) and accelerated resource harvest from East Pakistan (now Bangladesh) that didn't allow sustainable forest management (Ahmed, 2008; Rahman, 2011).

## **Forest Policy in Bangladesh**

The context and people's need changed over the decades and regular adjustment resulted in Forest Policy in Bangladesh (Alam, 2009). Bangladesh adopted the first forest policy in 1979. However, implementation was rather limited due to insufficient capacity of the Forest Department. The Earth Summit in 1992 surfaced issues, concerns about the conservation and protection of forests for the ecosystem services along with the economic and societal benefits. The discourse culminated into the consensus and adoption of Forest Principles. Subsequently, Bangladesh National Forest Policy, 1994 was developed and adopted. The Forest Policy, 2017 has been drafted considering contemporary issues, concerns, aspirations of Bangladesh and using available knowledge internationally and in Bangladesh. Besides, there are a few narrowly defined field specific policies supporting forest management in Bangladesh like the Spotted Deer Rearing Policy, 2009 and the Compensation Policy for Causalities caused by Wildlife, 2010.

Bangladesh is densely populated, and land resources are extremely limited. In recent decades' economy of Bangladesh is growing rapidly. In the context, several other policies of various sectors have bearing on the forest management. For example, the National Environment Policy, 1992; the National Agricultural Extension Policy, 1997; the National Water Policy, 1999; the National Industrial Policy, 1991 and the National Land Use Policy, 2001. Rest of this section details insight of the forest policy of Bangladesh and mentions the relevant other sectoral policies.

## **The Forest Policy 1979**

This Policy focused on the Forest Department and provided generalized directives; suggested to expand government forest area horizontally and manage scientifically by the forest cadre; protect the forest from encroacher, extract optimally and set up new forest resource-based industries (GoB 1979). The Policy called for massive plantation and was traditional emphasizing sustained yield with no suggestion for overcoming the crisis of the forestry sector. For example, objectives for hill forests was to convert irregular hill forests by valuable and fast-growing species; objectives for Sal forests was to create recreational facilities (Khan, 2001). The Forest Policy, 1979 includes following statements (reproduced):

- a) Forest land shall be protected and will improve forest quality
- b) No conversion of state forests; and forests shall be expanded into coastal accreted lands and Unclassed State Forest land
- c) Participatory plantation will be extended massively to meet national requirement.
- d) Forest produce shall be based on modern trend and technology
- e) Measures shall be taken to meet the raw material needs for existing and new forest-based industries from national forests
- f) Forestry training, education, and research will be enhanced
- g) Measures will be adopted for establishing forest cadre to supply required forest cadre officers
- h) Relevant laws shall be updated
- i) Conservation and protection measures shall be taken for forests and wildlife; and to realize recreational potentials
- j) Massive motivation through mass media and inclusion of forestry in the school curriculum

Clause (c) of the Forest Policy 1979 statements recognized and prioritizes the participatory forestry in the country for the first time (Rahman, L., 2011). The Rio Conference, 1992 inspired policy makers of Bangladesh to conduct a sector study and prepare longer-term Management Plan. Accordingly, the government conducted a study and framed 20-year Forestry Master Plan in 1993. National Forest Policy, 1994 has been adopted by MoEF considering the recommendations of Forestry Master Plan (Hassan, 2001; Rahman, L., 2011). The Plan, however, was published in 1995 (1995-2015) for 20 years. This policy set a target to bring 20% land of the country under tree cover. The policy continued promoting timber-based industries, production forestry and acknowledged the participation of the community in forest management (Ahmed, 2008).

## **The Forest Policy 1994**

The Forest Policy, 1994 focused on maintaining the environment, supporting economic and societal development. This forest policy considers agriculture policy, industrial policy, and other relevant policy as well as relevant international convention, treaty, and protocol. The Policy (1994) acknowledged the need for the benefit of the forest resource-dependent people.

This policy promoted effective community participation in forest management to reduce forest offense and encroachment. The Forest Policy 1994 intended employment generation (Ahmed, 2008). Prominent features of this policy are: (i) 20% tree cover by 2015; (ii) wider stakeholder's participation in forestry; (iii) Capacitate Forest Management Institutions; (iv) sustained and profitable use of research findings; (v) reorganization of Forest Management Institutions (Hassan, 2001). Following are reproduced Policy Statements:

- Government shall ensure people's participation; raise tree cover to 20% by 2015
- Planting trees will be promoted to available public land, institutions and private properties
- Afforestation program shall be taken in CHT
- Natural hill forests, river catchment shall be declared as Protected Area for biodiversity conservation and soil conservation
- Protected Area extended to 10% of the state forests by 2015
- Sundarban Integrated Resource Management Plan shall be developed
- Commercial production forestry in Sal and hill forests will be promoted
- Encroached and degraded state forest land shall be brought under participatory forestry ensuring participant's benefit
- Contemporary advanced technologies shall be familiarized to avoid loss of forestry
- Measures shall be taken to increase use of forest raw materials in the industries
- Measures shall be taken to make the forest industries profitable
- Measures shall be taken for employment generation by promoting small-scale production using forest raw materials
- Simple Forest Transit Rules shall be developed and enacted
- Export of wood remain ban, processed products, however, could be exported
- Import of timber will be made easier, however protecting in country forest products
- Forest land conversion will be only through the permission of the Prime Minister
- Land for the ethnic community will be delineated and other lands will be brought under forestry

- Private afforestation, the rural plantation will be supported technically, financially and provide training through Development Partner's assistance in this regard
- Promotes women engagement in plantation
- Promotes sustainable Eco-tourism
- An extensive media campaign will be taken to enhance awareness on various issues of conservation and development of the forest and plantation
- Orchard, timber, and NTFP will be promoted in the forestry program
- Enhance the capacity of the Forestry Department
- Set up a department for Social Forestry
- Necessary amendment of existing laws will be done and enact a new law if necessary for the implementation of the forest policy (Muhammed, et.al., 2005; Ahmed, 2008)

### **Review of the Forest Policy 1994**

Many Forest Congress held since the Forest Policy, 1994 has been adopted. These congresses came up with the contemporary issues, challenges, opportunities, and solutions for the forestry sector in Bangladesh. The context of Bangladesh has changed considerably and the development pace has gained a momentum over the last couple of decades. The economy is shifting from predominant agrarian to medium sized industries. Large infrastructure including bridge, roads, railways, and energy and power generation plants are increasing. All these changes are putting very high pressure on the forest resources particularly forest land. The pressure calls for excellence in forest management and demands adjustment of forest policy. The forest professionals suggested review and revision of the Forest Policy 1994 during the forest congress and other forest sector events. The revision suggested addressing the emerging issues and to make the forest policy more precise and consistent and proposed following sub-sectors:

- Conservation of natural forests, biodiversity, and genetic resources
- Conservation of wild animal resources
- Afforestation and reforestation
- Wetland resources conservation
- Mangrove/Coastal Forest Management
- Protected Area Management
- Watershed management and soil conservation
- Participatory Forestry
- Development of village forest
- Non- timber forest products management

- Strengthening of forestry research
- Forest-based industries
- Local and indigenous people's rights and responsibilities
- Forest carbon trading through clean development mechanism and REDD+
- Forest land survey and demarcation
- Application of modern management tools
- Caring international obligations (ICTPs)
- Amendment and new enactment as the policy demands
- Institutional reforms and capacity building
- Provision for adequate and sustainable financing to implement the policy for achieving sustainable forest management (Choudhury and Hossain, 2011; Rahman, L., 2011)

### **The Forest Policy 2019 (submitted for approval)**

The Forest Department has drafted the Forest Policy, 2017 and submitted for approval.

This policy accommodates aspirations of the forest sector professionals to improve the environment. The forestry policy aligned other international forest and environment-related agreements, including the Paris Climate Change Treaty. The main goal of the Forest Policy 2019 is the management of the forests ensuring forest services and products to meet the needs of the present generation without compromising the ability of the forests to meet the need of future generation. Management of the forests to ensure the development of degraded forests, expansion of forests and plantations, wildlife sustenance and increase climate change resilience. Objectives of the submitted National Forest Policy 2018 are as follows:

- Ensure compliance of article 18(ka) of the constitution
- Increase the area of tree cover to a minimum of 25% of the total area, by 2035 with 50% density through a countrywide extensive plantation
- Ensure forest conservation, forest enrichment, forest ecological services growth and sustainable forest management
- Increase the tree cover through the plantation in the public, private and private land including urban areas outside the forest area
- To reduce forest dependence on forests, encourage social forestry activities and encourage outside forest employment generation
- Development of wildlife management and preservation methods
- Preparation and implementation of the program to reduce climate change impact on forests
- Strengthen education, research, and training programs through forest ecosystem management practices



- Identify the catchment of rivers, lakes and other wetlands and declare it as a protected area
- By 2035, 30% of the forest area declared as the 'protected area' and the introduction of ecotourism
- Valuation of forest ecosystem services and include a pricing mechanism
- Encourage the rural population and entrepreneurs with the establishment of NTFP based industries and marketing simplification
- Take effective steps for strengthening eviction and preventing encroachment of forest lands
- Ensure compliance with international environmental and forest-related commitments

The National Forest Policy, 2017 guidelines include focused directives on following thematic areas:

- General principles
- Expansion and enrichment of forest cover
- Forest conservation
- Planting in outside forest areas
- Biodiversity and wildlife conservation
- Social forestry
- Protected areas and ecotourism management
- Forestry education, research, and training
- Climate change
- Watershed management
- Forest industry
- Non-timber forest products
- Urban forestry
- Eviction of the encroachment of forest lands
- Forest administration
- International commitment

#### Other Policy Relevant to Forest Management

- The National Environment Policy, 1992 has vested responsibilities of tree planting, conservation of wildlife and biodiversity and erosion control to Forest Department. However, this policy may interfere with production forestry such as clear felling and the raising of short-rotation plantations. The policy has yet to be implemented fully
- The National Agricultural Extension Policy, 1997 does not contradict forestry, however, in case of fellow lands conflict may arise
- The National Water Policy supports plantation and afforestation

- The National Industrial Policy, 1991 does not have a direct conflict, however, competition for land and overexploitation and pollution may result from industries
- The National Land Use Policy, 2001 guides against forest land conversion (Hassan, 2011)

## **Legislations and Acts**

The forest sector legal regime of Bangladesh is a continuum of the Indian forest sector legal regime which was created by British ruler. Following Indian Forest Laws were enacted and enforced during the British period:

- The Forestry Charter of India, 1855
- The Indian Forest Act, 1865; Regulation VII of 1865
- The Indian Forest Act, 1878
- The Elephants Preservation Act, 1879
- The Assam Forest Regulation, 1891
- The Land Acquisition Act, 1894
- The Indian Forest (Amendment) Rule, 1901
- The Indian Forest (Amendment) Rule 1911
- The Indian Forest (Amendment) Rule 1914
- The Indian Forest (Amendment) Rule 1918
- The Indian Forest Act, 1927 (Ali, 1997; Ali, et al., 2006)

It is worth mention that the Indian CrPC, 1898 (Act V, 1898), has been adopted for Bangladesh. This law is applicable for the offense inside the forests like the other part of the country. The forest offenses are cognizable, and Forest Officer can arrest an offender without a warrant per CrPC (Rahman and Mannan, 2011). The Forest Act 1865 was the first forest Act of India that provided legal support for forest management; having provision to treat forest-offence; authority to declare reserve forest to support maintains water supply, soil conservation, and others; and tribal people could collect resources to meet their needs within reserve forest (Rahman, L., 2011). The Indian Forest Act of 1865 was further consolidated and legitimized to the Forest Act, 1878 (VII of 1878) which was amended by Act V of 1890, Act XII of 1891, Act V of 1901 and Act XV of 1911. Further development of the legislations ultimately developed and enacted the Forest Act, 1927 and enforced (CPD, 2002).

The Forest Act 1927 remains the major legal instrument for managing and protecting forests of Bangladesh. The Wildlife (Preservation) Order, 1973 amended and transformed into the

Wildlife (Preservation) Act, 1974. This Act is to protect wildlife and wildlife habitat. Protected Area of different qualifications has been declared under this law, to ensure wildlife protection, prevent destruction, stop exploitation or removal. However, the law has provisions to allow entry into the reserve for improvement of habitat or biophysical conditions and scientific purposes or to enjoy aesthetic beauty (Ali, et al., 2006).

A pool of legal and policy instruments is in place for Bangladesh which has been inherited from Pakistan and British period. Bangladesh has amended inherited legal instruments as appropriate and new laws have been enacted over time. Bangladesh constitution through the Fifteenth Amendment in 2011 introduced article 18A for protection and improvement of environment and biodiversity. Bangladesh constitution through this article commits that the state shall take the effort to protect and improve the environment and to preserve and safeguard the natural resources, biodiversity, wetlands, forests, and wildlife for the present and future citizens. However, it is also necessary to hold that the state is, responsible for conducive environment and, equally citizens are also responsible under the Duties of Citizens... (Article 21). The constitution is the highest and supreme law. Bangladesh needs enacting Acts, set Rules, issue Executive Orders, adopt Policies, take strategies and prepare and implement plans, programs and projects to comply with the constitutional obligation.

Following Acts are enforceable in Bangladesh:

- The Forest Act, 1927 (Act No. XVI of 1927) with all amendments
- The State Acquisition and Tenancy Act, 1950 (East Bengal Act no. XXVIII of 1951)
- The Private Forest Ordinance (1959)
- The Atia Forest (Protection) Act, 1982 (Ordinance XXXIII of 1982)
- The Wildlife (Conservation & Security) Acts, 2012 (Act no. XXX of 2012)
- Bangladesh Biodiversity Act, 2017

### **The Forest Act 1927**

Consolidated Indian Forest Act, 1927 (Act XVI of 1927) has provisions of and procedures for declaring Reserve Forest, Protected Forest, Village Forest; regulate movement and transit of forest produce, revenue collection on forest produce; and defines forest offense and penalties. The Forest Act, 1927 as amended up to date is applicable in Bangladesh to enforce and protect forests (Hassan, 2001; Ali, et al., 2006). Forest Magistrate has the authority to impose a penalty under the Forest Act, 1927 amended in 2000. The Prosecution Officer (PO) conducting an inquiry to an identified offense, prepare a Prosecution Offense Report (POR) and produce before a magistrate to try under section 52 of the Forest Act, 1927 (Rahman and Mannan, 2011). Following are key

features of the Act: i) during the process of declaring reserve all rights are settled and no new rights are offered once the land has been declared reserve forest (ii) without permission from Forest Department no activity is allowed within reserve forest (iii) Law has the provision of imprisonment for two months and or fine 2000 BDT and (iv) restrict land clearing and harvest from steep slopes. Forest Act of 1927 first amended in 1989; further amended in 2000 brought major changes and renamed as the Forest (Amendment) Act, 2000 (Ahmed, 2008). Forest Department is responsible for the implementation of the Forest Act 1927 provisions, however, is not specified by the Act. The amendment of 1989 extended the authority of the Forest Department over any government land suitable for forests.

### **The State Acquisition and Tenancy Act 1950**

The Permanent Settlement of Bengal in 1793 granted chunks of land (which sometimes included forests) to Zamidars (landlords) for a fixed fee on a permanent basis and thus forest land was privately owned (Hassan, 2011). In the backdrop of numbers of farmer uprising during late nineteenth centuries, the then government of British India, enacted the Bengal Tenancy Act, 1888. The landlords (Zamidars) under the provisions of the Tenancy Act provided user rights to the tenants. The tenants used to get the use right from the Zamidars against an annual fee. The Zamidar after reaching an agreement with the tenant through a document called 'Patta' offered a parcel of land. The tenant accepted the offer through a document called 'Kabuliat'. While agreeing, tenant pays tax and get a receipt of tax called 'Dakhila'. The State Acquisition and Tenancy Act (SATA), 1950 returned all forest land of more than 4.05 ha, including areas where trees were scattered to the government. The State Acquisition and Tenancy Act, 1950 declared six types of land as the privately non-retainable land class which are Zamidar Office premises (Kachari houses), Marketplaces, Ferry landings, Jolmohals (wetlands), vested tea gardens and forests (SATA,1950). The Forest Department managed forested land of the Zamidars. Forest Department claimed the record of these land in their name after the State Acquisition and Tenancy Act 1950 has been enacted.

All land belongs to Ministry of Land by the law of Bangladesh, even the Reserve Forest and all Khash and state-owned lands. However, different agencies and ministries along with the Ministry of Land are involved in administering land records and managing ownership transfer. Directorate of Land Record and Survey (DLRS) under the MoL conducts cadastral survey and settlement and prepares Records of Rights (RoR). The RoR include ownership information, area, and land type. Transfer of land ownership involves local administration, particularly ADC (Land). When any landowner intends to sell a parcel of land, must have a

permission from the ADC (Land) mentioning proof of ownership, i.e. confirming that RoR shows the proposer as owner. The certificate must also mention the character of the land, e.g. forest land or wetland or farmland etc. Registration Department of the Law Ministry is responsible for Transfer Deed registration, and updating of RoR (mutation) is done by the Upazila Administration (Hassan, 2017; Nahrin and Rahman, 2009). Land administration involves in land record preparation, upgrading of RoR and registration of land transfer are performed by separate offices with little coordination (Hassan, 2017).

## **Forest Land Tenure**

Forest Department controls and manages forest land, however, CHT forest lands are under district administration. Management for conservation and protection of the biodiversity and ecological integrity involves property rights. Land tenure refers to the legal relationship or prevailing norms, between people and the land (Hassan, 2011). Four different property rights regimes have been recognized for common property resources: unrestricted access, private property, communal property and state property (Feeny et al. 1990; Ostrom et al. 1999; Hassan, 2011). The land tenure system of Bangladesh, of which forest land is an integral component, has evolved over centuries. Land tenure system revolves around ownership and in Bangladesh is generally categorized as private, communal, free access and state-owned (Hassan, 2011) and forest land tenure is no exception.

The government maintains the Record of Rights (RoR) of land parcels. The records are updated following land transactions such as registration and transfer. Land transfer in the RoR must be verified through field survey according to the regulation. The regular tenure system maintains a user aspect which is neglected when tenure is granted. The Forest Policy (1994) and Land Use Policy (2001) has directives to maintain forest use aspects of tenure which is not followed due to population pressure (Hassan, 2011). Following the SATA, 1950 Zamidar system was abolished and the land belonged to the Zamidars were compensated and taken back from them. The agriculture lands of the Zamidars were vested to tenants and the forests were to vest to the Forest Department. For the purpose, a survey was conducted which is known as State Acquisition (SA) survey. There was around 65,000 ha of Sal Forests in the Dhaka Division, that was acquired by the government following the SATA, 1950 must be handed over to the Forest Department through the process of declaring reserve.

For recording the land rights under the reserve, it is necessary to issue notice under article 4 of the Forest Act, 1927 and then to notify under Article 6 and finally to declare reserve under Article 20 of the same Act. The process must be initiated and carried by the Forest Settlement Officer (DC

or ADC (Land) on his behalf). The Survey following the SATA, 1950 was already completed by 1954, however, in last 73 years out of 65,000 ha of Sal Forests only 20,000 ha has been declared Reserve (Forest Department, 2016b). Before the State Acquisition survey, large chunks of forests were cleared and recorded as agriculture land showing fake backdated Patta (Zamidars Offer Letter for handing over a piece of land), Kabuliat (Acceptance by the Tenant) and Dakhila (receipt of lease money from the Zamidars). Following this process, substantial forestlands were converted into different tenure.

Local ruler and landlord owned Sal forests of Modhupur and Bhawal Garh was brought under the control of Forest Department under the provisions of the State Acquisition and Tenancy Act 1950; however not properly reserved and subsequently could not be effectively protected (Sharma and Banik, 2011). The Sal forests under the Gazipur district were under the ownership of the Bhawal Raj. Per the Cadastral Survey (CS, held during 1924 to 1944) a total of 11,806.21 ha. of land was recorded in the name of the Bhawal Raj (Rahman, M., 2016).

The Bhawal Estate management came under the Court of Ward's management in 1911-1912 fiscal year by the provision of the Article 6 e of the Court of Wards Act, 1879. Following the State Acquisition and Tenancy Act, 1950, the Sal forests owned by the Bhawal Raj became privately non-retainable; and supposed to be handed over to the Forest Department. The transaction of the forest land didn't happen smoothly and even after 60 years of the gazette notification of State Acquisition compensation in 1956, still today the forest lands have not been handed over in totality, rather there are disputes. SATA, 1950 directed the agricultural lands to the tenants and during that period a corrupt nexus grabbed Bhawal Raj land by preparing fake Patta (Offer Letter by the Bhawal Raj to the farmer-tenant) and Kabuliat (Acceptance by the farmer-tenant) and Dakhila (Receipt of Land Tax to the Bhawal Raj). At the same time, many people have cleared forests and planted homestead tree species to proof their occupation for long; thus, gaining entitlement of forest land as other lands.

There are some low-lying lands within the Gazipur Sal forests and was not forested rather a combination of wetlands, seasonally inundated lands, and croplands. These low non-forested cultivated lands were recorded as privately-owned farmland. However, a large chunk of Gazipur Sal forest land had been recorded as Khash land showing not forested. These lands were ultimately leased out as the cropland in favor of private ownership by the corrupt nexus. A large chunk of forest land is recorded to the private owner through the same strategy of producing fake Patta-Kabuliat-Dakhila and then repeated Deed of Transfer, where the corrupt

nexus of AC (Land), Forest Officer, Court Clark and the influential grabber worked for hand in hand and transferred the record.

The deed is not the proof of land ownership, rather the transfer of the ownership. Deed registrar does not look for the land use or land record history. The AC Land is responsible for checking the use aspect of the land. He maintains the Right of Record (ROR) where a land use aspect is recorded. He is the custodian for maintaining the land use consistency as well as the ownership rights. However, the AC (Land) allows the transfer without checking the use aspects though not appropriate by the land records. Whenever the forest land is occupied by the grabber, the Forest Officer is to notice, notify, take appropriate measure to evacuate. The Forest Officers may not do the right thing due to lack of capacity or undue pressure from powerful vested interest or corruption to become a part of the nexus or a combination of these. The corrupt nexus is very innovative. For example, once grabbers occupy a piece of forest land, the Forest Officer makes a case against the grabber on understanding. The grabber continues to stay there and as the time matures for the hearing, the grabber arrange documents in his favor and court goes in his favor, all happens very smoothly, and the forest is converted.

A Large chunk of the forest of the Bhawal Estate has been converted to industries and other land use, though the Revised Survey (RS) still shows Forest Department as custodian of the land. To reflect the transfer (mutation) periodic land survey is a continuous process and the recent land survey (2016) is going on in Savar and Keranigonj Thana of Dhaka District, however, not yet started in Gazipur District. There is also misunderstanding on the Forest Department side of claiming all the Bhawal Raj lands as recorded in the RS as forests; farmers were occupying low lying lands and wetlands, however not recorded in their name; the Court of Wards lodged 100 cases against land grabber and people lodged 319 court case against the Court of Wards so far (Rahman, M., 2016).

To prepare a set of recommendations to manage and maintain lands recorded to Court of Wards and Forest Department, the existing review committee has been reformed on 19th May 2016 as follows:

Member (Land Management), Additional Secretary, Land Reforms Board	– Chairman
A representative of Ministry of Land (Not below Deputy Secretary)	– Member
A representative of MOEF (Not below Deputy Secretary)	– Member
Conservator of Forests (Central Circle), BFD	– Member
ACCF (Administration and Management), BFD	– Member
Manager, Dhaka Nawab Estate	– Member

Manager, Bhawal Estate	– Member
ADC (Revenue), Gazipur	– Member
Divisional Forest Officer, Dhaka	– Member Secretary

The Scope of Work for the Committee are as follows:

- Review all gazette notices for Forest Department in this regard
- Decide a course of action to comply with Article 20 of the Forest Act, 1927 to bring the lands recorded to Court of Wards based on CS, to record under the Forest Department as forest land
- Review the court cases on the CS recorded Court of Wards land and RS recorded Forest Department's land
- The committee will submit their recommendations to the Chairman, Land Reforms Board and Chairman of the Court of Wards by 31st July 2016. The committee may co-opt members from the lawyer panel of Court of Wards and Forest Department and experts and may take their advice.

The forested lands, not reserved are recorded and declared as Protected Forests and Unclassed State Forests. These are government lands (Khash) and management responsibility vested to the District Administration under control of the Ministry of Land. There are provisions for leasing out the Khash lands for various purposes to various recipients including landless. However, the forest law does not allow leasing of forested land irrespective of ownership entitlement.

### **The Private Forest Ordinance, 1959**

The forests on the privately-owned land had no management. The Bengal Private Forest Act, 1945 was enacted for the conservation of private forests. This Act couldn't be enforced because of the partition of India in 1947. East Pakistan endorsed the provisions of the Bengal Private Forest Act in 1949, however, was enacted as the East Pakistan Private Forest Ordinance, 1959. This Act provides government provision of taking management responsibility of i) private forested land if found not properly managed ii) private land suitable for forest and iii) private land not used for 3 or more years. The provision was that the owner must prepare a management plan and implement; the government is to approve the management plan and monitor the implementation. If the owner does not implement the approved management plan, the forest may be declared vested for 100 years; the government will manage the vested forests against a fee,



however, owners get the net profits; the Forest Department manages approximately 8,500 hectares of Vested Forests (Ahmed, 2008).

### **The Atia Forest (Protection) Act 1982**

This Ordinance has protected the Atia Forest in the districts of Dhaka and Tangail. This Act has constituted Atia Reserve Forest (24,149.27 ha.) and provided a safeguard against any contrary provisions in the Forest Act, 1927 (XVI of 1927). The safeguard has also been provided against any other law or executive order or judgment.

### **The Wildlife (Conservation & Security) Act, 2012**

The Government has promulgated the Bangladesh Wildlife (Preservation) Order, 1973 (President's Order No. 23 of 1973). Enactment of the Wildlife (Preservation) Order has repealed all the previous acts regarding preservation of Wildlife such as the Elephant Preservation Act, 1879, the Wild Birds and Animals Protection Act, 1912 and the Bengal Rhinoceros Preservation Act, 1932. The Order has been converted to the Wildlife (Preservation) Act 1974. This Act has the provision of declaring Protected Area and following categories of Protected Area had been declared:

- National Park: the primary objective of declaring a relatively large area as National Park is to protect and preserve the beauty of the forest including plants and wildlife of the area, where people's access is limited for recreation, education, and research article 2(h)
- Wildlife Sanctuary are declared under Article 23 for the protection of wildlife, vegetation, soil, and water; an undisturbed breeding ground and closed to hunting, shooting or trapping of wild animals Article 2(p)
- Game Reserve: The primary objective of declaring Game Reserve is to protect Wildlife and increase important species population; wherein capturing of wild animals are prohibited Article 2(c)
- Private Game Reserve: Game Reserve on private land by the owner and declared under Article 2(i)

The National Park corresponds IUCN category II, Wildlife Sanctuary Corresponds IUCN category IV and Game Reserve Corresponds IUCN category VI (Nigel, 2008). However, IUCN does not recognize Private Game Reserve. Protected Areas in Bangladesh declared under the Bangladesh Wildlife (Preservation) Order, 1973 are 'Reserved Forest' designated under the Forest

Act, 1927. Reserve forest is restricted entry and any activity without prior permission of the Forest Department (Rahman, 2004; Chowdhury, et al., 2009).

There has been a lot of changes during the last couple of decades in the national and international context including massive deforestation and loss of biodiversity. The development aspirations have been changing because of the overwhelming spread of the consumerism. The natural resources, forests, and wildlife are under high pressure throughout the world and in Bangladesh. In response, Bangladesh has enacted more comprehensive Wildlife (Conservation and Security) Act, 2012. The Bangladesh Wildlife (Preservation) Order, 1973 (President's Order No. 23 of 1973) has been repealed once the Wildlife (Conservation and Security) Act, 2012 has been promulgated. Chapter III of this Act provides Protection to Wildlife and Animals. Chapter 4 deals with Protected Area.

Article 13 through to 16 details declaration, prohibitions, and management of the sanctuary. Article 17 details declaration of National Park and Article 18 details declaration of Community Conservation Area. Article 19 details declaration of Safari Park, Eco-Park, Botanical Garden and Wild Animal Breeding Center. Article 20 details declaration of Landscape Zone, Corridor, Buffer Zone and Core Zone. Article 22 details declaration of Special Biodiversity Conservation Area. Article 23 details declaration of National Heritage, Memorial Tree, Sacred Tree and Kunjaban. This Act introduced Co-Management through Article 21. License, suspension or cancellation of the license has been provisioned for captive animals and wild animals in Articles 24 and 25. Import, Export of Wildlife and Plants; formation of Wildlife Rescue Center, Constitution of Wildlife Crime Control Unit has been detailed out in the Articles 24 to 31. The provisions of penalties have been detailed in the Article 34 through to Article 42 for various offense including the killing of animals. However, penalties for filing a case of false or harassment or wrongful seizure mentioned in Article 42 is controversial and because of this article, the enforcement of the Act is practically hampered.

### **The Bangladesh Biodiversity Act 2017**

The Bangladesh Biodiversity Act 2017 (Act II of 2017) has been enacted on 19th February 2017. Biodiversity Act regulates conservation of biodiversity and biological resources ensuring fair benefit sharing. The Act includes formation and function of national and technical committees; formation and function of biological diversity management and monitoring committees at city corporation, district, Upazila, Union, Municipality committees; formation and function of village biodiversity management groups, various professional groups, and community groups.

The Act guides declaring national heritage site, ban on activities that might adversely impact biological diversity; establish a fund, account management, and audit; and finally deals with the offense in the regards of the biological diversity and directs judgment and punishment.

## **Forest Rules and Protocols**

### **Forest Rules**

Rules have been enacted over time to spell out details and guide enforcement of forest-related laws. Following Rules are in force in Bangladesh:

- The Social Forestry Rules, 2004
- The Forest Product Transport (Control) Rule for Bangladesh, 2011
- The Rules for Transportation and Protection of Sundarbans (1959)
- The CHT Forest Products Transportation Rules, 1974
- Separate Rules for Forest Fire Protection for Sundarban, Chittagong and Sylhet, CHT Forest Fire Protection Rules
- The Saw-Mill (License) Rules, 2012
- Other forest-related Rules
- The Protected Area Rules, 2017 (submitted for approval)

### **The Social Forestry Rules, 2004**

Social Forestry Rules details directives on issues of site selection, agreement among parties, selection of beneficiary, NGO selection, the formation of the management committee and advisory committee; responsibility, mandate and other relevant details like duration of the committees, meeting frequency, criteria and methods for committee dismantle etc. The responsibility of the Forest Department and all other parties in the agreement are defined with mandates. Benefit-sharing, NGO service charge, fees, training costs are defined. The Rules also define and elaborated Tree Farming Fund (TFF) and its use, Management Committee for TFF, Social Forestry in private land, conflict resolution and formation of the national advisory forum. Social Forestry Rules elaborates rights and responsibilities of participants, their organization and even site selection (Hassan, 2001; Ali, et al., 2006). Social Forestry has been institutionalized enacting the amended Forest Act of 2000; Social Forestry Rules framed in 2004 and amended in 2010 (Sharma and Banik, 2011).

### **The Forest Product Transport (Control) Rule for Bangladesh, 2011**

By the provisions of this Act, Forest Department is to issue permits for felling trees and transporting logs and timbers. Forest Department marks the materials, inspects and specifies routes for transportation of forest produce. The government has promulgated following Rules in this regard:

- Sylhet Forest Transit Rules, 1951
- Dinajpur and Rangpur Forest Transit Rules, 1954
- Chittagong, Cox's Bazar and Comilla Forest Transit Rules, 1959
- Dacca Forest Transit Rules, 1959
- Mymensing Forest Transit Rules, 1959
- East Pakistan General Forest Transit Rules, 1960

However, all these rules have been repealed through the enactment of the Forest Product Transport (control) Rules, 2011. This Rule is applicable to entire Bangladesh other than Chittagong Hill Tracts and Sundarbans.

### **The Saw-mill (License) Rules, 2012**

The Saw-Mill (License) Rules, 2012 prohibits establishing Saw-Mill within 10 km from the boundary of any state forests; allows Saw Mills to operate only between 6 am to 6 pm. Failing in complying with this Rules may result in cancellation of the license. Furthermore, use of forest produce or illegal wood is a punishable offense and may result in 2 months to 3 years of imprisonment plus fine of 2,000 to 10,000 Taka.

### **The Protected Area Rules, 2017**

The Protected Area Management Rules, 2017 provided policy and legal support for the Co-Management of the forest Protected Area; formalized the Co-Management Committees, provisioned sharing of revenue and provide guidance for the management. The Rules include:

- Guidelines for developing management plans for Protected Area; designation of core zones, buffer zones, landscape zones, corridors

- Directives and guidance for the formation of the Co-Management Committees; structure and composition of the committees; selection of participants for Co-Management General Committee (CMGC), Executive Committee of the General Committee (CMEC), Peoples Forum (PF) and Village Conservation Forum (VCF)
- The scope of work, responsibilities, membership, and provisions, election procedure of the members, tenure, meeting, cancellation of membership and related provision and mandates of the Co-Management Committees.
- Office and manpower, dissolution of the committee, the formation of Community Patrol Group (CPG)
- Recovery of affected/decaying/destroyed/ encroached forest Protected Area, administering forest Protected Area, afforestation and management thereof, in the landscape zone
- Responsibilities of the Forest Department in Co-management
- Sources of revenue and distribution of income

### **Other Forest related Rules**

Sundarban and CHT forest produce transportation are controlled by ‘Control of Transit of timbers and other forests produce for transit in the Sundarbans, 1959’ and Chittagong Hill Tracts Forest Transit Rules, 1974. Besides following Rules are in force: Sylhet Forest (Protection from Fire) Rules, 1954; Chittagong and Chittagong Hill Tracts Reserved Forests Fire Protection Rules, 1958.

### **Forest Related International Convention and Protocol**

Bangladesh often signs and ratifies international and regional efforts for sustainable forest management, for example, CBD, Sustainable Management of Dry Forests in Asia, SDG, MDG, Principles of Sustainable Forest Management. However, it remains challenging for Bangladesh to enunciate the principles of sustainable forest management, criteria, and indicators matching the country context (Choudhury, 2011). Bangladesh signed and ratified following international convention, treaties and protocols:

- Convention on International Trade in Endangered Species (CITES): this convention is to control and restrict import and export of selected endangered species. Bangladesh signed on 20.11.1981 and ratified on 18.02.1982.
- United Nations Conference on Environment and Development (UNCED), 1992. This conference gave birth of Convention of Biological Diversity, UN Convention on Climate Change and Convention on desertification.

- Agenda 21 is an outcome of the UNCED that promotes sustainable development.
- Forestry Principles that calls for management of forest resources considering social, economic, ecological and cultural needs for now and future (Chowdhury, 2011).
- Convention on Biological Diversity (CBD): promotes biodiversity conservation and encourage equitable benefit sharing generates from genetic resources. Bangladesh signed on 05.06.1992 and ratified on 20.03.1994.
- Convention on Wetlands of International Importance (Ramsar): provides a framework for wise wetland use. Bangladesh ratified on 20.04.1992; Sundarbans designated to this category.
- World Heritage Convention: is to protect cultural heritage throughout the world identifying and drawing global attention. Bangladesh signed on 03.08.1983 and ratified on 03.11.1983; UNESCO declares heritage site. Sundarban wildlife sanctuaries declared as world heritage sites in 1997.
- International Plant Protection Convention: to protect plants from controlling pests and disease.
- Global Tiger Forum: Established in 1994, HQ New Delhi. 1st general assembly held in Dhaka in 2000.
- United Nations Convention to Combat Desertification: 14.10.1994 (signed), 26.01.1996 ratified.
- United Nations Convention on Climate Change (UNFCCC).
- GTI (Global Tiger Initiative): established in 2008. 1st Ministerial Meeting at Bangkok in 2011. 2nd Ministerial Meeting at Thimpu in 2012.
- APFNet (Asia Pacific Network for Sustainable Forest Management): Officially launched on 25th September 2008 in Beijing. Chief Conservator of Forest (CCF), Forest Department is the focal point.
- UNFF (United Nations Forum on Forests): Established in 2000. This forum declared and observed International Year of Forest in 2011. Joint Secretary (Administration), Ministry of Environment and Forests is the focal point.
- Nagoya Protocol: Nagoya Protocol adapted in CBD, COP 10 in Japan, 2010. Bangladesh became Member in 2012 during the 9th Regional Steering Committee meeting.
- SAWEN (South Asia Wildlife Enforcement Network): Bangladesh joined in 2013.
- APAP (Asia Protected Area Partnership): is to provide technical support for Asia's Protected Area. Bangladesh joined in 2014.

## **Chapter 7: Governance**

## **Governance in Forest Management**

Management of natural resources involves actors and institutions at various levels including local people, accordingly governance need to be ensured (Berkes, 2007). Scholars identified two governance areas: i) governance at various levels, which are dependent on each other and ii) actors dealing with each other in multi-level governance system (Seixas and Berkes, 2010). Forest management in Bangladesh involves the government agencies across the levels and engages local people. Working relation of the government agencies and the community, allows local people to learn and increase their capacity (Berkes et al. 2005). In recent years, various legal and policy frameworks drive decentralization throughout the world (Ashish Kothari, 2006).

The importance and effectiveness of governance in Protected Area management has only been recognized in 2003 during the 5<sup>th</sup> World Park congress of IUCN (UNESCO, 2005). The conference formulated following good governance principles: Legality and opinion, equality, functioning and responsibility (CBD, 2008). Governance is a key determinant of Protected Area Management and Biodiversity Conservation (Bosselmann, *et.al* 2008). Various dimensions of governance influence Protected Area Management Objectives (Berkes, 2009). Protected Area governance requires legal and policy framework and exercise over management spectrums to address priorities and reach goals (Lockwood, 2010). Government agencies all over the world, have been increasingly taking over the natural resources management responsibility since the Second World War, with an assumption that government employees will be able to achieve certainty and dependability (Ludwig, 2001). Policy and legal regime must be competent responding to the contemporary issues and must be enforceable. Encouraging devolution of the management authority for natural resources is also crucial to governance (CPD, 2008). The rest of this chapter describes, community involvement in forest management, accountability and transparency, capacity of the forest management institution and coordination to implement policy and enforce law.

## **Community Participation in Forest Management**

The forest management organizations of independent countries of greater India followed the colonial administration. The alienation of people from the forests continued during the post-colonial regime. Thus, people's attitudes to forest resources remained unchanged. Since the government owned the forest, creating and maintaining forests was government's responsibility. This has been the consideration of the community. People were



tempted to exploit the forest to meet their needs. Environmental conservation and reduction of wastage were not their priority. They were uncertain whether they would be able to use forests. Until recently Forest Department maintained the client-patron relationship with the community. Thus, the age-old conservational attitude of traditional societies changed over time, resulting in forest degradation. As such rural development potential of forest management has not been realized (FAO, 2005). However, in recent years Forest Department engaged community to protect forest as a strategic compromise against the sovereign authority of the state forest management towards multi-stakeholder's engagement.

Social exclusion, forest regulation and control over forest rights during colonial and post-colonial period had an adverse effect on the material and social condition of the forest dependents. The forest areas conceded to the village communities were found to be too small for a growing population. When ordinary people saw that their village headmen were powerless to restore their rights of forest use, the tradition of social respect and social cohesion was disrupted. People disregarding the social norms started behaving inconsiderately. The incidence of forest crimes increased. Periodical outbursts of local resistance to forest regulators resumed from the 1920s, when people's discontent tended to merge with activists and agitators of the non-cooperation movement against the British regime. People became uncompromising in their pessimistic attitude. Perhaps similar uncertainties and agitation induced the negative attitude of forest dependents. Thus, the social uncertainties of forest use and the competitive attitude of people continued beyond the colonial regime. With increased pressure of policy measures, people's attitudes to forest land use began to deteriorate. For example, the increase in firewood confiscation commenced in 1921-22 during the working plan preparation for the hill divisions. People felt that resources would no longer be available to them. Such insecurity feeling could have influenced the negative attitude of people to forest land use (Ali, et al., 2006). Similarly, the local community literally wiped out almost all the trees from the Chunati forests overnight after the forest was declared a Wildlife Sanctuary in 1986. The people felt that soon the forest will no more be their property and it is smart to get whatever is possible before that happens.

The protective approach of guarding the forest by the authority undermining the local people resulted in the decline of the forest resources (Choudhury, 2003). Resource dependent people develop negative attitude to forests because of unsympathetic Rules (Ali, et al., 2006). Local

people has demand for forest land and accordingly go for use of forest land that is a crucial factor for forest degradation in developing countries (Loneragan, 1998). Forest Department's competence of protection would not save the forest, because new conflict will emerge (Mayers and Bass, 1999).

Involving local people in forest management has been initiated in Bangladesh in 1980 in the Community Forestry project. The Social Forestry Rules in 2004 defined community participation structure in the production forestry and distribute benefit as per the Rules. The Wildlife (Conservation and Security) Act 2012 provided directives for Co-Management of Protected Area and through implementation of the management plan for the respective Protected Area. Co-Management is a shared governance with active participation of the community and legally defined shared rights and responsibilities, is gaining momentum in Bangladesh since the traditional management couldn't protect forests (Rashid, 2012). Community participation is fundamental dimension of forest Protected Area governance (Brockington, et al., 2008). Effective participation of the resource users including women, ethnic people, youth, disadvantaged and all levels of stakeholders have been initiated in the participatory forestry in Bangladesh. For example, the Social Forestry engages local people near the plantation site. The Co-Management structure includes the local community in to the VCF and thereby represents in the People's Forum and in the CMC where the decision on the forest management are taken. The community could raise their voice in the decision-making forum, i.e. CMC. However, the rural people yet to influence the decisions.

The people of Bangladesh lack awareness on forestry practices and approaches, forestry linkage with economic efficiency, income growth and protection of the environment; limits our forestry achievement far behind international standard (Jalil, 2011). The biological and social consideration of forest management is less discussed and feedback and learning are missing (Phelps et al. 2010). Farmers involvement in forestry provided only limited livelihoods (Khan, et al. 2004; Kibria, et al., 2013). Resource dependent communities yet to develop sense of belongingness with government attitude (Ahammad, et al. 2014). Large part of the Chunati Reserve Forest was declared 'Wildlife Sanctuary' in 1986. During this period, hundreds of individuals proceeded to clear fell parts of the forest hills, and then made claims to the court that the land should be converted from Reserve Forest status to Khash Lands. Level of engagement in decision making, trust on institutions and resource flow to the community affects understanding differently (Ahammad, et al., 2014). For example, few rural households know what can be done

to remove the brick fields, or to stop them from being established. Few even know the brick fields are illegally placed.

The Co-Management as it is practiced in Bangladesh offers only limited benefit to the community; not sustainable due to project orientation though enhances conservation and forest cover (Koli, 2010). The Forest Officials create beneficiary groups and engage them for forest and forest land protection, however, do not ensure their benefits (Khan, 1998). Protected Areas are to be managed properly with active community participation and benefit sharing to realize potentials (Borrini-Feyerabend, 2004). Lack of effective engagement of the community, the rural development potential of forest management is not realized (FAO, 2005). Like the previous forest policies, Forest Policy 1994 considered people as the main threat to the forests.

Bangladesh hill forests in the CHT and Sylhet and plain land forests in the Modhupur are inhabited by ethnic people. The Forest land in CHT was inhabited by the ethnic people since long. Traditionally, Chittagong Hill Forests were managed following customary rules by the community. The predominant land use was shifting cultivation other than homesteads and cattle grazing. British regime in 1868, took over the land ownership and declared around 25% of the forests as reserve and the rest of the forest were allowed for resource use by the local communities. However, as soon as the Pakistan emerged in 1947, the regime initiated systematic dispossession of the land rights of the ethnic CHT communities. Only 2% of the CHT people was Bengali in 1947 which has risen to 9% in 1951, 11.6% in 1974, 39% in 1981 and well over 50% by 1985 (Crisis of CHT, annual report 1985). In this process, the forest was not only encroached but also converted to large extent. Commercial exploitation by the Bengali in these forests, increased revenue while the forests were being degraded (Matin, et al., 2014).

The plain land Sal forests in Modhupur is the home for Garo and Koach for hundreds of years. However, the state authority was hostile to the ethnic communities and ignored their existence (Ahmed, 2008). Modhupur Eco-Park Project initiated without discussion with indigenous residents. Eco-Park in Moulovibazar and Alutila were declared similarly without any consultation, however postponed later. Historically many people were deprived of cultivation because they didn't get land by lease from the Zamidars and compelled to depend on forests; social exclusion changed the attitude of people to forest resources (Ali, et al., 2006).

United Nation's Conference on Environment Development, 1992 is the corner stone of changing and shifting paradigms of forest management throughout the world. The Forest Principles, Agenda 21 and CBD emphasizes community participation in forest management. New Delhi Declaration mentions that people's participation is essential to ensure good governance and sustainable development (ILA, 2002). Governance system yield outcomes favoring poor people where they are involved in decision making process or designed the governance system (IFAD, 2015). Stakeholder participation plays a key role in recognizing and managing conflicts (Diduck et al. 2007).

The Forest Policy 2019 (submitted for approval) commits:

Participation of local communities and civil society in forest conservation.

Increasing public cognizance on the significance of conserving biodiversity.

Local community will be involved in Social Forestry activities to increase socio-economic development, environmental benefits and forest products.

Local community participation and Co-Management system will be encouraged in Protected Area Management.

Local people including women will be encouraged in forestry activities.

(National Policy Guidelines D 3(3), 5(5), 6(1), 7(2), 1(9)).

### **Capacity of the Forest Management Institutions**

Forest Department is the lone custodian of the natural forests. One Forest Department's staff administers about 500 ha, which is far beyond ideal (Khan, et al., 2004). Limited enforcement of law and implementation of policy directives impediment forest conservation and protection (Alam, 2009). Forest Department cannot conduct effective patrolling because of inadequate logistics and insufficient budget (Ahmad, et al., 2009). The sustainability of forest Protected Area and biodiversity conservation suffers from shortage of funding (Chowdhury, et al., 2014); due to extreme resource constraints competing with other national urgencies (Mulongoy, et al., 2008).

Management responsibility of Reserve (1.246 m ha), Notified (0.224 m ha.), Protected (0.037 m ha.), Acquired (0.008 m ha.) and Vested Forests (0.003 m ha.) assigned to the Forest Department whereas, the ownership of only reserved forests is vested with Forest Department; and ownership of other types of forests are vested with land administrations. Tea Estates (0.070 million ha) and homesteads (0.27 million ha.) forests are privately owned. Unclassified State Forests (0.73

million ha.) land entitlement and management are vested with district land administration (Hassan, 2011). Forest Department is accountable for enforcement of the Forest Act, 1927. However, on the contrary, forest land Settlement Officer is from the Ministry of Land who works under DC (Deputy Commissioner also act as District Collector). DC or ADC (Land) on DC'S behalf is designated as 'Forest Settlement Officer' play key role in reserve declaration process.

Law enforcement and policy implementation suffers because of limited institutional capacity (Alam, 2009). It is true for all the forest types and divisions. The Sundarban management suffered due to lack of information as well as inability to enforce law (FAO, 2000). The enforcement effort is costly; and adequate human resources and logistics are not there to effectively manage a growing Protected Area system (Merrill, 2011). Challenge for sustainable forests management involves limited investment in the forestry sector. Inflexibility in the management arrangements, limited law enforcement and inadequate funding for the sector resulted poor productivity of the forests (FAO, 2000). Gathering initial investment to realize huge tourism potential of the forests remains challenging.

Th institutional capacity of the Bangladesh Forest Department is inadequate to enforce the Rules. Protection and conservation of the icon species of Sundarbans, the Bengal tiger remain a challenge in the backdrop of widespread illiteracy and insensitivity to the conservation needs. No budget allocation to meet emergency following weather extremes like cyclone or storm surges (Ahmad, et al., 2009). Many organizations in Bangladesh work with local organization to build institutional capacities including raising technical expertise, enhance networking, raising funds, providing legal support and facilitate knowledge transfer (Berkes, 2007; Seixas and Berkes, 2010). A better and collective understanding of the community aspiration and needs is essential for sustainable conservation of the Protected Area (Craig, 2002). The Forest Policy 2019 (submitted for approval) commits:

Increasing education, training and skill related to wildlife conservation for the relevant officers and employees.

A full-fledged wildlife center will be established to play role in the wildlife management, research and wildlife information.

(National Forest Policy Guidelines D 5(8).

## **Coordination**

Governance of the natural resources depend on the interrelation of the society, economy, political influences, legal regime and institutions (Ludwig, 2001). State has developed specialized agencies to act as the custodians of respective resources. Ministries control agencies and are responsible for policy making. The natural resource bases are not bound by any administrative or political boundaries. For example, in Bangladesh the Ministry of Water Resources has jurisdiction and responsibility over open water including rivers, *haors*, floodplains and others. Whereas land entitlement of wetlands belongs to Ministry of Land and again the fish therein, are under the jurisdiction of the Ministry of Fisheries and Livestock, furthermore some of the wetlands are declared Ecological Critical Area (ECA) under the management responsibility of the Department of Environment, MOEF. As such, the development suffers from conflicting situation basically due to mandate culture prevailing among the administrative officers and the professionals. Thus, complexities are there among different implementing agencies as well as with the local community for control over natural resources.

Management of state forests like Protected Area involves engagement of different government agencies at various levels and often there are conflicting interests. Sundarbans, the largest mangrove tract on earth, part of this forest has been declared Protected Area. Forest Department, is responsible for the management of the Protected Area. Whereas the ECA declared 10 km band around Sundarbans is under the ECA Rules, which is the responsibility of the Department of Environment. However, the license for catching fish are issued by Forest Department. There are conflicting issues among interrelated and overlapping policy and legal regime like water policy, wetland management policy, ECA Rules, PA Rules and accordingly among the professionals of the corresponding agencies. Coordination among the relevant government agencies and among the development partners is very important to have synergies of the implemented interventions for sustainability.

Governance in one agency or single institutional level is not enough to sustainably manage natural resources. Coordination among relevant agencies including Forest Department, DAE, DoE, Roads & Highways, Power Division, Social Welfare and law enforcing agencies are necessary at various levels. However, coordination is not happening as needed. The most important governance issue in the forest sector however, centers around forest land grabbing and conversion. Ministry of Land and land administering agencies work independently with little coordination (Nahrin and Rahman, 2009).

Conflict over land tenure in the CHT has a legacy. Cadastral survey conducted throughout the country during 1920-1945, however, the Chittagong Hill Tracts were not surveyed. Only Mouza demarcation through natural land marks like Khal, edge of the hill etc., were done for the CHT land. The practice was to lease CHT land to the Headman by DC. Headman then distributed leased lands for use to number of Karbari (leader of small group). A group of people under a Karbari used the land. DC issued lease paper, whereas, the headman distributed land use right verbally to the Karbari. Similarly, group members also received use rights verbally from the Karbari. There are instances of issuing lease in the name of ethnic people and then transferred to the Bangalis. It is mentioned that the Bangalis were always keen to have a document and ethnic people didn't care. Through this process, the Bangalis have a document that proofs his/her occupancy to a parcel of land in the CHT and most of the ethnic people do not have any document.

The CHT Treaty, 1997 has been signed on 2 December 1997 after more than two decades of arms struggle. The treaty also ensured return of displaced hill people. According to one estimate more than 50, 000 people returned to their home. Upon repatriation after the treaty, the Shanti Bahini found their land occupied. The leaders showed them hillocks inside reserve forest and the repatriated people has settled there. The Ministry of Chittagong Hill Tract Affairs has been established by the provision of the CHT Treaty to consider the matters concerning the three hill districts. However, the ministry and the line agencies are not functioning properly because of procedural and coordination issues. Bangalis immigration in the hills, compulsory acquisition of land, displacement of ethnic community and forest degradation continued even after the treaty was signed (Matin, et al., 2014). The most critical issue of land settlement has not been addressed yet, though CHT Land Dispute Resolution Act 2001 was enacted. This Act had contradictions in the legal aspects and could not bring settlement of land issue. However, the Act has been amended in December 2017. The ethnic community alleged the political will of the government is below the level to be effectively implement the treaty to its entirety. It can be assumed, even with proper political will, the implementation of the treaty to bring confidence to the ethnic community will take more time. Meanwhile, forest degradation and deforestation in the Reserve Forest and other forests in the CHT continues.

The mindset and mandate culture of professional and officers of the relevant institutions create conflicts once jurisdiction overlaps. For example, oil and gas exploration or sand/ stone quarry in reserve forest. Jurisdiction over multiple resources create mismatch among

government agencies (Ahammad, et al., 2014). Conflict identification and resolution requires thorough understanding across the institutions; institutional framework plays key role in identifying conflicts and resolution (Berkes, et al., 2005). Inter-agency conflict resolution, harmonies among science, policy and practice are crucial issues for forest management (Miah and Koike, 2011).

Natural resource management institutions function at various levels. Number of agencies like Forest Research Institution, Forest Department or the Forest Education Institutions is involved in forest management. To bring local issues of natural resources management to the political level cross-scale, institutional linkages could play role and offer governance at different level (Berkes, et al., 2005). The organizations at various levels interact with each other. Governance begins at community level; however cross-scale linkages at multiple levels are essential for successful natural resources management (Berkes, 2006). Collaboration among institutions is critical for ecosystem-based adaptation (Ahammad, et al., 2014). Protection of state own forest resources against poachers, illegal feller and forest offender, support from the law enforcing agencies are directed by law, however not often implemented. Wider participation and civil society advocacy for reinforcing state responsiveness will make collaboration effective (Ahammad, et al., 2014). Leaders in the society and knowledgeable persons facilitates social learning (Seixas and Berkes, 2010). The organizations at different zones and working in different dimensions facilitates integration of information from different zones and dimensions for environmental issues (Boissin, 2009); these organizations bridges supports from various zones and levels (Seixas and Berkes, 2010). The findings of the organizations at various levels communicate with each other and thus joint governance takes place (Berkes, 2009).

Political support is necessary to address conservation in development planning (Ahmad, et al., 2009). The political support is not there to stop pollution into the forests from the surrounding other land use type, e.g. tea estates, agriculture or oil spill from transport while passing through the forest (Ahmed, et al., 2009). The hill forests of the Sylhet region suffer from the pollutants from the tea estates. The Sundarbans often are polluted by oil spill from transportation and sinking of oil shipper. Hill forests and plain land Sal forests are subjected to pollution from the brick fields. Globally decentralization and devolution of power is increasing aligning goodgovernance policy for natural resources management (Bosselmann, et al., 2008). Un equal distribution of power determines access to the natural resources and varies for social groups, places and characterizes environmental health (Mosedale, 2015). However, dependent people draw livelihoods despite power relation. Political agreement on the position



of the forests in the national economy is a prerequisite to designate areas in accordance with the capability and necessity, i.e. land use planning clearly demarcating permanent forests and to manage land conversion (FAO, 2010).

### **Transparency and Accountability**

Transparency and accountability are fundamental dimensions of Forest Protected Area governance (Brockington, et al., 2008). Transparency of the operations enable accountability. Institutional governance based on faith, responsibility, receptiveness, and equality between the government and people determines effectiveness of Co-Management of natural resources (Khan, 2011). For example, Sundarbans management suffers from greediness of the resource users, influential people and political backstopping to the smugglers (Hassan, 2013). Strengthening governance in general and in the forestry sector is an overarching need; reducing or eradicating corruption including bribery is very important in this regard (Banerjee, 1997). There are corrupt nexus of Land Officer, Forest Officer and influential encroacher. Interference to the forest administration for transfer and posting, lobbying for illegal tree feller, and lobbying for land grabber are widespread practice in Bangladesh.

Forest conservation requires dealing crucial factor like corruption and political influence (Miah and Koike, 2011). Political influential people ignore voice and interest of the local communities (Jashimuddin and Inoue, 2012). Some political influential people are involved in illegal tree felling and poaching (Fox et al., 2007; Muhammed, et al., 2008). Political leaders in occasions patronize encroachment, illegal felling and poaching within the Protected Area (Ferdous, 2015). Success of Co-Management suffers for lack of transparency, accountability, inclusiveness, government support, coordination; land ownership right of the ethnic people, physical achievement focusses and internal conflict (Tamima, 2015). Most readily perceived issue in the literature is the corruption, however less discussed (FAO, 2003). People capitalize the existence of malpractice due to lack of capacities of the government or due to corruption and continue illegal operations in the forest in Bangladesh (Iftekhar and Hoque, 2005).

Political pressure increases corruption in the forest sector. The politician creates undue pressure to Forest Department Officials. The politicians are involved in policy adoption and their interference is a crucial factor for implementing REDD+ (UN-REDD, 2013). The political influential people grab forest resources. Advocacy for land grabber is common by the influential and political power. Whenever, political people become a part of the administration, they no longer work for the interest of the nation but for their own interest. Minister, Member of

Parliaments or other political influential people interferes for recruitment of lower level positions. Minister's being the executive head of the ministry has the final say regarding transfer and posting of senior Forest Officers which in many cases undermines decision of the CCF who knows whom to position where. The influential people, who steal forest resource, claim themselves as political force and stopping them is a very difficult task. There is wide spread political interference in land grabbing, transfer, posting and recruitment.

During the military backed Care Taker Government in 2007, following the instruction of the Chief of Army, CCF prepared a list of 300 encroacher of forest land in the Gazipur District. Once the list has been deeply considered, the Care Taker Government kept silent and decided that the matter be better dealt with by an elected government. The fact was, highly connected and rich people grabbed forest land and established industries. It was estimated, that if evicted, around twelve thousand crore of BDT bank loan will become unrecoverable, more than one lac worker will lose job. Political power has a special role in forest management and political commitment is very important for conserving forest resource. For example, in Noakhali, politicians protect illegal tree feller, supports construction of roads felling trees and do not protect trees that saves exposed population from cyclones. Political interference is massive and increasing overtime. The conflict management mechanism is poor in Forest Department.

Ownership is the most important feature of land tenure, which is equally true for forest land. Land tenure system, land record, land transfer engages number of authorities at various levels; flaws are there and corruption makes the complex system vulnerable and governance remain far cry (Hassan, 2017). Mistakes or errors in the deed of transfer is not punishable, taking advantage of this flaw, big fraud and forgery happens (Alam, 1992). Widespread corruption in the Office of the Registration supports fraud and forgery (Nahrin and Rahman, 2009). Once the SATA 1950 has been enacted, the vested quarter took the strategy and cleared forest land and claimed land was under cultivation and not forest and as such privately retainable. They prepared fake documents (Patta and Kabuliat and Dakhila) and recorded cleared forest land in their name through the Land Ministry. People continue to clear the forest and grabbed a large chunk of land of the Dhaka, Tangail, Mymensing forests in the same or similar process. The process of encroachment and forest land conversion is continuing through a corrupt nexus of land office, forest office and land grabber. Land grabbers make forged documents and grab Government Land (Barakat, Zaman and Raihan, 2001). Civil court considers deed (land transfer document) and document of mutation (receipt of name record in ROR) for ownership decision (Mia, 1996). False

reports from Tehsildars or intentional wrong survey entry can distort mutation records (Nahrin and Rahman, 2009).

Still today, the same practice continues clearing forests, planting homestead variety of trees, making fake papers and filing a case. The corrupt nexus of the AC Land, Forest Officer, Court staff and the land grabber collectively transfer the land from forest tenure to private tenure with different use aspects. Even, now the lands which have been under forest cover for long and are recorded accordingly in the survey are transferred. Anyone make a deed for sale get the sales permission from the AC (Land). However, the AC (Land) is supposed to check with the Forest Department before allowing the transfer of a piece of land recorded in the ROR as forest. He does not check it and simply grants the transfer and thus the ownership right as well as ROR changes in favor of land grabber. The entire process is supported by the corrupt nexus of FD Officials, AC (Land), Court staff and the land grabber. The grabber is obviously highly powerful in the context, politically connected, military or civil bureaucrat or businessman.

In many cases, the land use after the transfer is an industry or resort which brings in too much cash money, as a result, sometimes the Forest Department become helpless. The corrupt nexus is prevailing all around the country and remains active throughout. The nexus is successfully converting Khash forest lands of different qualification like unclassed state forests, protected forests etc. They also convert the reserve forest in to Khash land status first and then lease out for other land use. The conversion also includes politically decided conversion which is legal but immoral.

The Forest Officials ask the encroacher to leave once they notice illegal settlement. The Forest Department break illegally build houses if the encroacher does not leave by themselves. In serious circumstances, the Forest Officers files case against the encroachers. Lodging court case take 6–7 months. However, this process is being used by the corrupt nexus in grabbing forest land. The nexus makes fake papers of ownership utilizing flaws of the law and bending the rules and bribing the corrupt officers. The politically connected elites grab lands for themselves or support the landless in grabbing forest land against money and loyalty. During the Bangladesh Survey (BS) in 1980s Protected Forests was recorded as Khash land and then leased out by DC Office taking bribe (Iftekher and Hoque, 2005). Deputy Commissioners (DC) are authorized to lease out Khash lands since British regime. The DCs had no personal interest in land grabbing during then and maintained integrity which continued throughout the Pakistan regime. Unfortunately, during the Bangladesh regime many DCs have their personal

interest in land and they have abused their authority in declaring lands Khash that were to the Zamidars and were not vested to Forest Department following SATA, 1950. Once classified as Khash, the land can be legally leased, although the terms by which they were converted from reserve forest to Khash land is unclear; this process of conversion in the local courts happens on a regular basis throughout the country (DeCosse and Susan, 2006).

Victims of river bank erosion start living inside reserve forest without having land ownership. They plant non-forest trees like Mango or Jackfruit and claim that they are living on this land for long years. All other land grabbing tricks also applies, like making fake deed, converting forest land into Khash land through fake papers and then arrange to lease to the occupiers. Can it be protected by existing law? Yes, but then who enforces must be sensible. For example, in case of land of the Bhawal Forest, a chunk was leased out as Khash. Another chunk was grabbed through 'Bhawal Court of Words' formed after the death of the Bhawal King, since he had no offspring. The grabbing process is similar to grabbing of other forest land after the State Acquisition and Tenancy Act, 1950. In the case of the Bhawal forests more innovative process was followed by the name of the 'Court of Words'. However, the land ultimately going out to the private ownership. The forest land in Sylhet district was bit better in this regard. Rangpur and Dinajpur district's forest land are like those of Bhawal, Mymensing and Tangail Districts, where DCs play role and forests are continuously being converted to other land use and ownership also changes.

Making case against the forest offenders is a responsibility of the Forest Officer. However, there is much more instances of making fake case against the people who were trying to catch the illegal tree feller. The corrupt Forest Officer uses the case as a 'tool' in his/her malpractice of making money from the forest offenders. There are, thus, a mixture of the forest offenders including good man but abused by the foresters and genuine forest offenders. There are large numbers of case victims fell tree to meet case expenses, until or unless they are relieved, they will not stop extracting forest resources (Ahmed, 2008).

Governance requires multi-pronged action on the ground by various levels of stakeholders. Legal and policy regime of relevant sectors and institutions have bearing on those ground actions. Enforcement of forest law require collaboration of different actors like Forest Department, Police Department and Court of Justice. However, the coordination and collaboration are not happening due to lack of appropriate incentives and accountability

among these departments. The criminals including illegal tree feller, poacher and encroacher are escaping.

## **Chapter 8: Forest Health**

## **Forest Health**

Forest is considered healthy when the extent of the natural forest is maintained with biodiversity; forest remains vital for regeneration, deliver products and services. For a critical analysis of the forest management in Bangladesh, the fundamental question for forest health is whether forest extent (size of the forest) is maintained or deforested; is the remaining forests degraded? i.e. are forest trees and other non-timber forest resources and wildlife on the decline? is there regeneration vitality? Illegal tree felling, over-exploitation of forest resources, poaching and other use like grazing degrade forests (C.E. Haque et al. 2012). The degradation is the first step and the next is the deforestation and then encroachment and permanent conversion occur. The forest extent and forest quality both are on continuous depletion (FMP, 1995).

According to the Global Forest Resources Assessment (2015), 1.429 m ha of forests (11% of land area) in 2015 which was 1.468 m ha in 1990 and was decreasing steadily since then by 2,600 ha/year (0.2%). Woodland in 2015 was 0.269 m ha which was 0.294 m ha in 1990 and decreased steadily since then by 1,000 ha/yr. A total of 0.2356 m ha of other land has tree cover as of 2015. During 2000 to 2005, the forest area has been expanded by 4,510 ha/yr., during 2005 to 2010 expanded by 4,520 ha/yr. and since 2010 the expansion is 7,340/yr. till 2015. During 2005 to 2010 tree plantation of introduced species was 850 ha/yr. Which was 1,120 ha/yr. from 2010 to 2015; deforestation was 2,600 ha/yr. (2010-2015). and artificial reforestation was 7,300 ha/yr. during 2000 to 2005 and 14,500 ha/yr. during 2005 to 2010 and 8,100 ha/yr. from 2010 to 2015 (FAO, 2015 b).

The global forest resources assessment includes following trends in forest cover in Bangladesh:

Primary forests in 1990 were 0.436 m ha which has decreased to 0.411m ha in 2015 and the reduction was reported the highest by 1.2%/yr. from 2010 to 2015. Other natural regenerated forests were 0.819 m ha in 1990 and since then decreasing steadily but from 2000 to 2005 and decrease again at a rate of 0.7%/yr. during 2010 to 2015 and reached at 0.744 m ha in 2015, planted forests were 0.239m ha in 1990 and increasing consistently but during 2005 to 2010 and again increasing and reached to 0.274m ha in 2015; mangroves increased from 0.46 m ha in 1990 to 0.531m ha in 2015 of which 0.099 m ha are planted, till 1990 the planted mangroves was 24 thousand ha and during 1990 to 2015 a total of 75 thousand ha of mangroves has been planted in Bangladesh; growing stock in 2015 was 86 m m<sup>3</sup> at 60 m<sup>3</sup>/ha which was 72 millionm<sup>3</sup> in 1990 and increased considerably during 2005 to 2010 from 70 mm<sup>3</sup> to 83 m m<sup>3</sup>, the composition of the growing stock with 2, 4, 6, 8, and 10 most common species was 26%, 35%, 41%, 46% and 50%

respectively in 2015; The net annual increment in forest was 1.2 m<sup>3</sup>/ha/yr. in 1990 and steadily increased since then and reached 2.9 m<sup>3</sup>/ha/yr. in 2015, the biomass stock above ground in 2015 was 218 million tons that include 6 million tons of dead wood whereas below ground was 35 million tons and was increasing since 1990 from 178 million tons in living forest biomass, carbon stock was 83 million tons above ground, 16 million tons below ground and 3 million tons of dead wood; carbon stock in living forest biomass is also consistently increased since 1990 from 84 million tons to 99 million ton at 70 tons/ha in 2015; production forest was 0.28m ha in 1990 and reached 0.34 ha in 2015, substantial increase during 2005 to 2010 from 0.276m ha to 0.34m ha; Total wood removal from the forests was 28.38 m m<sup>3</sup> of which 27.74 m m<sup>3</sup> was fuel wood in 1990 and the removal of both total wood and wood fuel reduced to 27.57 m m<sup>3</sup> and 27.29 m m<sup>3</sup> in 2011 respectively; 0.193m ha forests supporting clean water production, 0.062m ha stabilizing coastline, 0.034m ha controlling desertification while 0.131m ha controlling erosion and flood, 0.04m ha provides public recreation, the forest area providing protection and ecosystem services were more or less same till 2005 around 0.315m ha and increased substantially to 0.482m ha in 2010 and reduced again to 0.42m ha in 2015, that includes rising of forest area under public recreation to 0.04m ha in 2015 from 0.017m ha in 1990; Forest area designated for biodiversity conservation/forest area within protected area and conservation was 0.11m ha in 1990 and increased to 0.227m ha by the decade and reached 0.271m ha in 2015; Since 2003 till 2012, the highest land burned was over 110 thousand hectare in 2005 and lowest was 23 thousand ha in 2010 whereas forest land burn was over 42 thousand ha in 2006 and less than 7 thousand ha in 2004 (FAO, 2015 b).

The reduction has also been evident in the hill forest. The National Forest Assessment (2007) reported reduction of tree densities, growing stock and canopy covers for Bangladesh (FAO, 2007). Forest degradation and deforestation depleted native species alarmingly (Hossain, et al.,2004). Due to indiscriminate and unrestricted felling, most valuable species such as Jarul, Toon, Chapalish, Gamar, Telsur and Bailam disappeared almost completely from Unclassified State Forests (CHT, 1973a). Forests were degraded in all the colonies of the British regime due to clear felling and plantation of valuable timbers. For example, irreversible damage was done to the Sal forests for rubber plantation during the mid-1980s in Bangladesh; the coppice of Sal forests was cut and the stumps were uprooted (FAO, 2000; Ahmed, 2008) which has eliminated the ability of natural regeneration of Sal in the area (Ahmed, 2008).

The Forest Policy 2019 (submitted for approval) recognizes forest ecosystems are affected because of increased population, increased demand for forest products, increasing industrialization and urbanization; frequent cyclones, temperature rise, irregular rainfall, sea



level rise, etc. following climate change; and forest-dependent population are affected because of declining forest products and services. As a result, forest degradation, declining forest produce, declining wildlife habitat, and shrinkage of biodiversity are happening; the forest ecosystem services have been downgraded (The Forest Policy, 2017).

## **Forest Degradation**

Degradation makes forest less productive; large canopy gap encourages invasive species; trees remain and wildlife cannot survive; lately leads to forest degradation (WWF,2011). The primary forest in Bangladesh has been degraded to a considerable extent because of overexploitation and unwise use. Bangladesh forests cannot produce enough timber or fuelwood or NTFP to meet the demand of the increased population. In 1984, the estimated per head fuelwood and wood use in Bangladesh was only 0.08 m<sup>3</sup> and 0.008 m<sup>3</sup>, respectively (FAO, 1986). In the sub-continent standard, per head fuelwood use in Bangladesh is low, however still above the threshold of sustainable supply from the forests (GOB, 2008). Fuelwood requirement during 1985-90 was 7 m M<sup>3</sup> whereas, legally supply was only 0.7 m M<sup>3</sup> and the average timber supply was 1.09 m M<sup>3</sup> against the demand of 2.42 m M<sup>3</sup> (Miah and Koike, 2011). People cut saplings of the timber species to use for the pole to betel leaf and for fuelwood (GOB, 2008) which is a major cause for forest degradation. FAO suggested, protection and tending to the Sal stands still could respond and grow (FAO, 2000), however, Ahmed (2008) opined Sal trees in the forests has lost coppicing power.

The hill community historically practices Jhum cultivation in CHT. Some of them are continuing the practice. Bushes and trees are cleared from selected hilly land for Jhum cultivation. They ethnic community uses the process of slash and burn into ash. In a piece of land, they crop for 2-3 years. This is an unsustainable form of agriculture as the soil is exposed; sun and rain cause erosion of the topsoil. The production drops and within 2-3 years they shift to another piece of forest land. The abandoned site in course of time may rehabilitate as forests naturally. Shifting cultivator (Jhumia) historically maintained a cycle of 15-18 years to comeback for shifting cultivation into the same parcel of land. Due to increase in the population of the Jhumia and consequently demand for more land for the shifting cultivation, the rotation cycle was reduced which resulted in degradation of the forest land under the Jhum cultivation.

During the 1950s, the context in the CHT was changing rapidly. For example, Kaptai Dam was created for the generation of electricity. The dam has inundated vast tract of hill forests in the Rangamati valley forming Kaptai lake. Karnaphuli Paper Mill was established in the early 1950s that used raw materials from CHT forests. During the same period, BFIDC was

established that stepped into timber exploitation in the CHT to use as raw materials for their 19-forest resource-based industries. The emergence of Kaptai Lake opened remote forests of CHT for exploitation. Fast growing species was introduced for reforestation. However, watershed management and wildlife management drew attention during this time. Nonetheless, throughout the 1960s, the extraction continued and fed the Karnaphuli Paper Mill and all other industries under the BFIDC.

The struggle of the ethnic communities for their rights began around 1973. The armed confrontation continued till 1997 when the CHT agreement was signed. During the entire period of armed confrontation, tree felling in the CHT was massive. Bangladesh Army cleared valuable trees in the name of security. CHT 'Shanti Bahini' fell trees to generate revenue to meet the cost of the guerrilla war. The ill-motivated all other force took the opportunity and harvested as much as they can. The poor resource-dependent people had continued to collect fuel and others for their consumption and to maintain livelihoods. The CHT Forest becomes totally barren during the last four decades. The CHT Forest land still is in the vulnerable condition; land tenure system is the main reason.

Extensive changes in the river flow, associated sediment deposition, and salinity changed the ecology of Sundarbans. Freshwater flow from the upper catchment of the GBM basin has direct influence in the salinity intrusion into the Sundarbans and the sediment deposition over the pneumatophores of the mangroves. Around 80% of the sediment transported in the Ganga river comes from High Himalaya, around 8% deposited in the Bangladesh delta and floodplains, around 45% deposited in the subaqueous delta and Bengal Fan; causes behind the sediment to come is not clear; grazing in high altitude, forest management, agriculture and road building could be reason which requires testing (Wasson, 2003).

## **Deforestation and Conversion**

The driver of change of land tenure was the high tax against land to the crown during the period between the permanent settlement and enactment of State Acquisition and Tenancy Act (SATA) 1950. Zamidars promoted conversion of forests to agricultural land to realize more revenue from tenants to meet the crown tax (Hassan, 2011). During the 1950s Bangladesh Forest Department brought the worker from various parts of India and allowed them living within the reserve forests. These people are later termed 'Villagers'. In course of time, 'Villager' increased in numbers and encroached further and occupying a large chunk of forest land in every hill forests. Some of them become engaged in illegal tree felling and poaching. The changing forest composition and cover can be closely linked to the growth and change of civilizations; development over the years caused gradual depletion of forests

(TERI, 2015). Tropical forests are often converted to agriculture land after heavy logging (Mustafa, 2002). Even in 1960s encroachment to forest land was a concern and unrestricted tree felling was there; Kaptai dam was built in the 1960s that inundated large chunk of forests (CHT, 1973). The political decision of introducing Bengali settlers in the hills is another reason for deforestation and conversion of the CHT forests. The government also de-reserved 40,000 ha of north CHT forest under the provision of Act and established villages where ethnic people and in few cases Bangalee settled there (Mia, 2016).

The landless people took shelter in the reserve forests from the Island of Sandip, Hatia, Kutubdia, and Maheshkhali and even, Bhola following the big cyclone and land erosion. The people following the devastating cyclone and storm surges in 1970 took shelter in Hill Forests. These people ultimately settled in the forest land developing homesteads and small holding agriculture. Poverty prone unskilled people encroach into forest land; the encroachers in average have less than 0.5 ha of land and many of them after assuming the land become peasant though they have sources of income other than agriculture (Iftekhar and Islam, 2004). Illegal tree felling creates vacant places within the forest territory that allow an individual to build a hut and become direct encroacher and plant non-forest trees to prove longer living (Iftekhar and Hoque, 2005). The encroacher villagers settled in the undeveloped area of the forest of the failed plantations (Iftekhar and Hoque, 2005). In course of time, the individual farm size near the forest gradually become smaller and the productive land remains in the hand of the corporation and influential people, the poor people moves their homestead and cultivation in the forest frontier clearing forests (Islam and Sato, 2012). Gradually other people come and establish their holding rights.

Rohingya (Rakhain) refugee are encroaching forest tracks along the Myanmar border in the Chittagong and Cox's Bazar districts during the last couple of decades and degrades forests. Most of the refugee escaped from the camp and living independently within the reserve forests. These people using the loopholes in the governance able to convert the forest land into a settlement of their own where they have successfully gained support from relevant DC, SP, Law year and humanitarian workers at places and various times. The Rohingya destroy forests taking shelter, using all the resources for their consumption and livelihoods. They become engaged in illegal tree felling and cut saplings as fuelwood.

Sundarbans is crisscrossed by rivers and Sea on the south limit human access (GoB, 2012) and because of tidal inundation and the very existence of pneumatophores, is not suitable for other land use, as such is not subjected to encroachment, except for fish farming.

The Sal forests in Gazipur and Shalna along the Dhaka-Mymensing highway has been converted to industries by powerful people. Many powerful people including the owner of the media house, businessman, military, bureaucrats, and politicians encroached forest land in Gazipur district and around the country. During the governance of the caretaker government (2007-2008), hundreds of hectares of land had been deforested. Total area under Sal forests is around 0.12 million ha (Islam, 2016). Sal forests have maximum encroachment and are partly caused by tenure uncertainties (GoB, 1993). The Sal forest is subjected to settlement, industrialization and agriculture expansion (GoB, 2012). Sal forests were converted to Eucalyptus and rubber plantations with active ADB promotion (Islam, 2016).

The ethnic communities are living in the Modhupur Sal forest for more than 100 years; however, encroachers during last 4-5 decades occupied nearly half of Tangail forests per 1999 data (CPD, 2008). The encroachers are dependent for fuelwood, and for cattle food or housebuilding materials (Khan, et al., 2004).

The forest land conversion, however, has several approaches, purposes, and actors. Development of Kaptai hydraulic dam submerged huge forested land, forest land converted to a rubber plantation, forest land used for army installation and other various uses (Choudhury and Hossain, 2011; Rahman, 2011). Forests are being degraded and converted following the intervention of national political decisions. For example, many Bangalee families were brought to the CHT for political reasons and were allotted with 2.02 ha. of forest lands per family (Hassan, 2011). These forested lands are under the management of the Ministry of Land through the District administration. These inhabitants are degrading forests in addition to the conversion of the allocated 2.02 ha. to other land uses. Unplanned development activities convert forests (Farooque, 1997) which is very high since the GDP growth is more than 6% over the last couple of decades.

The forest lands continued to convert after the liberation, during the 70's and 80's hundreds and thousands of hectares of forestland were converted mainly for agriculture, settlements, and industries. So far 64002.80 hectares of forest land has been allotted to various government and private organizations for settlement, industries, infrastructure, military installations and other purposes (Forest Department, 2018).

### **Conversion for Infrastructure Development**

Infrastructure development, especially the construction of roads through forest land makes it easily accessible; powerful people realize that the forest land can be used for industries and

subsequently grab it for establishing industries. More than 2,025 ha of forest land in the Dhaka Forest Division has been converted to other land use (Islam, 2016). Several lawsuits in this regard are pending for settlement in the Court of Law. On the other hand, the government at various times allocated forest land for development activities. For example, Kaptai Hydroelectric Project created artificial Kaptai Lake which has inundated around 22,000 ha. (220 km<sup>2</sup>) of farmland; displaced 100 thousand people, some of these people went to reserve forests and started Sweden cultivation (Matin, et, al., 2014; Ahmed, 2008). Inundation due to Kaptai Dam forced people to move further high land into the Reingkhoyong Reserve Forests. The armed conflict (1976-1997) also forced people to take shelter at higher elevation in the remote forests. Altogether around 40,000 indigenous people took shelter in the reserve forests. These people do not have any land rights or resource rights, rather face frequent court cases. Gas exploration in the Sylhet Region and stone quarries in Sunamgonj district destroyed forests (Ahmed, 2008; Hassan, 2011). The economic growth of Bangladesh during the last couple of years is over 6%, that required industrialization and forests are easy places from where one can grab land.

### **Forest Land Leased for Non-Forest Use**

The government leased out forest land for other uses during the 1950s and 1960s. Much of the forest land administered by the Government (Khash land) but not under the control of the Forest Department, was leased out for agriculture, horticulture, and rubber gardens. In the 1970s, large chunks of Unclassified State Forests, especially in Chittagong Hill Tracts (CHT), were leased out for establishing rubber gardens. As of 2010, more than 13,660 ha were granted to individuals for rubber gardens (FAO, 2007). The process resulted in the conversion of forested land to other use. In addition, more than 17,448 ha of reserved forest was transferred to BFIDC from 1971 to 2007 mainly for rubber plantations (Choudhury and Hossain, 2011). CHT forested land was given for rubber plantation to individuals as well (Choudhury and Hossain, 2011). Chokoria Sundarban were leased out for shrimp farming and Sal forests in Dhaka division were converted to other land use (Hassan, 2011). The Modhupur forest land was cleared by the lessee and converted to other land use (Paul and Chowdhury, 2011).

Accreted lands along the coast are Khash land per the existing law. The government has afforested around 190 thousand ha of accreted land during the 1980s. Around 30% of this afforested land has been permanently designated as reserved forests. The government has allotted about 46 thousand ha of mature plantations to convert to agricultural land in 2015. Accreted coastal land in the greater Chittagong region has been encroached and converted to agriculture, aquaculture, ship-breaking and livestock grazing (Misbahuzzaman, 2015). Khash

land mangroves, especially in the greater districts of Chittagong and Noakhali has been leased for shrimp farming. These transactions involving Khash land resulted in the further conversion of large chunks of forest land to farmland, e.g. more than 20,000 ha. of newly forested land in the coast has been leased out by the local land administration during last 4 decades (Islam, 2016).

### **Conversion to Settlement and Agriculture**

Forest lands are converted every year for homestead development and urbanization (Ali 2015). Indigenous communities are living in CHT forests for many years. Forest Department brought labor from various parts of India during last century for forestry operation in remote forests of Bangladesh and allowed them living within the forests. The settlers were allotted forest land. These forest villagers remain within the forests and increased in numbers by many folds naturally. They also brought their relatives from outside the forests to live with them. Consequently, forest degradation and deforestation and conversion are increasing. The settlement is the main issue for forest degradation and deforestation in the forests of the Cox's Bazar and Chittagong division. It is a great challenge to keep the CHT forests, because of government influenced Bengalis settlement in the CHT during the 1980s (Ahmed, 2008; Matin, et, al., 2014). The hill people was 98% in 1947, become 50% in the 1991 and came down to 44% in 2001 census (Matin, et, al., 2014). Migration of Rohingya, the Muslim refugee from neighboring Myanmar increased due to extortion by the majority ethnicity to Rohingya in Myanmar. The Refugee flash came in 1978, the 1990s, 2014-2015 and 2017. The refugee encroaches in the forests of Cox's Bazar and Chittagong Forest Division. Trans-border migration occurs in the forests of the Chittagong and Cox's Bazar (Iftekhar and Hoque, 2005).

### **Conversion for Military Purpose**

The natural forests are on the decline. The reserve forest area has encroached illegally and legally. Transfer of forests lands to military and other agencies and subsequent conversion to different land use became a regular practice. For example, 404.85 ha. of Modhupur Sal forest has been transferred to the Air Force (Gain, 2003); 728.74 ha. of forest land in Ramu has been given in 2014 and 34,818 ha. of forest land in Hatia has been given to Army in 2015 (Islam, 2016). All these lands are deforested and converted to other land use. During the armed conflict in the CHT, militarily destroyed large chunks of forests in the CHT to meet their camping needs (FAO, 2005; Ahmed, 2008) which have never been reforested.

The Forest Policy 2019 (submitted for approval) includes objective (C 2.) - to increase the area of tree cover to a minimum of 25% of the total area, by 2035 with 50% density through

the countrywide extensive plantation. The National Forest Policy Guidelines (D 14. Forest Land Encroachment Prevention and Eviction) includes following commitments:

- The law enforcement will be strengthened after the creation of the database of the occupation of forest land.
- Provide adequate manpower, logistics and legal assistance to prevent forest encroachment.
- A task force consisting of the Forest Department, district administration, and law enforcement agencies will be formed for accelerating eviction; authority will be given to the Forest Department for eviction.
- The forest land encroachment will be reduced to zero. Evicted lands will be under priority plantation program.

## **Biodiversity**

Biological diversity of Bangladesh is rich because of her location in the transitional zones between South and South East Asian flora and fauna biomes. Modhupur Sal tract and Barind tract, Coastal landscapes and eastern hills hosts rich biodiversity. The species recorded in Bangladesh includes 49 amphibians, 126 reptiles, 628 birds of which 244 are migratory species, 110 inland, and 13 marine mammals; other than the homes of Bengal Tigers, Asian Elephants, and Dolphins; Bangladesh is also a station for the migratory birds (GoB, 2015). A total of 41 bird species, 40 species of mammals are categorized as threatened; 58 species of reptiles are categorized as endangered or threatened in Bangladesh (IUCN, 2000). Out of the amphibians, 19 species are rare, 11 species are uncommon, 13 species are common and 6 species are very common; out of reptiles 82 species are rare, 20 species uncommon, 26 species common and 9 species are very common (GoB 2015).

The Sundarbans, the only remaining habitat for Bengal tiger has been degraded over the years. Poaching and human-wildlife conflict reduce the numbers of the famed Bengal tigers. The tiger census in 2004 used traditional method and recorded 440 tigers in the Sundarbans; Tiger census in 2015 found at least 83 tigers and at the best 130, as such average 106 tigers are there in the Sundarbans, however, camera trap method was used in this census (Dey, 2016; Personal Communication). However, experts argued the changes in the methodology must be considered. The hidden cameras used in 2015 instead of pugmarks methods during the previous census gave a more accurate result.

The elephant habitat has been destroyed; and human settlements in their movement corridors forced elephants to venture into the paddy fields and engage in conflicts with human

(Rahman et.al., 2011). Bangladesh is the home to 10 primate species (Ahsan, 1984) and eight of them are ranked threatened per IUCN Red Book (Ahsan and Kabir, 2011). Long-tailed Macaque (*Macaca fascicularis*) is critically endangered in Bangladesh but globally the least concern species (IUCN, 2011). The habitat of this monkey in Bangladesh was leased to Bangladesh Coast Guard to make a Jetty which has destroyed the monkey habitat (Ahsan and Kabir, 2011). Natural forest patches of Bangladesh are degraded and are not suitable habitat for wildlife, for example, arboreal mammals. Till the 1980s Capped Langur (*Presbytis pileatus*) was abundant and has reduced following a decrease of the closed canopy of Sal (Biswas and Choudhury, 2007).



## **Part 2: Case Study of a National Park and Protected**

## **Chapter 9: The Lawachara Forest Management Case**

## **Emperical Case Study of the Lawachara Forest**

### **Resarch approach, selection criteria and Analysis**

This research has taken an inductive approach. The forest management in Bangladesh includes national level aspects as well as the practice at the forest level. Gathering data and information from both the national level and the forest level and then make inferences is necessary to comply with the approach of the research. As such the research has used following criteria to select the case forest: the presence of Forest Management Institution at the forest level, prevailing practice of community participation, presence of Protected Area and buffer area, presence of dependent communities who has received support to divert livelihoods and dependent community not received support and implementation of the policy and enforcement of the Acts to an extent practiced.

Lawachara National Park has been selected based on the above mentioned criteria of selection. The core area of the Lawachara reserve forest has been declared as Lawachara National Park (LNP) i.e. a Protected Area. Lawachara National Park (1,250 ha) is considered the core zone as defined in the Wildlife (Conservation and Security) Act, 2012. Adjoining 1,286 ha of reserve forest to the north and east of the Protected Area has been identified as buffer zone, and 5,715 ha of tea state surrounding the core and buffer zones has been identified as the impact zone. The forest is being managed with the participation of the community and a co management a committee under the guidance of the division and lower tier offices of the Forest Department. The co management system is the provision of the Wild life (Conservation and Security) Act 2012. Among the forest dependent communities some received livelihood support and others didn't. The Forest meet all the selection criteria and has been selected as the case forest for this research.

This section endeavors to do a critical analysis of the Lawachara Forest Management. The analysis includes:

- Lawachara forest health, degradation, deforestation and biodiversity.
- Interaction of the resource dependent communities with the forest.
- Community participation in the management, their perception and aspiration.
- Capacity of the institutions involved in the Lawachara forest management.
- Coordination, transparency and accountability
- Effectiveness of forest policy and legal regime
- Efficacy of the Lawachara forest management approach

Reflection and recommendations of the stakeholders for better management of the Lawachara forest.

Household survey has been conducted in to randomly selected 600 households of 30 Village Conservation Forums (VCF) in 30 villages near the Lawachara forest. Focus Group Discussion has been conducted in randomly selected 11 VCFs and with the Lawachara Co management Committee. Interviewed four selected Key Informants. Three of the key informants are directly engaged in the co management of the Lawachara forest and another one is a secondary stakeholder, i.e. member of the Parliament from the constituency. Desk review of the Lawachara forest related published articles, Lawachara Management Plans, National Forest Policy, Protected Area Rules, Lawachara Forest Inventory, project reports, appraisal reports provided many data and information. Participants observation during the FGDs, KIIs and trail walk has been done.

**Table 5: Data Sources and Methods used**

Methods	Sources
Household survey	600 HHs
FGDs	11 VCFs and 1 CMC (104 participants, Men 63, women 41)
KII	36
Desk Review	Relevant documents
Participants Observation	FGDs, KIIs, Trail walk

**Table 6: Households Selection for Survey**

Households category	Number of HHs
Total recorded resource dependent HHs	2982
HHs supported for livelihoods	1191
Randomly selected supported HHs	290
Non-supported HHs	1791
Randomly selected non-supported HHs	310
Total HHs surveyed	600

**Table 7: Profile of the Respondents of the Household Survey**

Women	59.50%
Men	40.50%
Respondents age <=25, 26-40, 41-60, above 60	11.17%, 49%, 36.5%, 3.33%
Illiterate, can read-write, literate different level	27.5%, 26.67, 45.88%
Homestead in own land	66%
Landless (other than homestead land)	63.67%
Household monthly income up to 15000 BDT	76.5%

### Health of the Lawachara Forest

The forest has low ecological value species tree like teak, eucalyptus and others planted during 1920-1940s; in eastern and northern part, the canopy is broken; however, despite past logging and plantation, the forests resemble mixed evergreen tropical in nature (FD, 2016a). Major natural forest cover in the Lawachara National Park is 3.48 ha. of land allocated for Bangladesh Forest Research Institute (BFRI) which is mature natural forests; designated 'Forest Village' (129.8 ha) remains natural forest with degradation due to removal of lower branches and undergrowth for betel leaf cultivation (FD, 2016a). Within the plantations there are some remnant of natural forests (Mollah et.al., 2003).

However, overall the forest has remnants of biologically rich forests, characterized by a multi-tier vegetation assemblage; understory is evergreen and the upper canopy of tall deciduous trees. The plantation is of long-rotation primarily Teak (*Tectona grandis*) and Jarul (*Lagerstroemia spp.*), with Chapalish (*Artocarpus chaplasha*), Kadam (*Anthocephalus chinensis*) and other species, including natural regrowth; short-rotation species include Molucan albizi (*Albizia moluccana*), Eucalyptus, AKhashmoni, Mangium and Kadam (*Anthocephalus chinensis*) (Jalil, 2009). Many timber trees both of long and short rotation; and number of Bamboo species, shrubs, climbers and vines are available in the forest. Large scale encroachment and conversion fragmented the forests and reduced the wildlife habitat and biodiversity. However, due to favorable climate condition the forest gained natural growth in the ground and mid story. The different ecosystems viz. natural forest, plantation, bamboo and grassland are functional in the Lawachara forest. Carbon stock (in CO<sub>2</sub> equivalent) is an indicator of forest condition and contribution to mitigating climate change; Lawachara National Park stock estimated 323.3 tons per ha (Mg ha<sup>-1</sup>) (Netzer, et al., 2014).

Besides being home to rich biodiversity, the Lawachara forest provides regulatory services like climate regulation and water purification; support service like soil formation, nutrient cycling and primary production; ecological functions like catchment conservation, erosion control, irrigation, carbon sink; cultural services like spiritual, religious, educational, aesthetic and tourism and provide home to ethnic minorities (FD, 2006). Recently tourism has become a way of livelihood. People sell street food and handicraft, guide tourist and work in the newly build hotels.

### **Lawachara Forest Degradation**

Lawachara forests with only remnant of natural forests and mostly planted exotic species, resemble semi evergreen tropical forests. It is a challenge to remove the exotic species and bring back indigenous canopy. More over the fragmentation is caused by highway, rail road and power grids which are even expanding. The betel leaf cultivation is also expanding. During the old days, the common people did not enter in to the forest since they believed and feared presence of supernatural powers in the forests. They also feared wild animals. As such degradation was not there for human presence and acts. Now as forests are degraded, wild animal is rare and fear of the super natural power is almost nonexistent. Now Lawachara Forest is a popular tourist destination and a popular picnic destination which is a threat to the forest. Unmanaged tourists are polluting the forests with loads of solid waste including plastics, polythene, cane etc. in addition to kitchen waste. The visitors often physically destroy plants and trees. Severe sound pollution disturbs the wild life. All together the wildlife habitat is seriously degraded. Responsible tourism is a challenge.

Tree felling in the Lawachara forests continue though varies in intensity at times; however tall tree abundance, medicinal plants and natural bamboo and cane reduced significantly compared to pre- liberation period (Jalil, 2009). Some activities like Sawmills, Furniture Shops, Brick fields, Fuel wood marketing chains etc. support degradation. These are not illegal, however very existence of these installation near the Lawachara forest is to use illegal collections of forest resources. There are numbers of Sawmills and furniture shops in Bhanugach-Komolgonj and Srimongol, which are alleged to have linkage with illegal tree feller; local brickfield and restaurants use fuel wood from the Lawachara forest (Jalil, 2009). Following are main reasons for Lawachara degradation:

Fuel wood collection: by the people living inside and near the forest. They not only collect the dry branches but also remove under growth, cut saplings and trees.

Illicit timber extraction: diverse groups sometimes armed, sometimes in collaboration with ill moral FD staff, with support from powerful elite with vested interests.

Plantation/monoculture/exotic species (production forestry): clear felling, remove undergrowth and change the species composition. Plantation of single species.

Betel leaf cultivation: removes lower tree branches and under growth.

Removal of undergrowth: Cultivation of cane and for other purposes.

Hunting/trapping of animals: though limited, still poses threat to wildlife.

Unplanned tourism: visitors do not comply the restrictions, create high noise, leave wastes, disturb wildlife.

Grazing and fodder, bark, fruit etc. collection.

Management Plan for the Lawachara National Park (2006) and Lawachara Forest Protected Area Management Plan (2016-2025) recorded degradation and reasons for degradation. Both the plan mentioned similar causes for degradation and deforestation however plan of 2016 - 2025 mentioned added concern of aggressive expansion of betel leaf cultivation and uncontrolled tourist. Management plan for Lawachara 2016-2015 considers following threats to the Park and the biodiversity: continued pressure of illegal timber felling; fuelwood, bamboo, cane and poles exploitation; hunting, poaching and human wildlife conflict; plantation strategies; unclear boundary in places, encroachment, conflict between conservation and development; betel leaf cultivation, livestock grazing, uncontrolled tourist (FD, 2016 a).

## **Deforestation and Conversion**

The encroachment was reported in previous site level appraisals. Encroached areas in the Lawachara forests have been converted to houses, and lemon, pineapple garden (Jalil, 2009). Field level investigation during the development of the Lawachara Forest Protected Area Management Plan (2016-2025) has identified an updated figure of encroachment. Over 55 hectare of core forest (Protected Area) are used for agriculture and over 52 hectares has been converted to settlements; over 81 hectare of reserve forests converted to agriculture and over 257 ha reserve forest has been converted to settlements (FD, 2016 a).

The encroachment continues; most crucial issue for forest protection. However, encroachment for settlement has been reduced in recent years. The projects implemented for the conservation and development of the Lawachara forests helped develop awareness. Forest Department under an agreement signed with the representatives of the tribal community established Magurchara Punji (village) and Lawachara Punji within the Lawachara forest reserve during 1950s. These are forest villages inhabited by Khashia ethnic groups and they work for Forest Department. 1.21 ha. of

Lawachara forest lands was allocated to each family for settlement and agroforestry (FD, 2016a). Khashi community have been cultivating betel leaf on forest land since long and their cultivation area has been extended over the years. It is very difficult to rehabilitate them in various places as they have no alternative occupation. Due to the poor management of Forest Department, illegal encroachment is taking place, it must also be mentioned that the Department doesn't have adequate manpower to protect the forest resources.

Forest lands are encroached by 'villagers', local influential people and political leaders. The encroached forest land has been converted to agriculture land, pond, pineapple and lemon garden and other land use. A total of 160 villager families living inside the forest. There are 3 headmen among them named Makhon, Etya, and Kormu Singh who are currently possessing around 161.94 ha. of land under MOU with the Forest Department. Even though there is no permission for making pond inside forest, Mahmud (villager) has constructed pond for fishery. Uttar Baligaon Village Forest Conservation Cooperative Society and Shonachara Village Conservation Group have not been found involved in betel leaf cultivation. Lawachara Punji Village Forest Conservation Cooperative Society have 30 families who are dependent on betel leaf cultivation, and some of them expand their betel leaf cultivation area beyond allocation, even after taking training form CREL project for alternate livelihood.

Physical demarcation of the boundary of the forest is a critical issue linked to encroachment and conversion. The issue of the forest villages, their land tenure settlement with physical demarcation of the villages remain critical and is linked to the encroachment. During the famine of 1974 people started fell trees, unfortunately illegal felling continues since then. During the regime of Ziaur Rahman (1980) some people were provided with a settlement namely "Eksoni (one-yearly) arrangement" for agriculture and corruption was there in the process. However, in 1982, during Ershad regime they were evacuated. Estimated forest cover reduction in the Lawachara forest is about 25% (Jalil, 2009).

### **Wildlife in Lawachara Forest**

The abundance of the wildlife species has reduced over time as the forest land encroached and forest extent reduced, less dense, fragmented, and fruit bearing trees are scanty and habitat degraded. Many wildlife like Bear, Goyal, Titir, Kedu Bagh, Chita Bagh (leopard) and Sambar (Deer) become locally extinct; and others like small Deer, Hoolock (gibbon), Hanuman, Dhanesh, Parrot, wild Fowl, Sazaru, Ghughu (doves), Turtles (2 species) and Laudoga snake are locally endangered (FD, 2016 a). Kumbir pata, Mulibash etc. are also endangered (Jalil, 2009). Due to gradual habitat degradation, some wild animals enter into the



settlements and agricultural fields in search of food, this can bring species such as monkeys and pythons into conflict with local people (FD, 2016 a).

### **People and the Lawachara Forest**

The people are living in this area since long. Local people irrespective of the ethnicity and socioeconomic conditions has a direct interaction with the forests. Forest Department brought some people for supporting Lawachara forest activity during 1950. Forest Department allowed these people to live within the forest. These people are named 'villagers' and they are completely dependent on the forest resources. There are more settlers near the forest and draws from the forest to some degree. People extract from the Lawachara forests for their consumption and livelihoods. Fuel wood, timber, thatching materials and other NTFP are extracted from the Lawachara forest. People visit the forests for the aesthetic beauty and for cultural practice and believes. Critical analysis of the Lawachara forest management calls to unveil the interactive relationship between the people and the forest.

### **People Living near the Lawachara Forest**

Forest Department formed 30 Village Conservation Forum (VCF) in the 30 villages situated in and near the forest. All together around 53000 people of 10,607 families live in these villages (FD, 2016a). Two of these villages, Magurchara Punji and Lawachara Punji are within the park and inhabited by Khashia ethnic community. The Tipra community lives in Dolubari village near the forest. Magurchara punji, Lawachara punji, Bagmara, Baligaon, Dolubari, Bishamoni, Arshidron, Dilvernagar, Birainpur slum, Lamua, Kalapur and Kakiabazar villages have high stake in the forest. Fulbari, Khaichara, Jakchara, Gilachara tea estates are bordering the park and Bharaura tea garden and Noorjahan tea estate are located nearby (Jalil, 2009). These villages are in 5 Union of Komolgonj and Srimongol Upazila of Moulovibazar district. Mostof the households of these villages have different degree of dependence on Lawachara forest for resources, either for their livelihoods and or for consumptions.

Village Conservation Forum (VCF) has been formed in each of these villages, to engage resource dependent local communities in co-managing the park. The Forest Department facilitated the formation of the forums. The membership in the VCF is per households and one person either man or woman represents the households in the VCF. A total of 2982 households are represented in to 30 VCFs by 1794 men and 1188 women; Vashanigao VCF has maximum member (187) followed by Kalachara VCF (157) and South Baligaon VCF (148); VCF members are engaged in 27 types of profession, of them, around 34% is

housewife, more than 29% farmers and 14%-day labor; among the women members around 12% are tea labor (CREL, 2015).

### **Cultural Value of and Believe on the Lawachara Forest**

Khashia ethnic group does not believe in Forest Gods and Deities as they are Christians. Ethnic people of Uttar Baligaon believe in Forest God and they venerate before they enter in to the forest. Their place for worship Forest God has been forced to change since a mosque was built in the same place. They do not go to Raj Teela (a place in the forest) in noon as it is a sacred place to them and they express veneration before going to this place. Both the Muslims and Hindus convey devotion to a place next to Janki Chara bridge. There is a saying that accident happens if someone does not show respect to this place, so people express veneration by getting down from car while passing the place.

There is another place in the Tea garden beside Lawachara forest named 'Hill number Eight' where Tea garden community and Hindus worship and Muslims provide offerings. Hindus believe that Forest Deity lives there, and they worship before sowing crop with an expectation of high yield. A faith-based story float around. Once Radha Moni Santal, a tired Tea garden worker was resting there in mid noon. He died after drinking water from that place. The resident ethnic community believe the accident is a result of, not worship the Forest Deity. Worship also takes place during harvesting, inauguration of tea leave collection to avoid harm. Muslims and Hindus express respect in their own way. Hindus have several worship ceremonies in 'Hill number Eight', for example, Bon Sati worship in Jackfruit tree, Saint Worship in Banyan tree,

Forest Deity worship in Mango tree etc. Several tea garden labors have claimed that they have witnessed Forest Deity in several forms such as old lady, snake, big deer etc.

### **Forest Resource Dependent HHs and AIGA**

The alternative livelihood for the resource dependent households is a must to reduce forest degradation in a country setting like Bangladesh. This is a widely accepted idea. Forestry projects implemented in the Lawachara forest area provides livelihood support to the most dependent and poor households with an aim to divert their livelihoods away from the direct forest extraction. Climate Resilient Ecosystem and Livelihoods (CREL, 2012-2018) project implemented by Forest Department, funded by USAID has been providing support to most dependent HHs of the 30 VCFs of 30 villages near the Lawachara forest. However, CREL is not providing livelihood support to all the VCF member households. For this research, those households (HH) were provided with livelihood support will be termed hereinafter as

supported household and those households didn't receive any support for alternate income generation will be termed non-supported household. This research surveyed households with structured questionnaire covering both supported and non-supported households.

A total 1,191 VCF members out of 2982 HHs received support from CREL project. These natural resource dependent people from these selected households have been provided with training, demonstrated better technologies and facilitated with marketing etc. to pursue alternative livelihoods. Training on high value vegetable cultivation was provided to 767 persons, 166 persons were trained on fish culture, 144 persons on duck rearing and 48 ethnic community members who live inside the park was provided training to improve betel leaf production, 4 person received special training on mobile phone servicing, 1 person on duck hatchery and 2 persons on fish nursery. A total of 43 women received training on toy making, 96 VCF members received support in petty trade and 49 farmers received support for cow rearing. A total of 117 persons from the VCF households received financial entrepreneur and literacy training which was for seven months (every day 2 hours). The training enabled participants to run their farming activities or small business in a systematic way. The learners are mostly women (76%). These participants are treated as supported HHs; of them 47% women VCF members. A total of 14 Local Service Provider (LSP) work with the farmers and community people of these 30 villages around Lawachara National Park. LSPs have received specific training from CREL project on vegetable production, poultry rearing, and aquaculture.

LSPs have been acting as agriculture extension agent for the small and marginal farmers. CREL project provided matching fund to four of the LSPs to expand their existing business, increase service quality and ensure quality inputs for the community. A total of 30 persons are performing as Nishorgo Shahayak (NS), of them 13 are women. 61 persons are working as Community Patrol Group (CPG) member where 16 are women. 2 members work as plantation guards to protect block plantation established by CREL Project. 9 women recruited for CREL project operated Financial Entrepreneurship and Literacy Center (FELC) teacher.

A total of 207 people from the VCF households has participated in Social Forestry of them, 50 are women. CREL project facilitated the establishment of demonstration farms on duck rearing, fish culture, organic vegetable production and commercial homestead gardening with technical and input support from the project. A total 141 farmers including 77 women has been engaged and demonstrated better production systems. Of these demo farmers, 100 farmers established commercial homestead garden followed by duck rearing (30) and organic vegetable production (8). Women participation in duck rearing, fish culture, commercial

homestead gardening and organic vegetable production demonstrations are 67%, 33%, 53% and 25% respectively (Zahangir, 2016; Personal communication with CREL).

Research has considered both supported HHs and non-supported HHs for survey to compare the dependency; and find out the extent of reduction in livelihood dependency, if any. A total of 290 supported HHs out of 1191 HHs and 310 non-supported HHs out of 1791 non-supported HHs have been randomly selected and surveyed.

### Socio Economic Condition of the Resource Dependent Households

Among the residents of the 30 villages near the Lawachara forest, an estimated 48% of people are poor (HH income per month up to 10000 BDT), 30% middle class (HH income up to 20000 BDT) , 17% extreme poor (HH income up to 3000 BDT) and a 5% are rich (HH income per month is above 20000 BDT); however, economic status of the ethnic minorities is quite different: only 3% are considered rich and middle class, and about 97% are considered poor or extremely poor (FD, 2016a).

Sixty percent of the supported HHs and 71.61% non-supported HHs lives in their own homestead respectively; 6.21% and 7.24% supported HHs live in forest land and Khash land respectively where as 1.29% and 2.90% non-supported HHs live in forest land and Khash land respectively; 26.55% of supported HHs and 24.19% of non-supported HHs live in private land (Table.8).

**Table 8: Homestead Land Ownership of the People**

Ownership	Livelihood				Total	
	Supported		Non-supported		No.	( % )
	No.	( % )	No.	( % )		
Owned	174	60.00	222	71.61	396	66.00
Forest land	18	6.21	4	1.29	22	3.67
Khash land	21	7.24	9	2.90	30	5.00
Living in private land	77	26.55	75	24.19	152	25.33
<b>Total</b>	<b>290</b>		<b>310</b>		<b>600</b>	

Homestead size of around 18% supported HHs are equal or less than 0.012 ha. whereas 12.58% Non-supported HHs homestead is of this size. Only 1.5% HHs have over 0.2 ha. homesteads, more than 61% homesteads are between 0.016-06 ha., around 11% homestead size is 0.065-0.1ha. and around 11% has homestead size between 0.1-0.2 ha. irrespective of supported or non-supported HHs (Table 9)

**Table 9: Homestead Land Size**

Homestead land size (ha)	Livelihood				Total	
	Supported		Non-supported		No.	( % )
	No.	( % )	No.	( % )		
<=0.012	52	17.93	39	12.58	91	15.17
0.016 – 0.028	79	27.24	105	33.87	184	30.67

0.032 – 0.06	91	31.38	95	30.65	186	31.00
0.064– 0.105	29	10.00	35	11.29	64	31.00
0.109-0.2	35	12.07	31	10.00	66	11.00
> 0.2	4	1.38	5	1.61	9	1.50
<b>Total</b>	<b>290</b>		<b>310</b>		<b>600</b>	

Around 34.5% of HHs irrespective of supported or not monthly earn 7500 to 10000 BDT while another 33.67% monthly earn 10000 to 15000 BDT (Table 10).

**Table 10: Monthly income of the Household Head**

Monthly income (Taka)	Livelihood				Total	
	Supported		Non-supported			
	No.	( % )	No.	( % )	No.	( % )
Up to 7,500	26	8.97	24	7.74	50	8.33
7,501 - 10,000	94	32.41	113	36.45	207	34.50
10,001 - 15,000	99	34.14	103	33.23	202	33.67
15,001 - 20,000	49	16.90	54	17.42	103	17.17
Above 20,000	22	7.59	16	5.16	38	6.33
<b>Total</b>	<b>290</b>		<b>310</b>		<b>600</b>	

In terms of income from the forest, around 28% of supported HHs draws 10-25% of their livelihood income from forests while only 3.87% of non-supported HHs draws same portion of their livelihood income from forests; another around 11% of the supported HHs draw 26-50% of their livelihood income from forests and only 1.61% of the non-supported HHs draws this portion of their livelihood income from forests. Over 87% of non-supported HHs do not draw any income from the forests (Table 11).

**Table 11: Percentage of HH income from forest**

Percentage of HH income from forest	Livelihood				Total	
	Supported		Non-supported			
	No.	( % )	No.	( % )	No.	( % )
0%	158	54.48	270	87.10	428	71.33
10 to 25%	81	27.93	12	3.87	93	15.50
26 - 50%	32	11.03	5	1.61	37	6.17
Above 50%	19	6.55	23	7.42	42	7.00
<b>Total</b>	<b>290</b>		<b>310</b>		<b>600</b>	

Around 27.5% are academically illiterate and 1.33 % is graduate; non-supported HHs are having less illiterate persons and more graduate, HSC, SSC and JSC (Table 12).

**Table 12: Educational level of the Respondents**

Education level	Livelihood				Total	
	Supported		Non-supported			
	No.	( % )	No.	( % )	No.	( % )
Academically illiterate	86	29.66	79	25.48	165	27.50
Can read and write	67	23.10	87	28.06	154	25.67
PSC	77	26.55	73	23.55	150	25.00
JSC	27	9.31	31	10.00	58	9.67
SSC	26	8.97	28	9.03	54	9.00

HSC	4	1.38	7	2.26	11	1.83
Graduate and above	3	1.03	5	1.61	8	1.33
<b>Total</b>	<b>290</b>		<b>310</b>		<b>600</b>	

There is more service holder (7.74%) in non-supported HHs compared to supported HHs (1.72%); more of members of the non-supported HHs is in Business and day labor compared to HHs received support; however, more HHs 6.13% of non-supported HHs compared to 4.48 % of supported HHs primary occupation is resource collection (Table13).

**Table 13: Primary Occupation of the Household Head**

Primary Occupation	Livelihood				Total	
	Supported		Non-Supported			
	No.	(%)	No.	(%)	No.	(%)
Farmer	76	26.21	71	22.90	147	24.50
Betel farmer	4	1.38	2	0.65	6	1.00
Service	5	1.72	24	7.74	29	4.83
Business	28	9.66	36	11.61	64	10.67
Tea laborer	41	14.14	43	13.87	84	14.00
Other day laborer	67	23.10	78	25.16	145	24.17
Resource collector	13	4.48	19	6.13	32	5.33
Rickshaw/ Van/ CNG driver	13	4.48	14	4.52	27	4.50
Housewife	38	13.10	21	6.77	59	9.83
Oldman	5	1.72	2	0.65	7	1.17
<b>Total</b>	<b>290</b>		<b>310</b>		<b>600</b>	

These figures reveal supported HHs is poorer and more dependent on forest Resources. However, 62% supported HHs compared to 65% non-supported HHs is functionally landless (Table 14).

**Table 14: Land ownership of the Households other than Homestead**

Other land size of HHs (ha.)	Livelihood				Total	
	Supported		Non-Supported			
	No.	(%)	No.	(%)	No.	(%)
No land / Landless	180	62.07	202	65.16	382	63.67
0.2 ha. or less	49	16.90	51	16.45	100	16.67
Up to 0.404 ha.	34	11.72	32	10.32	66	11.00
Above 0.404 ha.	27	9.31	25	8.06	52	8.67
<b>Total</b>	<b>290</b>		<b>310</b>		<b>600</b>	

### Dependence on Lawachara Forests

Resource dependent community exploits Lawachara forest for income (FD, 2016a). The Lawachara forest resources include tree, fire wood, leaves, cane, bamboo, honey, fruits, grass, medicinal plants, wild animal and forest land. Households inside the forest are completely dependent on the forest for fuel wood (CNRS, 2000). Around 200-250 people collect fuel wood; one person collects 20-40 kg (Jalil, 2009). The dependence of the communities on the forest, particularly for fuel wood remained similar during last decade (FD, 2016a). More than

62% of supported households near the Lawachara forest are dependent on forest for fuelwood at various level, little more than 14% fully dependent, around 24% are dependent for more than 50% of fuelwood needs and around 25% are dependent for more than 25% of the fuelwood needs for consumption; On the other hand the non-supported households dependency comparatively less, only 7.42% dependent fully for fuelwood, 11.61 % households are dependent for more than 50% of the fuelwood consumption needs and around 10% are dependent for more than 25% of the fuelwood consumption needs (Table 15).

**Table 15: Dependency on Lawachara forest for fuelwood for own Consumption**

Description	Livelihood				Total	
	Supported		Non-supported			
	No.	(%)	No.	(%)	No.	(%)
Fully dependent	41	14.14	23	7.42	64	10.67
Over 50% dependent	69	23.79	36	11.61	105	17.50
Over 25% dependent	72	24.83	22	7.10	94	15.67
Not dependent	108	37.24	229	73.87	337	56.17
<b>Total</b>	<b>290</b>		<b>310</b>		<b>600</b>	

At least one person from 62.8% of the supported HHs compared to 26.1% of non-supported HHs, visit the forest for resource collection; however, a total of 404 persons visit forest for resource collection, of them 278 persons from supported households and 126 persons from non-supported households; 66.8% visitors are men (Table 16)

**Table 16: Persons from HH visit Lawachara forest for Resource Collection**

No. of person visit forest from one HH	Livelihood				Total HHs	
	Supported		Non-supported			
	No.	(%)	No.	(%)	No.	(%)
1	106	36.5	44	14.1	150	25
2	59	20.3	30	9.5	89	15
2+	17	5.8	7	2.5	24	4
<b>Total</b>	<b>182</b>	<b>62.8</b>	<b>81</b>	<b>26.1</b>	<b>263</b>	<b>43.8</b>
<b>Total person</b>	<b>278</b>		<b>126</b>			
Total men 270 and women 134						

The resource collector in an average spend around 2.5 days a week (Table 17) and around 4 hours per day to collect resources (Table 18).

**Table 17: Number of days a week resource collector visit forest**

Days	Livelihood				Total	
	Supported		Non-supported			
	No.	(%)	No.	(%)	No.	(%)
1 day	50	27.47	15	18.52	65	24.71
2 day	60	32.97	25	30.86	85	32.32
3 day	31	17.03	27	33.33	58	22.05
3+ day	41	22.53	14	17.28	55	20.91
<b>Total</b>	<b>182</b>	<b>62.7</b>	<b>81</b>	<b>26.1</b>	<b>263</b>	<b>43.8</b>

Minimum	1	1	1
Maximum	6	5	6
Average	2.42	2.54	2.46
<b>Total day</b>	<b>441</b>	<b>206</b>	<b>647</b>

**Table 18: Hours spent per day to collect Forest Resources**

Hours	Livelihood				Total	
	Supported		Non-supported			
	No.	( % )	No.	( % )	No.	( % )
<=3 hour	57	31.32	27	33.33	84	31.94
4 hour	72	39.56	39	48.15	111	42.21
5 hour	35	19.23	8	9.88	43	16.35
5+ hour	18	9.89	7	8.64	25	9.51
<b>Total</b>	<b>182</b>	<b>100.00</b>	<b>81</b>	<b>100.00</b>	<b>263</b>	<b>100.00</b>
Minimum	2		2		2	
Maximum	8		6		8	
Average	4.10		3.93		4.05	
Total hour	747		318		1065	

Dependence on forests for livelihoods varies within the group and between the groups of supported and non-supported HHs. Among the supported HHs, more than 45 % have a dependency at different levels for their livelihoods on the Lawachara forests, whereas around 29% of non-supported HHs have a dependency at different levels. Some draw over 50% of the livelihood needs from the forest while others even less. Only 7-8% of households from both supported and non-supported HHs are having more than 50% dependence for livelihood on the Lawachara forests; 10.69% supported HHs (compared to 1.94% of non-supported HHs) is dependent on forests for more than 25% but less than 50% of their livelihoods; and another around 27% supported HHs (compared to 3.55% of non-supported HHs) is dependent for less than 25% of their livelihoods on the Lawachara forest (Table 19).

**Table 19: Dependence of HHs on Lawachara forests for Livelihoods**

Description	Livelihood				Total HHs	
	Supported		Non-supported			
	No.	( % )	No.	( % )	No.	( % )
More than 50% on resource collection	23	7.93	23	7.42	46	7.67
More than 25% on resource collection	31	10.69	6	1.94	37	6.17
Less than 25% on resource collection	78	26.90	11	3.55	89	14.83
No dependency for livelihood	158	54.48	269	86.77	427	71.17
	<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

However, resource collection is primary occupation of only limited HHs (6.13 % of non-supported and 4.48 % of supported HHs) (Table 9). More than 14% supported HHs completely



dependent on forests for their fuelwood needs for own consumption where as little over 7 % of non-supported HHs are dependent completely for their fuelwood consumption needs; others are dependent for different degrees, however, only 37% supported HHs have no fuel wood dependency whereas around 74% non-supported HHs are not dependent on forests for their fuelwood consumption (Table 11). Around 17 % and 4.48% of supported HHs collect food items and fodder respectively while only 8.71 and less than 1% non-supported HHs collect food items and fodder respectively; only 1 HH collects medicinal plant out of 600 HHs (Table 20).

**Table 20: Items collected from the Lawachara forest for consumption**

Description	Livelihood				Total	
	Supported		Non-supported		No.	( % )
	No.	( % )	No.	( % )		
Food items	50	17.24	27	8.71	77	12.83
Medicinal plant			1	0.32	1	0.17
Fodder	13	4.48	3	0.97	16	2.67
Nothing	224	77.24	278	89.68	502	83.67
Other	3	1.03	1	0.32	4	0.67
<b>Total</b>	<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

17.24% supported HHs and 7.42% non-supported HHs collect fruits, 3.45% of supported HHs collect grass, collection of honey, medicinal plant is only 0.17% and thatching materials is collected by below 1% of the HHs (Table 21).

**Table 21: Items collected from the Lawachara forest**

Collect from forests	Livelihood				Total	
	Supported		Non-supported		No.	%
Nothing	108	37.24	229	73.87	337	56.17
Stem	33	11.38	24	7.74	57	9.50
Fuel wood	182	62.76	80	25.81	262	43.67
Thatching materials	1	0.34	3	0.97	4	0.67
Leaf	41	14.14	7	2.26	48	8.00
Fruit	50	17.24	23	7.42	73	12.17
Honey	1	0.34			1	0.17
Medicinal plant			1	0.32	1	0.17
Grass	10	3.45	1	0.32	11	1.83

Among the fuel wood collector, more than 43% collects dry and dead branches and trees, more than 26% collects branches, 5.5% collects leave and 0.5% collects saplings (approximately 1.3-meter live trees) (Table 22).

**Table 22: Composition of the fuelwood collected from the Lawachara forest**

Description	Livelihood		Total
	Supported	Non-supported	

	No.	( % )	No.	( % )	No.	( % )
Dry and dead branches and trees	181	62.41	81	26.13	262	43.67
Branches	103	35.52	56	18.06	159	26.50
Sapling	3	1.03			3	0.50
Leaf	30	10.34	3	0.97	33	5.50

Around 22.75 % of the supported HHs and 13.22 % of the non-supported households consume their entire forest resource collection; around 16% of the supported HHs and around 8% of the non-supported HHs consumes 50% of their collection (Table 23).

**Table 23: Consumption of Collection from the Lawachara Forest**

Description	Livelihood				Total	
	Supported		Non-supported			
	No.	( % )	No.	( % )	No.	( % )
Consume 100%	66	22.75	41	13.22	107	17.83
Consume 75%	6	2			6	1
Consume 50%	46	15.86	3	0.9	49	8.1
Consume 25%	64	22	37	11.93	101	16.83
<b>Total</b>	<b>182</b>	<b>62.7</b>	<b>81</b>	<b>26.1</b>	<b>263</b>	<b>43.8</b>

Most of the consumer tagged a price of up to 2000BDT/month for what they consume (Table 24).

**Table 24: Price of the Consume Goods collected**

Consume price (BDT.)	Livelihood				Total	
	Supported		Non-supported			
	No.	( % )	No.	( % )	No.	( % )
Up to 999	52	17.93	22	7	74	12.33
1,000 - 1,500	89	30.68	49	15.8	138	23
1,501 - 2,000	24	8.27	6	1.93	30	5
2,000 +	17	5.86	4	1.2	21	3.5
<b>Total</b>	<b>182</b>	<b>62.7</b>	<b>81</b>	<b>26.1</b>	<b>263</b>	<b>43.8</b>

Forty percent supported HHs sell a portion of the collection while 26% of the non-supported HHs sale a portion. Only 9% of the seller earn more than 4000BDT per month. 5.5% resource collector earn up to 1500 BDT, 6% earn from 1501-2500, around 5.5% HHs earn from 2501-4000 BDT per month selling their collection after consumption (Table 25).

**Table 25: Earning/month of the resource collector selling a portion of the collection**

Earning (BDT.)/month	Livelihood				Total	
	Supported		Non-supported			
	No.	( % )	No.	( % )	No.	( % )
Upto 1,500	29	10	4	1.29	33	5.5
1,501 - 2,500	32	11	4	1.29	36	6
2,501 - 4,000	25	8.62	8	2.58	33	5.5
4,000 +	30	10.34	24	7.74	54	9
<b>Total</b>	<b>116</b>	<b>40</b>	<b>40</b>	<b>12.9</b>	<b>156</b>	<b>26</b>

More than 3% supported HHs and less than 1% non-supported HHs brings cattle in Lawachara forests for grazing (Table 26).

**Table 26: Households Graze Cattle in the Lawachara Forest**

Earning (BDT.)/month	Livelihood				Total	
	Supported		Non-supported			
	No.	(%)	No.	(%)	No.	(%)
My own cattle	10	3.45	3	0.97	13	2.17
I do not bring cattle to the forest	136	46.90	144	46.45	280	46.67
No cattle	144	49.66	163	52.58	307	51.17

Dependence on Lawachara forests for livelihoods of more than 39% of the supported HHs has totally reduced receiving a support from a development project, while 34% HHs reduced dependency by 50% and a quarter of the households reduced dependency by 25%. On the other hand only, a nominal (less than 3%) non-supported HHs reduced their dependency by different degree on Lawachara forests for livelihoods (Table 27). This clearly reveals project support for generating alternate opportunities for livelihoods reduced dependency of the supported HHs significantly compared to those HHs were not supported.

**Table 27: Reduction of dependency on resource collection for livelihoods**

Level of Reduction	Livelihood				Total	
	Supported		Non-supported			
	No.	(%)	No.	(%)	No.	(%)
Reduced totally	114	39.31	2	0.65	116	19.33
More than 50 % reduced	99	34.14	3	0.97	102	17.00
At least 25% reduced	74	25.52	4	1.29	78	13.00
Not reduced	3	1.03	301	97.10	304	50.67
<b>Total</b>	<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

### Perception and Aspiration of the Dependent People

More than 85% household respondents who are more than 24 years old, noticed a substantial decrease of forest resources during last decade, while over 14% thought the forest resources remained same (Table 28).

**Table 28: Change in forest condition during last decade**

Description	Livelihood				Total	
	Supported		Non-supported			
	No.	(%)	No.	(%)	No.	(%)
It has decreased substantially	224	85.82	238	85.00	462	85.40

Similar	36	13.79	41	14.64	77	14.23
Has increased			1	0.36	1	0.18
I can't understand	1	0.38			1	0.18
<b>Total</b>	<b>261</b>	<b>100.00</b>	<b>280</b>	<b>100.00</b>	<b>541</b>	<b>100.00</b>

The resource dependent respondents believe there are several reasons for Lawachara forest degradation and deforestation of the Lawachara Forest. 70 % respondents believe illegal tree felling, 32% poaching, 14% undergrowth /sapling clearing and around 14% blamed encroachment for the degradation and deforestation. Only less than 1% respondents pointed to brick field, and grazing for the degradation, while only one person out of 600 respondents mentioned forest fire as a cause of degradation (Table 29).

**Table 29: Major Cause for Lawachara degradation and deforestation**

Description	Livelihood or Non-livelihood				Total (n=600)	
	Livelihood (n=290)		Non-livelihood (n=310)			
	No.	(%)	No.	(%)	No.	(%)
Illegal felling	195	67.24	225	72.58	420	70
Undergrowth sapling clearing	54	18.62	30	9.68	84	14
Grazing	1	0.34	3	0.97	4	0.67
Encroachment	47	16.21	36	11.61	83	13.83
Forest fire			1	0.32	1	0.17
Poaching	107	36.90	85	27.42	192	32.00
Brick field	4	1.38	1	0.32	5	0.83
Disturbance to wild life	64	22.07	92	29.68	156	26.00

Over 56% respondents have given up forest resources collection for their livelihoods due to resource decline. Another more than 43% taken an additional livelihood, while less than 1% continued resource collection as only livelihood (Table 30)

**Table 30: Impacts of Resource Depletion on Livelihood**

Resource collection	Livelihood				Total	
	Supported		Non-supported			
	No.	(%)	No.	(%)	No.	(%)
Continued having no other option	2	0.80	3	1.13	5	0.97
Pursued additional livelihood	153	61.45	68	25.66	221	43.00
Gave up resource collection	94	37.75	194	73.21	288	56.03
<b>Total</b>	<b>249</b>	<b>100.00</b>	<b>265</b>	<b>100.00</b>	<b>514</b>	<b>100.00</b>

The respondents by large (88%) are supportive of the conservation, while only 11.33 % are aware of the value of the forest conservation (Table 31).

**Table 31: Awareness on the Forest conservation Value**

Upazila	Description	Livelihood or Non-livelihood		Total
		Livelihood	Non-livelihood	

		No.	( % )	No.	( % )	No.	( % )
All Upazila	Fully aware of the value	33	11.38	35	11.29	68	11.33
	Supportive as VCF /CPG member	257	88.62	275	88.71	532	88.67
<b>All Total</b>		<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

All the respondents but 1 heard that the forest require management for sustenance (Table 32).

**Table 32: Awareness on Management requirement for sustenance**

Forest require management	Livelihood or Non-livelihood				Total	
	Livelihood		Non-livelihood			
	No.	( % )	No.	( % )	No.	( % )
Do not know			1	0.32	1	0.17
Heard that Lawachara forest require management	290	100.00	309	99.68	599	99.83
<b>Total</b>	<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

Among the respondents 81% know about Forest Department and 13 % interact with the department and only 1.5% believe the department is supportive to the forest conservation and the forest resource users while 4.5% don't know the forest officers (Table 33).

**Table 33: Aware of the Forest department**

Awareness on Forest Department	Livelihood or Non-livelihood				Total	
	Livelihood		Non-livelihood			
	No.	( % )	No.	( % )	No.	( % )
<b>Know the officers</b>	228	78.62	258	83.23	486	81.00
<b>Have interaction</b>	43	14.83	35	11.29	78	13.00
<b>Supportive to the forests and us</b>	6	2.07	3	0.97	9	1.50
<b>Don't know forest department or officers</b>	13	4.48	14	4.52	27	4.50
<b>Total</b>	<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

More than 82% of the respondents raise their voice moderately in the co management meetings on Lawachara forest, more than 11% are passive, 3.83% very active and more than 3% do not raise their voice (Table 34).

**Table 34: Participation in Forest Management Meetings**

Raising voice	Livelihood or Non-livelihood				Total	
	Livelihood		Non-livelihood			
	No.	( % )	No.	( % )	No.	( % )
Very active	17	5.86	6	1.94	23	3.83
Moderately	240	82.76	251	80.97	491	81.83
Passive	24	8.28	43	13.87	67	11.17
Not at all	9	3.10	10	3.23	19	3.17
<b>Total</b>	<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

More than 57% respondents mentioned women member often raise voice in VCF meeting, while 39.5% mentioned women seldom raise voice and around 3% mentioned women do not raise any voice (Table 35).

**Table 35: Proactive women members of in raising voice**

Raising voice	Livelihood or Non-livelihood				Total	
	Livelihood		Non-livelihood			
	No.	( % )	No.	( % )	No.	( % )
Often	173	59.66	171	55.16	344	57.33
Seldom	105	36.21	132	42.58	237	39.50
Not at all	12	4.14	7	2.26	19	3.17
<b>Total</b>	<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

Why participate in the Lawachara forest management? 77% feel they are performing their social responsibility, another more than 11% feel they are socially benefitted and 7% feel empowered, only 2.83% are economically benefitted and 2% felt nothing. (Table 36).

**Table 36: Feeling of the participants being a part of the management**

Why participate	Livelihood or Non-livelihood				Total	
	Livelihood		Non-livelihood			
	No.	( % )	No.	( % )	No.	( % )
Empowered	23	7.93	19	6.13	42	7.00
Benefitted socially	29	10.00	38	12.26	67	11.17
Benefitted economically	16	5.52	1	0.32	17	2.83
Feel realizing social responsibility	218	75.17	244	78.71	462	77.00
Do not feel anything	4	1.38	8	2.58	12	2.00
<b>Total</b>	<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

More than 58% respondents of HH survey believe Lawachara is well managed, more than 34% mentioned moderately managed while 4% mentioned very well managed and only around 3% mentioned the Forest is poorly managed (Table 37).

**Table 37: Reflection on Lawachara management**

Management	Livelihood or Non-livelihood				Total	
	Livelihood		Non-livelihood			
	No.	( % )	No.	( % )	No.	( % )
Very well managed	15	5.17	9	2.90	24	4.00
Well managed	162	55.86	190	61.29	352	58.67
Moderate managed	102	35.17	103	33.23	205	34.17
Poor managed	11	3.79	8	2.58	19	3.17
<b>Total</b>	<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

## Lawachara Forest Management

Lawachara forest management changes substantially since the beginning of the management during British period. Forest management around the world is being shifting paradigms. Bangladesh is no exception. This section discusses evolution of Lawachara forest management and prevailing management approach.

The forest range in the present day Komolgonj Upazila, Moulavi bazar district, was declared reserve forests and named “West Vanugach Reserve Forest” during the early nineteenth century. The 2740 ha forest range consists of Lawachara bit, Kalachara bit, and Chautoli bit. The catchment of the 8 streams has been designated 8 compartments of the Vanugach forest which demonstrate that the management considered watershed concept. The forests were harvested without restriction and shifting cultivation was a practice in part of the forest; grazing and forest fires were there. System of tree felling against permit issued was introduced in 1924-25 by the Forest Department. The threshold of maturity and selling was set at a minimum of 6 feet girth trees. However, in 1930-31 system of tree marking was introduced. Bamboo were harvested in a four-year rotation, however restricted for excessive extraction and extraction of immature bamboo (FD, 2016a).

Working plan for the Lawachara forest management have been prepared at various times. The first one was for 1938-1947, followed by for the period of 1950-1954 and 1959-1965), however revised for the period of 1963-1964 to 1982-1983 (FAO, 2007). The management practice included selection cum improvement felling, clear felling and artificial regeneration. The plantation was short and long rotations. Thus, many natural forest areas in the reserve forest were clear felled and planted with Teak, Jarul and Garjan. (FD, 2016a).

### **Lawachara Forest Management Approach: Co-management**

Lawachara National Park is a Protected Area; co-managed by the provision of Wildlife (Conservation and Security), Act, 2012. Co-Management positively influences local biodiversity and people’s conservation attitudes in forest Protected Areas (Ferdous, 2015). Nishorgo Support Project (NSP 2003-2008) of the Forest Department initiated Co-Management approach in Lawachara National Park, Integrated Protected Area Co-Management (IPAC 2008-2013) formed Village Conservation Forums (VCF) in to each of the 30 villages located near Lawachara National Park. Co-Management has been officially formalized through a Committee with fixed membership. From each VCF, 2 representatives and thus total 60 members formed Lawachara Peoples Forum where 50% members are women. A total of 11 person including 5 women from different VCFs got membership in Lawachara National Park Co-Management Committee. Total 4 VCF members got membership in different standing committee of different Union Parishad under

Komolgonj and Srimongol Upazila. The Lawachara Co-Management Organization has following key constraints:

Lawachara National Park Co-Management Committee has a regular income of up to BDT 150,000 per year from visitors (50% of entry fees). This is not sufficient to operate the CMC and do what is necessary for the resource management.

CMC members including the government officers' changes periodically, as such require continual orientation, capacity development and commitment.

Inadequate CMC capacities to capitalize government facilities and benefit from responsible tourism

Potential role of CMC in reserve forest management is yet to conceive

Equitable and effective participation of marginalized groups (women; poor etc.) is partial

Mobilizing support from wider stakeholders including government, LGI, NGOs, PS and others is limited

Capacity to effectively engage with adjacent tea estates is not there.

Conflicts arise from encroachment, illegal extraction, elite influence and others.

However, capacity of the CMC for conflict management is narrow.

Despite having constraints there are following opportunities for Lawachara CMC:

Protected Area Management Rules, 2017 provides legal basis and organizational structure involving government, non-government; ensure revenue sharing; and participation of marginalized groups including women and poor is ensured by law

High numbers of visitors attracted and coming to the LNP

National and international recognition of the LNP

Social forestry potential for CMC in the buffer zone

The potential for influencing NGOs, projects, and LGI to gain support for CMC mission

PA management plan and CMC plans are available

### **Community Participation in the Lawachara Forest Management**

Nishorgo Support Project (2003-2008), Integrated Protected Area Co-Management (2008-2013) project and Climate Resilient Ecosystem and Livelihoods (2012-2018) project influenced the governance in Lawachara forest management. These projects were funded by USAID and implemented by Forest Department; conducted awareness and sensitization campaign, provided organizational capacity training, supported livelihood diverting efforts,



facilitated establishing and maintaining networks among government, local government, non-government and civil societies and forest management organizations. These projects facilitated and supported CMCs to organize Community Patrol Groups to strengthen forest protection effort joining the Forest Guards. During last decade, these projects paved the way for adoption of the Protected Area Rules, 2017, the legal basis for the Co-Management Organizations. CMC members can raise their voice in monthly meeting, however the implementation of their demands is not ensured. The ethnic representative has less opportunity for raising demands in the Lawachara CMC compared to Bangalee.

VCF members are aware of their scope of work: VCF meetings, maintain account and audit; communication with People's Forum, CMC and project related organization; inform illegal extraction to CPG and FD; participate in training; assist in livelihood diversification; savings & loan; prepare annual plans; and forest protection. CMC members consider following as their scope of work: Financial assistance to People's Forum and VCF to protect forest; manage Lawachara entry fee collection; conflict resolution; supervising CPG activities; assist FD for conservation; awareness generating activities and record offense and raise to council to solve.

### **Capacity of Lawachara Forest Management Institutions**

Forest Department is formally responsible for the protection and conservation of Lawachara National Park. The Forest Department's team at the site includes one Deputy Ranger/Forester and 7 Forest Guards. Forest Department Organogram does not have a setup for the National Park or Protected Area management. Moulovi Bazar Forest Range under Wildlife and Nature Conservation Division, Moulovi Bazar administers Lawachara National Park; however, the reserve forest adjacent to the National Park is under Sylhet Forest Division. This situation is not conducive to the prevention of illegal felling, be it on reserve or in the National Park. The Forest Department suffers from lack of manpower in general. There is no devoted ACF or Range Officer for Lawachara National Park; Foresters of one beat perform as an additional charge to the other beat; however not very effective. Staff facilities are poor, Range Office and Beat Offices are in broken condition, communication among staffs are poor, no firefighting equipment, housing facilities of all staffs require renovation (FD, 2016a).

Inadequacy of staff, logistics and or insincerity of the Forest Department Officers results in to infrequent visit to the Lawachara forests. The local people with few exceptions do not recognize respective forest staff. More than 81% people, however know about Forest Department and 13 % interact with the department and only 1.5% believe that the department

is supportive to the forests and the forest resource users (Table 29). Law enforcement sometimes creates a vicious cycle of illegal logging; loggers continue illegal logging to meet the cost of legal representation and appearance in the court and maintain livelihoods (Mukul, 2014).

The CMC do not have financial ability to contribute for forest protection. VCF does not have any written plan for forest management, however, conduct monthly meeting and discuss and decide on issues, demands and suggestions. The VCF members raise their voice in People's Forum; VCF members through PF represents in CMC and these representatives raise the voice of the grass root in the CMC meetings. VCF and People's Forum contributes in preparing and implementation of CMC plans.

There are many NGOs working in the area, however only few like CNRS and NACOM have the conservation focus nationally and have conservation activities in the Lawachara area. Following local Organizations deal with local problems and welfare and cultural activities (Jalil, 2009): Khashia Welfare Society, Srimongol, Dakshin Sylhet Adivasi Forum, Srimongol, Tripura Sanskritik Kendra, Dolubari, Rashtila AbaKhash Tarun Sangha and there a few Social Clubs.

### **Coordination**

Lack of coordination among various stakeholders and managers limit the success of Co-Management (Ferdous, 2015). Local elites including the Member of the Parliament has control over the management of the Lawachara forest (Jalil, 2009). The forest 'Villagers' has their own governance system; however, Villagers are also linked with CMC. The elites maintain relation with administration, some of them also linked to illegal tree feller (Jalil, 2009). The ethnic community practice their traditional governance. There are complaints on CPG recruitment without consultation with the local resource users and there are instances of recruiting known illegal tree feller.

There are conflicts on encroachment, grazing, tree felling, competition of syndicates, relationship with the Forest Department and forest cases. The conflicting issues are taken by the VCF representative to PF and then the PF representative takes this to CMC, who ultimately manage the conflict in most of the times. In some instances, local elites, elected representatives and Forest Officers manage conflicts. However, failing resolve conflicts at this level some time end up with police or even in the Court. Communities believe that conflict occurs between local influential who are involved in stealing tree.

## **Transparency and Accountability**

The forest management in Bangladesh was a continuation of what was done during Pakistan period, e.g. issue permit to collect forest resources (such as woods, dry leaves etc. to use as fuel); illegal trespassing and forest exploitation took place from that time with the illegal use of the permit. Illegal logging and trading reduced woody plant species in Lawachara National Park (Ferdous, 2015). There is a widespread perception for long that one of the major cause of forest land loss and illegal tree felling and poaching is the corruption of the Forest Department staffs in nexus with others. The corrupt nexus formed in collaboration of the corrupt Forest Department staffs, ill-motivated elites, land officials, law enforcing officers and political powers. The corrupt nexus has different combination. For example, for poaching land officer is not required to be in the nexus. In case of illegal tree felling, corrupt community Patrol Group members join the nexus. There are instances of appointment of tree thieves as CPG members for several reasons. One of the reason is to transform thieves to protector. However ill motivated reasons are also there. Poor people have been manipulated by different quarters including influential person, political person, wood businessman as well as dishonest CPG members and Forest staff. There are instances of stealing tree by convincing poor people, regardless they are member of CPG or not. Common people notices that Forest Department is not tough on the illegal feller and get encouraged in illegal felling.

Selection of Social Forestry participants are widely criticized by the people who were not selected. Beneficiaries are included by choice of Upazila chairman, vice chairman, local members, tribal head and people outside the forest. As such, the local people do not protest illegal tree felling. If the Social Forestry participants were selected from among the villagers, they would protect and maintain it for their own sake. However, the forest villagers outnumber forest staff and pretend to be more authoritative. They involve some locals in theft. The Forest Officers usually do not confront to 'Villagers', as such they take advantage of the situation. The forest villagers are responsible for the destruction of resources. Community Patrol Group (CPG) formed during last decades are currently assisting the forest department in forest protection. Forest 'Villagers' is a legacy, however, are no longer required, instead VCF, PF, CPG, and CMC members can support the Forest Department in managing the forest.

One of the governance issues is the court case against the tree feller. Sometime the authority of making case has been abused. Forest Officers in some instances make case against the gentlemen who protested illegal felling. However, there are true cases as well. The situation is complex with both true and falls cases. Once case is lodged against a 'Villagers', he needs

money to representation in the court. He is an easy target to tree felling corrupt nexus. He becomes regular tree feller. Illegal tree fellers once enter in the corrupt system and court case lodged against them they are tied with the system to meet the cost of prosecution against them, they continue illegal felling (Jalil, 2009).

Ethnic people believe that forest law is not effective. When a tree thief gets caught, he mentions falls name as associates. The thief wants to punish his enemies. Forest Officer acts without investigation, so when an innocent is charged with tree stealing, he then become illegal tree feller. For example, in 2007, when Mr. Masud Rayhan was the Bit officer, a group of 40 people entered in Baghmara Teak forest to cut down trees. VCF and CPG member Khalil Mia and some other persons informed Mr. Masud Rayhan about the incidence and 60 pieces of Segun timber was recovered and kept in the Bit office. Next morning, Khalil Mia came to know Mr. Masud Rayhan has sold those woods. Khalil Mia protested the illegal selling. Mr. Masud Rayhan reacted and warned Khalil not be concerned, if would, will sue with false accusation. Khalil Mia ultimately was sued by Mr. Masud Rayhan with 20 false charges. To defend charges, Khalil Mia has lost his all. This is the reason why common people do not protest tree stealing.

### **Effectiveness of Forest law and Policy in Lawachara Forest Management**

People in general never have thought about forest conservation, rather they believed they have right to collect forest resources. They collect woods and dry leaves for fuel, honey, fruits etc. Common people believe influential people do harm the forests, illegally fells vast numbers of trees. Common people suggested collecting resources from forest comes naturally to the residents of the vicinity. People are not aware of the provisions of the law, however acknowledged prevalence of law in this regard. Ethnic people and Tea garden laborers have no idea about forest law, however, know that forest trees cannot be cut down without permission. People though do not know the provisions of the law, however recognize followings:

Forest trees cannot be cut

Wild animals cannot be hunted

Homesteads cannot be established in forest area

High volume music is prohibited in forest area

People is not allowed to enter in to dense wild animal habitat

Wild animal should be sent back to the forest safely if they enter locality

Resource dependent people has heard of the Forest law and Rules, however, more than 29% are aware of the restrictions and little over 7% are aware of the provisions and little less than 7% claimed they comply with the Forest Laws and Rules (Table 38).

**Table 38: Level of Awareness of the Resource Dependent People on Forest laws**

Description	Livelihood				Total	
	Supported		Non-supported			
	No.	( % )	No.	( % )	No.	( % )
Only heard	158	54.48	180	58.06	338	56.33
Aware of restrictions	83	28.62	93	30.00	176	29.33
Aware of provisions	26	8.97	18	5.81	44	7.33
I think not relevant for us	1	0.34	1	0.32	2	0.33
I comply	22	7.59	18	5.81	40	6.67
<b>Total</b>	<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

Only little more than 3% respondents thought the natural forest must be open access for the local community; more than 46 % respondents suggested to allow resource collection following wise use policy, more than 32% respondents suggested strict law enforcement to stop people collecting resources and conserve forest and around 18% respondents would like to get back their forest and they will protect it (Table 39).

**Table 39: Suggestion for amendment of law and adjustment of policy**

Description	Livelihood or Non-livelihood				Total	
	Livelihood		Non-livelihood			
	No.	( % )	No.	( % )	No.	( % )
Allow us collecting resources following wise use policy	165	56.90	114	36.77	279	46.50
Make rule heard to stop people collecting resources and conserve forest	83	28.62	112	36.13	195	32.50
This is natural so we should be collecting as we want	5	1.72	14	4.52	19	3.17
Give back our forest to us we will protect it	37	12.76	70	22.58	107	17.83
<b>Total</b>	<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

## Reflections on Lawachara Forest Management

Protection of Lawachara forest is a major challenge. There are obvious reasons for Lawachara forest degradation like lack of alternate livelihood opportunities for many around the forest and deficiency of substitute resources like energy for cooking. Adequate efforts were not there to disseminate law provisions and policy guidance to the local communities, as such

people do not understand the provisions (Rashid, et al., 2013). Massive awareness and sensitization campaign among the community by large will have positive impacts. Species richness and abundance have increased in Lawachara National Park since people are included in the management (Ferdous, 2015). Lawachara CMC has initiated forest patrolling by the community forming a group termed Community Patrol Group (CPG). CPG patrols the forest in the presence of forest guard. Limited numbers of Forest Guards necessitate patrolling by the communities. However, the perception of the people in this regard varies.

CPG could have been a good instrument to support the Forest Department in forest conservation. The faulty selection process and limited compensation/guarding fee forced them to get engaged in fuelwood collection and illegal tree felling. It is worth noting that the CPG members though not appropriately remunerated, still they don't give up duty, which indicates, they might be getting some illegal facilities from various sources. However, there are many instances of capture of illegally collected forest resources with CPG support. There is mixed feeling among the communities on the role of CPGs. Some support their role as a protector while other believes CPG members are engaged in an unholy alliance with the Forest Department and involves in illegal tree felling. Well, both has their arguments based on facts.

The 'Forest Village' is a legacy and a reality. Forest 'Villagers' are accused of the encroachment of forest land enhancing their allocated area for betel leaf cultivation. Forest 'Villagers' sometimes are engaged in illicit felling (Nath, et al., 2003). Two Forest Villages in the Lawachara forest are inhabited by ethnic Khashia community. Each Khashia family was allocated 1.21 ha of land for agroforestry and settlements. They cultivate betel leaf and are accused of encroachment beyond allocation. Encroachment and subsequently conversion remain a major problem (Rashid, et al., 2016). The betel, the principal livelihoods for the Khashia, is sustainably cultivated controlling disease, maintain soil fertility management and following traditional management system. The betel seems socio-culturally acceptable and the Khashia people are making modest earning, though they haven't got land entitlement yet (Nath and Inoue, 2013).

The inherent spirit of Co-Management is inclusive management. Involved government agencies and resource dependent local people are to be included in planning and implementation process. Formation of Co-Management Organization engaging government and non-government stakeholders involves addressing a lot of details. It is essential to define 'community', in detail among others; community collaboration in management would be through the inclusion of community representative in the Co-Management Organization. The question is how many of the

local resource users and stakeholders are to be included, from which locations, which social class and would occupy which position in the committees, so on and so forth.

The Protected Area Management Rules, 2017 provided an architecture and directed quantity of member representation from various stakeholders like community, Forest Department and other government and resource user groups. The Rules also provides directives for process of election/selection; scope of work, duties and responsibilities of various committees. The Lawachara Co-Management Committee (Lawachara-CMC) operate within a keen sense of ownership of the Forest Department (FD) and a growing sense of ownership of the community. There is a clear understanding that progress on Protected Area, including Lawachara National Park (LNP), cannot be achieved without a strong commitment to Co-management. However, there is a concern of sustainability of the CMC; effectively engage the poor and disadvantaged in decision making; elite capture of the Co-Management institutions results in limiting community voices in decision making (Rashid, et al., 2016). For example, Lawachara Co-Management Committee from its inception is headed by the politically influential persons. Saw mills, brickfields, furniture shops are owned by influential people; are accused of part of the syndicate that supports illegal felling. The syndicate uses poor people and corrupt Forest Officers in illegal tree felling. Ambiguity in Forest Department’s role vis-vis CMCs and lack of trust instead of collaboration resulted limited transparency and responsibility (Rashid, et al., 2016). There is room for improvement of CMC effectiveness. Monitoring and follow up of the CMC meeting decisions are not properly addressed. There is lack of coordination between CMC and Forest Department.

More than 71% of resource collector believe current law and policy restricts them collecting resources while another around 28% says often law restricts them collecting (Table 40).

**Table 40: Perception of Communities on Resource Collection Restriction by Law**

Restriction by law	Livelihood or Non-livelihood				Total	
	Livelihood		Non-livelihood		No.	( % )
	No.	( % )	No.	( % )		
Do not know	1	0.34	1	0.32	2	0.33
Yes	174	60.00	253	81.61	427	71.17
Often	115	39.66	52	16.77	167	27.83
No			4	1.29	4	0.67
<b>Total</b>	<b>290</b>	<b>100.00</b>	<b>310</b>	<b>100.00</b>	<b>600</b>	<b>100.00</b>

More than 55% non-supported HHs and more than 50% of supported HHs who collects resources, believe it is their right. More than 11% supported HHs and around 7% non-

supported HHs collect forest resources for better income. More than 16% of the supported HHs and more than 24% non-supported HHs collect forest resources having no other skill. More than 21% supported HHs and more than 12% of non-supported HHs claimed lack of alternate income made them collect resources (Table 41).

**Table 41: Perception of and reason for Resource Collection**

Reason for resource collection	Livelihood or Non-livelihood				Total	
	Livelihood		Non-livelihood		No.	( % )
	No.	( % )	No.	( % )		
It is a right	92	50.55	45	55.56	137	52.09
For a better income	21	11.54	6	7.41	27	10.27
No other skill for livelihood	30	16.48	20	24.69	50	19.01
Lack of alternate livelihood opportunity	39	21.43	10	12.35	49	18.63
<b>Total</b>	<b>182</b>	<b>62.7</b>	<b>81</b>	<b>26.1</b>	<b>263</b>	<b>43.8</b>

The administrative jurisdiction of Lawachara National Park (Protected Area) and adjacent reserve forest area vested to different division of the Forest Department; inadequacy of skilled staffs and logistics hamper protection and conservation of the forest and biodiversity (FD, 2016a). Local forest dependent people by large irrespective of ethnicity are not satisfied with the action of Forest Department Officers though most of Bengalis have admired current Range officer. Khashia community are satisfied with forest officers. People expect immediate action from Forest Department, once informed on tree felling. Local people believe officers of Upazila are not assigned to work for forest. UNO presides Lawachara CMC because the forest is in Komolgonj Upazila. However, local people expect support for poor forest dependent villagers from Upazila administration and LGIs (Local Government Institutions). However, the Member and Chairman of UP are politically biased and do not help common people. People by large are dissatisfied with law enforcement officers; accused them of being involved with influential persons in tree stealing. However, people demanded law enforcement officers to patrol the forest during night and LGI to take initiative to aware and sensitize people about forest conservation to reduce tree felling.

The communities believe that moratorium is good for forest, however Forest Department should allow defined amount of resources collection to meet poor people's need. Saw mills should be reduced and law must be enforced conserving people's right. The forests belong to local people and they know the problem and possible solution.



Following are the strength, weakness, opportunities and threats of the Lawachara forest Co Management.

**Strength:**

- CMC, PF, VCFs, and CPG formed
- Few VCFs are registered
- Engaged members are trained in forest conservation and management
- Own savings, unite together and participate in forest conservation and develop leadership
- All the VCF joined to PF which is, registered, having bank account and regular audited
- Assist forest dependent communities for alternative livelihood
- Generate awareness on the importance of forest, animals, and forest resources.

**Weakness:**

- PF and VCF do not have income or even Office room
- VCF members do not have Social Forestry plots in buffer zone
- Rivalry between forest villagers and others
- VCF has no fund of its own
- Support for AIGA is limited
- Illegal felling continues
- Unable to write its own resolution
- VCF not emerging as an organization (no effort for registration)
- All the members do not have shares and savings

**Opportunity:**

- Building its own office rooms
- Wider participation in preparing forest management plans
- Social forestry for VCF members
- Savings and Loan by all members of VCF
- AIGA for resource dependents
- Group forestry by VCF
- Networking

**Threat:**

- Over extraction by villagers.
- VCF is project based, limited leadership, no fund and not sustainable

## **Lawachara Forest Management Plan 2016-2025**

Bangladesh Government efforts for the management of the Lawachara forest initiated with the process of declaration of the Lawachara National Park in 1996. The feasibility study was carried out with the help of Fountain Renewable Resources (FRR) and Desh Upodesh. This agency prepared Lawachara forest management plan in 1996. Next initiative was a draft management plan prepared in 2000 under Forestry Sector Project which was incomplete and insufficiently prescriptive; and was not approved (FD, 2006). Taking from this Forest Department developed a five-year Lawachara Forest Management Plan in 2006. This management plan was not implemented due to lack of funding (FD, 2016a). Management of Protected Area under a management plan is mandatory per the Wildlife (Conservation and Security) Act 2012. Forest Department with support from USAID's CREL project (2012-2018) has developed 'Management plan for Lawachara National Park, 2016-25'. The plan identified drivers of the degradation, challenges, and threats, to the park. The drivers mentioned in previous management plan of 2006 remained and unmanaged tourist and aggressive expansion of the betel cultivation are added drivers and threats. Accordingly, vision, goal, and priorities of activities have been set. The long-term vision is to improve and restore the natural resources throughout Lawachara National Park and in the surrounding landscape. The Plan set result of healthy populations of all threatened primates, including Western Hoolock Gibbon, and offorest dependent birds, reptiles, amphibians, and insects. The goals are to minimize key threats overcoming constraints and capitalizing opportunities. The plan intends to obtain following results by 2025:

Critical habitats are protected and recovered

The buffer forests are sustainably managed to enhance their ecological value and provide forest products to communities that commit to protecting LNP and its buffer area

Landscapes outside LNP are sustainably managed in ways that contribute to both environmental and livelihoods objectives

Tourism is managed to limit adverse impacts on habitats and wildlife in LNP while improving attitudes towards conservation and maintaining a source of income

Forest Department, CMC, and other stakeholders will work together to realize results. Priorities of the plan are activities that: i) improve and restore the biophysical condition of LNP and its buffer areas; ii) encourage livelihoods that reduce pressure on wildlife habitats in

LNP, including environmentally compatible tourism; iii) engage other stakeholders working in and around the LNP to support this vision and goals (FD, 2016a).

The Boundaries will be demarcated with signs and pillars that border Tea estates and village land and fix boundaries of two Khashia “forest villages” or “punji” within the LNP. 281 ha of reserved forest (buffer) immediately bordering the current northern boundary of LNP should [will?] be incorporated within LNP as an extension with the aim of increasing protection level and restoring this area to support threatened species (particularly gibbons) dependent on the high-quality forest (FD, 2016a).

Habitat: Will protect and restore native forest through limited planting of native species that is preferred by primates; limited extraction of mature/dead bamboo stems will be allowed to reduce fire hazards; CMC will work with the Khashia for regeneration of saplings and patches of undergrowth, and to develop nurseries and recognize the mature trees as “mother trees” for restoring forest (FD, 2016a).

No new infrastructure will be permitted (such as roads) in the park; agencies with infrastructure (road and railway) will not be permitted to fell trees. Existing visitor trails will be maintained; other existing trails used by encroachers and resource extractors will be designated as visitor walking trails (FD, 2016a). Up to 300 ha of encroached land in the buffer zone (reserve forest) will be converted to a participatory social forest of indigenous forest trees. All exotic plantations will be enriched and gaps filled with native forest trees preferred by Hoolock Gibbons; soil conservation measures will be taken where necessary (FD, 2016a).

Tourism: Responsible nature-based tourism will be promoted: (1) the existing trails and ticket counter will become a quiet nature trail destination; (2) the existing interpretive center will be a starting point to orient visitors, a focus of educational visits and have some trail development; and (3) the student dormitory and lake will be a destination for larger groups and more recreation based tourism including picnics.

Landscape and stakeholder coordination: The managers of adjacent Tea estates will join a liaison and environment protection forum with representatives of Lawachara CMC including Forest Department. This forum will review environmental management in the Tea estates, promote the planting of native trees, restoration of bamboo in lands bordering LNP, promote integrated pest management and minimization of use of agrochemicals, encourage production of fuelwood within Tea estates for their inhabitant’s use, and enhance cooperation to reduce theft of trees and illegal logging.

Roads: To reduce disturbance to wildlife, wildlife casualties and accidents, Forest Department and Lawachara CMC will obtain approval for and install speed breakers on the road that passes through LNP; erect speed limit and “no horn or loudspeaker” signs; hold orientation sessions on minimal impact driving with local bus, truck, micro-bus and three-wheeler drivers; and install ropeways and tunnels as safe connections for wildlife.

Livelihoods: Livelihood support will be provided to betel leaf cultivar; people drawing from the Lawachara forest; Community patrol group members. Lawachara Co-Management Committee and People’s Forum will develop links with service providers, including NGO and government programs; provide training to target communities, and promote growing biomass (fuelwood, fodder) as part of social forestry, promote fuel efficient stoves, extend stall-fed livestock raising and high-return crops, develop tourism-based enterprises, and enhance access to markets, inputs and credit.

Capacities: Training, and orientation will be provided to new and old stakeholders in Lawachara CMC, and the groups and bodies under it; will focus on management skills, planning and environment (FD, 2016a). Awareness raising, patrols, capacity building in fighting fires, and fire breaks/lines between the core area and other land uses will be ensured. More intense storms are likely to lead to gullying and erosion along the Chara, restoring forest cover and small-scale soil and water conservation works will address this. There is at present no information on possible changes in forest composition for eastern forests of Bangladesh that might be associated with predicted climate changes, but it is expected that a healthy diverse restored native forest will be more resilient to potential stresses (FD, 2016a).

## **Part 3: Discussion, Key Findings and Concluding Remarks**

## **Chapter 10: Critical Reflection and Discussion**

## **Sustainable Forest Management**

Sustainable management of tropical forests to produce wood primarily should consider: operational practice, embrace a balanced working plan, yield prediction, and control and other technical requirements; and should include the wider political, social and economic criteria; strike a balance between forest resources demand and forest vitality (FAO, 2016). A better understanding of the socio-political influence and scientific knowledge on environment facilitates addressing environmental problems (Forsyth, 2003). To protect forests, in the monetary driven global economy, it is necessary to internalize social and environmental costs of forest degradation and invest in forest assets (Ahmed, 2008). Central political support is necessary to reach forest management goal. Financial and technical capacities of stakeholders on sustainable forest management and harvesting must be enhanced (RPP, 2014). For sustainable forest management, the Forest Policy 1994 requires update, the Forest Act 1927 needs amendment and it is necessary to capacitated Forest Management Institutions. Awareness, sensitization, and motivation are necessary to engage community fruitfully in the forest management. Developing and implementation of a forest management plan will be conducive to sustaining forest resources. There are transboundary issues regarding sustenance of the biodiversity conservation. These issues might be addressed harmonizing legal and policy instruments of neighboring countries through discussion. Community awareness, institutional capacity and resolving community conflicts across the borders are necessary to address transboundary issues; can be achieved demonstrating strong political commitment and authorities work in cooperation with their counterparts at various levels for planning, joint research, and information exchange (Haque and Islam, 2011).

It is necessary to shift the focus from tree to forest and better forest management and conservation; is a cost-effective way of reducing GHG, delivering livelihood and environmental benefits (FAO, 2014). Establish forest land boundary through comprehensive survey and maintain the boundary through regular monitoring (RPP, 2014). Huge landless people encroach forest, so forest protection is necessary. Implementation of 20% forest cover per the Forest Policy, 1994 will help reduce atmospheric GHG. Policies, institutions, and resources to meet the environmental and socioeconomic challenges shall focus on sustainable forest management, Protected Area management, biodiversity conservation, climate resilient forestry, research and training, strong restrictions on the transfer of forest land to other uses and so on (FD, 2016). There are some achievements in Bangladesh forestry: coastal afforestation raised large numbers of mangrove plantations; Social Forestry running well; hugetree plantations in village/homestead, strip plantations; huge plantations for climate change resilience; few

policy reforms; enacted laws; adopted Co-Management approach; some focus on wildlife conservation; received international recognitions e.g. Equator Awards, Wangaree Mathai Award and Earth Care Award (Khan, 2017).

The Forest Policy, 2017 (submitted for approval) for forest conservation mentions that proper efforts will be taken to conserve the ecosystems of the world heritage sites, Ramsar site, and the Sundarbans, considering the importance as the symbol of Bangladesh's glory (National Forest Policy Guidelines D3(2) and in (D 3.), specific commitments are the following:

- 1) Forest conservation will be strengthened with the help of law enforcement agencies. Establishment of separate forest courts will be ensured for quick disposal of case related to forests and wildlife.
- 2) Proper efforts will be taken to conserve the ecosystems of the world heritage, Ramsar sites, and the Sundarbans, considering the importance as the symbol of Bangladesh's glory.
- 3) Participation of local communities and civil society will be ensured in forests conservation.
- 4) Like other law enforcement agencies, for the effective control of the forests and safety measures, trained, well-equipped and efficient forest conservation forces will be formed.
- 5) Other government and non-government organizations will cooperate with the forest department for forest conservation.
- 6) Through modern equipment and technology, the complete mapping, delineation of boundaries, land ownership information will be updated and Records of Rights (ROR) will be preserved for all the notified forests.

### **Forest Management Plan**

The broad consensus for Protected Areas is having a core zone and buffer zone; essential tasks for management comprises: community outreach and awareness raising, livelihoods development for resource dependents; law enforcement; ecological research and monitoring; habitat management; and ecotourism (Parr, et al., 2013). The Wildlife (Conservation and Security) Act 2012 has the provision to physically delineate Protected Area in to core and buffer zone. It is necessary to comply with this guidance. Updated planning process engaging wider stakeholders addressing conservation instead of traditional management plan is necessary. The working plan/ forest management plan was good practice and could be revived. There are flaws in the Integrated Resources Management Plan for Sundarban 2010-2020, for instance, it describes harvesting trees but there is a moratorium and we do no harvest. District level community participated forest management planning aligning policy will be conducive to sustainable management of forests (RPP, 2014). The development projects help in realizing development objectives as per the



agenda of the development partners, but not forest management. Forest development projects are not always aligned with the guidelines of the Forest Management Plan. Ecological catchment forests provide ecosystem services like ground water recharge and the Sundarbans provides a protection to the coast along with other ecosystem services. These services are much more important than wood or timber. As such, moratorium on these forests will help continuing the services. Tourism management plan for each forest could be developed considering: tourist carrying capacity, visitor's behavior management, easy access to the forests for the visitors, activities for tourists etc. The local community can be engaged in gainful activities that provide them livelihood serving visitors (Islam et al., 2011). It is necessary to effectively manage Protected Areas for biodiversity conservation (Parr, et al., 2013). Wildlife (Conservation and Security) Act, 2012 provided directives to manage all the Protected Area in Bangladesh with a management plan.

### **Forest Management Practice**

Bangladesh forest management considers soil and water management, high conservation value forests assign special management categories; the stakeholders are involved in the planning phase, operation phase and in the review of operation (FAO, 2015 a). Natural forest should be managed to realize a balanced objective of ecological, social and economic benefits maintaining nature (Grulke, et.al. 2016). Sustainable management arrests degradation and deforestation, create livelihood opportunities and help conservation of biodiversity, soil and water and carbon sequestration (FAO, 2016). The sustainable natural forest management (SNFM) includes Protected Area management for the high conservation value of tropical forests that Forest Stewardship Council adopted during the late 1990s (Grulke, et.al. 2016). Nature has its own adaptive resource management cycle with back loop systems, e.g. disturbances like forest or grassland fire destroys over surface trees and undergrowth including seedling or sapling. However, the system retains seedbed that helps reorganize and renew ecosystems; local communities pursuing livelihoods is a disturbance, however people being an integral part of the ecosystem, disturbances often is consistent with natural adaptive management (Niamir-Fuller, 1998).

The forest management practices evolved over time in Bangladesh. Forest Department used to do clear felling and plantation that resulted in the loss of biodiversity. Lawachara forest was cleared once. Clear felling of natural forests and artificial regeneration of commercially valued species changed CHT Landscape (Misbahuzzaman, 2015). India realized the negative effect of clear felling before Pakistan and they stopped clear felling, peoples need must be reflected in the

donor-funded projects. However, currently tree plantations planning considers biodiversity; e.g. in Social Forestry started planting eucalyptus, however, now various kinds of trees are planted. Rubber plantation instead of natural forests in Cox's bazaar is not acceptable.

Regeneration is vital for preservation and conservation of biodiversity (Hossain, et al., 2004). Regeneration is preferred because it is low-cost, comparative easier site protection and genetic conservation (Hossain, et al., 2004). Assisted natural regeneration (ANR) in agreement with the community for sharing benefit like Social Forestry or even providing more share to the community; large area could be regenerated with native species ensuring protection against fire, grazing, and illegal logging (Shono, et al., 2007). ANR has potential in seedling establishment and growth performance if completed before the rainy season and fruit dispersal and fruiting season (June-August) of mangrove species (Rahman, 2011). The extent of natural regeneration in different forests of Bangladesh is not known. Mother trees are not adequate in the west Sundarbans and low vegetation density, however in the east, though plenty of seedlings germinates but not established (Shafi, 1982). Natural regeneration fails due to many reasons including research inadequacy (Hossain, et al., 2004). The tropical Dipterocarp forest in Bangladesh yet to research and generate knowledge to remove regeneration problems (Biswas and Choudhury, 2007). The degraded vegetation can be converted to productive forests using an inexpensive, simple, and effective technique like ANR useful at the landscape level (Ganz & Durst 2003; Shono, et al., 2007).

There are school of thought that suggests to accommodate the Jhum culture. However, continuing the shifting cultivation (Jhum) is difficult due to increased numbers of Jhum family and limited land to maintain required rotation cycle to maintain the soil fertility and forest productivity. Enhancing the rotation cycle of shifting cultivation to at least 20 years is necessary (RPP, 2014). It requires more land, which is scarce in Bangladesh. However, appropriate use of empty spaces of CHT through plantation ensuring accountability (Ahmed, 2008) will increase the tree coverage. Sustainable and participatory forest management systems engaging women, youth and weaker sections can be adopted in an invigorated social forestry initiative; expansion of community-based wildlife management through ecotourism and Co-management; consultation with other agencies and beneficiaries in developing species suitable for agroforestry and involving urban population and civic authorities in enhancing urban tree cover (FD, 2016). Pilot sustainable forest management practices in the field and disseminate results widely (RPP, 2014). Reforestation and afforestation of native species is necessary, however, to meet immediate needs eucalypts in a mix could be considered (Hossain and Ahmed, 2011).

Forest Policy 2019 (submitted for approval) commits expansion and enrichment of forest cover, plantation, Social Forestry, urban forestry, and co-management.

### **Forest Management Approach**

Forests were managed traditionally during the British regime; prevailed throughout the Pakistan regime and continued in Bangladesh. Before the Forest Department was established, there were, to a certain extent, some forest management activities. The community used to cut down trees keeping the concept of forest health. They knew the forest belongs to them and for this reason they must not destroy it. The dependent community used resources sustainably. The traditional forest management does not work anymore in Bangladesh and reasons behind are: if the Forest Department receives money, the implementation fails and if it is externally donor driven, Forest Department does not own it psychologically and conceptually. The paradigm of forest management in Bangladesh is on the shift from clear felling to the moratorium. Approaches like participatory management, Social Forestry and Co-Management are emerging. A comprehensive and holistic approach keeping a national network of the forest, wetland and other Protected Area as the centerpiece to development, is yet to evolve. National-level policy and legal framework to integrate, for example, environment and development in the changing climate regime are not yet there. Harmonization of relevant sector level policies and functional coordination amongst various government agencies to guide the country to sustainable development without compromising ecosystems integrity to remain functional and productive, in the years to come (Merrill, 2011). Community participation in forest management in Bangladesh has revealed success both in gainful partnership with the community and reforestation of denuded forests within and outside forest reserve (Rahman, L., 2011; Islam et al., 2015; Ali, Uddin, and Chowdhury, 2015). Biodiversity conservation through Protected Area management gained recognition as an important mechanism (IUCN et al. 1980; UNEP 1992).

### **Community Forestry/Agro Forestry**

There are traditional Village Community Forests (VCF) in the CHT. The custodian for VCF is the village community. Ecosystem health of Village Community Forest is dependent on several factors, including the functioning of institutions, conservation sensitization of the local resource users and change in the economy of the participants (Miah and Ahmed, 2014). CHT land mass is categorized as Unclassed State Forests (USF) and there is a political issue

along with the legacy of the land tenure and ownership arrangement. Betagi-Pomroa Community Forestry Project demonstrated substantial output increase of the marginal land with appropriate management by genuine landless farmers around fallow and denuded lands (Safa, 2004). It has been revealed through scientific evidence that the community ownership is a prerequisite for sensible natural resources use (Pawłowski, et.al, 2015). Nepal has a conducive legal and other support for community forest management; and the communities have succeeded establishing basic entrepreneurial structures; making profits and contribute to the community wellbeing providing employment and income (Pawłowski, et al., 2015). Community Forestry and Social Forestry, both are collaborative forestry. Community forestry in Nepal and Bhutan could be successful but cannot be in Bangladesh, because forest land is limited in Bangladesh. CHT forest can generate huge tree resources and thereby revenue, provided land tenure issue is settled. The approach for the generation and management of the forests in the CHT could be agroforestry, community forests or social forestry. Denuded forest of CHT could generate yearly around 28 billion BDT within 40 years if planted with tropical rainforest varieties of timber; will require an investment of 600 billion BDT; current revenue is around 2 billion BDT (Hassan, 2001). Profitable forest management requires national legislation to recognize long-term land tenure for commercial use, well-structured community organization, proactive community enterprises, and fair benefit sharing. Since last 30 years Community Forest Management (CFM) is in practice at a different level and degree, still hardly any opportunities for profit-oriented investments; however, umbrella organizations could be a promising entrepreneurial vehicle (Pawłowski et.al, 2015).

The Village Common Forests in the CHT is the community forests managed by the villagers under the Karbari, should be supported and extended to all recorded Village Common Forests; Promotion of Agro-forestry into the denuded CHT hills through groups under a Karbari and following the management plan, like schedules of trees recommended for the slope, hilltop or valley and support from government to the community for development of the agroforestry till the Agro-forestry starts providing outputs will be conducive to create and maintain forestry and livelihoods of the participating people (Ahmed, 2017; Personal Communication).

### **Social Forestry**

Bangladesh has now been almost 25 years in Social Forestry. Following constraints are still there: Land tenure issues, monitoring, and supervision, silviculture management, beneficiary trust to Forest Department are limited, marketing facilities; credit facilities, limited research,

institutional arrangements, top-down approach, recognition to the role of women and other social groups (Banik, 2014). During 2000-2009 around 84,000 participants of Social Forestry received BDT. 1,250 million; the Social Forestry is being expanded into private and on non-forest Khash lands (Sharma and Banik, 2011). Forest Department during 2008 to 2013 harvested more than 44 thousand ha of the woodlot, 10 thousand ha of agroforestry and around 60 thousand km of strip plantations; more than 100 thousand participants were engaged and have distributed more than 2 billion of BDT (Banik, 2014).

Everyone in a village or locality are participants of Social Forestry in India. However, in Bangladesh only limited selected person of the nearby village are participants. Both the approaches of selected participants and engaging the entire village to have advantage and disadvantages. Nonetheless, there are differences in the mindset of the citizens of India and Bangladesh. For example, an amount of benefit keeps an Indian participant happy, however, a similar amount is not satisfactory for a participant in Bangladesh. There are many dimensions to consider while measuring the success or failure of the Social Forestry. The Social Forestry Rule was enacted only in 2004 and amended in 2010. Success of Social Forestry, devolution of power; timber production, participants benefit and biodiversity all are questioned; social and financial assets of the Participatory Forestry participants remain inadequate though increased more than the non-participants; however, the actor power has a great deal of influence in gaining assets (Islam et al., 2015). Social Forestry is simply a production system following patron (Forest Department) client (community) relationship which will not do anything to conservation.

International financial bodies provide loans for Social Forestry in government land and to capitalize the opportunity, the natural forests have been cleared destroying remaining biodiversity including native vegetation; plantation forestry projects have been passed in the name of social or community or participatory forestry. As a result, for example in Modhupur, there is hardly any remaining medicinal species like Amloki, Sajna, Sesra, Jiga or Kaika which were in abundance before (Ahmed, 2008). There is a success in Social Forestry in producing timber; however, expected impact on forest conservation yet to achieve. The success of Social Forestry in terms of production and benefit sharing was very high initially. However, recently it is becoming challenging. Forest Department initiated with an idea that Social Forestry will be in the marginal land by the community and Forest Department will motivate and provide technical know-how. In course of time, Social Forestry became the function of the Forest Department and on the Forest Land. There are some weaknesses in the Social Forestry Rules. Institutionalization of the Social Forestry is a challenge, in many places, the Tree Farming Fund

cannot support the next rotation of plantation. It depends on the quality of the plantation, particularly in the marginal lands. Sometimes Social Forestry is inadequately supported by the community. The land-owning agencies like Bangladesh Railway, Roads and Highways, the District Council and the Water Development Board do not support Social Forestry adequately.

Active community engagement ensuring gainful partnership is necessary to protect forests (Ahmed, et al., 2011; Sharma and Banik, 2011). Positive mindset of the forest Ranger and Forester is necessary for enhancing success in Social Forestry. Encroached forest land can be brought under Social Forestry. Existing Social Forestry in the reserve forest can be invigorated. The production forests upon maturity and logging can be brought under Social Forestry. The Forest Policy 2019 (submitted for approval) commits: Social Forestry program will be taken up on the roadsides, rail lines sides and fellow areas along the dam and other marginal lands. Increase in tree cover, new plantation programs will be expanded to the lands of public-private and autonomous organizations (submitted National Forest Policy, 2017 Guidelines D. 6(3), translated by the researcher).

## **Co-management**

The Co-Management is a governance structure engaging government, non-government, local people, commercial entity and other stakeholders; to share the responsibilities, benefits and decision-making powers; enhance the capacity of local people, equity, the efficiency of decision-making and improve resource management outcomes (Carlsson and Berkes, 2005). Coexistence of the community with nature, not protectionism and community lead conservation with support from the government best characterizes the community-based conservation (Western & Wright 1994). Centralized, command and control based natural resource management approaches are shifting towards conservation and management; recognizes human as an integral part of the ecosystem and engages the empowered community for conservation and Protected Area management (Colby, 1991; Berkes, 2004; Phillips, 2003). Definition of a community like the perception of nature varies based on the context and country in question (Western & Wright, 1994). Natural resources or biodiversity conservation engaging the local community is community-based conservation in a broad sense (Hoole, 2008). Realize development without compromising conservation is the idea behind the community-based conservation (Berkes, 2004).

Co-Management concept emerges during the late 20th century and is in practice with a degree of success in the forest management of the Asia and the Pacific region. Community engagement and collaboration in forest resource management are increasing throughout the world (Petheram, et. al, 2004). Co-Management of the Protected Areas has been increasingly

acknowledged globally (Borrini-Feyerabend et al., 2004a); and in Southeast Asia (Clifton, 2003; Erdman et al., 2004; Parr et al., 2007). Co-Management approaches are critically important for forest and wetland ecosystem management in Bangladesh for the people, environment, and future generations (Ali, Uddin, and Chowdhury, 2015). Co-Management for forest ecosystem in Bangladesh has been initiated by the Nishorgo Support Project (NSP 2003-2008) and IPAC (2008-2013) project continued; both these projects had been implemented by the Forest Department and was supported by USAID fund (Merrill, 2011). Co-Management received the support of the local people in Bangladesh; enhanced biodiversity conservation and ecosystem services of the Protected Area (Mukul, et al., 2015). The Co-Management into forest Protected Area has been officiated through Government Order, the Co-Management Council 2006. Sundarban Environmental and Livelihoods Security (SEALS) project, Climate-Resilient Ecosystems and Livelihoods (CREL 2012-2018) project, Global Tiger Recovery Program (GTRP), Bengal Tiger Conservation Activity (BAGH) has adopted Co-management. Co-Management has been introduced in some of the Protected Area and it is functioning. Co-Management encourages community in protecting forest and consequently, the community feels ownership.

Co-Management approach in Bangladesh transferred state-centric forest management to people-centric management; established multi-stakeholder Co-Management organization, however with limited effective voices of the resource users and prominence of the elite class in making decisions (Koli, 2010). However, the poor resource users are gradually gaining competence and raising voice; supported for alternate income generation, resulted in limited success in reducing illegal logging and hunting; however serious challenges remain due to high population and complex socio-political dynamics (Habibur, 2013; Rahaman, 2013 and Hassan, 2013). Support from the Forest Department for Co-Management is not unanimous; local power structure is complex and the motivation of the local communities varies (IPAC, 2012). The aspiration of the Officers of the Forest Department on Co-Management is mixed; some of them understand, support and promote while some others perceive wrongly and again some others are against Co-Management approach. Powerful actors influence decisions to suit their interest, however, as influential people desired to improve forest condition, the ecological assets improved, despite having an imbalance of power among the actors; the overall livelihood assets development of the participants is impressive (Islam et al., 2015).

Scholars raised few drawbacks of Co-Management like vagueness and rigidity, the sluggish pace of engaging communities, and one-sided authority and dubious forest conservation acceptance by local people (Ericson 2006). Howlett et al. (2009) mentioned the lack of

participation of foresters and farmers, accountability, conservation awareness, insufficient support from stakeholders, unequal benefit distribution and financial constraints. Political, institutional and regulatory governance are important encounters to the attainment of forest preservation. Community mindset is not yet conducive for sustainable forest management. Community Patrol Groups (CPG) are formed as a direct community participation in the co-management, providing voluntary service joining forest guards in protecting forests. There are mixed opinions regarding CPGs, some people believe they are the hardest worker and taking risks in protecting forests and are getting very little for their survival; and some others are skeptical on their integrity (Rakkibul et. Al., 2011). The Co-Management approach is evolving in Bangladesh. Forest-dependent communities and Forest Department came closure overcoming century old segregation through Co-Management and Social Forestry (Ali, Uddin, and Chowdhury, 2015). Co-Management is a new system and if effective, could be very good for the protection of the forest. The success of Social Forestry is visible in rural areas where trees have become a commodity. Co-Management has been initiated to some of the Protected Area, which is essentially natural forests. However, since forest resources have already been depleted, Co-Management is not providing desired dividends. Stakeholders with unequal power and conflicting interest can better manage the forests in Co-Management approach where poor communities join the effort of the government in managing natural resources (CPD, 2008). Effective people's participation is the biggest challenge although there are well structured Social Forestry and Co-Management structure. Co-Management is yet to attain sustainability through policy and financial support (Jefferson, et al., 2013). The Protected Area Management Rules, 2017 provided policy and legal support in Bangladesh. The Protected Area Management Rules 2017 confirmed sharing of revenue with the Co-Management Committee. However financial flow will have to be operationalized. Investments will be necessary to generate revenue through nature responsible tourism in many Protected Areas. The Co-Management approach may become successful overcoming weaknesses and threats ensuring community participation including women and landless; promoting tourism capitalizing indigenous culture and integrating poverty mitigation tactic, confirming answerability and clearness, and decentralization of management; (Tamima, 2015). Koli (2010) argued, the orientation of the Co-Management in Bangladesh enhances conservation and forest cover; however, are not sustainable and limited livelihood options and political space are insufficient to significantly reduce forest resources dependence. Co-Management promotes reducing the difference between the local people with the Protected Area (Parr, et al., 2013).



The USF can be managed through forming “USF Management Committee” a form of Co-Management body; the committee could be chaired by chairperson of the district council and DC would be member secretary, DFO technical expert, the local army head of the district law and order support and members representing government and non-government organizations; legal basis for the management committee is necessary (Chowdhury and Hossain, 2011). The USF could be categorized in accordance with the existing land use like i) Village Common Forests, managed under Karbari or forming a group from the village ii) USF that is not a Village Common Forest can be managed for agroforestry planting scheduled tree species at different elevation and iii) thoroughly denuded hills, fallow after shifting cultivation could be converted to agroforestry with special attention for enrichment plantation.

Uddin and Alam (2015), in “An Ecological and Economic Analysis of Different Forest Management Institutions in Bangladesh” compared attributes of forest health of traditionally managed forests and co-managed forests. More tree species and significantly higher basal area of larger size in co-managed forests compared to traditionally managed reserve, indicates higher disturbances in traditionally managed forests and domination of a more mature forest in co-managed forests; most of the attributes of forest health are significantly more in co-managed areas of forests, e.g. higher number ( $5.85 \pm 2.27$ ) of tree species in co-managed areas than the areas with traditional management ( $5.50 \pm 2.88$ ), higher number of tree individuals in traditional management ( $12.84 \pm 9.91$ ) than Co-Management ( $8.33 \pm 3.68$ ); mean basal area in Co-Management ( $.64 \pm .39$  m<sup>2</sup>) is higher than traditional management ( $.48 \pm .40$  m<sup>2</sup>) area; the canopy cover is higher with Co-Management ( $78.22 \pm 21.90\%$ ) compared to traditional management ( $69.61 \pm 59.62\%$ ); higher mean numbers of regeneration counted ( $1681.12 \pm 1375.98$ ) in co-managed areas than reserve forests ( $1089.12 \pm 970.72$ ); no significant variation ( $t$  value = .094,  $p > 0.05$ ) between the mean number of disturbances in co-managed forest ( $4.87 \pm 1.59$ ) and in reserves ( $5.44 \pm 2.24$ ) (Uddin and Alam, 2015). The communities protected trees having conservation value to a larger size and as such the co-managed areas are having higher ‘mean’ basal area as well as canopy cover.

The Forest Policy 2019 (submitted for approval) provided guidelines for forest management to maintain the diversity of plant and animal species; commits expansion of the Protected Area to 30% of the public forests; in addition to planning and implementing ecosystem-based forest management plans, the process of silviculture will be practiced; extensive plantation program will be taken in all types of available land including the marginal land; plantation program with appropriate climate resilient species in the newly accreted land will be taken;

transboundary initiatives for wildlife conservation and protection will be taken and cooperation of global organizations will be ensured to control international trafficking of wildlife and plants of Bangladesh (National Forest Policy Guidelines D7(1);D 2(4);D2(1); D2(6);D 5(6); D5(7); D1(5)).

## **Monitoring and Evaluation**

Forest monitoring system is very important to find failure and success. Forest Department does not have the capacity for monitoring and evaluation of the forest. However, the Forest Department had management information system (MIS) which has now been emerged as Resource Information Management System (RIMS). Nonetheless, no monitoring or evaluation report is there. Resource Information Management System (RIMS) mandated and responsible for digital and spatial data generation and management; however, does not have the staffs or facilities (FD, 2016 b). The Resource Information Management System in the department is not able in canopy cover measurement. There is hardly any forest patrolling. However, Forest department maintains an offense register, the only source of offense records (Rahman and Mannan, 2011). Forest Department is not able to use aerial photography and does not have internal capacities for forest assessment, rather use external expertise. For example, Forest Department take the assistance of FAO for National Forest Inventory and Assessment.

A consistent system of monitoring is essential necessary along with evaluation and feedback. Rigorous forest inventory and comparative study on co-managed forest and the traditionally managed forest are necessary. Forest Department should use satellite imagery and aerial photography to monitor forest cover and degradation. Rahman, et al. (2011) suggested to develop corridor maps, generate and manage habitats and allow wildlife to use undisturbed corridors. A separate wing in the Forest Department for Monitoring and Evaluation will help sustainably managing forests. Smart patrolling could be introduced for continuous follow up of forest cover and canopy increase and or shrinkage. A separate Cell for REDD+ and Climate Change could be established. Multi-stakeholder monitoring and evaluation must be improved (RPP, 2014). It is very important to develop forest baseline and conduct National Forest Assessment (NFA) in a way that meets the global requirements as well as for use in Bangladesh. A process for surveillance and monitoring of forest encroachment and illegal tree felling will help reducing the encroachment and illegal tree felling.

The Forest Policy 2019 (submitted for approval commits establishment of, Information Management, Monitoring and Evaluation Unit in Forest Department with appropriate

manpower and database development and regular monitoring of plantation/forestation (National Forest Policy Guidelines D 1. (6) translation researcher)

### **Budget allocation and Funding for Forest Management**

The budget allocation for the forestry sector is inadequate. The Forest Department suffer from inadequate funding for implementation of the Forest Master Plan and other routine monitoring, patrolling, development and others (Chowdhury and Hossain, 2011). Funding and manpower of the Forest Department are insufficient even to coordinate and support emerging Co-Management organizations. The Forest Sector Education Institute including Forest Academy, Forest Training Schools, Forest Development, and Training Center, Forest Science and Technology Institutes do not have adequate and quality manpower and financial resources to conduct training. The research funding for BFRI is extremely inadequate to conduct research.

The Forestry Master Plan (FMP) 1995 -2015 proposed programs for orientation of people, direction for production and for strengthening institutions; the FMP proposed a minimum of BDT 60.24 billion and a maximum of BDT 145 billion for implementation of the Master Plan, however, only BDT 23.7 billion which is 38.3% of the minimum proposed was provided (FD, 2016b). Forestry sector received less investment over time, e.g. 166 crores in 2014-15 whereas it was 177 in 2004-05 and consequently GDP support of the forestry sector has reduced (0.27% against 1.6%), however, the importance of the sector cannot be measured financially (FD, 2016b). Government funding is insufficient, it only provides the salary of the staff, however, development activities are running with donor-funded projects.

Donors in the forestry sector are quite limited. Donor-supported forestry project does not support routine activity. ADB and World Bank-led program allow fund utilization in accordance with the requirement of the department. Some of this financial support is a soft loan and some others are a grant and the modality is reimbursable project aid (RPA). However, USAID and GIZ are other two donors of limited scale that supports forestry projects in the recent years. This funding is direct project aid (DPA) which means spending money by the implementing partners, not the Forest Department. There are five principles of aid effectiveness: Ownership, alignment, harmonization, results, and mutual accountability. Compliance with the principles of aid effectiveness involves a commitment of lots of people including the commitment of the Forest Department, local people, project developer, channeling funds and project implementation. Forest Department lacks in the fiscal management system. Bangladesh is drowned in public finance and institutional capacity related challenges, many Bangladesh agencies applied to become National

Implementing Entity (NIE) for adaptation fund (AF) and the Green Climate Fund (GCF). Only IDCOL and PKSF became NIE in 2017.

The development partners influence management and institutional reformation, e.g. Arannayk Foundation established with USAID support and is working as a partner of the Forest Department. NGOs are engaged in community mobilization for Social Forestry, however, these are sporadic and not an integral part of Forest Department. The development partners channeling fund considers the project/program proposal that is aligned to: the UN programs like MDG, SDG; the national policy and legal regime and sector policy and legal regime. Donor fund might well be for review and or amendments of law or policy thus funding mechanism and sources also shape the forest management to some extent in Bangladesh.

Financing for the sustainable management of the Protected Area and other forest is essential. The financing could be conservation financing including financing for Co-Management organizations, livelihoods diverting initiatives, and public outreach to sensitize the wider community to the Protected Area network of Bangladesh (Merrill, 2011). An opportunity exists for expanding partnership with the private and voluntary sectors (Khan, N., 2017). Biodiversity in the forest is not the priority in development assistance. There is no long-term forestry program assistance, rather few project-based assistances in accordance with the donor agenda are there. For example, currently (2016) combat climate change in the urban is the focus for German Government development assistance for Bangladesh. The forestry sector is not considered for funding from this donor. The role of NGO and private sector till date is not conducive to sustainable forest management and the CSR not yet supported. The allocation of money for the universities or institutions for research on forestry is very low in the country, regionally and even globally.

Bangladesh needs to pay importance to the environment since the country is approaching a medium economy. It is necessary to conduct research including land use planning and soil conservation. Forest Department can be capacitated on fiscal management; increased fund allocation for the Forest Department is necessary to carry out day to day work including logistic (Chowdhury and Hossain, 2011). The government should allocate more budget for the Forest Education Institute. There should be increased fund flow for conducting regular and refreshing training programs. Revenue budget should be increased for BFRI for conducting research to support forest management. Facilitation for public-private partnerships should be there to leverage additional financial, in-kind and technical resources

for Co-Management of Protected Areas (Merrill, 2011). Assets, facilities, infrastructure and knowledge developed through project support should be maintained with government support. The community organization could generate earning engaging and support eco-tourism and nature-friendly entrepreneurs.

The Protected Area Rules, 2017 provisioned revenue sharing for the Protected Area. The Co-Management Committee will get 50% of the entry fee and 100% of NTFP revenue for all Protected Area; for Sundarbans, the NTFP share will be 50%.

## **Emerging Issues in Forest Management in Bangladesh**

Some issues have already emerged which has high relevance to the forest management globally and more so for Bangladesh. For example, Climate change has potential of impacts on the forest management. Payment for Environment Service (PES) has already been in place in different countries, however, yet to establish in Bangladesh. There are potentials and needs for PES. The transboundary issues are there for Bangladesh forests and wildlife.

## **Climate Change**

Increase in temperature and moisture stress adversely impact native flora and reduce regeneration; increased torrential rainfall because of climate change enhance soil erosion and landslide (Misbahuzzaman, 2015). Sea level rise causes shifting of mangroves and less freshwater flow in the dry season causes siltation over pneumatophores that degrades mangroves. Cyclones, tidal surges, sea level rise and salinity increase are few drivers of forest degradation which exacerbates by climate change (RPP, 2014). The climate change is aggravating the salinity intrusion. The salinity intrusion was already happening in the Sundarbans vicinity due to the withdrawal of the fresh water from the Ganges system in the upper catchment by India. Following the salinity intrusion people are losing livelihood opportunities; are forced to migrate out to the nearby city of Khulna, Satkhira, and Dhaka. The possibility of pests and disease outbreaks increases in the changing climate (FAO, 2012); is a challenge for agriculture and as such the agrarian economy of Bangladesh.

Bangladesh has been proactive in considering the climate change issue. The Climate Change Cell, Department of Environment has been there since 2004. Bangladesh Climate Change Trust Fund (BCCTF), Bangladesh Climate Change Resilience Fund, Bangladesh Climate Change Strategy and Action Plan 2009, National Disaster Management Plan, Standing Order on Disaster have been developed. National Five-Year Plans and other National and Sector

plans considered climate change impacts on the forest; and positive contribution of sustainable forest management and forest conservation on the mitigation and adaptation to climate change impacts.

### **Reducing Emission from Deforestation and Forest degradation (REDD)**

Based on the Payment for Environmental Service philosophy, a mechanism named Reducing Emissions from Deforestation and Forest Degradation (REDD+) emerged. The idea is to ensure that the forests are not cleared, tree density not reduced, canopy maintained, undergrowth or litter are not removed; refrain from any forest activities that degrade the forest and releases carbon into the atmosphere. Afforestation, reforestation increases forest carbon stock; and reducing deforestation and degradation maintain forest carbon; thereby reduce emission and reduce atmospheric free carbon dioxide. Measured sequestered carbon dioxide is eligible for conservation financing validated through international compliance and voluntary markets (Ahmed, et al., 2011).

Bangladesh Forest Department prepared REDD+ Preparedness Program (RPP) following the UN approach. Globally UNDP, UNEP, and FAO are, the designated UN agencies to support member countries on UN REDD+ program. UN would like to see compliance with IPCC guidelines with regards to forest inventory/reference emission level. In 2010, Bangladesh becomes a member of the UN REDD+ Program and then developed their REDD+ Preparedness Program (RPP) in 2012. Bangladesh estimated 16-17 million USD for implementation of the RPP that comply with the UN requirements. The government would develop a monitoring system which would ensure Measuring, Reporting, and Verification (MRV) and provide information on safeguards and assist co-benefits (UN-REDD, 2013). Bangladesh enhanced public awareness of REDD+ (UN-REDD, 2013). The UN Board on REDD+ approved the RPP of Bangladesh in 2014 and allocated 2.3 million USD of these UNDP Bangladesh received 1.3 million USD for the following two outcomes. Outcome 1: Improved stakeholder awareness and effective engagement of stakeholders; Outcome 2: National REDD+ strategy support. FAO received 1 million for, Outcome 3: Forest Reference emission level and Outcome 4: National Forest Monitoring System. USAID allocated 6 million USD for the National Forest Inventory. FAO provides technical support. All the outcomes are expected to be completed by 2017; however, another more than USD 8 million will be needed to complete activities to realize all the outcomes.

A National REDD+ program provides a framework for countries to develop a Reference Level (RL) of expected future emission; that models a business-as-usual (BAU) scenario and allows REDD+ actors to plan specific interventions to reduce emissions below BAU. The Reference Level is the projection of future emissions against which the performance of REDD+ interventions is ultimately assessed. In other words, an RL is essentially a national or sub-national baseline for GHG emissions that is used as the threshold or target from which reductions in emissions can be measured. UNFCCC considers following 4 basic elements for UN REDD+ program:

- National Strategy or Action plan
- National Forest Monitoring System
- Establishment of Forest Reference Emission level (FREL)
- Safeguard Reporting System

Bangladesh in collaboration with UNDP and FAO has launched the UN-REDD Program on 3rd August 2016. An opportunity exists for Bangladesh in UN REDD+ mechanism (Khan, N., 2017). The Forest Policy 2019 (submitted for approval) make following commitments (National Forest Policy Guidelines D. 9, translation researcher):

- 1) Climate resiliency of forest ecosystems and forest-dependent people will be increased; steps will be taken to mitigate and adapt adverse impact.
- 2) Carbon sink will be created to mitigate the adverse effects of climate change through forestry. Strategies will be formulated and implemented to mitigate carbon emissions.
- 3) Initiatives will be taken to assess the potential climate change impact on the environment and the forests. Research on the selection of more efficient tree species in carbon sequestration will be done.
- 4) Local people will be engaged in the mitigation and adaptation of climate change and their capacity will be increased and empowered.
- 5) Increasing forestry program will be taken in coastal areas and remote coastal islands considering the high performance of mangrove species in carbon sequestration.
- 6) A 'coastal green-belt' will be created by dense mangrove and other climate tolerant species for reducing the sufferings of coastal people due to climate-induced hazards.

- 7) The climate financing mechanism will be invented. This fund, as well as government allocation and local resources, will also include innovative methods of funding in the local climate change program.
- 8) The establishment of National Carbon Trading Framework and the Payment for Ecological Services will be introduced for forming funds for climate-related programs.
- 9) Knowledge will be made by research on climate change impact on forest ecosystem, forest resources, and forest-dependent populations.

### **Payment for Environmental Services**

Payments for environmental services (PES) explored worldwide as an instrument to deal with the conflicts between protection and use of natural resources (Landell-Mills and Porras 2002; Wunder, 2007). It is necessary to initiate payment for environment services to conserve natural forests (Ma et. al., 2015). Recognizing communities for forest preservation and pay them for ecosystem services (Payment for Ecosystem Services) through transparent benefit sharing arrangement may be useful in protecting forests; climate change can be tackled by taking forest-based measures utilizing engaged community's skill and knowledge; to fulfill their needs, and aspiration realizing their rights (FAO, 2010). So far, conservation finance is the means of protecting the forest. However, is inadequate and requires adequacy. Payment for Environment Service (PES) could be introduced in Bangladesh. Bangladesh Bank is trying to impose a green tax on ecotourism which is a good sign. The entry fee from the tourist are shared with the Co-Management organizations in Bangladesh, is a kind of PES. However, collected money must be spent in maintaining and development of the ecosystem so that the visitors remain happy paying. PES has high potential; however, assessment of environmental services must be conducted for all types of forests which will build the basis for PES.

Standard valuation must be determined for: where Social Forestry is being practiced, the Sal forests where land has already been allocated to private owners, the Unclassed State Forests that are leased to a private owner and the forested Khash lands; the valuation will help determine and realize PES. There are many methods to calculate the standard PES of these forests. Most common methods are opportunity cost (OC), land expectation value (LEV) and contingent valuation method (CVM). Opportunity cost methods use a framework that includes Discounted Cash Flow (DCF), Monte Carlo Simulation (MCS) and Real Option Value (ROV). In Land Expectation Valuation method, land rent is considered as the value for environmental services. Contingent Valuation Method (CVM) investigates if and at which level (adjusted willingness)



the PES-standard could be accepted by owners (Ma et al. 2012). In the opportunity cost method, the Monte Carlo Simulation could deal with long-term scenarios for PES. LEV method could be the alternative when considering environmental services to be achieved through renting and CVM could be supplementary of Opportunity Cost by reflecting the owners' willingness to accept the standard to be implemented.

It is of high value to evaluate PES in the Bangladesh context and pilot and scale up. There are considerable domestic nature visitors in Bangladesh. Islam et al. (2011), reported over 5000 visitors (99% domestic) per month in an average into five PAs (LNP, SNP, RWS, CWS, TWS) from November 2009 to December 2010. Strength of the tourist spots in Bangladesh includes wilderness, ethnic communities, rich biodiversity, flagship species in most of the forests, easy access, welcoming local community; however, weaknesses include fewer facilities for the visitors, illegal resource harvest, no tourism management plans in place, lack of waste management and tourist's behavior is not friendly to the nature (Islam et al., 2011). Payment for environmental services in Bangladesh is not in practice since valuation for the services has not been pursued, for example, REDD+, yet to get hold.

However, the government could finance for conservation. The corporate social responsibilities from the private sector are possibilities. Traditional payment service system where upstream polluters pay downstream sufferers, will not be a success in Bangladesh. For example, the tea garden though using public lands for long, however, do not show any respect for the community. Formal conservation financing may be realistic right now and PES could be streamlined. It is necessary to initiate Payment for Environment Services to conserve natural forests (Ma et. al., 2015). Revenue generated through entry fee of people visiting nature can be invested for the improvement of the ecosystem health. Payment for Environment Service (PES) and Corporate Social Responsibility (CSR) financing can be harnessed. Local communities can be sensitized and oriented providing incentives for the preservation and conservation of the forest. Budgetary provision needs to be there to ensure community participation in long-term sustainable forest conservation. In the context of current social-economical-political structure, the government can be the main provider of payment for environmental services. Nature tourism could be promoted, establishing required utilities and engaging local communities; initiating responsible nature tourism based on the carrying capacity will enable local people gain an earning providing services to the visitors. Community will own the nature as their income provider and will protect forest, stop illicit felling; skilled manpower in tourism, activities for tourists and easy access for the visitors are necessary to promote tourism (Islam et al., 2011).

## **Forest Management Institutions**

The capacity of the forest management institutions is inadequate to address drivers, management challenges and to reduce the threat. Limited enforcement of law and implementation of policy directives impeded forest conservation and protection (Alam, 2009). Institutional reform of the forestry sector is essential provisioning required staff, logistics, and budgets (Rahman, L., 2011). All forest management institution requires improvement including increasing human resources; enhance skill and education of the staff, investment in research, logistics, and budgets; it is necessary to review the recruitment, posting and training policies of the government to enhance staff capacity and motivation (FD, 2016b; Ahmed et. al. 2009). There is the relevance of other agencies in forest management, which are not directly forest management institution, e.g. Judiciary. The forest professionals can study Judicial process for better understanding and for appropriate and effective enforcement of forest law (RPP, 2014). Implementation of the new policies and mandate will require review of the structure of the Bangladesh Forest Department and BFRIs and capacities shall be enhanced to provide a clear focus (FD, 2016b).

## **Forest Department**

The existing Forest Department Organogram is not appropriate. The budget allocation and human resources for Forest Department do not match the mandate. The number of skilled manpower is very few and their skill has been deteriorated. Forest Department does not have effective set up at the District and Upazila. Forest Master Plan 1995-2015 suggested the creation of Forestry Board, separation of the enforcement function of the Forest Department and establish a separate department for wildlife and nature conservation; however, didn't happen though many reserve forests were declared Protected Area that enhanced further workload (FD, 2016a). The Forest Department didn't recruit staff for a long time because of the cadre and non-cadre issue during the early nineties to around 2002 and again there was no recruitment during the last 14 years. Forest sector institutions suffer acute manpower shortage and resources; Forest Department has 22% vacancies and the vacancies at the senior level are close to 50%. Forest Department law enforcement ability is minimal, for example, enough guard for patrolling forests are not there. The budget for forest sector has always been inadequate operational funds for running internal systems including travel bills, IT infrastructure, forest protection, maintenance of buildings, vehicles and machinery etc. are extremely limited (FD, 2016b). Forest Department assessed manpower needs and designed an organogram in 2001, which was not implemented due to lack of recruitment rule; out of approved 10240 staffs more than 2000 remained vacant, resulting noncompliance to mandate.

The conventional central management institution in Bangladesh is not suitable for sustainable forest service in the face of rapid population growth, increasing demands and overexploitation of forest produce (Uddin and Alam, 2015). Forest management by the department alone became very difficult because of inadequate manpower, their limitation of skills and insufficient support from other departments.

Bangladesh was managing reserve forests and production forests where harvesting calculation was involved and accordingly the Organogram accommodated technical staffs. Forest management as it stands in Bangladesh in contemporary time includes environment, eco-tourism, watershed management, Social Forestry, and Co-management. Bangladesh Forest Department lack skill, training, knowledge, and manpower to manage the ecosystem. Forest Department has deficiencies in managing human resource since the Forest Department lack expertise on institutional and social aspect. There is no skilled manpower on Social Forestry, Protected Area, and Terrestrial Forest or Co-Management in the department. In-service training is irregular and inadequate and motivation is questionable. Further to the limitation of the adequate staff and skill, limited logistics constrained the operation. Most Prosecution Offense Reports (POR) lack required details and supportive documents and are inconsistent with the provisions of the law. The relevant prosecution officers do not have the required education or skill, results in the freeing of even red-handed caught offenders (Rahman and Mannan, 2011). Forest Department does not have the skilled and adequate manpower to run court cases against the offenders. Offenders can easily escape punishments. Forest Department is marginalized in Bangladesh and fight lonely against the forest land grabber. Forest Department being a party in the litigation case do not get support from any other corner. Whereas the grabber gets support from the Parliament, MP, political elite, lawyers and even law enforcing agencies. The management approaches and practice that has been continuing since last 40 years in the Forest Department was commercial focused and didn't deliver all the three functions viz. i) management ii) administration and iii) technical service. Forest Department provided the highest priority to administration, management was not good enough and technical service was poor. Forest Department was recruiting staffs in three tiers; Forester (technical), Ranger (sub-professional) and Assistant Conservator of Forest (professional). Ranger positions were abolished since the early 1990s. Recruitment of simple diplomas as technical staff (Forester) resulting in the inferior quality of human resources in the department. S.S.C pass Forester was Third Class Officers, now became Second Class Officer; after completion of diploma and 3-5 years of experience, these Officers could become conservator of forest, which is a first-class position. By provision, 33% of the position could be filled with the promotee officers and thus top post could be

occupied by the officers who are academically only crossed S.S.C. Reserve Forest, Protected Area, National Park, Wildlife Sanctuary, Safari Park, and Protected Forests designations are effective but the system of implementation is ineffective as Forest Department does not have that capacity.

Reformation of the Organogram of Forest Department is essential to enable the department dealing emerging issues of environment, watershed management, climate change, Social Forestry, Co-Management and ecological management. Forest Department in Bangladesh is the agency mandated to declare Protected Area and to manage these forests. Forest Officer should be positioned in each Upazila and groom them to technical soundness to be able to effectively work for Social Forestry, Co-management, Conventions and Protocols; thus, the Forest Department will be able to deliver mandated tasks. Increase staff in Forest Department and create provisions for recruiting subject matters specialist; and make changes in positioning and responsibilities for Assistant Conservator of Forest, Deputy Conservator of Forest, Conservator of Forest, Deputy Chief Conservator of Forest, and Chief Conservator of Forest (Chowdhury and Hossain, 2011).

Provision for remoteness and hardship allowance for remote posting will keep the motivation of the officers high to deliver services. Forest Department need adequate logistics including modern equipment and firearms. Enhance the capacity of the Forest Department improving fiscal management, strengthening management information system and establishing a robust monitoring and evaluation system (Chowdhury and Hossain, 2011). Risk allowance and official residential facilities for forest guards will boost up their morale (RPP, 2014). Forest Department must resolve cadre, non-cadre issue prevailing in the Forest Department. Enhance the capacity of the Forest Department is a must to implement upcoming Forest Policy 2019 (submitted for approval). Implementation of this policy will require staffs with knowledge and skills in integrated forest management planning, conduct quality research on forest management topics and other emerging and contemporary issues. The institutional framework of the Forest Department, Organogram, recruitment policy and measures to motivate the staffs will be necessary. The recruitment could be at three different tiers viz. Forester, Ranger, and ACF, reintroducing the Ranger recruitment. Separate divisions for Social Forestry, Protected Area, and Mangroves will enable the Forest Department manage forest resources sustainably. Generating motivation among forest officers with appropriate drivers and creating an attraction for the newcomers in the forest service is necessary to pursue sustainable forest management.

In the shifting forest management paradigm, emerging issues and concerns, complexities of conservation and management; Forest Department proposed a revised Organogram of 19635 staffs in 2011. Ministry of Environment and Forests (MoEF) declined the proposal and suggested to reduce the number of staff proposed. Forest Department revised the Organogram and proposed 13822 staff in June 2016 (Hasan,2016; Personal Communication) which didn't gain support from the Minister, MoEF, rather he is in favor of rethinking the approach of forest management without increasing staff. It is necessary to decide on the role and function of the Forest Department in the Forest Policy and then reshape the organogram of the department adjusting between the bureaucracy and political levels. Reorganization of the human resources pool and reorientation of Forest Department's staff to facilitate people in managing resources will be realistic to protect forests in the context. In other words, Forest Staffs are to manage people and people will manage forests. The Bangladesh Forest Department is a century-old institution having access at grass root level; need to be fully functional to realize the full potential of making revolutionary positive changes in the forest protection and management.

### **Bangladesh Forest Research Institute (BFRI)**

BFRI was established in 1955 and a total of 22 centers was established in 1968 under the Forest Management Research wing. However, the centers are not maintained due to lack of fund; land of two of the centers have already been encroached and grabbed. BFRI is suffering from insufficient staff and mediocre quality of staff; more than 50% officer positions are currently (2015) vacant, instead of 103 class one officers, only 50 officers are in position. One of the reasons for these vacancies is the lengthy process of recruitment through Public Service Commission. BFRI is not getting quality and adequate officers and knowledgeable researchers; suffers from lack of quality equipment, limited logistics and do not provide rigorous training to the researchers. Fresh recruits are not there and the existing qualified researchers are leaving BFRI seizing better opportunities elsewhere. BARC provides foundation training to the BFRI staff which is not enough and BFRI research capacity remains limited.

BFRI has been a good institute supporting Forest Department with timber treatment, seasoning, and bamboo treatment technologies. However, became ineffective due to lack of proper attention from the government in providing required budget allocation. BFRI scientists are thoroughly demoralized and good scientists are moving out. The traditional bureaucratic management set up, lack of leadership, political interference and nepotism are to blame. The institute does not have any long-term project. BFRI remains static since inception and currently have no modern research equipment and quality staffs leave the organization

realizing the lack of career development (FD, 2016a). BFRI is not able to support the Forest Department with required research and findings. The Forest Department also do not place demand to BFRI and as such their research is not demand driven and consequently not utilized. The capacity of the forest management section of BFRI is questionable, forest products section is redundant. Reformation of BFRI is essential. The capacity of the researchers needs to enhance by appreciating training at home and abroad. Provision for incentive should be there to conduct research on contemporary issues including soil conservation and on topics placed by Forest Department.

Adequate and quality researchers, sufficient equipment and logistics and resources for maintenance of the centers, are necessary among others. BFRI must conduct long-term research to find solutions for the emerging risks in the forestry sector. It is necessary to increase the effort of research for development. Interested foreign students could be engaged in forestry research. The coordinated effort for conservation and management of Forest Genetic Resources are necessary to maintain the integrity of forest ecosystems. A comprehensive study is necessary before giving permission to the mining operation to make an informed decision, for example by allowing mining for an economic reason even against forests loss. However, mining sand for a petty benefit of an individual cannot be allowed. Research on contemporary issues like sustainable forest management in the changing climate; and on livelihood and resource substitution will generate much-required knowledge. Generated and existing knowledge and information should be used in planning; will enable policymakers for allocation of resources accordingly.

### **Forest Education Institution**

A sound education system is essential for the specialized sector like forestry. Bangladesh forest education system includes a Forest Academy, a Forest College two Forest School, and a Forest Development Training Center. The National Herbarium offers learning for the forestry professional, though not an education institute by nature.

The Academy has excellent infrastructure, contemporary curricula, and training materials. The Academy provides formal training to the ACFs and yearly refresher course. The country context and perspective has been considered in teaching approach for both regular and refresher course. The training module includes theoretical knowledge and field experience. Curricula include participatory forest management, Social Forestry, Community Forest Management and Co-Management among others. The Academy collaborates with Environment Science and Forestry Department of Chittagong University for regular academic updates. The Chittagong University

support the Academy providing experts for training and facilitates ACFs to complete their Master's Degree in Forestry. Before the ACFs were offered two years Master Degree, however, converted to one-year Master of Science course. Forest Academy also uses experts from the Forest Research Institute, however, lacks an in-house resource person.

The Forestry Training Centers provide training to the Foresters. Due to a shortage of human resources of these training institutions regular in-service training does not take place, though education infrastructure is excellent. Consequently, demand from the department and supply from Forest Schools and Forest Academy do not match. The Forest Education Institutions are coaching few graduates and master's degrees and pursuing research or theses, which are mostly based on laboratory and are not usable in the field.

The National Herbarium provides scientific input for maintaining the natural history of the country. However, draws limited interest among the stakeholders and has no growth possibility.

The Government has never conducted a needs assessment for forest schools or academy; always allocated very limited budget. The Forest Officers rationally consider a transfer to Academy or Forest Schools or Forest Training Centers as dumping posting. The training curricula need regular update accommodating contemporary issues. New courses can be developed to boost up the Forestry Training Institutes and Forest Academy. It is necessary to facilitate and support the forest education institutes with adequate quality teachers and trainers. Training of the trainers (ToT) will help maintain in-service training. Continuous in-service training on contemporary forest management issues will enable forest education institutes to supply quality and adequate foresters. Forest Department and National Herbarium should have a functional linkage to benefit from flora knowledge.

The Forest Policy, 2017 (submitted for approval) has an objective to strengthen education, research, and training programs through forest ecosystem management practices (Objectives 8) and National Forest Policy Guidelines, D 8 include following commitments for education, research and training on forestry:

- 1) Creating an adequate scope of forest-related education, research and training will be made and organizations will be modernized
- 2) Foundation and timely training will be provided for forest officials, including higher education at home and abroad
- 3) Training programs including training infrastructure and other facilities will be improved and modernized

- 4) Opportunities for higher education will be created for researchers engaged in research work
- 5) The forest research program will be formulated and implemented according to the needs of the forest sector. Applied research will be strengthened to conserve biodiversity including wildlife
- 6) The curriculum will be improved by coordinating the organizations related to forest-related education

### **Bangladesh Forest Industries Development Corporation (BFIDC)**

BFIDC was established as forest resources user industrial corporation. The corporation has received unproductive land from the Forest Department and planted rubber and has no direct linkage with the forest management. However, the establishment of BFIDC was wrong. The corporation only served as the woodcutter of the Forest Department. The Tree felling moratorium has been imposed on the natural forests and as such the existence of BFIDC is questionable. BFIDC has no professional foresters or industry experts, manages government rubber plantations and manufactures furniture (FD, 2016). The rubber plantation suffers from monoculture. BFIDC is using less productive rubber clone which was brought in 1980. The corporation has failed so far to bring the latest high yielding clone available in Malaysia.

Institutional restructuring of the BFIDC is necessary for limiting operation for cash crop plantation, like palm oil, sericulture, and apiculture utilizing research findings from BFRI in this regard. The corporation could concentrate to continue the supply of alternate for wood products. The BFIDC is no more relevant since the forest management paradigm has been shifted considerably; government is to consider reformation of the BFIDC (FAO, 2000). However, the Forest Policy 2019 (submitted for approval) commits following for forest industries:

- 1) Encouragement and support will be provided for investment in the forest industry
- 2) Wood waste will be brought to the lowest level by encouraging modern and efficient wood processing technology
- 3) Industries producing alternative wood products will be encouraged for import of modern and advanced technological machinery
- 4) Import of timber will be encouraged to reduce the pressure of local demand on the wood
- 5) Export of wood products, including furniture, will be encouraged



## **Co-Management Organization**

Legal and policy support is necessary for the sustainability of Co-Management organization; wider stakeholder engagement, better collaboration with Forest Department, effective Community Patrol Group (CPG), endowment fund, alternative livelihoods for the resource-dependent people, and monitoring are necessary to become effective in Co-Management of Protected Area (Morshed, 2013; Ali, Uddin, and Chowdhury, 2015). Local community participation in CMC assists the organization to learn more about the Protected Area and needs and perceptions of local communities (Belal, 2013). Appropriate selection of CMC members is a challenge. Poor and disadvantaged are yet to raise a voice in the management, though included in the committee at various tiers. Strategies like democratization and localization may result in success in the long run for Co-Management (Wester and Yongvanit 2005; Taylor, 2010). The competency of the Co-Management organization is linked to the alternative income for the dependent communities. There is conflicting interest among stakeholders; Co-Management organization could be a platform for conflict management (Ali, 2013; Mustafa, et al., 2013). Voluntarism for the dependent community is not realistic. The Co-Management Council and Committee were established through an executive order in 2009. The directives for selection and or election of members and office bearers were not clear. The committee members were too many. Instead of executive order, a formal legal basis and capacity building is necessary to make the Co-Management organizations functional for natural resource management of the Protected Area (Merrill, 2011). CMCs formed during the IPAC (2008-2013) project and capacity building continues through the CREL (2012-2018) project. USAID funded Climate Resilient Ecosystem and Livelihood (CREL) project (2012-2018) conducted an in-depth survey and defined sustainability for Co-Management organization in Bangladesh. The sustainability has been defined by 17 indicators under five themes. The themes are the legal basis, capacity, governance and inclusiveness, adaptive management, and resource mobilization (finance). A scorecard assessment system has been established and assessed providing a 1 to 5 scale score to each of the indicators. The cumulative score for a theme indicates the competency. CREL decided to graduate (sustainability threshold), CMO must score in an average 70% and in each theme, must be 50%.

Bunaken Marine National Park in Indonesia, initiated Co-Management developing partnerships at the local level focusing the problems of natural resources surfaced by the locals; real collaborative partnership emerged working together (Erdman, et al., 2004). Co-management, with designated Protected Area Management Boards in the Philippines, is a model for Protected Area

governance, per Barber et al. (2004). Mt Kitanglad Range Natural Park, Philippines, succeeded in shifting management to the local authority (WRI, 2011; Viña et al., 2010). India has been practicing participatory forest management which is a joint forest management of local community-state partnerships (Aravindakishan, 2011). Government organized NGO (GONGO), Environment Development Committee (EDC) at village level and Protected Area working group, accommodating evolving landscape collaborative management arrangements succeeded to sustainably manage the Periyar Tiger Reserve in Kerala, India (Parr, 2015).

Sound institutional structures, democratic decision making and enforcing well-defined rights, enabled achieving excellence in following forest's management: Dong Phou Xoy and Dong Sithouane Production Forests, in Lao PDR; Forest Protection Committees for Dugli-Jawarra Sal Forests in Chhattisgarh, India; forests of Lin'an County in Zhejiang Province of China (FAO, 2005). Institutions learning values and guidelines from shared activities outline Sustainable Management within the commons (Ostrom, 1990; Ostrom, et al. 1994).

Co-Management could involve relevant administration and Union Parishad and coordinated under the Forest Department. It is necessary to establish a monitoring system and an endowment fund to operate co-management. The staff working for the Protected Area need to acquire skills for stakeholder facilitation, community outreach, awareness-raising and community development to support Co-Management (Parr, et al., 2013). Co-Management organization must continue to protect ecosystem for the sustenance of biological resources and improving lives of resource-dependent people. Co-Management organization in collaboration with Forest Department could be an effective platform for alternative dispute resolution (Hassan, 2013). Co-Management Organizations to become sustainable and deliver services require legitimacy i.e. having legal basis of operation, capacity to operate the organization for results including democratically change of executives and counselors, inclusive in decision making and ensure governance for adaptive climate resilient ecosystem management; and able to mobilize resources for sustenance of their efforts and achieving NRM results (CREL, 2014).

There are opinions regarding Co-Management structures and applicability of the Co-Management system. Co-Management structure is okay, however not yet mature enough to implement into all state forests. Co-Management could be taken in CHT forests bringing a balance of government and non-government representation in the structure. The legal backing of Co-Management Organization with detail scope of work, terms of reference and financial flow will be necessary to sustain The Protected Area Management Rules 2017 provided directives, structure and detail guidance for the formation of the Co-Management Committees.

The composition of the committees at different tiers, the scope of work, responsibilities, and mandates of the Co-Management Organizations has also been guided by the PA Rules 2017.

## **Legal and Policy Regime**

The British and Pakistan regime considered forests as state resources and philosophy was the commercialization of the forests. However, the legal and policy regime in Bangladesh supports forest conservation. National Land Use Guidelines, 2001 set objectives of implementation of Environment Policy, 1992 and Forest Policy, 1994. The Forest Policy 1994 has directives of community participation. The Environment Policy, 1992 has separated forest as a different sector, however, directs to stop deforestation and degradation. The land use policy 2001 prohibits forest land conversion (Hassan, 2011) and promotes conservation of natural resources, however, Deputy Commissioners do not follow the spirit very often and lease out forest land which is Khash.

## **Forest Policy**

Findings and innovation are grounded through policy (Mayers and Bass, 1999). The policy is the intention of the government and accordingly, the Forest Policy guides the forest management. The context of the country changes and consequently, the policy need to be adjusted. Historically, the national forest policies manifest a basic commercial-custodial orientation, and have remained largely unfavorable and unresponsive to the community-oriented afforestation programs including homestead forestry; the support and services, promised to the farmers in the policies, remain a far cry (Khan, 2011). There is a room for improvement in forest policy, legislation, and institution to address ecosystem-based management and increase community awareness and sensitization. However, the national policy of resource allocation for development has different priorities and allocation to forest sector is limited. There are good attributes of the existing policy and at the same time, there are deficiencies, as such a new Forest Policy is the demand of the time.

## **Review of the Forest Policy**

The forest management is shifting the paradigm throughout the world and in Bangladesh. Following the Rio convention, Bangladesh Forest Master Plan was drafted by 1993 and approved in 1995 for 20 years and Forest Policy 1994 was adopted. However, during the last 2 decades, there are many changes around the world in the social, economic and environment arena. Similarly, the Bangladesh country context has changed considerably. On the top of these changes, global climate change emerges that has a direct bearing on the forests of Bangladesh. Accordingly updating of the Forest Policy 1994 is essential to address emerging issues. Forest

provides essential environmental services to the wider community and livelihood support to the dependent communities; so, should no longer be treated as the revenue generator, rather be managed engaging communities and distribute the benefits among them (Sharma and Banik, 2011). Ensure legal and policy regime that rewards 'good' behavior and penalize 'bad' (FAO,2010).

Current forest policy does not have directives or guidance for conducting research, the patent right functions as an incentive in undertaking research; is a cumbersome process in Bangladesh. Government commitment in forest management ensuring conservation and protection is very important. The Forest Policy 1994 requires updating accommodating the findings of the Earth Summit, Forest Principles and other emerging issue like climate change (Rahman, L., 2011; Mukul, 2014; Jalil, 2011; Ali and Morshed, 2011; Chowdhury, et al., 2009; Mustafa, 2002; Alam,2009).

### **Aspirations for attributions of the New Forest Policy**

The policy must promote improved cooking stove to reduce fuelwood use, support resource-dependent communities with bamboo and fuelwood plantation at homestead and community space, enhance Social Forestry for the resource-dependent community, relocate settlers at the periphery of the core forest area; and decide with the encroacher to establish Social Forests in evacuated space to produce fuelwood. Incentives for the conservation supportive entrepreneurs will enable policy implementation and generate alternate income opportunity (Alam,2009). The forest policy must encourage conducting research on forest management issues, conservation of biodiversity and preservation of forest resources and find a substitute of fuelwood. Investment in research is highly recommended (RPP, 2014).

Industries must be established in a planned way avoiding forest land; do not displace people from their own land and avoid pollution (Ahmed 2008). The policy should restrict the use of forest land for shrimp cultivation, salt production, ship-breaking yards, infrastructure and other industrial development (RPP, 2014). Bangladesh should go for massive reforestation on state forests, afforestation of accreted lands, marginal lands, agroforestry; achieve 20% forest with tree cover at 50% canopy density; implement REDD+; and find and promote climate neutral substitutes for wood and wood products (FD, 2016b). All-natural forests should be declared Protected Area and save from further degradation (Ahmed, et al., 2011). The policy development process must ensure the participation of grassroots people and accommodate ground issues (Alam,2009). Sustainable forest management requires increased investment

and access to alternative energy technology through subsidies for forest-dependent poor and marginalized communities and increase investment in forest-friendly small and medium enterprises (RPP, 2014).

Bangladesh should have the provision of balanced combination between production and conservation forestry. National land use and land zoning policy should be reviewed and ensure compatible leasing principles and procedures; de-leasing of leased out forests land; explore innovative instruments e.g. Community Conserve Area; introducing green accounting in the national development persuasion; REDD+ for forest conservation and community benefit; there should be an upscale permanent coastal plantation as a community-based adaptation intervention (Khan, N., 2017). Bangladesh Forest Department should develop and implement a special protection program to restore degraded natural forests. Sitakunda eco-park can be taken as an example; end-use oriented plantation should be developed creating zones based on site suitability for respective species e.g. long and short rotation tree species; must raise genetically improved seedlings for Social Forestry or plantations; Social Forestry Participants should be made responsible for protecting and conserving the natural forest in the vicinity; there should be a permanent coastal plantation for protection; monitoring of plantations must be there with attention to species selection, site suitability and zoning following management plan; Forest species shouldn't be mixed with non-forest species; Forestry Master Plan should be implemented in totality not only the plantation; core forestry activities including routine operation and maintenance should be carried out from revenue budget (Ahmed, 2017).

During the liberation war in 1971, the Sal forests were heavily damaged. To restore the Sal forest, the moratorium was imposed and the result was okay. At a later date, the moratorium was sanctioned for other forests and in 1989 moratorium was sanctioned on all-natural forests. However, due to lack of enforcement, moratorium didn't work. There are differences in opinion on logging ban in Bangladesh. one school of thought is, the indiscriminate moratorium is not scientific and was a wrong decision, e.g. moratorium to teak plantation resulted widespread unemployment among related laborers and ill-motivated well-off people used the situation and influenced illegal tree felling and stealing. A schedule of species not to be harvested could be introduced and license shall not be issued for harvesting threatened tree species. Another thought is to continue moratorium/logging ban for the time being to combat serious degradation and upon achieving expected regeneration implementing proper management of natural forests, the moratorium should be lifted. Yet another, the thought is a continuation of the moratorium for

natural forests, however non- timber forest products and planted timber trees should be harvested.

Assessment of logging ban in China, New Zealand, Philippines, Sri Lanka, Thailand and Viet Nam, conducted by APFC, provides following conclusions:

- i) The standalone moratorium is not bad and not good for forest protection
- ii) Selective moratorium and other policy provisions together is good for the sustenance of forests
- iii) Improper moratorium often resulted in more denudation and forest clearing

Moratorium or logging bans have been revealed as inherently neither good nor bad as protection policy instruments rather a set of policy tools; selective ban along with other policy provisions is good (Waggener, 2001). There are instances where logging bans declined incomes which led to negligence in forest management exposing forests illicit felling and forest fires (FAO, 2001). However, in Bangladesh, no such study has been conducted.

## **The Forest Policy 2019**

Bangladesh Forest Department decided to adopt a new forest policy and accordingly drafted and submitted for approval. The Forest Policy 2019 includes the following objectives:

Ensure compliance of article 18(ka) of the constitution that safeguards forests

To increase the area of tree cover to a minimum of 25% of the total area, by 2035 with 50% density through the countrywide extensive plantation(draft Forest Policy 2018)

To ensure forest conservation, forest enrichment, forest ecological services growth and sustainable forest management

Increase the tree cover through the plantation in the public, private and private land including urban areas outside the forest area

To reduce forest dependence on forests, encourage social forestry activities and encourage outside forest employment generation

Development of wildlife management and preservation methods

Preparation and implementation of the program to address CC impacts on the forest

Strengthen education, research, and training programs through forest ecosystem management practices

Identify the catchment of rivers, lakes and other wetlands and declare it as a protected area

By 2035, 30% of the forest area declared as the 'protected area' and the introduction of ecotourism

Valuation of forest ecosystem services and include a pricing mechanism

Encourage the rural population and entrepreneurs with the establishment of non-timber forest products industries and the simplification of marketing

Take effective steps for strengthening eviction and preventing encroachment of forest lands

Ensure compliance with international environmental and forest-related commitments

## **Forest Legislation and Acts**

The legal framework for the forest management in Bangladesh is generally acknowledged as relevant. However, the enforcement is limited. The government intention and guidance for reserve, classified or protected forest have no detailed rules. Forestry legislation must have directives to implement policy (Rahman, L., 2011). The legal framework in India and Bangladesh is similar and Nepal follows the Royal Nepalese system other than Community Forestry. Indian has achievements in forest management, however, Bangladesh did better in Social Forestry and Nepal did much better in Community Forestry with support from the government in group formation, legal framework and land rights issue.

The Wildlife (Conservation and Security) Act, 2012 provided authority to eviction and seize to only Wildlife Division officer and not to Forest Division officer. Per the Act, case filing officers could be charged with malafide intention, as such the officers are reluctant to file a case. However, the Wildlife (Preservation) Order 1973 had definitive penal clause defining who can file a case. The Wildlife (Conservation and Security) Act 2012 however, created provision for compensation to the tiger victim, is an instrument though, however not enough to eliminate conflict (Islam and Hossain, 2011) between human and tiger. Amendment of Wildlife (Conservation and Security) Act 2012 could include an overriding section that this law will supersede any other law to ensure conserve wildlife and biodiversity. Provide prosecution authority to Wildlife and Forest Division-Officers and remove the provision of forest officer prosecution and introduce increased punishment provision.

The basic law that governs forests in Bangladesh is the Forest Act 1927 which provided police authority to Forest Department. Laws enacted during the British period were focused on a penalty, whereas current Acts are focusing on community mobilization for forest

management. The society is still at the primitive stage and yet to attain a serving mindset for not felling trees and not grab forest land. The Forest Act, 1927 clearly prohibits fresh clearing, removal of any timber, unauthorized tree felling from reserve forests. Section 27 of the Forest Act 1927 has ceased leasing of reserve forest and imposed penalties or sanctions of 0.5 to 5 years and with a fine of 5,000 - 50,000 BDT plus suitable payment for any harm done to the reserve as directed by the judgment (DeCosse and Susan, 2006). The Forest Act 1927 has been amended lately in 2000 following the Forest Master Plan 1995-2015 (FD, 2016 b). The Forest Law can support sustainable forest management moderately.

There are flaws in the Forest Act, 1927 e.g. clause 34 provided power to Forest Department to regulate land use over the watershed and or catchment that has bearing on forest health, even if the land is owned privately. However, for biodiversity, such authority is not there. There is a schedule of species for conservation in the reserve forest and the law is conducive for sustainable reserve forest management; however, license for harvesting any species of tree are allowed by law and license for transport trees from CHT by transit Rules is not conservation friendly. It is necessary to introduce a schedule of species for conservation even for the private trees and in CHT forests. Devoted forest law can be enacted to protect the forest from conversion. For the protection of a specific forest, the devoted law can be enacted. For example, Atia Forest Act 1982 was enacted to vest entire land of Atia Zamidar to the government and with a provision that no one can make a case against this Act in any Court.

To address all the dimensions of forest management issues, it is necessary to have interlinked Legislation, Rules, Executive Orders and Policies (MoEF & CC, 2014). It is necessary to amend the Forest Act 1927, Wildlife (Conservation and Security) Act 2012, Bangladesh Gas Act 2010 and Mines and Mineral Resources (Control and Development) Act 1992. The amendment requires harmony among these Acts to minimize conflicts of mining resources in reserve forests. Ministry of Environment and Forest (MOEF) could prepare a compendium of forest law that must include all related references of law for forest management and conservation including the role of District Administration, Police Administration, Land Administration and Forest Administration. The Forest Policy 2019 (submitted for approval) commits, to comply with current and future needs and modern forest management. The laws, rules, provisions, and regulations will be updated regularly by examining it (National Forest Policy Guidelines D 15(5) translation, researcher).

## **Forest Land Tenure**



British regime enacted Permanent Settlement, 1793. The Land Acquisition Act, 1894 historically defined and determined land tenure of India, that includes present-day Bangladesh. By the provision of the Permanent Settlement 1793 and relevant Acts, British rulers permanently leased out land to the Zamindars against a decided fee. The State Acquisition and Tenancy Act (SATA), 1950 is another milestone Act that has reversed the Permanent Settlement Act of 1793, i.e. land rights are taken back from the Zamindars. The SATA 1950 declared forest as privately non-retainable, reserve forests entitlement recorded to Forest Department and privately-owned forest were vested to Forest Department for management, though ROR (Right of Records) was private. The issue of land transfer and conversion is linked to the land tenure system. The responsibility of the state is to maintain and renew land records. However, in Bangladesh, it takes 25-30 years to update land records after survey, which is a lengthy period and leads to complexities. For example, a survey to update land class, whether a land is a wasteland, forest, agricultural land, dwelling house or wetland, it will take at least 25-30 years. By the time survey is completed the land status may change in the rapidly changing landscape and economy of Bangladesh. To settle land tenure issues and the Right of Record (ROR), the land survey was conducted at various times with different legal presumptive.

A cadastral survey was conducted throughout the country during 1920-1945, the Chittagong Hill Tracts (CHT) were not surveyed; however, Mouza demarcation through natural landmarks like Khal, the edge of the hill etc. was done. The CHT land was leased to the Headman by DCs and Headman then distributed leased lands to several Karbari (leader of the small group) and a group of people under a Karbari use the land. DC issued the lease on paper, whereas the Headman distributed land use right verbally to the Karbari. Similarly, group members received use rights verbally. There are instances of issuing lease in the name of ethnic people and then transferred to Bangalee. It is mentioned that Bangalee is always for a document and ethnic people didn't care. Through this process, Bangalee has a document and most of the ethnic people have no document.

Deputy Commissioners (DC) are authorized to lease out Khash lands since the British period. However, DCs during British regime had no personal interest in land; maintained integrity in this regard throughout Pakistan period. Unfortunately, during Bangladesh period the DCs have abused their authority to the highest degree in declaring forest lands as Khash. Forest land that was to the Zamindars and was not vested to Forest Department following SATA 1950 has been declared Khash by the DCs. In the case of land of Bhawal Forest, a chunk was leased out as Khash, another chunk was leased out through 'Bhawal Court of Words'; formed

after the death of the Bhawal king as he had no offspring. This land grab uses a similar mechanism for preparing fake deeds and other techniques. In addition, innovative corruption has been used in this case, using the name of the 'Court of Words', however, land ultimately going out to the private ownership. Forest land conversion was less in Sylhet. Rangpur and Dinajpur are like that of Mymensing and Tangail districts where district land administration collaborated with the forest land grabber and forests are continuously being converted to other land use and ownership also changes. However, there is an instance of proactive positive action in safeguarding forest land. For example, during 2009 to 2014, the Parliament Standing Committee, Ministry of Land and Forest Department collectively brought more than 50 thousand hectares of land under forest reserve, settled by June 2012.

Encroachers capitalize ambiguities in land tenure law and official documents (Farooq, 1997). The existing land laws need revision to sustain remaining forest, wetlands, river, and biodiversity. It is necessary to review relevant legal and policy documents; amend existing laws and or enact a new law to clarify land rights (RPP, 2014). The forest land in the CHT is Khash and the authority belongs to the Ministry of Land. The land rights for the ethnic communities remain a critical factor for the forests in the CHT. Ahmed (2008) suggested granting land rights to the ethnic communities for forest regeneration and sustenance. It is necessary to bring smallholders who manage most of the lands and produce goods and services including woods under a formal domain creating enable land tenure arrangements (FAO, 2010).

Establishing a special court for rapid disposal and settlement of court cases on forest land ownership will help save forest land avoiding a long delay. Accurate geodetic framework and the cadastral system will enable sound land-tenure change (Nahrin and Rahman, 2009). The cadastral survey (CS) records have the legal presumptive value of correctness and as such CS records should be taken as the base and recover forest land accordingly. The plantation in the accreted land could be vested with the Forest Department custodianship to facilitate terrestrial biodiversity conservation. These raised plantations with a reasonable thickness will protect the countryside against the weather extremes like cyclone and storm surges.

Ahmed (2008) suggested to prohibit the process of militarization in and around forest areas and suggested government not to allow any development activities in forest land. Handing over of forest land for the military purposes must be avoided. For example, Ahsan and Kabir, (2011) demanded the evacuation of the jetty established in natural habitat for long tail monkey by the

coast guard and subsequently restore habitat. Land rights in Bangladesh is a broader political matter and local strategy for use of land facilitates better conservation (Ahammad, et al., 2014).

### **International Conventions, Treaties and Protocol Protocols**

International Convention, Treaties, and Protocols (ICTP) have no legal binding, but a moral obligation; implementation of the ICTPs in Bangladesh is limited. No protocol is contradictory to our forest management plan, yet the signed and ratified ICTPs are not adequately reflected in respective plans. However, some of the ICTPs are reflected in the perspective plans like a 5-year plan; though adhered in a minimum scale, however, are not disseminated to the field level. Field level implementers have no idea of various conventions like CBD, CITIES or Ramsar convention and consequently not implemented. The implementation of the ICTPs is sometimes dependent on the support of development partners; in the process, development partners may pursue their own program /agenda.

International Convention, Treaties, and Protocols that Bangladesh signs and ratifies should adhere and national policy must align accordingly. Strategies to address international conventions shall be devised to ensure common databases and data collection programs to feed into the monitoring and reporting requirements of all multilateral environmental agreements and treaties (FD, 2016b). The Forest Policy 2019 (submitted for approval) commits adherence and implementation of signed and ratified International Conventions, Treaties, and Protocols related to the forestry sector (National forest policy guidelines D. 1 (6)).

### **Community Participation in Forest Management**

Historically, people were conservation oriented. However, since the British regime took over forest excluding people community believed the government owned the forest, therefore it is the government's responsibility to raise and conserve the forest. The people were tempted to use forest resources as and when to get the opportunity. The exclusionary policy continued even during Bangladesh (Ali, et al., 2006). The Forest Department maintained the exclusionary policy until 1990. Nonetheless, initiated Social Forestry during the early 1980s. Co-Management engages communities and shares authority and accountability with the government and the people; institutionalized through a process ensuring rights in decision making, empowering locals to confirm their rights on the resources (Berkes, 2004). The forest ecosystem and dependent communities are interdependent; however, response differently under different management system (Biswas and Choudhury, 2007).

Governance for the protected area management should be defined considering diverse stakeholders who share power in Protected Area management (Rashid, 2012). The community engagement has been revealed very important in forest management. In the Bangladesh context, it has been revealed in different forests over various time guarding with firearms cannot protect forests or conserve biodiversity. Shanti Bahini cleared CHT forests to support uprising costs and military cleared forests in the name of security. There is a criticism of elite capture of the Co-Management approach, e.g. Berkes (2009) mentions Co-Management aggravates more authority of the influential people at the grassroots and enhance the ability of the state to re-centralizes the administration of commons. Koli (2010) complains about the prominence of the elite class in making decisions. Community rights in the protected forest were recorded, however not settled (Ribbentrop, 1900). Involvement of the community by large in forest management can stop the encroachment of forest from villagers and powerful people (Huda, undated). Incorporating women into participatory planning processes ensuring gender sensitivity is critical in conflict resolution mechanisms (CPD, 2008). Scattered forests in Bangladesh can be protected with the active engagement of the residents (Ahmad, Sharma and Merrill, 2011).

Wide landscape approach and community engagement are necessary for better management of the Protected Area (Hoole, 2008). Engagement of indigenous community effectively needs to generate awareness of rights, grievance mechanism, and strong monitoring system in place and property rights (Ludwig, 2012). Involvement of rural poor in decision-making within the political process is necessary to reform resource governance (IFAD, 2015). Involving local community and their knowledge in park management through a sort of participatory management has been unanimously argued by the researchers; however, the site-specific strategy will be necessary (Jefferson et al., 2013). Over the last three decades, Bangladesh came to an understanding that sustainable forest management is only possible engaging wider stakeholders and gradually moving away from state forest management; external assistance supported this shift (Rahman, L., 2011).

There is a growing consensus for managing natural forests engaging community; forest protection cannot happen in isolation of local government. Community living near the forests participating in forest management are benefitted once there has been devolution of power and decentralized management; is revealed in the success of participatory forestry (PF) throughout the world (Islam, et al., 2015). The forest officers initially didn't believe in the people's participation in forest management, however now they are motivated and it will take

some time to work in Bangladesh. The community participation has brought a radical change in forest management in Bangladesh. Community collaboration in forest management will bring accountability. Devkota (2010) reported the highest level of trust, incentives, and coercion of the participants in Nepal. Bangladesh Forest Department needs to gain trust; donor-funded projects gain the trust of the community providing incentives (Islam et al., 2015). Opportunity for the institutionalization of people's participation in forest management is there (Khan, N., 2017).

The ecosystem helps the community to survive, similarly, community need to protect the forest ecosystem being the natural custodian. It is necessary to recognize community right, role, and responsibilities in the forest laws through to the management plans and implementation. Communities are formally included in the Co-Management institution, however need to engage communities effectively in deciding and execution. Incentives for the community should be there. Recognize community rights and common property institutions in the policy to reduce the vulnerability of poor rural populations (IFAD, 2015). More AIGA opportunity, a rational package for Community Patrol Groups and more philanthropic citizen's engagement are the demand of the local community (Rakkibul et. al., 2011). The Forest Policy need to be livelihood supportive and effectively engage local communities in forest management (Nath and Inoue, 2013). Diversified and additional income opportunities plan in the Participatory Forestry to support dependent communities is vital (Kibria, et al., 2013). Fuelwood and other nondestructive materials collection for the household consumption from reserve forest could be allowed; priority could be given to local people to avail Social Forestry opportunities (DeCosse and Susan, 2006).

Community participation in forest management can be increased raising awareness (RPP, 2014). Stakeholders need to be sensitized on the significance of the Protected Area network for the national sustainable development; and management of Protected Area engaging community (Merrill, 2011; Ahmed, et al., 2011). Women participation in forest management need to be ensured (CPD, 2008). Better awareness and capacity of the law enforcement agencies on forest issues should be enhanced (RPP, 2014). It is very important that the local leadership and the Forest Department work together to manage forest resources of the CHT including Village Common Forest. Law alone cannot protect the forest. Awareness and sensitization campaign targeting community, political level, senior administration level and in the judicial level will provide a dividend in the form of forest protection and biodiversity conservation.

The Forest Policy 2019 (submitted for approval) in the general guidelines commits that, the involvement of local communities including women will be encouraged in forestry activities (National Forest Policy Guidelines D 1. (9), translation researcher).

## **Forest Health**

The forests in present-day Bangladesh was never great if considered timber production. Regarding ecosystem service, however, most parts of the country was covered with forest ecosystems. The British administration has initiated forest management adopting policy and enacting laws which encouraged clearing of forests and convert forest land to agriculture land for enhanced return. British regime declared the forest as the reserve to prohibit community access to the forests. The then Forest Department cleared the native forests and planted with high-value timber species like Teak and others. The economic efficiency focused management degraded forests. The deforestation was encouraged by the than Forest Policy. The economic focused forest management continued during Pakistan period and even in Bangladesh till early 1990s; so, as the forest degradation. The importance of the ecosystem services other than the soil conservation or hydrological cycle was never considered in the forest management of this part of the world, until the Earth Summit in 1992. The Summit adopted Forestry Principles and other related conventions. The outcome of the summit influenced governments and forest managers over the following years and decades to shift the paradigm of the forest management towards protection of the forests and conservation of the biodiversity. The forest management paradigm shift in Bangladesh has been intended in the Forest Policy 1994 and the Forestry Master Plan 1995-2015. However, the legacy of the forest degradation, deforestation, encroachment and conversion of forest land to other land use continues.

The major forests of Bangladesh are: i) catchment forests in the Chittagong Hill Tracts ii) ecological forests (Sundarbans) iii) narrow strips of forests between Chittagong and Teknaf peninsula, sandwiched by villages iv) the patches of Sal forests in Madhupur and Bhawal, surrounded by residence and v) the evergreen hill forests of the Sylhet region were also not a wilderness. Forests are remote by nature. The land mass of a country depending on the suitability of use are categorized into A (suitable for agriculture), B (undulating, yet suitable for agriculture), C (Slopes and valleys could be useful for horticulture and forest) and D (strip hill, only suitable for forest) categories. Naturally D class land and selected C class land which is not suitable for other use, are recommended for forestry. The Chittagong Hill Tracts was surveyed by International Forestall Forestry during 1965 to 1967.

The survey found 73% of the land in the CHT is D class and suggested to bring these land under forestry. Surprisingly Bangladesh forests are in the plain land; should be released and start forestry in the high hill lands where the population pressure is low.

Return from commercial forests and alternate land use compete. It is truer for a land-hungry country like Bangladesh. It is becoming more pressing and realistic when Bangladesh is industrializing along with urbanization at a rapid pace during the last two decades; set a vision to become a developed country by the next 3 decades. Industrialization is necessary for economic growth and employment; Bangladesh requires land for the industries and forest land is an easy target; however, forest land must be conserved. For example, Co-Management might help in forest protection and conservation; however, the substantial economic development that will provide employment of the rural people in urban centers will help more in forest protection. This is a dilemma.

The mean annual increment (MAI) in the tropical forests varies greatly depending on the silvicultural practice from 1 to over 15 m<sup>3</sup>, however, yield range between 0.5 to 2.5 m<sup>3</sup> of commercial log/ha/year assuming 20 to 40 years' intervention (Grulke, et.al. 2016). Internal rates of return from natural forest management projects vary from negative returns to 15% and over depending on management efficiency and conditions (Grulke, et.al. 2016). Natural forests can sustain in the land not suitable for agriculture, remote places and legally classified for forestry use; political will is necessary for natural forest preservation (Grulke, et.al. 2016).

Unlike elsewhere the forest land in Bangladesh is immediately suitable for agriculture and other use. Therefore, retaining the forest is challenging and once converted can't be recovered in such a populous country that is having a yearly 6% growth in the economy. For example, the industrial belt in the Gazipur district is within Sal forest; struggling against massive encroachment for expansion of the industries. Enhancing forest productivity is a key factor in ensuring sustainability and strengthening the competitiveness of natural forest management (Grulke, et.al. 2016). Bangladesh forestry initiated with production forestry programs that used need-based analysis and practiced clear felling of indigenous species and plantation with valuable species. However, Bangladesh has shifted the management paradigm and moratorium on logging has been sanctioned since 1989 to the natural forests.

People need both Protected Area for environmental services and sustainably managed production forest for forest produce. However, fragmentation of forest habitat not only reduce the tree extents but also limits and reduces biodiversity. Roads and highways and railway thru the forests fragment habitat and create unnatural disturbances which affect the wildlife. A better

understanding of how species survive and colonize in the changing climate is necessary to take strategies to maintain keystone species (Ahammad, et al., 2014). For example, Lawachara National Park has been bifurcated by the railroad as well as highway; fragmented the habitat limiting survival of the gibbons and other wildlife. Extensive habitat loss, degradation, and fragmentation reduced tiger habitat. A joint tiger survey conducted in 2015 using camera trap method, found only 106 (83 to 130) Bengal Tiger in the Bangladesh part of the Sundarbans.

These are the challenges that originated from the infrastructures developed aligning people's aspiration. Tree resources are essential to keep the country livable. However, assessment reveals that despite management effort, tree density, forest cover and canopy cover in the natural forests are on the decline. Forest land is being used for developing infrastructures including roads and highways, railways, military purposes, creating new economic zones, shipbuilding, rubber plantations and for industries. Forest land converted for oil and gas exploration and stone quarry (Hassan, 2011). Whenever the government needs a sizable chunk of land for development work, decides to provide the forest land (Choudhury, 2011). However, the Forest Policy 1994 directed reserve forest land conversion only with the Prime Minister's permission (19th statement of the forest policy 1994).

The conversion of the forest land by the state is for development and follows legal procedures. However, may not be moral and for sure environmentally damaging. The drivers for forest degradation and deforestation are many and are interlinked. The deterrent of the forest health become increasingly complex over time in Bangladesh due to a high demand for land and forest produce. Following the Liberation War (National Revolution) and the emergence of Bangladesh in 1971, the middle class flourished in outlook and aspirations. The middle class and the neo-elite class require more utilities as the society gradually transforms into urban societies. The historical dependence of the predominantly agrarian Bangladeshi rural-based society on the face of rapid urbanization and to meet the ever-increasing demand for forest resources exerts huge pressure on the forests of Bangladesh.

### **Underlying Causes of Forest Degradation**

The main reason behind forest degradation is poor management. For example, clear felling has destroyed natural forest, habitat, niche, and biodiversity. Forest Department, at that point in time, had no knowledge or any plan for natural regeneration or managing natural forests maintaining biodiversity. The approach was clear felling and followed by artificial regeneration, i.e. plantation. Instead of indigenous species, the choice was valued timbers like Teak and other long valued long rotation species. The plantation included some other fast-



growing short rotation species. The ecology, utility, and economics of this plantation were never studied, however, converted the natural forests into the plantation. Plantations clearing natural forests is a major reason for deforestation in plain land Sal forests and forests in Sylhet and Bandarban district (Ahmed, 2002). Revenue generating policy converting forests to the plantation of exotic species were never successful and encouraged encroachment and conversion (Iftexhar and Hoque, 2005). Overcoming the colonial legacy of bureaucratic management of forests isolating communities and ignoring their customary rights remain a factor in forest health maintenance in Bangladesh (Rashid, et al., 2016).

Underlying causes for unsustainable harvesting practices include lack of planning, inadequate finance, poor scientific knowledge, and weak monitoring and implementation arrangements (RPP, 2014). Poor people having no alternate livelihoods are compelled to harvest forest resources; outside forces harvest forest products illegally taking the opportunity of weak law enforcement and corruption (RPP, 2014). For example, raised coastal plantations are exposed to encroachment, deforestation, and conversion for rehabilitation or other use. Increased pressure of policy measures influence people's attitudes to forestland use negatively, e.g. increase in firewood confiscation commenced in 1921-22; when working plan preparation for the hill divisions was visible to the people and they felt that resources would no longer be available to them, such insecurity feeling could have influenced people to gather and store fuelwood that has been revealed through an increase in fuelwood confiscation (Ali, et al., 2006). The negative attitudes of local people towards forest resources were exacerbated by unsympathetic regulations passed by the ruling authority, starting with the British regime continuing to the Bangladesh period (Ali, et al., 2006).

The underlying cause of high dependence of local community on forest and forest product is limited access to alternative sources of livelihood products, particularly fuelwood and timber (RPP, 2014). Forest 'villagers' have small holdings; limited livelihood options forced them exploiting directly from the forest to reduce poverty (Pandit and Thapa 2004; Belcher 2005; Thomas 2008, cited in Nath and Inoue, 2013).

Inefficient management because of limited and unskilled human resources of the custodial department and inadequate resources are reasons for natural forest degradation (Rahman and Mannan, 2011; Ahmed, et. al., 2011; Paul and Chowdhury, 2011). Around 50% of the Forest Department managed forests (1.52 million hectares) are almost denuded (Choudhury and Hossain, 2011). Illegal harvesting and overexploitation of fuelwood, timber, and bamboo degrade forests; the outcome of the degradation and dependence for settlement facilitate

organized encroachment (Khan, 2001; Hoole, 2008; GoB, 2012; Miah and Koike, 2011; Quddus, 2011; Sharma and Banik, 2011; Paul and Chowdhury, 2011; Misbahuzzaman, 2015; Mazumder, R., 2011; Muhammed et al. 2008; Chowdhury et al., 2014). Like many other countries, overexploitation and degradation are linked to high population density (Allen and Barnes, 1985), poverty (Ahmed, et al., 2011), lack of awareness and clear land tenure (Merrill, 2011; Paul and Chowdhury, 2011).

The poor people in the forest vicinity are reliant on the forest for their livelihoods (agriculture, the collection of NTFP etc.); many others are dependent for forest resources for consumption, e.g. fuelwood, timber, grazing etc. Most of the rural people in the forest surrounding villages depend on various forest resources (Sharma and Banik, 2011). Several studies found rural people dependent on forests for subsistence income (FD, 2009). High livelihood dependence on the limited forest is the major challenge for sustainable forest management in Bangladesh (Mukul, et al., 2010). Low literacy rate, low land assets of many people, low crop production limits alternative livelihood and force people for extraction (Ahmed, 2008). The forest villagers who are wage laborers sometimes involved in illegal logging. Sundarbans dependent people visit tiger habitat; some of them engage in the illegal trade of tiger (Islam and Hossain, 2011).

Grazing in many forests is a cause for forest degradation (Rahman and Mannan, 2011; Chowdhury et al., 2014). High demand for cattle and goat meat and scarcity of fodder drives grazing in the Protected Area (Rahman and Mannan, 2011). Newly planted forest in the accreted land, among other places, is used massively for livestock grazing (Misbahuzzaman, 2015).

Indigenous people live within and around the forest in Asia; their relationship with the forests are not considered good for the forests (Ahmed, 2008). Tribal people are often considered responsible for forest degradation. Increased Jhumchash in the Chittagong Hill Tracts (CHT) is a cause of forest degradation (Miah and Koike, 2011; Jalil, 2011).

The most evolving complication is to ensure diverting livelihoods for the landless people who depend entirely on forest products (Robinson, 2011). There is a grave importance in keeping up the asset base of poor people; having employment opportunities, well developed rural infrastructure and alternative fuel (CPD, 2008). Poor people living near the forest are highly dependent on forest resources and there is a widespread perception that alternate income generation activities are essential to reduce dependency on forests. However, (Islam, 2013) pointed out that given AIG supports could not reduce the dependency of local people on

Sundarbans. However, communities, especially those involved in forest management, can accrue user rights over forest land and can share benefits (Rahman, L., 2011). Limited livelihood options and political space are insufficient and significant changes in the use of forest resources dependence are yet to achieve (Koli, 2010).

The challenge remain is the demand for resources like betel leaf pole, house building and thatching materials and fuelwood. Substitute of forest resources remains a key to ecosystem and biodiversity conservation (Merrill, 2011). Needs and ability to meet the needs of the forest must be balanced to maintain forest health; will require diversified and diverting means for resource-dependent people (Ahammad, et al., 2014). Increasing energy and material use efficiency, converting existing knowledge into technology is necessary to reduce resource use; efficient use and increased use of renewable energy are essential for forest conservation (FAO, 2010).

It is necessary to ensure community benefit in forest management and support alternative livelihoods for forest conservation. Timber extraction is not allowed from Protected Area. However, the benefit sharing with the community could be from non-timber forest products and thinning operations. Divert and support livelihoods of resource-dependent local people (Merrill, 2011; Ahmed, et al., 2011). Diverting livelihoods are necessary to become effective in Co-Management of Protected Area (Morshed, 2013; Ali, Uddin, and Chowdhury, 2015).

Skill-based training and provide post-training financial and material support, for alternative livelihoods will decrease dependency (RPP, 2014). Special focus could be provided to divert the livelihoods of the people living inside the forests for a long time as villagers. The following intervention will help arrest degradation:

- Promoting improved cooking stove to reduce fuelwood use
- Support resource-dependent communities with bamboo and fuelwood plantation at the homestead and on the community spaces
- Enhance Social Forestry for the resource-dependent community
- The encroached forest land should be recovered in consensus with the encroacher for establishing fuelwood plantation using Social Forestry approach.

Encouragement including in-kind and financial support to the nursery operator for ensuring livelihood security could be introduced (Alam, 2009). The incentives in one hand will divert livelihoods of the dependent communities and on the other, will substitute fuelwood that in turn will reduce fuelwood collection from the natural forests. For sustainable forest

management, alternate livelihoods of the forest-dependent people gained growing attention during the last two decades (Nath and Inoue, 2013). Following four forests reached management excellence ensuring livelihood support to dependent communities (FAO, 2005):

- Periyar Tiger Reserve in Kerala, India; Chaubas and Bhumlu community set an example of sustainable forest management and income generation for poverty alleviation for the region and beyond
- Shree Binayak Pimidanda Community Forest User Group in Nepal
- high elevation forest in the Knuckles Range in Sri Lanka and
- forests around Huoshan County in China

Livelihood supportive forest policy engages local community effectively in forest management (Nath and Inoue, 2013).

### **Underlying Causes of Deforestation and Conversion**

Management of forests under the bureaucratic custodian approach was a major reason for deforestation (Khan, 1998). Land tenure issues, land use planning and social and political uncertainties, instability and poor economy influences the direct causes of deforestation (FAO, 1998; Iftekher and Hoque 2005). Consumerism influenced lifestyle and high consumption contributed to the deforestation (Ahmed 2008). The underlying reasons of forest land conversion is many, including settlement, infrastructure, agriculture, shifting cultivation, shrimp cultivation, salt production, ship-breaking yards, industries; politically induced planning process, unclear land tenure and land demarcation; conflicting policy and planning, weak law enforcement and coordination between government agencies (RPP, 2014).

Overexploitation leads to forest degradation that in turn leads to deforestation, encroachment and ultimately forest land is converted to homesteads, horticulture, agriculture and industries (Kamal et al., 1999; GoB, 2005; Miah and Koike, 2011; Sharma and Banik, 2011; Merrill, 2011). The victims of the natural calamities start living in the reserve forests. They plant trees like mango or jackfruit which are the non-forest tree, to prove their possession since long. These settlers claim ownership of the land in their possession and utilizing all other land grabbing tricks like a fake deed, converting the land class to Khash and lease out etc. During the Pakistan period, people were more law-abiding, worried to grab government land because of strong penal focused laws. Nonetheless, people were drawing for their consumption and livelihoods which degraded forests anyway. However, the degradation was at a slow pace. Since the independence of Bangladesh, the law enforcement become limited, people's aspiration and demand increased and political influence supported reckless land grabbing.

The remoteness of Sundarbans creates a separate set of challenges for forest management besides the generic pressure on resources, like pirate loot assets of the fisherman and in many instances ransom collection (Hassan, 2013. In Mustafa. M.G. et al. 2013). Poaching of tigers and deer and poison fishing remain challenges to sustainable forest management in Sundarbans.

The forest villagers living inside the forest has a legacy. There are different opinions regarding the settlement within the reserve forests or Protected Areas. One school of thought is that the concept of forest villagers is no longer valid, all people living inside the reserve forests must be evacuated. Nonetheless, the eviction is very difficult for so many reasons, like the constitution of Bangladesh confirmed the right to having a shelter for all citizens. So, landless people living inside the forests cannot be evicted. There is also a rich grabber and they use political influence to grab forest land. The other school of thought is to engage the forest villagers intimately into the forest management; support them with education, health facility, and the livelihoods. However, an inventory of the people living inside the forest is necessary to stop further entry and in consensus with the villagers, they could be relocated to the peripheral forest land.

Forest lands per Cadastral Survey (CS) has been encroached by illegal occupants. The process becomes complicated as the ownership rolled over from one to another to another. Now there are mills, industries, settlements, and agriculture on these occupied forest lands. This malpractice is continuing till date; ill-motivated people are doing this with the help of the corrupt officers. It is worth mentioning that CS records have the legal presumptive value of correctness in contrary other surveys like the SA or the BS do not have the legal presumptive value of correctness. There are huge litigations which are a process of retaining forest lands in the favor of the encroacher. Permanent conversion of forest land remains a major challenge in the backdrop of emerging high opportunity cost of forest land and prevailing governance system.

Forestry Master Plan (1995-2015) warned that deforestation will steadily continue till any forest left if measures are not taken to reverse the situation (Chowdhury, J., 2011). Forest management in Bangladesh faces many challenges including economic, sociopolitical, forest land tenure and climate change. Densely populated, land-hungry agrarian Bangladesh is transitioning to medium sized industrialization to reach a developing country by 2024. The aspiration is to become a developed country by 2041. Bangladesh, aligning development aspirations has initiated the development of infrastructures including railroad, highways,

power plants, industries, and associated other infrastructures. Urbanization and emergence of a middle-class are changing the land use landscape substantially. The land use in Bangladesh has become economically competitive.

Forest management in the recent years faces many challenges in Bangladesh. The most critical threat to the existence of the forest is forest land conversion. The challenge is paused by many reasons including increased demand for homesteads, small holding agriculture, infrastructure development, industries and the opportunity cost of the forest land. The intangible benefit of the environment is yet to be factored in into the development economics. Culture and land use rights of the indigenous people and land governance poses significant challenge to keep the forests as forestland. Flaws and legacy of the land tenure system increase encroachment and conversion potentials.

Climate change directly challenges forest health and even existence of forests depending on the geographical positions. Climate change has the potential for further aggravating existing challenges. Ever growing national demand for forest products, and desperate anthropogenic interference; the image crisis of the Forest Department; forestry being the low priority sector in the national development and policy agenda; poor coordination with other agencies; revenue/commercial orientation of NRM and not quite seeing the 'big picture' (institutional/policy integration, landscape/ecosystem-based approach) are threats to the forest sector (Khan, 2017).

National physical planning is necessary to stop settlement extension into the forest. Higher level political commitment is essential to stop providing forest land for military establishments, roads, highways or other infrastructures (Ahmed, 2008). Highway and railroads bifurcated forests and fragmented the wildlife habitat. For example, the high way through the Lawachara National Park can be shifted around the Noorjahan Tea estate. Forest Department should not allow further settlement inside wildlife sanctuary; help of civil administration and local elites are needed in this regard (Islam, 2013 in Mustafa, et al. 2013). Local people should be made aware of the difference between Khash land and reserve forest land and the boundaries of the forests; people could challenge land conversion processes (DeCosse and Susan, 2006). The settlement and industries or private establishment changing forest land entitlement must be stopped (Rahman, L., 2011). The government should take the step to recover forest land, using CS records.

Take adaptive approaches to help increase forest resilience, e.g. selecting appropriate species for the changed soil and climate condition will be necessary (FAO, 2016). Guidance for climate change adaptation plan for forestry, particularly for mangroves can be framed (Alam, 2009). Ensure corridors, protect habitats and conserve flagship species for the healthy ecosystem that will support all other species (Haque and Islam, 2011). The plantation of the storm and salt tolerant species can be increased (RPP, 2014). Pest-resistant or drought-tolerant varieties, use of stock from different origins and underplanting genotypes could be possible adaptation measures; specific to the forest condition will be essential to address arising challenges of climate change (FAO, 2010).

The Forest Policy 2019 (submitted for approval) commits to take effective steps for strengthening eviction and preventing encroachment of forest lands; recognizes, forest degradation, declining forest produce, declining wildlife habitat, and shrinkage of biodiversity and downgrade of the forest ecosystem services.

## **Governance**

Governance establishes right and builds capacity for the stakeholders to participate in decision-making (Bosselmann, et.al 2008). Strengthening governance in general and in the forest sector is an overarching need (Banerjee, 1997). The governance is lacking in forest management in Bangladesh. The barren CHT forestland clearly indicates a lack of governance. Most of the Sal forests have been encroached and converted which reveals lack or limitation of the governance. New Delhi declaration and MDG both emphasized the necessity of good governance that depends on rule of law for all (Rashid, 2012). There is an adequate legal frame, guidance for transparency and accountability, however not followed and provisions are not enforced. The society is changing, so is the ecosystem; from inside or externally, accordingly, governance for forest resources are emerging (Arts and Buizer 2009).

The governance is transforming in Bangladesh to conservation and management engaging local people (Ahammad, et al., 2014). Development Partners while supporting the development in Bangladesh are not following the principles of Aid Effectiveness. They refer to various deficiencies, however, there are instances where Development Partners in the Local Consultative Group (LCG) agreed on the priority of the government in providing support and later differ while they are back home. There is limited government funding for a development project; donor-supported projects though bigger in size, however, spent a substantial portion for consultancy.

## **Coordination**

The coordination among relevant government agencies and the development partners is very important to have synergies of the implemented interventions for sustainable natural resources management. However, the coordination must be facilitated through a procedural framework, e.g. under Rules of Business. However, coordination is a matter of professionalism and cannot be ensured by Rules. Centrally there is a provision of a monthly coordination meeting in the ministry. Inter-ministerial coordination takes place by forming a committee. Coordination is there within the Forest Department. Coordination instruments are there at the district level; District Environment and Forest Development Committee where Deputy Commissioner chair and Divisional Forest Officer is member secretary. The coordination of the Forest Department with local level government offices is very weak. Most of the departments were made a representative institution during 1983-84. Forest Department was not made representative during then, however, in subsequent amended Act of LGI 2011, Forest Department has been made representative in Upazila and Districts. The setup remains inadequate since Forester is a grade-15 officer who is to coordinate with UNO, is a mismatch. District administration has coordination meeting on the development projects. However, the Forest Department does not get help in need of forest protection due to many reasons. Awareness of the local level officers of other agencies on the forest is very low, they consider forest protection acts as an extra burden.

Coordination of Social Forestry is pretty good. Coordination is weaker in natural forest management and Hill Tracts forest management. However, the government officers can understand now that without the help of the community, it is impossible to manage forest properly. The local level government is far from understanding this new system, but it is essential to involve them since they are the main stakeholders. Extension forestry coordination is quite satisfactory, for example, nursery, and roadside plantation and homestead plantation.

The Forest Department lack in communication and coordination with other departments. For example, in Hakaluki haor, an ECA, Forest Department has done several development activities including an office building, tower, and planted trees. However, have not communicated with the ECA custodian, the Department of Environment. There is little coordination among BFRI, Department of Environment and Forest Department. Similarly, the Forest Department has less coordination with local government. There is a lack of coordination with Public Administration, Finance, Shipping, Water Development Board etc. For example, Plantation on polders along the coast create natural barriers to weather extremes; however, the Water Development Board prevents plantation. Forest Department raises mangroves in accreted coastal land and once the



land becomes suitable for agriculture transfer land to the Ministry of Land in accordance with the law. Coordination with other government agencies and LGI regarding natural forest management is not satisfactory. Lack of clear policy directives for maintaining a green belt creates conflict among district administration, community members, and forest staff. At the district level, ACF and Ranger are not able to restore the interest of the forest and Forest Department. Deputy Commissioners overpower these officers, even CCF cannot back up Forest Officers out of fear for being a part of the political conflict. However, in recent years' encroachment of substantial chunk is not there. Nonetheless, in declaring a reserve forest where Forest Officer is not involved, a sizable chunk of land encroachment occurs. Forest Department can't act to protect forest land because they must proceed through the Assistant Commissioner of land and Deputy Commissioner.

Conflict identification and resolution require having a thorough understanding of the matters by the actors across the institutions; institutional framework plays a key role in identifying conflicts and resolution (Berkes, et al., 2005). Inter-agency conflict resolution, harmonies among science, policy, and practice are crucial issues for forest management (Miah and Koike, 2011). The political interference is massive and conflict management mechanism is poor in the Forest Department. Project tide professional culture has evolved after the independence of Bangladesh in 1971. In some instances, the project staff has been absorbed in the government as non-cadre staff, which is contradictory to the cadre system. There is a conflict between cadre and non-cadre officers. Project-based non-cadre ACF recruited during the late 1990s following adoption of Forestry Master Plan (1995-2015) created conflicts within the department. This conflict hampered Forest Department's function for last two decades and will continue hampering for the next decade.

The Forest Act, 1927 and the Wildlife (Conservation and Security) Act, 2012 provide guidance to mining conflict. The biological conservation protocol clearly states, what can be done in Protected Areas; however, it has not adhered. Mining is banned inside Protected Area; however, mining continues degrading forest. Mineral resources could very well be found in forests. Ministry of Power, Energy, and Mineral Resources issues a license for sand and stone collection even from reserve forest. Mineral Resources Division and Forest Department clash with one another in many places regarding sand mining since supporting Acts favor respective sectors. Mineral Resource Division resumes authority if minerals are found, even in the Protected Area which results in conflict with the Ministry of Environment and Forests; conflicts can only be resolved at the cabinet level. There is the possibility of environmental degradation in extraction. For example, in Tangratila extraction, forest, and

ecological resource were lost, yet because of large-scale profit, mining and gas extraction have been permitted. However, mining for the small range for construction industries, make forest degraded and create a landslide, should not have been permitted in the Environment Impact Assessment. Seismic survey and stone quarry survey was conducted in Lawachara and in Mymensing. China clay, sand, and limestone survey is an ongoing process; degrades forest if the survey is conducted within the forest.

Enforcement of forest law requires the collaboration of different actors, for example, Forest Department, Police, and Court of Justice; collaboration is not good among these agencies. Tree feller and other forest offenders escaped due to lack of good governance. Fruitful interaction and collaboration are lacking due to the hierarchical mindset and mandate culture. For example, Conservator of Forest (CF) hesitates to coordinate with Deputy Commissioner (DC). CF knows, he is higher than DC and his psyche does not allow him the proactive coordinating role. Similarly, UNO is not interested in coordinating with Ranger. Forest Officers cannot do anything to prevent forest encroachment unless they see the green light from the DC. Magistrate gets police support whenever asked, however Forest Officers do not get similar support. Overlapping jurisdiction of various government agencies in managing resources create confusion and conflicts; ecosystem-based adaptation suffers (Ahammad, et al., 2014).

Lack of collaboration was visible in a severe oil spill incidence in 2014. Forest Department was very sincere and worked very hard to recover and reduce the damage of the Oil Tanker capsized in Sundarbans. Unfortunately, other departments instead of collaborating and supporting the effort of the Forest Department in recovery, they were firm against the Forest Department; that demonstrated a lack of collaboration. Conservation measures are limited because the value of the forest is not properly communicated to the authority in the government and neither to dependent people (Iftekhar and Islam, 2004). Inadequate research on the valuation of ecosystem services limit convincing communication, however, valuation for Sundarbans ecosystem services has been conducted in 2017 by CREL project. The valuation assessment is necessary for other ecosystems. The value of the ecosystem service can be factored in while planning for development. The harmonization between the political people and bureaucrats must take place; however, may require the initiative of Prime Minister and anti-corruption commission to act. Political support is necessary to consider conservation of natural resources in national planning (Ahmad, et al., 2009).

ECA management activities in the Sundarbans vicinity is yet to start. However, the coordinated effort of the Forest Department and the Department of Environment could make people more

conscious and the protection of Sundarbans can be ensured. The FD, DoE, BFRI, and BFIDC must coordinate among themselves to identify research needs, conduct research, generate results and subsequently utilize for development. Coordination among Forest Department, District Administration, Agriculture, Fisheries and Law enforcement agencies at the district level can be improved (RPP, 2014). The local offices of the national government agencies must take forestry seriously and coordinate under the leadership of UNO. Forest Department and MoEF need to take leadership in coordination with the Planning Commission to ensure that the development programs are forest friendly. The development partners could aid in coordination among various agencies avoiding competition; coordinate with the government to ensure appropriate steering of the investments or technical assistance.

Forest ecosystem edges water and other lands, as such collaboration of agencies is essential to manage given areas (Ahammad, et al., 2014). It is necessary to bring cohesion between the community and the ministry. Forest Department can consider putting up a mechanism for conflict resolution; manage conflicts with help of the community and recognize and deal with incompatible laws and policy for various related sectors (RPP, 2014).

The Forest Policy 2019 (submitted for approval) commits: to reduce the wildlife offense, a Wildlife Crime Prevention and Rescue Unit will be formed in coordination with other law enforcement agencies; conservation personnel, provision for training, appropriate equipment, and adequate resources; other government and non-government organizations will cooperate with the Forest Department for forest conservation (National Forest Policy Guidelines D 15 (4), D3(5)).

### **Transparency and Accountability**

There are numbers of administrative and management tools in place that are applicable to all the public institutions in Bangladesh. Rules of Business, Public Procurement Rule 2008 (amended in 2015), Auditor General Office, Anticorruption Commission, sets of Laws and Rules, and the constitution are in place to maintain transparency and accountability. Discipline and Appeal Rule 1985, Ordinance, day to day Duty Discharge Rule, Financial Rule and Anti-Corruption Commission are for ensuring accountability. The recruitment and transfer policy are transparent by the provision. A committee represented by the Ministry of Public Administration, Ministry of Environment and Forest, Public Service Commission complete recruitment process for the Forest Department. Officer transfer and posting are handled by the ministry and subordinate staff transfer and posting are handled by CCF office, rest is done by Conservator and DFO office. Transfer and Posting Policy, 2004 regulate the transfer and posting of Forest Department.

Forest Department used procurement guideline, 2003 and later Public Procurement Regulation enacted in 2006 and amended in 2008 and 2015. However, due to a shortage of skilled manpower, logistics, and financial support, there are incidents of immense deviations.

There are committees at various levels and purposes which has been formed to ensure accountability, e.g. Committee for Social Forestry, District Environment and Forest Committee, Upazila Environment and Forest Committee, Co-Management Committee, Ministerial Committee, Inter-Ministerial Committee, National Environment Committee and so on and so forth. These committees are the tools as well as platforms for practicing transparency. Terms of reference of these committees include ensuring accountability among others. Provision and guidance for accountability are there in the legal framework and associated Rules, however, in practice, it is not visible. The forest official has never seen to be accountable to the government when the forest is encroached or destroyed. The maximum punishment is a temporary suspension; no instance of the sentence to jail for Forest Officer involved in forest encroachment, even getting proof against him. However, this is true to some extent for all public administration in Bangladesh.

The transfer policy cannot be followed because of reckless interference in transfer and posting which results into misappropriation in the day to operation as well as long-term management of forests. There are incidents of interference in recruitment and transfer process by the Member of Parliament or other political power. Whenever political people become a part of the administration, the system no longer works for the interest of the nation. There are instances where Minister interferes for a recruitment of peon and sometimes in the transfer of Forest Officers. Member of Parliament influences Co-Management Committee formation. The influential people interference is very often.

The poor people degrade forests stealing fuelwood and other commodities for their livelihoods, whereas influential people support deforestation and convert forestland in collaboration with corrupt and greedy Forest and Land Officer. The influential people, who steal forest resource, claim themselves as a political force. Stopping them is a very difficult task. There is a correlation between the number of trees and size of the forest with the change of political regime. Once there is the new regime, new influential people with ill motivation emerge and grab forest resources including trees and land. Many politician advocates for land grabber. There is widespread political interference in land grabbing. Here is an example of the gravity of the situation. During the military-backed Caretaker Government in 2007, the chief of the army instructed the then CCF to prepare a list of Sal forest land grabber in the Gazipur district.

CCF prepared a list of 299 encroachers of forest land. Once the list has been deeply considered, the caretaker government remain silent and decided that the matter be better dealt with by an elected government. The fact was, highly connected and rich people are the grabbers and at that time it was estimated that if evicted, around one hundred twelve thousand crores of BDT bank loan will become unrecoverable. More than one lac worker will lose the job if the land is recovered from the established industries. The political interference has increased across the sectors. Political power plays role in forestry, e.g. politicians in Noakhali protect illegal tree feller, supports the construction of roads felling trees and do not protect trees that save the exposed population from the cyclones.

Forest Department maintains an offense record. When it is revealed that reserve forests and even most part of the Protected Area are barren, a large area of the reserve forest is encroached and converted; the offense record does not record these. For example, Rahman and Mannan (2011) reported, around 2000 people entered the Inani forest daily and only 1 offense is recorded; fuelwood or NTFP collectors or grazing is not recorded as offense (Rahman and Mannan, 2011). There is no accountability for a person in charge if any forest resource has been stolen from his territory. Everything looks good in the book and not good on the ground; reveals non-transparency of the process. Our society is very centralized, highly person-centric and the entire system is running as a patronizing system. The flaws of the land tenure system created opportunities for the land grabber. One-third of the Forest Department recorded crime is related to encroachment and conversion of forest land (Rahman and Mannan, 2011; Ali, 2013). 90% of the encroachment happened during the last 25 years (Ali, 2013). The forest land encroachment happens for weakness in enforcement, among many reasons inadequate law enforcement Officers is one of the crucial factors. One magistrate handles a load of cases, resulting in lengthy delays.

After enactment of State Acquisition and Tenancy Act, 1950, Ministry of Land followed a norm in providing ownership of released lands from the Zamidars. The right of a person onland was recorded if the person were found in the possession of the land, has a deed and receipt (Dakhila) of land tax (Khajna). The corrupt nexus of ADC (revenue), AC (land), staffs of the land registration office and the ill-motivated elite person took advantage of this norm. The encroacher prepared a fake deed, cleared forests and took possession and grabbed large area of Sal forest of Dhaka, Tangail, and Mymensing. Ownership of land is recorded in 'Right of Record' which is updated following land survey which takes several years. ADC (revenue) and AC (land) have the authority to provide the entry in RoR on a regular basis. Ministry of Land does not have the capacity to monitor and protect land ownership

confirming appropriate entry in the ROR; undue alliance facilitated land encroachment and grabbing. The person in charge of checking the land class in RoR, do not bother to check on the ground regarding the class of land and or ownership. As such, the forest land is reducing continually, though Forest Department is filing litigation case. In most of the cases, people prepare deed which is transfer deed and fight against one another, whereas the Forest Department who is the owner is not represented. Someone becomes the owner with the court verdict. In this process, the land transferred from one to another and another and another and ultimately the forest land ownership settles during the survey to one of the private owner. Inherent spirit of this provision was undermined and forested land which was not reserved was leased out declaring not forested Khash land.

The land tenure, land use rights and livelihood practice and culture of indigenous community have been impacted greatly by changes in political regime over the territory. During the Pakistan period, forest land in the CHT has been converted forcing ethnic people out of their father's land for hydroelectricity. Construction of Kaptai lake forcing hundreds of thousands of ethnic people out of their ancestor's land. This has had ignited the conflict into uprising movement. Bloody unrest in CHT initiated in the 1970s and the armed struggle continued for more than two decades. Finally, the CHT Peace Accord ended the conflict in 1997, however, land issue is not yet settled. During last 4 decades, however, forests of the CHT designated as Unclassed State Forests(USF) has been thoroughly denuded. Indigenous people living in the forests do shifting cultivation (Agroforestry/ Jhumchash) that requires huge land to maintain the rotational cycle of forest regeneration and crop productivity; as such even in British colonial period the Jhumchash was discouraged (Jalil, 2011). The political and social reason, land tenure ambiguity and institutional constraints limit new investment and development in USF (FAO, 2000).

Accountability of forest management institutions is not good. Projects fail to start and complete within the stipulated time frame. People accuse forest professionals of collaborating illegal tree felling, poaching deer and tigers. Image of the Forest Department is at stake. The forest officers interpret policies differently following their motivation. For example, one Divisional Forest Officer (DFO) allows building infrastructure and Social Forestry inside the Protected Area and another DFO behave conservatively. There is room for improvement of efficiency, accountability, and governance. Reserve declaration process does not thoroughly consider the consequences. For example, National Bhawal park has been bifurcated by the highway, the community has not been consulted explaining the implication of their livelihoods. The brick kilns are using forest trees as fuel and the authority responsible

overlooks. For many reasons Bangladesh, yet to enforce forest law successfully. Efficient enforcement of the Forest Act 1927 in India succeeded protecting natural forests.

Forest Officers and workers are very efficient, however many of them are dishonest. They prefer plantation projects to allow clearing of remaining forest trees and prefer enrichment plantation. Currently (2015) around 40 plantation projects are going on, and forest officers like to be posted in the plantation projects to earn illegally by corruption, though plantation is a major reason for forest degradation. Transfer and posting are influenced in this instance where corruption and political influence played a role. Clearing of forests and plantations generates illegal money for the corrupts. Another example is, land in the lower elevation in Gazipur Sal forests area was allowed as private property; however, gradually higher forest land was encroached and grabbed by the corrupt nexus of grabber, land ministry officer and forest department's lower level officers.

TIB (2008) suggested sufficient laws and regulations for increasing transparency and accountability and eradicate illegal activities in the forestry sector. TIB proposal, however, seems a generalist statement without any depth or direction; does not mean much or help to understand the situation or guide for betterment. Forest Officers do not mention the privilege and right of the community and only the restrictions to the forest user. Minister and Secretary need to act to improve the governance in the forestry sector. It is necessary to enhance governance, accountability, and transparency for sustainable forest management (Chowdhury and Hossain, 2011). The government to establish a decentralized participatory forest management system to increase accountability and transparency (RPP, 2014).

The Discipline and Appeal Rule 1985, Ordinance, day to day Duty Discharge Rule need adjustment to ensure accountability. One must be held responsible if resources are stolen from his territory; all others in the loop must be brought to law to ensure good governance. Timeliness of interventions is a factor to ensure governance. There is room for improvement in recruitment, transfer, posting, procurement, and expenditures. Recruitment must be based on competence and officer's functionality must be ensured providing authority and responsibility. For example, the DCCFs do not have authority to exercise, authority centralized to CCF. The authority of the CCF is not at par with the head of other departments in the country and not at par to the CCF of the neighboring countries. However, the Forest Department must work very hard to retrieve its good name, effectiveness, and skills of their manpower.

Political agreement on the position of forests in the national economy is a pre-requisite to designate areas in accordance with capability and necessity, i.e. land use planning clearly demarcating permanent forests and to manage land conversion; institutions suffer local level jurisdiction and inefficiencies (FAO, 2010). The forest management decisions must be free of political interference. It is necessary to aware and orient politicians and finds a way to ensure neutral planning processes; promote policy for avoiding the use of forest land for infrastructure development (RPP, 2014). Apply zero tolerance principles and enforce the law impartially irrespective of political affiliation.

### **Sustainable Forest Management in the Region**

The government and politicians of the regional countries have come to understand that forest is very important, however, is yet to evolve in Bangladesh. Many countries opted for a policy The generic name of the village organization is Village Forest Council (VFC) which works that supports better livelihood and the conservation, once convinced of the contribution of forests to society and ecosystem services (Nath and Inoue, 2013).

India practices participatory or joint forest management (Bahuguna, 2002). Forest Development Agency (FDA), registered under Charitable Societies Registration Act of 1955. under an upper tier body of the FDA. Organizational structure and membership are different in different states of India, e.g. in Kerala, VFC is formed with every one of the villages. In other states, it is not the case. However, the villagers elect a 5 to 15-member Executive Committee (one-third women). The EC members elect one of them as president of both EC and VFC; respective forest official act as the secretary of the EC (Aravindakishan, 2011). VFC members protect forest near to their village with support from Forest Department; take up conservation measures and manage degraded forest under the long-term agreement; the members get employment opportunity and benefit of the forest produce (State Forest Policy, 2008). VFCs are accountable for the protection of forests from various man-made disturbances; sharing the proceed from NTFP and others, operate the functionality of the VFC and uses a certain percentage of the proceeds of the earning for improvement of the village (Aravindakishan, 2011). India has introduced Panchayat Forestry system and succeeds in forest conservation. Efficient enforcement of the Forest Act 1927 in India succeeded protecting forests. However, India allowed ethnic people to use forest land with strong terms and conditions which are not recommended for Bangladesh.

Community Forestry in Nepal has been a success in natural restoration. Community Forestry in Nepal developed progressive legal and policy framework including providing land rights to



the community. The revolutionary improvement of forestry in Nepal is because of ownership of the forests by the common people, however, forestland ownership remains with the government. Thailand is better regarding forest and forest management, only Myanmar matches with terrible condition of the forest of Bangladesh.

Which forest ecosystems in the Asia and the Pacific region are functioning and producing forest goods and services sustainably; and what management excellence realized such level of performance? In the backdrop of serious degradation, deforestation, and poor management; the foresters of the Asia and the Pacific region wanted to find an answer. During the seventeenth session of the Asia–Pacific Forestry Commission (APFC) held in Yogyakarta, Indonesia, in February 1998; wanted to recognize instances of good forest management. FAO/RAP and the RECOFTC jointly sought nominations for superiority in forest management in the Asia and the Pacific region. The partnership received 172 nominations including community forests, private forests, state forests and joint management forests. Among these 14 were from Nepal, 14 Philippines, 39 Indian, 25 Indonesian and 17 New Zealand forest management cases were received. The process has selected 28 cases and studied those selected forest management cases between February 2003 and January 2004. The findings were consulted in the twentieth session of the Asia–Pacific Forestry Commission in April 2004 (FAO, 2005).

Exemplary forest management in different countries of the Asia and the Pacific region includes large and small forests, mangroves to hill forests; having diverse objectives and under different ownership arrangements. The thrust was given to numerous factors for different forest cases. There are cases where addressing property rights brought success, maintaining cultural identity make few forest managements good, creating and diverting livelihood opportunity reduced pressure and bring back nice forests in some cases and establishing sound institutional mechanism is the basis for few exemplary forest management (FAO, 2005).

### **Addressing Property Rights**

Property rights are essential for the active and meaningful participation of the indigenous community (Ludwig, 2012). Following forest management cases came out as management excellence transferring and enhancing safety of land entitlement: i) the local government of Ho Chi Minh City in the Viet Nam assisted local people settling inside Can Gio Mangrove and devolved a system of community management; has restored mangrove which has created opportunity for their livelihoods like crab, fish and eel farming; ii) community planted and managed Sulia Reserve Forest in the Indian State of Orissa, in effect community has been enjoying rights; iii) Cambodian government ensured resource security and provided mandate

to Kompong Phluk and Bos Thom communities through a sub-decree in 2003 that successfully rehabilitated and protected the forest around Tonle Sap Great Lake; in any case land titles were not transferred, rather an institutional arrangement of enforcing defined rights and assurance of benefit sharing make these forest management excellent (FAO, 2005).

Kalibo Mangrove Reforestation Project, central Philippines initiated in a bare mudflat. Community-based organization KASAMA was formed by the project and the organization planted and maintained mangroves fighting the challenge of land encroachment by powerful people; an agreement with the department and the KASAMA established community rights on the mangrove; community successfully supporting ecotourism.

The Can Gio Mangrove near Ho Chi Minh City in Viet Nam has been restored in a different approach than that of Kalibo; Local government assisted a group of local people making their homes within the forest and devolved management responsibilities for them; better mangrove management reversed degradation and allowed people to earn. The community using their business skills earned from crab, shrimp and eel farming; restoration success was revealed by the declaration of UNESCO Man and Biosphere Reserve.

Sulia Reserve Forest in the Indian State of Orissa was thoroughly degraded because of fuelwood and pole collection. The situation became so desperate that the local community formed a forest protection committee and initiated member's fees that enabled guarding the forest and restrict encroachment. The community having effective entitlement planted and managed the forest.

Forests of Kompong Phluk and Bos Thom around the Tonle Sap Great Lake in Cambodia has been restored. Cambodian government ensured resource security and provided a mandate to the community for forest management through a sub-decree in 2003. Kompong Phluk and Bos Thom communities formed "Community Resource Committees" and actively rehabilitate and protected the forest.

The objective of the leasehold forestry in Nepal is to revitalize the degraded forests alleviating rural poverty. The degraded forests are allocated to the community groups. The household who owns less than 0.5 ha. of land and per capita income is less than 110 USD at 1985/86 prices and 192 USD at 2010/2011 prices. One group is usually comprising of less than 10 in number. One member represents one household and per household receive around 1 hectare of forest land. The community group can manage the land collectively as a group or may decide to manage individually. The lease is for 40 years with a provision of renewing for another 40 years. The

community must shift their goat rearing if any to stall feeding, can produce broom grass and non-timber forest products including forage, grass, and trees. The timber is a secondary benefit. Last twenty years of experience reveals, about USD 3000 income per year per household. The responsibility of the group is to protect against open grazing, forest fires, soil erosion etc. concerned government officers including forest officer and livestock officer facilitate the group to prepare a forest management plan and provide training to build their skills and advise them to restore their plot. The group has been guided by a constitution. The group enjoys the harvest, however, cereal production is not allowed. Any remaining forest trees must be protected by the group and remain the property of the state. Transfer of the lease rights is allowed once the group successfully manage the forest land for at least one-third of the lease period.

Nepal practice Community Forestry in compliance with the Forest act 1993. The government handed over 18,13,478 hectares of forest land to 19,361 user groups (CFUGs) of the 1072 groups are women only committee members. A total of 24,61,549 households are benefitted. The community user group is the general body with a membership of all households in the boundary of the handed over land; they have an executive committee. The community writes an application to the government to initiate the process, the government sends a technical expert to support community for preparing a constitution following guidelines of the existing law in this regard. The community develops a management plan for 10 years' period which can be extended. The community groups get the lease once the plan is approved and accordingly can manage and utilize the resources according to the constitution and activities chalked out in the plan.

Common properties become unrestricted access turning into "tragedy". However, local communities forming resource management committees taking a participatory approach to overcome the respective tragedies of the commons. The democratic decision-making process, marginal group participation and sharing of the proceeds supported sustainable forest management and reveals that empowerment of the people allows them to respond strongly and positively. Transfer of land titles are not necessary; however, a capable institutional framework is necessary to enforce well-defined rights and assurance of the benefits of work for tomorrow (FAO, 2005).

### **Maintaining Cultural Identity**

The Ikalahan indigenous community developed a forest management approach incorporating Ikalahan culture. The leadership maintained their culture and demonstrated entrepreneurship.

The Kalahan Forest Reserve in Pangasinan Province, Philippines witnessed a dedicated "champion", the Reverend Delbert Rice motivating, enabling and leading harmonization of Ikalahan culture and contemporary Filipino culture.

The Krui Damar agroforests, Sumatra, Indonesia. The Krui community divided into 16 clans live in 60 villages and historically drawing their livelihoods from dammar resin. The ethnic minority had to suffer a lot from the customary rights and finally the Indonesian Government issued a Government Order in 1998 declaring the forest as "Kawa sandeng antuju anistemewa" meaning "area with special or extraordinary objectives" that recognized the customary rights and allowed Krui people managing the forest and thus century-old excellence has been restored.

The Ifugao people of the northern Philippines practice Muyong system, a time-tested traditional system of patch forests adjacent to Ifugao settlement that conserve soil, protect the settlement against runoff and safeguard irrigation water source thru drought period. Muyong provides forest resources for house making and handicrafts, and NTFP. Ifugao people had to fight like the Ikalahan and Krui people and finally, gain certain land rights by the provision of the Indigenous People's Rights Act, 1997.

The Fasak Eco forestry Project on the island of Espiritu Santo, Vanuatu, enhanced capabilities of the ethnic groups, creating their awareness that the forest resources is not inexhaustible and sensitized them on and build their skills for forest management. Fasak people no more sell the harvesting rights to concessionaires. The Fasak Eco forestry project is recognized and became a model for the community-based small-scale project; applied in other locations in Vanuatu.

### **Creating livelihoods**

The Periyar Tiger Reserve in Kerala, India has been restored diverting the livelihoods of the convicted cinnamon bark smugglers to ecotourism related entrepreneurs like wildlife sporting excursions. The effort of the committee to facilitate business based on nature tourism and protect forest was successful in transforming smugglers to biodiversity stewards. Different committees were formed for different activities including religious site rehabilitation, maintenance of trails, souvenirs production/ sell, transport/accommodation for tourists and religious pilgrims.

Four Forest User Groups of Chaubas and Bhumlu villages in Nepal gained management responsibility for planted hillside forest surrounding the villages during the 1980s; the villagers assisted in planting trees during 1970s. Following a feasibility study and community opinion, the community established and manage a sawmill. Share the revenue equitably among themembers

allocating a portion for the village infrastructures. The Chaubas and Bhumlou community set an example of sustainable forest management and income generation.

Shree Binayak Pimidanda Community Forest User Group in Nepal manages natural lotka (*Daphne* spp.) forest which produces raw materials for handmade paper. The community has established a factory and employed local people. Democratic decision-making, equity and institutional setup, adherence to management plans and harvesting guidelines helped success in sustainable forest management.

The government has taken a holistic approach “Peoples Protected Areas” and formed Forest Protection Committees for Dugli-Jawarra Sal Forests in Chhattisgarh, India. Empowerment through capacity building enabled the committee developing and implementation of micro-scale action plans. The action plan includes the creation of forest-based new livelihoods with a strong focus on medicinal plants that generates extra income. Ensuring transparent property rights, land management, irrigation system, biogas plants and water storage are other support activities that help sustainable forest management.

Shrubs and undergrowth clearing for Cardamom cultivation and huge fuelwood needs for cardamom processing highly degraded and threaten the existence of the high elevation forest in the Knuckles Range in Sri Lanka. Training for livestock management and dry land farming created alternate income generation. Forest management gradually shifted to the community-based organization through consultation by the Forest Department.

Engaging resource dependent farmers in expanding and intensifying forestry practice like propagation of new tree and fruit crops, soil and water conservation, increasing soil fertility around the Huoshan County in China help alleviate poverty. Farmer to farmer training, demonstration households, self-help groups and marketing of the forest-based produce help earning money for the resource dependent population without damaging the forests; the community are managing the forest sustainably.

### **Success in Forest Management with good Institutions**

Protected Area Management Board and Executive Protected Area Management Board manage at least 13 committees devoted for specific protected area issues to manage Mount Kitanglad Range Natural Park, Philippines; is one of the best examples of forest management institutional functions (Parr, 2017).

The Dong Phou Xoy and Dong Sithouane Production Forests, in Lao PDR, demonstrate sustainable forest management by the community-based organization. This forest has applied for formal forest certification. Village forestry has been institutionalized as a core national forest management strategy. The program provided training to the community and entrusted with the production forest practice. The participatory forest management practice exemplifies empowerment, livelihoods of the local people and investments for common infrastructures from the revenue.

The forests of Lin'an County in Zhejiang Province of China become a success case developing the association of GO, NGO, academics, and business. The partnership committee was formed after the county participated in the International Model Forest Network. The partnership committee functions as a forum for forest management ideas, sharing conflicts management and participatory decision making.

Board of directors consists of different stakeholders manages Nakai-Nam Theun National Protected Area in Lao P.D.R. Co-Management is supervised by the board. Thailand has developed policy guidelines for establishing Protected Area Committees within its protected area system; the committee meets only once every six months. Protected area agency in Vietnam link with the local community through Buffer Zone Management Committees.

A range of institutional bodies deals with issues of Periyar Tiger Reserve in India; the dedicated Forest Officers in Kerala, India has developed multi-level collaborative management through the methodical problem-solving for more than 20 years; institutional arrangements include establishment and operationalizing of GONGO (Government organized NGO), Environment Development Committee (EDC) at village level and Protected Area working group and accommodating evolving landscape collaborative management arrangements (Parr, 2015).

Good forest management cases in South East and South Asia including the neighboring countries reveal the importance of land property rights, livelihood creation, maintaining traditional uniqueness and institutional arrangement. Combat poverty, using traditional communal management has been demonstrated in many cases. The forest management excellence searching cases collectively provide a message that overexploitation for income is the cause of forest degradation and deforestation. People need to have diversified income sources which are not dependent on the collection from the forest; otherwise, people must exploit forest resources to meet their needs. However, for all exemplary forest management cases people's participation in natural resource management has been highly emphasized; effectively engaging common people in decision making,

fairness in benefit distribution, democratic norms; these together empower local communities; there are cases that highlight an appreciation of indigenous knowledge (FAO, 2005). Report of the Second Asia-Pacific Forestry Sector Outlook Study “Asia-Pacific Forests and Forestry to 2020” by the Asia-Pacific Forestry Commission found most countries in the region created an array of methods and plans for the forestry sector to tackle climate change (FAO, 2010).

Important parts that need utmost consideration are: (a) adjustments in policy, legislation, and institutional structures; to enable people to be effectively engaged in decision making for competing objectives and managing conflicts, various sectors are to take integrated approach; (b) developing competencies for commons; (c) consolidation skill and knowledge abilities; (d) rising learning and consciousness; (e) rising social agreement; and (f) rising leadership and communication. The attention also includes incomes, involvement, discussion, egalitarian management and values of fairness (FAO, 2010).

Social and community consensus on how the forest should be managed is a fundamental decision. A better and mutual understanding of the communities with respect to each other’s view and perception; striking a balance on the management objectives and strong commitment, dedication, enthusiasm to motivate others to similar aspirations is key to achieve sustainability in forest management. Societal consensus on forest management approaches and modalities and aspiration of the community is the centerpiece. The management is holistic in nature and all components are important. Forest is recognized within the broad socioeconomic and cultural context that determines the importance of various components. The context, perspectives on the appropriateness of management objectives differs from forest to forest. Environmental advocacy groups believe there should be some forests conserved exclusively and not for timber production or harvesting NTFP. Many poor people who draw income from the forest do not agree on robust preservation purposes because doing so hinders their living. The perception and demands are continually shifting, as such strive for continuous improvement should be persuaded.

## **Chapter 11: Key Findings and Concluding Remarks**



## **Key Findings**

### **The Lawachara Forest, National Park and Protected Area**

The Lawachara forest is a national park and a Protected Area, the selected case forest. The forest is co-managed under the Protected Area Management Rules 2017. All tiers of community committees have been formed and the committee members are trained and some of them are taking a leadership role. The committee is registered and operating a bank account. The committee assists the dependent members finding alternate livelihoods. However, the People's Forum and VCF do not have Office room or devoted fund. VCF members are not able to write meeting minutes or resolution. There is a rivalry between forest villagers and others. Illegal tree felling to some extent are still there. Fuelwood, bamboo and building materials collection are above threshold level. The forest villagers are expanding betel-leaf cultivation area encroaching inside the forest. Local dependent people are willing and demand to participate in Social Forestry. Even the VCF members have not been selected as the participants of the Social Forestry. There is an opportunity to restore degraded habitat, re-introduce and rehabilitate endangered plants and animal species, and biodiversity of the Lawachara forest can be protected. There are exotic short rotation tree species plantation within the Protected Area. It is possible to gradually replace the exotic and short rotation species and conserve and facilitate regeneration of indigenous species, fruit-bearing trees to fill canopy gaps and bring back wilderness. Lawachara forest is the most visited forest and can promote planned ecotourism, however, picnic and army training are detrimental to the Lawachara forest health. Gas field excavation was there in Lawachara vicinity.

The management of the forest suffers from inadequate staff and logistics. There is scope to enhance the skill and morale of the staffs. The boundary has not been physically delineated. A fence at strategic locations of the park will increase protection. A large chunk of the Lawachara forest has been encroached and has been converted to pineapple and lemon orchards. Dependent people are collecting fuelwood in excess of the threshold limit. Community by large suggested to promote husk fuel sticks, Improved Cooking Stove, trees and bamboo clams in houses. Community demand is to recover encroached forest land and use the land for fuelwood production in Social Forestry approach.

### **Recommendations to achieve and maintain healthy Lawachara forest:**

Increase community awareness

Stop illegal tree felling ensuring protection

Stop fuelwood, bamboo, major building materials collection

Stop expansion of betel-leaf cultivation area

Promote Social Forestry in the buffer zone

Restore degraded habitat; re-introduce and rehabilitate endangered plants and animal species; ensure biodiversity conservation

No exotic species plantation, gradual removal of short rotation exotic species; conserve and facilitate regeneration of indigenous species, fruit bearing trees to fill canopy gaps and bring back wilderness

Promote planned ecotourism

Stop picnic and army training in the Forest area

No more gas field excavation in Lawachara vicinity

Provide adequate skilled staff and logistics to Forest Department for scientific management; revive Wildlife Circle of Forest Department; provisions of incentives for the local staff, enhance staff moral

Physically delineate the boundary and install fence at strategic locations of the park

Stop encroachment to forest land

Ensure sustainable harvest of NTFP

Establish a zone for communities to meet their needs

Develop husk fuel sticks; promote ICS; promote trees and bamboo clams in houses

Recover encroached forest land and use the land for fuel wood production in social forestry approach

Divert livelihoods and income generation of the dependent communities away from the direct forest resources drawings

Bring local elite and peoples representatives in to advisory role for the park management

Dialogue with Police and BDR at a higher level for better assistance with integrity

Review existing court cases against local people and withdraw falls cases

Dialogue with tea estates, for habitat conservation and biodiversity

Generate scientific and social knowledgebase on the Lawachara National Park and prepare a comprehensive faunal and floral inventory and a management arrangement for conservation for endangered species

Initiate biodiversity monitoring, evaluation and conservation action

Lawachara National Park territory should be extended to Reserve Forest of West Bhanugach (buffer) and the park should be administered under the Wildlife and Nature Conservation Division, Moulovi bazar to remove administrative anomaly;

Recruit one ACF, one Range Officer and one Office assistant cum computer operator, one cleaner and one additional forest guard for the Lawachara forest

## **Key Findings on National Level Forest Management**

### **Forest health**

Natural forests in Bangladesh is on the decline for various anthropogenic reasons. Wildlife availability is decreasing because of forest degradation, habitat loss, encroachment of wildlife corridor, and poaching. Native tree species are decreasing. Major reasons for forest degradation are poor management, over-exploitation of fuelwood, illegal tree felling, poaching, and grazing in some forests. Major causes of deforestation are the extension of settlements, increase in small holding agriculture, development of infrastructures and industries. The government has allocated forest land for military installations, economic zones, roads and highways, railways, rubber plantations, horticulture, and others during the last couple of decades. Highway and railroads bifurcated forests and fragmented the wildlife habitat. Underlying causes for forest land conversion and forest degradation are the scarcity of land in the country and opportunity cost of the forest land compared to other emerging land use; huge demand for forest produce, high dependence of poor people living near the forests on the forest resources for consumption and to meet their livelihoods.

Special restoration program depending on the condition of the denuded and degraded forests, various interventions could be implemented. In many forests where there are mother trees and soil is conducive to natural regeneration, protection will bring back the frosts. Assisted Natural Regeneration (ANR) and Enrichment Plantation will be necessary for the denuded forests.

### **Governance**

Communities were segregated from the forests during the British regime. The community participation in the management of forest was not there. People didn't have the sense of ownership on the forest, which is still the same by large. The capacity of the Forest Department is limited. Coordination and collaboration with the wider stakeholder are not there. Coordination among Forest Department, District Administration, Agriculture, Fisheries

and Law enforcement agencies at the district are very poor. The Upazila and Districts level relevant government officers and the law enforcement agencies are not sensitive to the forest protection and biodiversity conservation. Inter-ministerial coordination meetings take place at the central level. However, in case of conflicting mandates like the exploration of gas, minerals, sand, and the stone quarry within reserve forests and or Protected Area; the conflict management does not happen in the inter-ministerial level. The respective heads of the agencies cannot come to a consensus because of their mindset of protecting their domain and no one is willing to accept the logic of others. There are corruption and unholy nexus to grab forest resources, particularly forest land. Illegal tree felling has reduced following moratorium, however, illegal felling is prevailing to some extent and in some forests. Overall governance is poor. As such, land grabbing, illegal tree felling, poaching, over-extraction of fuel-wood continues and degrades the forests. And such degradation eventually leads to deforestation, encroachment and conversion of forest land to other land use.

The role of the forest is not acknowledged within the broader ecological, economic and societal system. Political parties are not sensitive to commit forest and biodiversity conservation in the election manifesto. The value of the forest is not considered while developing a national plan, nor in the national accounting system. The forest management decisions are not free of political interference.

### **Sustainable Forest Management**

Systematic forest management in Bangladesh has been initiated during the British period. During those days, the forest management was primarily focused to maximize profit, which continued even during Pakistan and Bangladesh period. The focus of forest management was sustainable yield. Clear felling and artificial regeneration approach were practiced in many cases to plant valuable timber species instead of indigenous tree species to maximize the revenue. The colonial regime left behind the legacy of the economic efficiency focused forestry management.

The Earth Summit enunciated the Forest Principles for sustainable forest management in 1992. Following the adoption of the Principles, Bangladesh initiated a paradigm shift in the management of the natural forests. Ecological sustainability has been given priority instead of more yield. Over the last three decades, forest management in Bangladesh is engaging wider stakeholders and participation of the communities in the forest management has been encouraged. Forest management in Bangladesh adopted co-management for the Protected

Area. Social Forestry which is mostly in the reserve forests and communities are engaged in the management. Community managed agroforestry prevails in the hilly terrain. Around 60% of the forest area (0.871m ha) were managed under Forest Management Plan as of 2010 of which 0.435m ha production forest, 0.436 m ha conservation forests. Bangladesh forest management considers soil and water management; high conservation value forests assign special management categories.

The Protected Area is managed per directives of the Wildlife (Conservation and Security) Act 2012, however, Core and buffer zone are not delineated within Protected Area per the provision of this Act. Social Forestry is managed under the social Forestry Rules 2004, however, the selection of participants is elite biased and the management could not uphold the conservation provision of the Rules. Village Common Forests (VCF) and the community managed agroforestry and shifting cultivation to some extent are prevailing in the CHT. Numbers and extent of the VCFs have reduced and the shifting cultivation rotation cycle reduced to one third resulting soil degradation and reduced productivity.

The forest villages were set up during the British and Pakistan period for the imported labor and a parcel of the forest land was allocated to each household, collectively formed the forest village. The forest villages are extending encroaching further inside into the forest. This is a legacy, the forest labor is no more required, however, the village dwellers cannot be evacuated since they are functionally landless.

However, it is necessary to limit the territory of these villages by setting boundaries in accordance with the allocated land.

Most acceptable or popular forest management cases in South East and South Asia including the neighboring countries reveal the importance of land property rights, livelihood creation, maintaining cultural identity, inclusive institutional arrangement, and community participation.

### **Forest Policy and Legislation**

Forest policy and legal regime of Bangladesh is a continuation of what was enacted and practiced during the British and Pakistan period. Forest land tenure system is complicated and flawed and not conducive to protect the forest land or manage forest sustainably. The CHT forest land tenure is not settled, land entitlements have not been provided to the ethnic communities and or to the Bangalee settlers.

The Wildlife (Conservation and Security) Act, 2012 has provided the authority to seize and to evict to the officers of the Wildlife Division only and not to the Forest Division Officers. There is no law to protect the conversion of forest land. There is no interface and links among the laws relevant to forest management. For example, Bangladesh Gas Act 2010 and Mines and Mineral Resources (Control and Development) Act 1992, the Forest Act 1927 and Wildlife (Conservation and Security) Act 2012 are not harmonized.

The cadastral survey (CS) records have the legal presumptive value of correctness and as such CS records can be taken as the base and the encroached forest land can be recovered. The plantation in the accreted land could be vested with the Forest Department custodianship to facilitate terrestrial biodiversity conservation. These raised plantations with a reasonable thickness will protect the countryside against the weather extremes like cyclone and storm surges.

### **Community Participation**

The alienation of people from the forests has been initiated during the British period and continued during the post-colonial regime. Thus, people's attitudes toward forest resources remained unchanged. Since the government owned the forest, creating and maintaining forests was the government's responsibility. This has been the consideration of the community. People were tempted to exploit the forest to meet their needs. Involving local people in forest management has been initiated in Bangladesh in 1980 in a Community Forestry project. The Social Forestry Rules in 2004 defined community participation structure in the Social Forestry, which is essentially production forestry. This Rule has created the provisions of benefit sharing with the community. The Wildlife (Conservation and Security) Act 2012 provided directives for Co-Management of Protected Area. The Rules provided directives to include the resource users including women, ethnic people. The Co-Management structure includes the local community into the VCF and thereby represents in the People's Forum and in the CMC where the decision on the forest management are taken. The community could raise their voice in the decision-making forum, i.e. CMC. However, the rural people yet to influence the decisions. The Forest policy 1994 and the draft Forest policy 2019 promoted effective community participation in forest management to reduce forest offense and encroachment.

### **Forest Management Institution**

The Forest Department is the custodian of forest land in Bangladesh. Bangladesh Forest Research Institute is responsible for research. Numbers of Forest Education Institute including the Forest Academy provides forest-related education. BFIDC is the corporation of the forest product-related industries. Co-Management Committees, People's Forum and Village Conservation Forum are co-management organization.

Forest Department organogram do not have positions to support: Co-management, Social Forestry, Community Forestry, planted mangroves, habitat and wildlife conservation, and financial management. The Forest Department officers do not have expertise on the judicial process for dealing land disputes and filing cases against forest offense appropriately. The Forest Department needs professionals to support conflict management, community organization, communication and outreach, land management, land tenure, livelihoods diversification to avoid directly nature drawings. There is room for improvement in recruitment, transfer, posting, procurement, and expenditures. The DCCFs do not have authority to exercise, authority centralized to CCF. The recruitment for the Forest Department was at three different tiers viz. Forester, Ranger, and ACF. However, recruitment currently is at two tiers where Ranger recruitment has been stopped. There are no separate divisions for Social Forestry or Protected Area or Mangroves.

Monitoring and Evaluation system of the Forest Department is weak. Smart patrolling is only at the rudimentary stage tested only in the Sundarbans. Multi-stakeholder monitoring and evaluation are not in practice. There is no devoted process for surveillance and monitoring of forest encroachment and illegal tree felling. The Resource Information Management System (RIMS) do not have adequate skilled manpower, provisions, and resources for updated remote sensing imageries and GIS are not there. The forest inventory is not periodic. The forest land parcels not yet digitized and backup database with relevant data and information on habitats, the corridor for wildlife movement, water courses, and wildlife availability by species are not in place.

The capacity of the Bangladesh Forest Research Institute is limited to support the generation of much-needed knowledge for forest management in the changing context. Currently, BFRI researchers are demotivated. The research conducted is not demand driven. Research on contemporary forest management issues is not there. For example, there is no research to find resource substitution like stake for betel leaf cultivation, pole for house building or

developing fast-growing fuelwood species or enhance the durability of wood, bamboo, and cane.

The capacity of the Forestry Education Institutions is inadequate to ensure a sustained supply of forestry educated skilled professionals. Forest Academy and other Forest Education Institutes do not have in house expertise and overall manpower is insufficient. Do not have provision for regular on the job training. The curricula are not updated. There are no new courses on contemporary issues. Infrastructures and facilities for these institutes are old and require to upgrade.

National Herbarium is partially functional to keep updated knowledge on the flora of the forests. There is only limited functional linkage among the Herbarium, Forest Education Institutes, Forest Research Institute, and the Forest Department.

BFIDC has become irrelevant since the forests are under moratorium and Bangladesh's forests are no longer able to supply the raw materials for these industries. BFIDC has been allocated with forest land. BFIDC could go for cash crop plantation, like palm oil, sericulture, and apiculture utilizing research findings from BFRI in this regard. The corporation should concentrate to continue the supply of alternate for wood products.

## **Recommendations for the National level Forest Management**

### **Forest Management**

The forest management approach should be Social Forestry in the degraded reserve forests, Co-Management in the Protected Area, which is a natural forests and a blended Collaborative Forest Management for Unclassed CHT hill forests and in other hill and plain land forests where production forestry is currently prevailing. The model should be developed blending the experience of Bangladesh, e.g. Village Common Forest in CHT and learning from success of the neighboring countries with similar context.

Forest land must not be converted; encroachment, grabbing and conversion of forest land is continuing and forest land to other land use. De-leasing of the forest land should be pursued to the extent possible.



Declare all the remaining natural forest patches in the country as Protected Area and expand the boundaries of the existing Protected Areas up to available reserve forest. Co-Management of the Protected Area and the Social Forestry in the reserve forest should be functionally and geographically linked. Protected Area could be surrounded with Social Forestry plots. Community Conserve Area can be introduced. Depending on the condition of the forests, Assisted Natural Regeneration (ANR), enrichment plantation and in some cases selected tree species should be planted to restore degraded forests.

Most acceptable or popular forest management cases in South East and South Asia including the neighboring countries reveal the importance of land property rights, livelihood creation, maintaining cultural identity, inclusive institutional arrangement, and community participation for sustainable forest management.

### **Community Participation**

Effective engagement of the local resources users in the forest management is a must for sustainably manage the forest. Participation of the wider stakeholder is essential to succeed in forest management. Engagement of the women, ethnic community, youth and other social change maker are necessary in the forest management for sustainability.

Outreach and conservation awareness and sensitization should target and engage rural populations living in and around natural forests; build positive attitudes and behavior to reduce threats to biodiversity. Awareness, sensitization, and orientation should also target community leaders, forest resource users, students and government partners. District Cultural Officer, the Education Officer and the Cultural Group representative, women, youth, religious leaders, local elites, local political leaders, business associations, clubs, social issue associations, community members and local journalists must be sensitized. Importantly, such outreach and conservation awareness programs must be coordinated with local government, civil society and non-government organizations (NGOs) to raise awareness of and support for the implementation of the wildlife and forest management Rules and Acts.

Processes for changing leaders of the Co-Management Committees must be well-placed and functioning. The capacity of leaders and delegation of responsibilities among the members should be practiced

### **Forest Management Institution**

Forest Department should be converted to Forest Conservation Management Department. Forest Department should justify their relevance in providing benefit to the people and should focus more on environmental functions, biodiversity, and climate change and produce service not revenue. The people and the politician should realize Forest Department should not be a revenue earning department rather like Health or Agriculture Extension Department, provide service to the society.

The Organogram of the Forest Department should be reformed and positions for the professionals with expertise on Social science, Judicial process to deal forest offense, conflict management, Co-Management Committees, Committees for Social Forestry and Collaborative Forestry, communication and outreach, land management, land tenure and livelihoods diversification. The recruitment for the Forest Department should be at three tiers, viz. Forster, Ranger and ACF. The authority and responsibility should be entrusted balancing among CCF and DCCFs and others to enable decentralized management of the forests with the devolution of power to the communities.

Organogram of the Bangladesh Forest Research Institute (BFRI) requires reformation. Motivation of the BFRI researchers must be uplifted. The research conducted must be demand driven. Research must concentrate on contemporary forest management issues.

Forest Academy and other Forest Education Institutes should have in house expertise and adequate man power. Provision for regular on the job training should be ensured and the curricula must be updated on a regular basis. The institutes must ensure courses on contemporary issues.

There is room for improving the functionality of the National Herbarium. There is no functional linkage with the Herbarium, Forest Education Institutes, Forest Research Institute and the Forest Department.

### **Policy and legal regime**

The Forest Policy 1994 requires an update to respond to many emerging issues. The policy formulation must be in bottom-up approach ensuring effective participation of resource user people.

Enact Forest Land Protection Act to stop transfer of forest land for any other purposes. The Act should include ways for the protection of the ownership of the forest land against the fake

court cases. This Act should include provisions for CHT lands. The CHT land should be brought under a tenure system that allocates land rights to the ethnic people as well to the settlers. Cadastral Survey (CS) records have the legal presumptive value of correctness; shall be the basis for deciding the ownership of the forest land in case of disputes. The forest land recorded in Forest Department's name must be delineated physically and boundary pillars should be established.

The Wildlife (Conservation and Security Act) 2012 must be amended. Authority to seize and to evict should be provided to both Forest Division and Wildlife Division Officers amending the Wildlife (Conservation and Security) Act, 2012. There should be elements in the law so that Forest Officers are not refraining from lodging case against the offenders. The amendment of forest laws must accommodate Social Forestry, Co-management, protection of Swamp forests and planted mangroves and promote ecosystem. Forest law should be very clear for protection.

### **Governance**

Political agreement on the position of forests in the national economy is a pre-requisite to designate areas for various land use in accordance with availability and necessity. The land use planning must demarcate permanent forests. The forest management decisions must be free of political interference. Aware, sensitize and orient politicians and finds a way to ensure neutral planning processes. Promote policy for avoiding the use of forest land for infrastructure development. Apply zero tolerance principles and enforce the law impartially irrespective of political affiliation. Political parties should be sensitized to commit to forest and biodiversity conservation and they must declare their position in the election manifesto. Effective engagement of the resource dependent local community and the wider stakeholder in the management of the forest must to be ensured

The Discipline and Appeal Rule 1985, Ordinance, day to day Duty Discharge Rule should be adjusted to ensure accountability. One should be held accountable if any resource has been stolen from his territory; all others in the loop must be brought to law to ensure good governance. Timeliness of interventions is a factor to ensure governance. There is room for improvement in recruitment, transfer, posting, procurement, and expenditures. Recruitment must be based on competence and officer's functionality must be ensured providing authority and responsibility. However, the authority should provide support to the Forest Department and the professionals of the department must work very hard to gain skill and effectiveness and

the department should retrieve its good name. Forest Education Institutes, FRI must be capacitating to be able to support forest management with adequate supply of quality forest professionals and generation of much required knowledge.

The value of the forest must be considered while the national plan is developed, and the policymaker must incorporate forest value in the national accounting system. Forest Department and MoEF should assume leadership in coordination with the Planning Commission to ensure that the development programs are forest friendly. The forest management institutions and other linked institutions must coordinate and collaborate to avoid any conflicts. The Co-Management Committees should manage conflicts that arise at the forest level.

### **Forest Health**

Stop providing forest land to any agency for other land use. Stop conversion of forest land. The Forest Land Protection Law should be enacted with provisions for ban on handing over forest land for any other purpose. There should be provision for de leasing of the previously leased forest land. Encroached forest land should be recovered following the CS records from the rich encroacher. However, the landless who are in the forest cannot be evicted without providing them a shelter. The forest dweller households should be inventoried, and a profile must be prepared to closely work with them. No new family should be allowed living inside the forest. Alternate income opportunities, education, health provision must be enhanced for these dependent communities. These people must be brought under the government social safety net program. They should engage effectively in the forest management. It is necessary to generate sense of ownership of the forests to these people and then they will protect and conserve forest.

Forest villages must be delineated following the land allocation and boundary must be pillared. The village territory should be maintained, no further encroachment. The co management and the community patrol group must be activated and ensure surveillance and patrolling of the forest along with the Forest guard to protect forest resources.

Protection must be there to enforce forest Act and Rules. The saplings and undergrowth must be protected. Government should take measures for reducing dependency of the community on the forests for the fuelwood. The measures should be promotion of improved cooking stoves, risk husk stick, bio gas etc. Government should provide subsidies for LPG for cooking

for the poor resource dependent people and promote LPG for others who use fuelwood. Create provision for diverting livelihoods away from the direct drawings.

## **Concluding Remarks**

This sub chapter concludes the research document on the critical analysis of the forest management in Bangladesh focusing national level inferring the findings of the case study of a National Park and Protected Area. The concluding remarks are on sustainable forest management, community participation in the forest management, forest management institutions, legal and policy regime, forest health and governance.

## **Sustainable Forest Management**

Outcome of the sustainable forest management in Bangladesh has been sought in the following policy, plans and forestry related literature: the Forest Policy 1994; the Forest Policy 2019 (submitted for approval); the Forestry Master Plan 1995-2015; the Forestry Master plan 2016-2035; relevant papers and articles published in Bangladesh Forest Congress 2011; Bangladesh focused papers and articles published in the Durban Forestry Congress, 2015; Bangladesh focused papers and articles published during last one decade held in the forestry congress for the regional countries; published outcome of the research on forest management in Bangladesh and in the regional countries. In all these management plans and blue prints following are the desired outcomes:

Stop forest land conversion and protect forest land

Stop illegal tree felling from the natural forests, poaching, over-exploitation of forest resources like fuelwood and other NTFP

Restore forest health and wildlife habitat, conserve biodiversity and ensure ecosystem functionality and service

The resource dependent local communities including ethnic community, women, youth and other disadvantaged people living near the forests should participate meaningfully in the forest management; Ensure access and benefit sharing for the community and support the communities for alternate livelihoods and income earning.

To reach these outcomes it is necessary to: i) Adopt new Forest Policy ii) Adjust and adopt forest friendly national development policy iii) Amend and or enact new law and Rules to support implementation of new forest policy iv) Capacitated Forest Management Institutions

to implement the new forest policy enforcing law v) Confirm well-coordinated Enforcement and implementation vi) Ensure transparency of the process and accountability of the of the institutions and responsible individuals vii) Safeguard meaningful participation of the localresource dependent communities and other stakeholders to be watchful and raise their voices against any flaws. All these will bring a good governance in the forestry sector.

However, to achieve much needed conducive environment, the prevailing mindset of the stakeholders need to be changed. It is not the money per say, rather an openness to better understand the wrongdoings and the potentials to make things good. Changing mindset will not happen instantly, rather requires practice for a period.

The Social Forestry approach is popular, however, conservation of native species as directed in the Rules is not implemented and the sustainability after the 3<sup>rd</sup> rotation is not known and the participant's selection process for Social Forestry is contaminated by the 'elite capture'. Forest Department during 2008 to 2013 harvested more than 44 thousand ha of the woodlot, 10 thousand ha of agroforestry and around 60 thousand km of strip plantations; more than 100 thousand participants were engaged and have distributed more than 2 billion of BDT (Banik, 2014). The social forestry is successful in drawing interest of the people, demanding their inclusion in the Social Forestry. The interest is because of benefit sharing with the participants. Social Forestry is guided by the Social Forestry Rules and usually implemented in the Reserve forests. A functional link with the Co-Managementof the Protected Area and the Social Forestrythrough interfacing these two Rules to keep Protected Area in the middle and practice Social Forestry encircling the Protected Area may enhance conservation. The social forestry participants collectively will provide protection to the Protected Area which can be included while awarding Social Forestry Plots. The protection will not be difficult because of the geographical positioning of the proposed Protected Area and the Social Forestry plots.This is necessary because, the Co-Managementdoes not allow harvesting from the forest to share with the participants, which is provisioned in Social Forestry. Shifting cultivation is a traditional forestry practiced by the ethnic community since long. Shifting cultivation requires more percapita land to allow a fellow period. Shifting cultivation cannot continue in the context of ever increasing population. There is history and existence of community managed forests, the 'village common forest' in the CHT. VCF has the potential to restore the forests and bringing back the biodiversity. The ethnic communities with their inherent knowledge, experience are the natural managers of the VCF and if allowed, they can

maintain the forest and their culture. However, support in regards to settlement of land tenure and legal and policy support for the indigenous institutional arrangement will be necessary.

**Co-Management** principles have been defined and implementation guidelines has been outlined in the Protected Area Rules, 2017. The Rules provide structure, formation, the scope of work, responsibilities, and duties of the CMCs. Directives are there in the Rules to engage women, ethnic communities, and the forest resources dependent people in managing Protected Area. Out of 39 Protected Area declared till 2017, a total 21 Protected Area has so far come under Co-Management Committees (CMC). The capacity of these Co-Management Committees has been increasing, they are able to carry out the organizational activities like conducting meetings, keeping records, communicating with the relevant offices and stakeholders; however, not yet fully capacitate to reform the committee by themselves. The voices of the poor are raised, however not profound yet to influence the management decisions. The PA Rules, 2017 provided directives to make CMC president from the resource dependent people and provisioned revenue (entry f and NTFP) sharing with the community. Practice of this provision has not yet started. Once implementation of the PA Rules initiates, formation and capacity building for CMCs for all PAs will be required and requirement for adjustment of the Rules will surface. Co-Management approach for the Protected Area seems progressing. There is more tree species and significantly higher basal area of larger size in co-managed forests compared to traditionally managed reserve (Uddin and Alam, 2015). The Forest Policy 2019 (submitted for approval) stated that 30% of the state forest will be declared Protected Area by 2035. It is possible to expand the boundaries of the some of the existing Protected Areas and should be expanded. There are still some patches of natural forests which are good to declare as Protected Area.

**Accountability** and responsiveness to the needs and necessity of resource dependent local people, especially the impoverished or disadvantaged must be a core norm of natural resource management practice. Effective engagement of the poor and women in decision making in the CMC may increase the accountability. Securing rights and livelihoods for minorities, traditional users and the poor is necessary to ensure accountability. Processes for changing leaders of the Co-Management Committees must be well-placed and functioning. The capacity of leaders and delegation of responsibilities among the members should be practiced. The committees must gain competence in planning and implement adaptive and resilient management of ecosystem considering climate change hazards. The committees should manage conflicts; ensure monitoring, evaluation and feedback process in planning and implementation.

The CMC needs a cost to maintain their organizational activities. The main function of the CMC is to protect and conserve the forests. As such to support forest guards, community patrol groups have been formed. There is a cost to get the services of these groups. The CMCs should gain capacity to mobilize resources for patrolling forests, restoration activities and organizational cost. The Protected Area Rules (PAR) 2017 declared sharing 50% of the revenue collected from entry fee and NTFP with the CMCs. A Protected Area (PA) Fund has been provisioned in the PA Management Rules 2017 under the jurisdiction of the CCF. This fund can receive grant money from the government or from an individual or organization from home or abroad. This fund can accept interest against deposit and can receive grants from any other source approved by the government. CMCs can also generate income by setting up enterprises to provide services to the tourists.

**Social Forestry** approach is suggested for the production forestry in the reserve forests other than the Protected Areas. The Social Forestry (SF) has been in practice since two decades with enactment of Social Forestry Rule (SFR) in 2004. SFR defines and governs the partnership mechanisms of the plantations with the local communities and guided the management and benefit sharing. There is wide dissatisfaction among the people who could not become the partner of Social Forestry. The Social Forestry is very popular; everybody wants to participate. Many qualified and interested people are interested, however, the land is limited. All the local people cannot be partnered. Social Forestry must be expanded into all reserve forests (except PAs). However, it is necessary to ensure participation of the resource dependent poor people in the Social Forestry and not the rich people. Appropriate selection of the participants considering a functional linkage with the PAs Co-Management will be conducive for sustainability of the healthy forests and biodiversity.

Village Common Forests (VCF) is an age-old participatory forestry practice in the CHT, which has become limited following the intervention of the formal forest management, displacement of the ethnic communities and wide-scale deforestation following the unrest in the CHT. The CHT forests could be restored engaging community and developing an approach blending the experience of the VCF and learning from the successful approach of the neighboring countries with similar context.



Some last remnants of the VCFs (a few numbers) remain in the CHT with the traditional management committees in place. The land tenure issues are not settled for these VCFs, like all lands of the CHT. There are ethnic communities living in the CHT since long and during last almost 4 decades Bangalee settlers are living there. The ethnic people need land rights. The Bangalee settlers is a reality and these are poor people and they also need land rights. However, the Bangalee settlers do not have inherited knowledge on the management of the hilly terrain. As such, the ethnic people could be provided with the land entitlements in the hill tops and slopes and Bangalee could be limited to the plain land and land near the growth centers in the CHT.

In the regional, particularly in neighboring countries, the success has been achieved providing land rights, setting appropriate institutions, maintaining cultural identities and ensuring livelihoods of the dependent communities. The CHT forest land could be reforested employing a community forestry model.

Asia and the Pacific region countries, FAO (2003) finds that overexploitation is the cause of forest degradation and deforestation. Poor people living near the forest draw livelihoods from the forests; alternate sources of income for these people are necessary to reduce overexploitation. Otherwise, dependent people will continue harvesting from the forests to meet their needs and forest ecosystem will be destroyed. Management mechanisms should effectively engage common people in decision making; there must be fairness in benefit distribution; democratic norms should be practiced in decision making - all these together empower local communities (FAO, 2005).

There are different models in practice in the regional countries. For example, the community forestry in Nepal hand over forest land to the community Forest User Group for an unlimited time; however, the ownership remains with the government. Nepal has another model called leasehold forest model for the highly degraded forests. The time tenure for lease is different in different countries of the region; for example, in Philippine, it is 25 years, in India period is decided and mentioned in the contract, in Nepal it is 40 years with a provision for extension of another 40 years for the leasehold forestry.

Most acceptable or popular forest management cases in South East and South Asia including the neighboring countries reveal the importance of land property rights, livelihood creation, maintaining cultural identity, inclusive institutional arrangement and community participation. Combating of poverty using traditional communal management has been demonstrated in many

cases, such as: Forest management cases in Philippines, Indonesia, and Vanuatu found successful, using the ethnic practices upholding cultural identity. Lao PDR, China, Indonesia, Philippines and India forest management cases demonstrated success with proper institutions. Many forest management cases in India, Srilanka, and China achieve success ensuring livelihood support to the dependent communities. However, context, communities, and conditions determined the prominence of each element and in some cases, all the elements were necessary. All these elements should be considered, and a Community Forestry Model must be developed and implemented in the CHT forests considering local realities.

Apart from the afore-mentioned mechanisms or dimensions of the forests management, a Forest Management Plan (FMP) is an integral tool to manage forests sustainably. Traditionally working plans for the forest division were in practice. The working plans are the traditional forest management plans for annual harvesting of trees. Since the moratorium is sanctioned, tree harvest is not allowed. So, the working plans become redundant. However, a management plan is required by law for Protected Area management. FD develops PA management plans and the Ministry of Environment and Forests approves the plan. Co-Management Committees in partnership with the Forest Department prepare 10 years' management plan for the Protected Area, which is a subset of the Protected Area Management Plan. CMC also develop annual development plan (ADP) which is a subset of the 10 years' management plan prepared by CMC. The Social Forestry plantations are done with a plan and manage under the directives of the Social Forestry Rules, 2004. Integrated Management Plan for Sundarbans 2010-2020 is there. Management plans are prepared, must be implemented. The management plans include forest management practice for various forests depending on the contemporary context and paradigm.

**Management practice** like the silviculture operation like pruning, thinning, nurse and others must continue. The canopy cover of many natural forests has declined which has limited the ecosystem functionality and service. Special restoration program for the denuded and degraded forests is essential for restoration of the forest creating at least 50% as suggested by the National Forest Policy 2018 (Submitted for approval).

The potential of Bangladesh forests is always there because of favorable climate and soil condition. The forest land with remnant of natural forest trees may gain forest appearance and diversity through ANR, enrichment plantation and plantation of selected species. There are instances, for example, the Lawachara forest was cleared once, now it has the resemblance of

evergreen forests with biodiversity and canopy coverage. Sitakunda Eco-park is a more recent example, during last decade it has been restored to current good health. This forest patch and other similar selected forest patches could be declared Protected Area. Each of the Protected Area in the hill forests could be extended up to the extent of available natural forests. The co-management of the Protected Area and the Social Forestry in the reserve forest can be functionally and geographically linked. Protected Area could be surrounded with Social Forestry plots. However, to do so, creation of the provisions might be necessary adjusting law and policy. The members of the co-management organizations, particularly Community Patrol Group members can be Social Forestry participants and would be benefited and can be tagged with a responsibility of protecting the Protected Area.

**Monitoring, evaluation and feedback** process must be streamlined enhancing the existing capacity. Bangladesh Forest Department has established Resource Information Management System (RIMS). Capacity and functionality of the RIMS must be enhanced to be able to regularly monitor the forest extent, tree densities, undergrowth, canopy cover, and biodiversity. Participatory monitoring process should be conducted by the community organizations engaged in the forest management. Participatory monitoring must provide required and valid data and information to the RIMS through the appropriate channel. The competency of the RIMS is inadequate with limited GIS and remote sensing capacity. The forest inventory is not periodic. The forest land parcels not digitized and no database on habitats, niche, a corridor for wildlife movement, water courses, and wildlife availability by species etc.

**Financing** for the sustainable management of the PAs, Social Forestry, Community Forestry, plantations and wildlife conservation is crucial. Adequate fund flow for the execution of the management plans is necessary. Social Forestry Rules 2004 has provision for the Tree Farming Fund, which should be streamlined for reinvestment as guided by the Rules. The expansion of the Social Forestry will require initial funding from government or other relevant sources.

The Protected Area Management Rules, 2017 provisioned for revenue sharing with the Co-Management Committee. It is necessary to invest in the Protected Area (PA) to generate more revenue through nature and eco-friendly and responsible tourism. More PA declaration will require an initial investment to initiate and establish Co-management. The investment in the mangrove plantations will provide dividend not only in terms of the forest products but also

in protecting frontline sea facing communities and infrastructures from climate extremes. Investment in generation and protection of the freshwater swamp forests will enhance the ecosystem service of the wetlands and restore habitat and biodiversity.

## **Forest Management Institutions**

Forest management in Bangladesh directly involves Ministry of Environment and Forests (MOEF), Forest Department, Bangladesh Forest Research Institute (BFRI), Forest Education Institutes, National Herbarium and Co-Management Organizations. Bangladesh Forest Industries Development Corporation (BFIDC) is not directly involved in forest management, however, manages rubber plantations and add value to the forest products.

**The Forest Department** has been operating in Bangladesh since 1925 and inherited the legacy of the then Forest Department, India that was established in 1864. Forest Department is a century-old institution. More than 17 % of the land mass of Bangladesh is the forest of which around 10% forest land entitlement is with Forest Department. Other 7% forest land is in CHT and the land entitlement is with the Ministry of Land - managed by the district land administration. The Forest Department is the core authority for managing forest resources. The law provided the management responsibility to the Forest Department. The forestry professionals serving at the Forest Department are passionate about the forests. The Forest Department is exposed to corruption like all other sectors in Bangladesh.

People have limited understanding as to how forests are being managed; nonetheless, there is a widespread perception that the Forest Department has unholy nexus with poachers for illegal tree felling and forest land grabbing. However, there are many good forest officers and guards who are working relentlessly to protect and conserve forests. Among the forest professionals, there are old schools, who are kind of protective of the jurisdiction of the department and devoted to the traditional forest management excluding the people. However, others are open and in a transformative stage towards forest management engaging people and accepting common's right in the decision making to realize better management results.

The organogram of the Forest Department does not have the professionals to support: Co-management, Social Forestry, Community Forestry, planted mangroves and habitat and wildlife conservation. The approach of the forest management and associated legal and policy instruments should determine the organogram for the Forest Department. The Forest Department professionals irrespective of the old school or transformational, demand that Forest Department must be provided with adequate human and other resources which are inadequate now. The

traditional forest managers believe in providing protection through surveillance and guard. They believe in the continuation of silviculture, enrichment plantation, sustainable yield, introducing high valued timber plantations, research and improve the yield and the quality of the products. Current human resources have been to support the traditional forestry, though few Social Forestry expertise has been developed through experience. Some other gained experience in Co-Management of Protected Areas.

The age-old experienced Forest Department is the custodian of the forest management. However, community engagement in the management has been initiated in the part of the country's forests. The Forest Department requires professionals with expertise on conflict management, Co-Management Committees, committees for Social and Community Forestry, Communication and Outreach, Land Management, land tenure, livelihoods diversification to avoid directly nature drawings. Risk allowance and residential facilities for the Forest Guards and officers functioning in remoteness will be conducive to enhance conservation. A dedicated Outreach and Conservation Awareness Unit in the Forest Department will enhance communication among the wider stakeholder. Biodiversity conservation efforts must be enhanced to achieve national goals for sustainable biodiversity conservation. In reforming the organogram, current and upcoming forest management approaches must be considered. Organogram must ensure avoidance of any cadre vs non-cadre conflict in the future. The paradigm shifts towards more and meaningful participation of the community must be considered. Accordingly, the authority and responsibility could be entrusted balancing among CCF and DCCFs and others to enable decentralized management of the forests with the devolution of power to the communities.

Forest Department could be converted to Forest Conservation Management Department. Forest Department should justify their relevance in providing benefit to the people and should focus more on environmental functions, biodiversity, and climate change and produce service not revenue. The people and the politician should realize Forest Department should not be a revenue earning department rather like Health or Agriculture Extension Department, provide service to the society.

Organogram of the Bangladesh Forest Research Institute (BFRI) requires reformation. Currently BFRI researchers are demotivated. The research conducted are not demand driven. Research on contemporary forest management issues are rare. For example, there is no research currently to find resource substitution like stake for betel leaf cultivation, pole for house

building or developing fast-growing fuel wood species or enhance the durability of wood, bamboo, and cane used for furniture etc. BFRI could create provisions for engaging national and international students in research.

Forest Academy and other Forest Education Institutes do not have in house expertise and overall man power is inadequate, do not have provision for regular in job training and the curricula is not updated on a regular basis. There are no new courses on contemporary issues. Infrastructures and facilities for the forest education institutes are not upgraded to accommodate the requirements.

There is room for improving the functionality of the National Herbarium. There is no functional linkage with the Herbarium, Forest Education Institutes, Forest Research Institute and the Forest Department. Updated knowledge on the flora could help the forest management.

The context when the **Forest Industries Development Corporation** (BFIDC) was formed has been changed a lot. These industries were set up to use forest resources as raw materials. Currently Bangladesh forest is not in a position to supply raw materials. However, industries to support enhancing the durability of the forest products and develop a substitute for forest resources are relevant.

## **Policy and Legal Regime**

Bangladesh constitution through article 18A declares state responsibility for protecting forests and conserving biodiversity. The Forest Policy 1979, focused on Forest Department and provided generalized directives to increase forest extent providing protection against encroachment. This policy was traditional in suggesting massive plantation and sustain optimal harvest, on the contrary, directed the installation of forest produce-based industries. This policy lacked the strategy for the forest sector development to maintain the health of the forests with biodiversity. For example, the objective for the hill forests was to clear natural forests and go for fast-growing tree species and for the Sal forests recreational facilities development was intended. These reflect lack of sensitivity to the biodiversity and wildlife protection, though directed scientific management and prohibited other use of national forest land.

The Second Forest Policy of Bangladesh has been adopted in 1994 after the Earth Summit with adoption of the Forestry Principles on global consensus. The forestry principles were not legally

binding, however, commanding declaration for an international agreement on the administration, maintenance and viable expansion of all types of forests. Nonetheless, the forest policy 1994 did not hold the spirit of the Forestry Principles in its entirety. This policy focused on engaging communities in managing forest, however, identified people living inside and near the forests as the threat to the forests. The commitment for the preservation of the forest land against encroachment and conversion was in the previous forest policy and has been reiterated in the Forest Policy 1994. This policy introduced a provision, that without the decision of the head of the state no forest land can be converted. This policy targeted that 20% of Bangladesh shall have forest cover by 2015. In continuation of the spirit of safety and preservation of forests and the biological diversity in previous policy, this policy has reiterated declaration of more Protected Area. However, this policy continues the idea of employment generation based on forest produce.

Nevertheless, the Forest Policy 1994 requires an update to respond to many emerging issues. It should take the advantage of using the enormous knowledge generated during last two decades in the forestry sector in Bangladesh the regional countries and throughout the world. This knowledge must be used along with appropriate technology considering local realities. Adoption of new practices is essential to address issues emerged during the last two decades and to uphold the spirit of the Forestry Principles in the local realities. To support alternative livelihoods of the dependent communities, incentive should be provisioned in the forest policy. The moratorium should be sanctioned and maintained for all state-owned The forest policy must address adverse impacts of climate change on the forests of Bangladesh and develop and maintain healthy forests to decrease climate change pace.

However, the provisions of these Rules are not yet implemented properly, for example the indigenous trees in the social forestry plots are not protected or conserved, the revenue sharing in case of protected Area yet to start. Planted mangroves along the coast are cleared upon completion of the rotation period (attained acceptable maturity to harvest) which exposes the coastline. Maintaining a certain depth of trees (different strands and log accordingly) will provide a protection against the tidal surge.

The Forest Policy, 2017 (submitted for approval) does not include the provisions for de-leasing of previously leased out and converted forests to bring back under the forest cover. The proposed policy does not have provisions for leasing forest land to the community or providing forest land

use right to the community; for restoring degraded forest land and ecologically managing the forests. If a decided depth of planted mangroves along the coast is maintained, the shore-line may get a natural protection against the tidal surge.

The Wildlife (Conservation and Security) Act, 2012 provided authority to eviction and seize to only Wildlife Division officers and not to Forest Division officers. Wildlife Division officers could be charged with malafide intention, as such the officers are not applying their authority in this regard.

The forest management in Bangladesh has been largely abiding by the Forest Act, 1927 while the Wildlife (Conservation and Security) Act, 2012 provides directives for the protection of wildlife. Again there are already enacted Protected Area Rules 2017, Biodiversity Act (2017), , and Ecological Critical Area Rules, 2016. Now, there must be harmonization in these sets of law.

National development strategy and policy, especially the five-year plans accommodate forest management, however, other components are not scrutinized to confirm that these are not undermining the forests. These policies and strategies need to be sensitive to forest protection and conservation of biodiversity. In addition, policies and laws, for example, the laws for the land tenure, laws for extraction of mineral resources, and development of the infrastructures including Railways and Highways and other are not sensitive in protecting the forest land and conservation of the biodiversity.

Since the establishment, the Forest Department collects revenue. The budget allocation from the government considers this aspect for the revenue earning agencies. on the other hand, there are agencies that do not collect revenue and government considers these agencies as service providing agencies. Forests provide greater service to the entire population in various forms, however not considered by the national policy authority. Alternate energy for cooking for the people living near the forests will reduce dependencies on the forests for fuelwood and will reduce pressure on the forests. Improved cooking stoves, and biogas could be promoted. Provisions of subsidized LNG to the forest resource-dependent communities could be there. Short rotation and fast-growing plantations in the homestead and selected Social Forestry would help. There are latest technologies available for brick making. Bangladesh must avoid using firewood for making bricks. Alternate technologies and energy provision in the policy and implementation for making bricks is way to reduce pressure from the forests. Small and medium enterprises can divert forest resources dependent livelihoods to forest-friendly enterprises. The policy can guide



and provide support to BFRI and BFIDC to work for enhancing the durability of the wood products and find a substitute for timber. Demand for timber and related products can be met by import. The campaign to initiate and practice stall feed for the cattle in the villages near the forests will reduce grazing threats into the forests.

The inventory must be reviewed with the community organizations and other stakeholders to find a way to consolidate existing forests and forest lands. It is not necessary and not possible to evict all the settlers. However, at the minimum, further encroachment can be stopped and relocation within the reserve forests and or in the Khash lands should be possible. For example, Sal forests in the Modhupur is now fragmented and could be brought to one stretch through meaningful dialogue and offering acceptable alternatives to the settlers. A similar attempt can be taken to all the Protected Area. The settlers will either remain in position or change location in consensus.

The proposed Forest Land Protection Act should have provisions for CHT lands. The CHT land should be brought under a tenure system that allocates land rights to the ethnic people as well to the settlers. The highlands and slopes should be allocated to the ethnic people and as far as possible Bangalee must be limited in the available plain lands and near the growth centers in the CHT. However, land rights should be provided with a condition to maintain and bring back the forests. Like the recipient of the allocation will prepare a forest management plan for 10 or more years with assistance from the Forest Department. Divisional Forest Officer will approve this plan and monitor implementation. However, the recipient will enjoy all the benefit, though initial investment shall be done by the government and the management responsibility will lie with the recipient.

### **Community Participation in Forest Management**

Ethnic communities living in forests since time immemorial; also, there are people who live nearby forests. These people always had a relationship with the forests in terms of dependence for food, fodder, thatching and building materials. There are communities who believe in Forest Gods and Deities and venerate before they enter the forest. The communities worship in some place within the forest; they believe sacred. People believed forest as part of their life. The human being is a member of an ecosystem, e.g. a forest. Till the British regime established in India, the people and the forests were inseparable. Once the British regime took over the state power in India, they have consequently taken over all the forest land and people had no access to the forests.

Pakistan regime following the inherited colonial rules didn't allow access of the people to the forests. However, during the British and the Pakistan regime, the ethnic communities were living in the CHT forests; similarly, ethnic communities were living in the Sal forests of Modhupur Tract. The Forest Department imported labor during the British period and later during Pakistan period for forestry work and provided them settlement within forest land. Communities living inside and near the forests were drawing from the forests. Forest Department during the British period initiated a partnership with the community to develop plantations in the CHT forest land; the agroforestry under a system called the Taunggyi shared proceeds from the harvest. This approach is considered as the people's involvement in managing the forest for the first time in the then India.

The Protected Area Rules 2017 under the Wildlife (Conservation and Security) Act, 2012 has provided the legal basis of the Co-Management for the Protected Area (PA). Community participation in the forest Protected Area is mandatory; PA must be under Co-Management by law. Local poor people are partners in Social Forestry and are actively involved in managing plantations. The Social Forestry is functioning quite for a while and the Co-Management is a recent introduction. Both the approaches are gaining experiences and are on the trajectory.

Community interest in the forest management must be explicated, be it an incentive in terms of subsistence or economic benefit or social benefit. Community development in terms of their skill to divert livelihoods will be highly necessary to gain their confidence in the management of the forest. The Forest Department must emphasize on outreach and conservation awareness to reduce threats to biodiversity in the natural forests.

## **Forest Health**

The quality of the forests has been deteriorated because of clear felling and plantations by the Forest Department. The infrastructure development for example railways and highways fragmented forest habitat and opened the forests for illegal tree felling and extraction. Illegal tree felling, over-extraction for livelihoods, harvesting undergrowth for cooking, reduction of fruit-bearing trees, grazing in some forests, breaks in the canopy, disturbance like killing of wildlife in the railway and highway, noise and high frequency sound disturbances and day to day activities of the people living inside the wildlife habitat degraded almost all forests in Bangladesh. In case of Sundarbans, poison fishing and pirates are added disturbance other

than transboundary disturbance like reduction of freshwater flow by India and wildlife trafficking through the waterways.

People were living in the forests since long, however, the number of forest settlers increased following the population explosion during last 4-5 decades and extraction remain very high. The Sal forests and hill forests have been encroached by new settlers, and the old settlers further encroached into forest land to increase small hold agriculture. The rich people grabbed forest land and converted forest land to other land use, bending law and influencing authorities inappropriately. Forest land encroachment and conversion was due to many reasons including absence of good governance; lack of capacity for law enforcement; flaws in the land tenure systems; overexploitation lead to deforestation; and encroachment for settlement and small hold agriculture for livelihoods. The government has supported forest land conversion in many instances. Plain landers were introduced in the hill forests with political decisions. The government has taken forest land over the years for other priorities like infrastructure development including dam for generation of hydroelectricity, highways, railways, military installations and industries. The government leased out forest lands for other purposes like rubber plantation, orchards, agriculture, etc. The position of forestry in the national development policy is to blame for these conversions by the state.

The ethnic communities used forest land for agriculture through ages. They used to cultivate in the slash and burn approach which is known as “Jhumchash”. Historically Jhumchash was done in a rotation of 15 to 18 years to allow the soil productivity revitalization. In course of time, the ethnic population increased, and consequently per capita land availability decreased; forced them to reduce rotation of Jhumchash to only 4 to 5 years. This change decreased the soil productivity and ultimately degrades forest. The Bangalee migrants who do not have a clue on the type of land; and where to cultivate what in the hilly terrain. They opted for cash croplike ginger and turmeric in the hill slopes. High tillage necessary to realize high yield for these cash crops, which exposed the nutrient-rich topsoil to erosion reducing the productivity of the land. There is high demand and necessity for the forest produce like fuelwood, betel leaf pole, house building pole, thatching materials and fodder (grazing). There is unemployment among the poor people living near the forests are drawing forest resources for their consumption. Unemployed people collect forest resources to gain their livelihood. Currently, the forests of Bangladesh are unable to meet the fuelwood demand or timber need or other demand of the citizens. Overexploitation and inappropriate forest management practices lead to forest

degradation; that, in turn, leads to forest clearance, encroachment and ultimately forest land is converted to homesteads, horticulture, agriculture, and industries.

Among multifaceted and interlinked challenges, forest land conversion can be considered as the 'fundamental issue'. The legacy of establishing village inside the forests with imported laborers for plantation is a major reason for forest degradation, deforestation, encroachment, and conversion. The settlement within the forest has been expanding because of the increase in the family size of the settlers and consequently proliferation into new homesteads. It is necessary to limit the territory of these villages by setting boundaries in accordance with the allocated land. The boundary shall be determined in close consultation with the settlers and engaging Co-Management Committee as the mediator.

The land resource is very scarce in Bangladesh; land use, in the growing small-scale industrialization, become very much competitive. In one hand, the ever-increasing population in the agrarian economy of Bangladesh is highly dependent on natural resources; need more and more land for homesteads and small hold agriculture. On the other hand, technological development throughout the world and widespread consumerism enhanced the desire and demand for more products and services. The neo-elite class and the ambitious middle class in Bangladesh raises their aspirations. They influence the government and the economy and capitalizes the flaws in the Acts and Rules regarding forest land. The greedy land grabbers bend the law in their favor creating a nexus with the relevant corrupt government officials and staffs in the land registration office. They encroach on forest land and subsequently convert to other land use. On the other hand, encroachment by the landless is driven by their needs and initiates with degradation of the forests harvesting illegally to denudation and gradually clearing land for settlement and small holding agriculture. During the last couple of decades, the data reveals a continuous decrease in the natural forest extent and quality. However, the planted trees have been increased during this period.

## **Governance**

The lack of good governance can be viewed through the barren hills in the CHT - decreasing forest cover, evolving industries in the forest land, and widespread degradation of the natural forests are contributing to the situation. Good governance is a requisite for sustainable forest management in Bangladesh. Political agreement on the position of the forests in the national

economy is the prerequisite to maintain the forests in a growing economy of a densely populated country like Bangladesh.

Community participation in the forest management can improve the governance. Organized and capacitated communities can raise their voice; communities must be a part of the decision-making process and community aspiration must be accommodated in the management decision. Engagement of more and more grass root people, civil society organizations and other formal and informal community organizations will improve governance situation. However, Forest Department must initiate decentralization of the forest management and devolution of power to the community organization to establish and maintain good governance.

Forest Department must gain competency of developing court cases with supportive evidence. The Judiciary must be sensitized and oriented on the forest offense. Forest Officers must learn the nature of evidence required by the court to have judgment. The policy and the laws must be harmonized with other linked sectors policy and law. The Forest Land Protection Act will help to avoid conversion of forest land by the government or individuals. The policy and Act must be enforced equitably. The capacity of policymakers and the development designers must be able to appreciate the value of the forests in the national economy. Forest Department must advocate the policymakers with convincing facts to factor in, the forest health and biodiversity value in the national development process.

The coordination between the BFRI and Forest Department is only procedural; practically there is no purposeful coordination. This creates redundancy in the use of the research findings of the BFRI researches. BFRI research must be driven by demand from the Forest Department. BFRI is reluctant to seek research topics from the Forest Department other than presenting the research topics in the Ministerial meeting, where Forest Department participate. Real coordination does not happen. This situation can and should be resolved.

There is a District Environment and Forest Development Committee. At the local level, the district and the Upazila administration are supposed to support forest protection and conservation. However, in realities, it is almost nonexistence. The law enforcing agencies, the Agriculture officer, Social Welfare Officers and other relevant officers in respective geographical areas are members of the Co-Management Committees. They hardly attend the meetings. Even if someone turns up occasionally looks un-interest in forest protection. The law enforcing agencies always have other priorities. The Forest Officers do not get the

magistrate while going for evacuation or chasing illegal tree felling or poacher. The UNO is the advisor of the committee, however, participate once or twice a year in the Co-Management Committee meeting and take some interest to the extent possible.

The Forest Management Institutions must be transparent and remain accountable. Forest Department and other forest management institutions are government agencies and are abiding by the government procedures, rules of business and other relevant Rules. There are procedures and committees in place, sanctions are provisioned in the relevant law and Rules. However, implementations are limited. There are political influence and corruptions. Recruitment, transfer and posting are influenced using political authority and corruptions. The ill-motivated people create nexus, using political influence and partnering with corrupt forest and land officers. The nexus grabs forest land, fell trees illegally and poach wildlife.

The Forest Department should serve as a service department; must gain public confidence and improve the image of the department. However, in case of forest land grabbing, the offender gets all the support from: the politicians (when the grabber is rich and influential person), humanitarian workers (when the grabber is poor), the AC (Land) who gives the clearance for sale without considering the land class. On the other hand, Forest Department, the loan custodian, requires proofing that the offense has happened. The department does not have lawyers, Social scientists, communication, and negotiation expertise. Technological improvement like digitization of the land parcels must be done and land hand over procedures must be simplified. In case of land entitlement dispute, the presumptive correctness of the CS records must be practiced. There should be routine checks for the procedural deficiencies while the land officers clear a parcel for sale. (S)he must ensure the parcel of land in question asking for sale permission is not a forest land according to the CS records.

The Upazila and Districts level relevant government officers must be sensitized and oriented on the forest management, forest protection and biodiversity. Inter-ministerial coordination meetings take place at the central level. However, in case of conflicting mandates like the exploration of gas, minerals, sand and the stone quarry within reserve forests and or Protected Area; the conflict management do not happen in the inter-ministerial level. The respective heads of the agencies cannot come to consensus because of their mindset of protecting their domain and no one is willing to accept logic of others. Often it requires intervention from the prime minister's office.

The coordination effort must go beyond present effort. Working in coordination and harmony is a matter of culture. The Forest Department must take the lead in changing the culture. Awareness, sensitization, orientation of the policy makers must be enhanced. The value of the forests must be communicated to the policymakers.

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## Annexures

### Annex 1: Indicators and Diagnostic Questions

Indicators	Diagnostic questions
<b>Forest Health</b>	
Forest Extent, deforestation, encroachment and fragmentation.	To what extent deforestation happens, encroachment? Conversion to what land use? Fragmentation of forests? What are the drivers for deforestation? Way to improves?
Degradation, loss of habitat.	What are the extent of exploitation? Illegal tree felling? Extraction of undergrowth, saplings and others that degrade forest habitat? Is there enough food for wildlife? what are the drivers of degradation? Way to improve?
Forest productivity and vitality	To what extent germination occurs; undergrowth coming, maintaining material and service delivery? How to improve?
Wildlife abundance	To what extent wildlife is available; if reducing why? What to do to increase?
<b>Legal and Policy regime</b>	

Clear objectives for forest management in the forest policy.	To what extent the forest management objectives are clearly mentioned in the forest policy?
Reduction of deforestation and degradation.	Does forest policy guide reduction of forest degradation and deforestation?
Tree felling moratorium in the natural forests.	Does moratorium help conserve forest?
Necessity of new Forest Policy	Is it necessary to adopt new forest policy?
The consistency of the Forest Act 1927	Is the Forest Act 1927 relevant in the contemporary forest management paradigm?
Effectiveness of the Wildlife (Conservation and Security) Act 2012	How effective is the Wildlife (Conservation and Security) Act 2012?
Bangladesh Biodiversity Act 2017	What are the attributes of Bangladesh Biodiversity Act 2017 to protect and conserve biodiversity in the forests.

Clear authority and responsibilities in the law and policy for forest management.	Are the authority and responsibility for forest management is clear in the forest policy and forest law including implementation and enforcement?
Clearly defined offenses and penalties in law.	Are the offense and penalties defined in law?
Forest Conservation Rules	Are there Rules for enforcement of the forest laws?
The legal framework of the regional countries	What are the major attributes of the legal framework for forest management in the regional countries
Amendment of Forest Acts;	Is it necessary to amend Forest Acts
New Forest Act and Rules	Is it necessary to enact new Forest Act and Rules
Forest related international convention and protocols (ICTP).	To what extent the agreed ICTPs are adhered?
State Acquisition and Tenancy Act 1950.	What are implications of SATA 1950 on forest land tenure entitlement?

Forest land reservation process.	What process are followed to reserve a forest?
Settling forest land entitlement disputes.	What are the process of settlement of disputes over forest land tenure and to what extent disputes are settled?
<b>Forest Management Institutions</b>	
Expertise of Forest Management Institutions.	What are the roles, responsibilities and level of expertise of Forest Management Institutions (MOEF, FD, BFRI, BFIDC, FA, FTC)?
Coordination with and capacity of law enforcement agencies.	To what extent law enforcing agencies are sensitized and capable of supporting FM?
Coordination with and capacity of Judiciary	To what extent judiciary are sensitized and capable of supporting FM?
Coordination of forest management across sectors.	to what extent forest management are coordinated across the sectors? How disputes are resolved?
Implementation of forest policy and enforcement of forest law.	To what extent forest policy is implemented; forest law enforced?
Success in forest management having appropriate institutional	Are there examples of success in forest management having appropriate institutional framework in the regional countries?

framework in the regional countries	
<b>Governance</b>	
Accountability in Forest Management Institutions.	To what extent corruptions influence decisions; to what extent political and influential people engaged in grabbing forest resources?
Transparency in the Forest Management Institution.	To what extent the recruitment, transfer and posting are done complying Rules?
Transparent revenue sharing mechanisms.	To what extent revenue sharing mechanism is transparent?
Transparent management of resource funds.	Are the extra budgetary resources managed transparently?
Transparent and accessible land tenure administration services.	To what extent the land tenure administration is transparent and accessible?
Public access to information	To what extent the public have access to information

about forest management.	regarding forest management?
Clear and consistent land tenure information	To what extent forest land tenure information comprehensive, accurate and accessible?
Effective prosecution of offenders.	To what extent accused forest offenders are prosecuted?
Effective application of penalties.	To what extent penalties are applied against those who have been convicted of forest offense?
Capacity of the Forest Department monitor forest tenure.	To what extent FD capable of monitoring forest land tenure and dispute resolution?
<b>Community participation</b>	
Forest policy guides community participation in forest management.	To what extent forest policy promote community participation in forest management?
Forest Acts provides directives for community engagement in forest management	To what extent Forest Acts have the provisions for community engagement in forest management?

Participation of communities in Forest Management	To what extent do forest management practices promote the meaningful participation of local communities including women, disadvantaged groups, ethnic community (where relevant)?
Civil society and NGO engagement in forest management and monitoring.	To what extent civil society and NGO are engaged and capable of supporting FM?
Capacity and willingness of the communities in forest management	To what extent the communities are capable and willing to participate in the forest management?
Effectiveness of the community participation in forest management	To what extent the participation of the communities is successful in sustainably manage the forests?
Successful forest management in the regional countries engaging communities	Are there example of successful forest management by engaging communities in the regional countries?

<b>Sustainable Forest Management</b>	
Forest Management Approach	What management approaches are practiced in Bangladesh?
Forest Management Plan	Does legal and policy provides directives for planed management of forests? coordination among forests and non-forest sectors for implementation of forest management plans; how far the plans are implemented?
Effective information system as a basis for forest management.	To what extent comprehensive and reliable information system in place as a basis forest management?
Effective management of protected areas and indigenous lands.	To what extent are the protected areas and indigenous lands (or similarly classified forests) effectively managed?
National forest inventories.	To what extent are comprehensive and accurate forest inventories available?
Monitoring changes in forest cover.	To what extent are forest cover and forest cover change effectively monitored?

Monitoring forest management and forest use.	To what extent are changes in forest uses and conversion effectively monitored?
Financing for implementation of forest policy, plans and enforcement of law.	to what extent FMI are provided with budget for policy implementation and enforcement of law?
Payment for environment service and conservation financing	to what extent payment for environment service(PES) is in effect? Are there potential to introduce? Is there budgetary support for conservation finance?
Successful forest management approaches in the regional countries	What are the examples of successful forest management approaches in the regional countries?
Climate change and forests	What are the threats of CC on forests? What are the potential of forests in reducing CC threats?

## **Annex 2: Household Survey questionnaire**

### **Community-Forest interaction**

#### **Lawachara Forest**

Household survey questionnaire

This questionnaire is for household survey, a source of primary data for the research work on ‘the forest management in Bangladesh by a PhD student of Dhaka University. The collected data & information will be used only for the research and secrecy of all collected data & information will be maintained. I appreciate your support for the research work.

#### **A. Household Identification**

Household identification number	
House hold is a member of VCF	Yes 1, no 2
Name of the village	
Type of village by majority dwellers ethnicity	Bengalivillage1, Ethnic village 2, Tea garden village 3

Union name	
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**B. Household's Socio-economic Information**

1. Name of house hold head	
2. Name of the respondent (Only in absence of HHH, adult member could be respondent)	
Cell phone number of the respondent (if any)	
3. Respondent's father/husband's name	
4. Age	
5. Sex	Male 1, Female 2
6. Marital status	Married 1, unmarried 2, widow 3, divorced 4
7. Religion	Musalman 1, Hindu 2. Buddha 3, Christian 4, other 5.
8. Education	Academically illiterate 1, can read and write 2, PSC 3, JSC 4, SSC 5, HSC 6, Graduate and above 7.
9. Homestead land ownership	Owned 1, Forest land 2, Khash land 3, other private land owner 4.
10. Land ownership of the HH head	0.202 ha. or less 1, up to 0.404 ha. 2, above 0.404 ha. 3.

**C. Livelihoods**

1. Primary Occupation of the HH head	Farmer 1, Service 2, Business 3, day Laborer 4, resource collector 5, other 6( please specify).
2. Dependency on resource collection for livelihood	Primary source of income is on resource collection 1, More than 50% on resource collection 2, more than 25% on resource collection 3, less than 25% on resource collection 4, no dependency for livelihood 5. Other dependency
3. Dependency on fuel wood collection for own consumption	Fully dependent 1, over 50% dependent 2, over 25% dependent 3, not dependent 4
4. What else you collect for consumption	Food items 1, medicinal plant 2, fodder 3, other 4 (please specify), nothing 5.
5. Total monthly HH's income	Total taka
6. (what % from forest resource)	



7. Is your income through the year remain consistent, if not, how many months remain more or less consistent	throughout the year 1, more than 9 months 2, more than 6 months 3, no consistency and no confirmation 4
8. Are you satisfied with current occupation/livelihood	Yes 1, no 2, partially 3.
9. If you are not or partly satisfied and dependency on resource collection is high	You have tried and reduced your dependency 1, tried and could not reduce the dependency by yourself 2
10. If not, have you ever received any support from anybody to diversify livelihood	Yes, from GO agency 1, yes from NGO 2, yes from Project 3, Never received 4
11. If yes, did the support reduced your dependency on resource collection	Yes, reduced totally 1, more than 50 % reduced 2, at least 25% reduced 3, not reduced 4
12. If you have never received support, do you welcome such support	Yes 1, no 2

13. Any recommendation for livelihood improvement or development

#### D. Resource collection

1. Did you noticed any changes in forest condition during last one or two decades, in terms of tree density, wild animals and other forest resources availability	It has decreased substantially 1, similar 2, has increased 3, I can't understand 4, any other (specify) 5.
2. If decreased substantially did it influenced your livelihood	Switched livelihood 1, additional livelihood 2, continue even resource decreased because no other option 3, any other (specify)
3. How many people including you	0, 1, 2, 3,

from this HH collects forest resources currently	
4. What you collect from forests	Nothing 1, Timber 2, fuel wood 3, thatching 4, NTFP 5, other (Specify) 6
5. Fuel wood includes	Only litters 1, dry and dead branches and trees 2, Dead saplings and under growths 3, Cut the undergrowth and dry them 4.
6. How many days a week you go to forests	
7. how many hours in one go you spent	
8. Total hours invested per week for resource collection from this HH	*Estimated hours
9. What % of the total collection you consume	1 Consume 100% , 2 consume 50% , 3 consume 25%, do not consume 4
10. Whether current law/policy restrict you collecting resources	Don't know 1, yes 2, no 3
11. Do you want any change in law/policy, if yes, what	Allow us collecting resources following wise use policy 1, make rule heard to stop people collecting

	resources and conserve forest 2, this is natural so we should be collecting as we want 3, give back our forest to us we will protect it 4, any other (specify) 5.
12. You collect forest resources	you believe it is your right 1, you get a better income 2, you have no other skill for livelihood 3, no social discouragement 4, lack of alternate livelihood opportunity 5, peer pressure to continue 6, compelled to earn money to face the forest offense previous cases 7,
13. Do you bring cattle for grazing in the forest	My own cattle 1, Other's cattle I work for 2, I do not bring cattle to the forest 3.
14. Tell me if you specifically know of encroachment of Lawachara	

forest land	
15. Suggestion/recommendation to reduce dependency	

\*Enumerator estimates along with the respondent to sum hours per week

**E. Perception on forest conservation and management**

1. Forest conservation	Fully aware of the value 1, supportive as VCF /CPG member 2, supportive though not member 3, it is not worth conserving 4.
2. Forest laws and rules	Only heard 1, aware of restrictions 2, aware of provisions 3, don't even heard 4, I think not relevant for us 5, I comply 6
3. Forest department	Know the officers 1, have interaction 2, supportive to the forests and us 3, not supportive to forest and us 4, don't know forest department or officers 5
4. Do you know forest require management for sustenance	Don't know 1, heard of 2, exposed to 3, involved 4
5. Do you know Lawachara forest management engaged community, i.e. Co-management	Don't know 1, heard of 2, exposed to 3, involved 4

6. If you are engaged, VCF/CPG member what is your major concern for Lawachara	Illegal felling 1, undergrowth sapling clearing 2, grazing 3, encroachment 4, forest fire 5, poaching 6, brick field 7, disturbance to wild life 8, others (please specify) 9.
7. Being a VCF/CPG member do you feel	Empowered 1, benefitted socially 2, benefitted economically 3, feel realizing social responsibility 4, do not feel anything 5
8. How frequent you meet as VCF	Monthly once 1, once every two months 2, less frequent 3.
9. If you are representative from VCF to PF and then to CMC member, what is the level of support you get to raise your voice	Very good 1. Good 2, poor 3, not at all 4

at CMC	
10. Your participation in decision making	Very active 1, moderately 2, Passive 3, not at all 4.
11. Do any women member put any issue in the discussion in VCF meeting	Very often 1, often 2, seldom 3, not at all 4.
12. If you are not engaged in Lawachara management, what is your major concern	Illegal felling 1, undergrowth sapling clearing 2, grazing 3, encroachment 4, forest fire 5, poaching 6, brick field 7, disturbance to wild life 8, others (please specify) 9.
13. If not engaged	You want to engage yourself 1, don't want but support forest <b>management</b> and community engagement 2, do not support forest management 3, and do not want community to engage 4.
14. Your reflection on Lawachara management	Very well managed 1, well managed 2, moderate managed 3, poor managed 4, very poor managed 5, any other (specify) 6.
15. Your recommendations for better Lawachara management	

### Annex 3: Checklist for Key Informant Interview

#### Forest Health

To what extent encroachment and deforestation and conversions occur? What are the underlying causes? Way to improves?

What are the extent of exploitation? Illegal tree felling? Extraction of undergrowth, saplings and others that degrade forest habitat? what are the underlying causes of degradation? Way to improve?

#### Law and policy

Is the Forest Act 1927 relevant in the contemporary forest management paradigm? How effective is the Wildlife (Conservation and Security) Act 2012? Are the offense and

penalties defined in law? Is it necessary to amend laws and or develop and adopt new forest policy?

To what extent the forest management objectives are clearly mentioned in the forest policy? Does forest policy guide reduction of forest degradation and deforestation? Does moratorium help conserve forest?

What are implications of SATA 1950 on forest land tenure entitlement? What are the process of settlement of disputes over forest land tenure and to what extent disputes are settled?

To what extent forest land tenure information comprehensive, accurate and accessible?

To what extent relevant law recognizes indigenous and community groups tenure?

To what extent legal support is available to protect forest land tenure?

Is there clear authority of forest land tenure administration?

To what extent the forest management objectives coordinated with forest land tenure law and policy?

### **Forest Management Institutions**

What are the roles, responsibilities and level of expertise of Forest Management Institutions (MOEF, FD, BFRI, BFIDC, FA, FTC)?

Are there clear authority of enforcing law and implementation of policy? To what extent forest policy is implemented; forest law enforced?

### **Governance**

To what extent corruptions influence decisions; to what extent political and influential people engaged in grabbing forest resources?

To what extent the recruitment, transfer and posting are done complying Rules?

Are the extra budgetary resources managed transparently?

To what extent FD capable of monitoring forest land tenure and dispute resolution?

**Community participation:**

To what extent do forest management practices promote the meaningful participation of local communities and indigenous peoples?

**Sustainable forest management:**

Does law and policy provide directives for planned management of forests?

What management approaches are practiced in Bangladesh?

How about the Co-Management structure and composition?

To what extent are forest cover and forest cover change effectively monitored?

To what extent payment for environment service (PES) is in effect? Are there potential to introduce? Is there budgetary support for conservation finance?

**List of Key Informant**

1. Akber Hossain, Deputy Chief Conservator of Forest (DCCF). 2015. Mohakhali Forest Office, Forest Department, Ministry of Environment and Forest, Government of Bangladesh. 6 June 2015.
2. Mr. A K M Shamsuddin, Chief Conservator of Forests (Former), Bangladesh Forest Department. 2015. CREL Office, Gulshan 2, Dhaka, Bangladesh, 22 October 2015.
3. Dr. Azharul H. Majumder, Climate Change Specialist, USAID. 2015. Program Officer, USAID Bangladesh Office, Dhaka, 15 June 2015.
4. Farid Uddin Ahmed, Executive Director, Arannayk Foundation. 2015. Arannayk Foundation office, Banani, DOHS, Dhaka, 19 May 2015.
5. Ishtiaque Uddin Ahmed, Country Representative, IUCN Bangladesh. 2015. IUCN office, Banani, Dhaka, 12 May, 2015.
6. Junaid Kabir Chowdhury, Deputy Chief Conservator of Forest (Former). 2015. IUCN Office, Dhaka, 31 May, 2015.
7. Dr. Kamal Uddin Ahmed, Secretary, Ministry of Environment and Forest (MOEF), Bangladesh. 2015. Office of the Secretary, Ministry of Environment and Forest, 16 July, 2015.
8. Md. Abdul Latif Mia, Conservator of Forest. 2016. Forest Department, Ministry of Environment and Forests, Government of Bangladesh, Sher-e-Bangla nagar, Dhaka, 21 March 2016.
9. Dr. Md. Liakath Ali, Climate Change and Environment Adviser, DFID Bangladesh. 2015. DFID Office, Baridhara, Dhaka, 25 May 2015.

10. Dr. Maksud Kamal, Professor, Department of Earth Science and Disaster Management, Dhaka University. 2015. Office of Department of Earth Science and Disaster Management, Dhaka University, 23 May 2015.
11. Dr. A.Z.M. Manzoor Rashid, Professor, Department of Forestry, Shah Jalal University of Science and Technology. 2015. Shah Jalal University of Science and Technology, Sylhet, 13 July 2015.
12. Dr. Mihir Kanti Mazumder, Secretary, Ministry of Environment and Forests (Former), Bangladesh. 2015. Dhaka, 13 May 2015.
13. Mike Robson, Country Representative, FAO, Bangladesh Country Office. 2015. FAO Bangladesh Country Office, Dhaka, 5 July 2015.
14. Dr. M. Mokhlesur Rahman, Executive Director, Centre for Natural Resources Studies (CNRS). CNRS office, Banani, Dhaka, 8 May 2015.
15. Dr. Niaz Ahmed Khan, Professor, Department of Development Studies, Dhaka University.  
Professor's Chamber, Development Studies Department, Dhaka University, Dhaka, 3 September 2015.
16. Otilie Mooshofer, Principal Adviser, GIZ, GIZ Bangladesh Office, Dhaka, 12 August 2015.
17. Dr. Ramsharma, Forest Management Policy Specialists, The Climate Resilient Participatory Afforestation, and Reforestation Project (CRPARP). 2015. Forest Department, Ministry of Environment and Forest, Government of Bangladesh, Dhaka, 31 May 2015.
18. Professor Dr. Mizan R Khan, Environmental Science, North South University. 2015. Professor's Chamber, North South University, Dhaka, 10 June 2015.
19. Ratan Kumar Mazumder, DCCF, Bangladesh. 2015. Forest Department, Ministry of Environment and Forest, Government of Bangladesh, Dhaka, 24 February 2015.
20. Dr. Abdul Rob Molla, Professor, Department of Zoology, Dhaka University. 2015. Professor's Chamber, Department of Zoology, Dhaka University, Dhaka, 30 May 2015.
21. Advocate Safura Begum Rumi, MP (Woman Member of Parliament). 2015. Residence Apartment 2B Building 3, NAM complex, Manik Mia Avenue, Dhaka, 3 September, 2015.

22. Safiul Alam Chowdhury, Director, Forest Academy, Chittagong, Bangladesh. 2015. Office of the Director, Forest Academy, Chittagong, Bangladesh, 27 October 2015.
23. Dr. Shahin Akter, Director, Bangladesh Forest Research Institute (BFRI). 2015. Office of the Director, Bangladesh Forest Research Institute (BFRI), Chittagong, Bangladesh, 26 October, 2015.
24. Sharfuddin Ahmed, Chairman, Bangladesh Forest Industries Development Corporation (BFIDC). 2015. Office of the Chairman, Bangladesh Forest Industries Development Corporation (BFIDC), Motijheel, Dhaka, 9 August 2015.
25. Dr. Sultan Uddin Ahmed, Director NRM, Department of Environment. 2015. Office of the Director, Department of Environment, Ministry of Environment and Forest, Government of Bangladesh, Dhaka, 16 July 2015.
26. Dr. Aminul Islam, Sustainable Development Adviser, UNDP, Bangladesh. 2015. UNDP Office, Dhaka, 15 May 2015.
27. Md. Yunus Ali, CCF (Jan 2012-Jan 2017), Forest Department. 2015. Department, Ministry of Environment and Forest, Government of Bangladesh, Dhaka, 24 May 2015.
28. Md. Zakir Hossain, IUCN, Regional Coordinator (Former) Bangkok. 2015. Gulshan residence, Dhaka, 11 June 2015.
29. Mihir Kumar Doe, Divisional Forest Officer (DFO), Wildlife Division, Moulovibazar, Sylhet. 2017. DFO Office, Moulovibazar, 19 October 2017
30. Janak Dey Borma, ethnic representative in Lawachara CMC . 2015. CMC office Lawachara, 20 October 2017
31. Laila Begum, CPG member. 2015. CMC office Lawachara, 20 October, 2017
32. Abdus Shahid MP. 2017. Residence of MP in Srimongol. 21 October 2017.
33. Shamsul Huda (former DCCF), Consultant, Protected Area Management Plan. 2015. Forest health and forest Land. Interviewed by the Researcher. [Checklist] CREL Office, Gulshan, Dhaka, 26 September 2015.
34. Dr. Hassan Mahmud, Chairman Parliamentary standing committee on Environment, Bangladesh Parliament. Immediate former minister, ministry of environment and forests, Bangladesh. September 2015, Nakhil Para MP residence
35. Md. Mahfuzur Rahman, Secretary, Chairman Land Reforms Board, MO L, 24<sup>th</sup> May , 2016 [mahfuz1041@yahoo.com](mailto:mahfuz1041@yahoo.com), web: [www.lrb.gov.bd](http://www.lrb.gov.bd)
36. Md. Rakibul Hassan Mukul, Assistant Chief Conservator of Forests, Forest Department, Bangladesh. 5 June 2016. [lalpiprey@gmail.com](mailto:lalpiprey@gmail.com)



**Annex 4:** Check list for FGD

<b>Questions</b>
<i>What are the drivers of forest degradation and deforestation, what are the underlying causes? Are People collecting forest resources judiciously?</i>
<i>What is your perception on the Forest Law and Policy? Do you suggest amendment of law? Do you like moratorium? Do you suggest amendment of law?</i>
<i>What is your perception and aspiration of the Forest Management Institutions? What are the challenges of the Forest Department? How to overcome?</i>
<i>What is your perception on Co management? What is perception on CPG? What are the overall challenges and successes in Lawachara Forest Management? Betel leaf and</i>

*agroforestry has been introduced in the Lawachara Forest during early 1950s. What is the situation now?*

*What measures you are considering for Climate Change?*

*Your recommendations for sustainable management of Lawachara*

*Is Upazila administration supportive to forest management? In case of forest land encroachment or illegal tree felling, what is the role of Police?*

*What is your relationship with the Lawachara forest in terms of values, cultural and religious beliefs?*

*The perception, aspiration of the FGD participants has been exposed while answering on Co-Management approach. Are the UP members and chairman supportive of forest management?*