

An Evaluation of Protected Area Management Planning and Policy in Bangladesh

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DECLARATION

I certify that this work has not been accepted in substance for any degree, and is not concurrently being submitted for any degree other than that of Doctor of Philosophy being studied at the University of Greenwich. I also declare that this work is the result of my own investigations except where otherwise identified by references and that I have not plagiarised the work of others.

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ABSTRACT

AN EVALUATION OF PROTECTED AREA MANAGEMENT PLANNING AND POLICY IN BANGLADESH

This study reviews and evaluates the current status of management planning and policy in Protected Areas (PAs) in Bangladesh via a case study of two Wildlife Sanctuaries and one National Park. Using a mixed method approach, the research evaluates the perceptions and attitudes of local residents and other stakeholders towards the effectiveness of protected area planning and management, specifically co-management plans for the case study areas. The research was based on semi-structured and in-depth interviews with key informants, focus group discussions, and questionnaire surveys of village residents.

The study revealed a complex socio-economic context characterised by poverty; within this, a diverse range of stakeholders exist whose interests in, and perceptions of, protected area management do not necessarily coincide with those of the Forest Department officials, leading to situations of conflict and difficulty for the Forest Department in enforcing the law over areas of forest in Bangladesh, a situation that has not been helped by the limited availability of manpower and modern equipment. It is concluded that the co-management approach, by taking into account the interests, wishes, and aspirations of the local communities, holds out better prospects of protecting the forest, meeting the objectives of the protected area management plans, and development ambitions of local communities. However, the findings suggest that community participation needs to be improved if effective forms of co-management are to be achieved, in turn improving the chances of conserving the forest for future generations while permitting the present generation to pursue sustainable livelihoods. Based on this study, it is clear that not only is action required to increase the participation of the local community, but human resource development is required to produce parallel institutional capacity building within the Forest Department. Moreover, programmes designed to support the generation of alternative livelihood opportunities are required to reduce dependency on forest resources. All of these lines of development are essential to increase the capacity of the local communities and officials to work together to develop and implement the management objectives of the National Parks and Wildlife Sanctuaries. However, without genuine political will to act it will be difficult to achieve the aforementioned ambitions/objectives.

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LIST OF ACRONYMS AND ABBREVIATIONS

Abbreviation	Meaning
ACA	Annapurna Conservation Area
ACF	Assistant Conservator of Forests
ADB	Asian Development Bank
AIGA	Alternative Income Generating Activities
ASA	Association for Social Development
BDR	Bangladesh Rifles
BGB	Border Guard of Bangladesh
BFRI	Bangladesh Forest Research Institute
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CBC	Community Based Conservation
CBOs	Community-based Organizations
CBD	Convention on Biological Diversity
CBNRM	Community Based Natural Resource Management
CBT	Community Based Tourism
CCA	Community Conserved Areas
CCF	Chief Conservator of Forest
CEGIS	Centre for Environmental and Geographic Information Services
CF	Conservator of Forests
CIFOR	Centre for International Forestry Research
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CM	Centimeter
CMC	Co-management Committee
CMPA	Co-Managed Protected Areas
CMS	Conservation of Migratory Species
CoP	Conference of Parties
DDT	Dichloro-Diphenyl Trichloroethane
DFID	Department for International Development
DFO	Divisional Forest Officer
EBM	Ecosystem Based Management

e.g.	For example
EIA	Environmental Impact Assessment
et al.	And others
FAO	Food and Agriculture Organization
FD	Forest Department
FDB	Forest Department of Bangladesh
FG	Forest Guard
FGDs	Focus Group Discussions
FR	Forest Ranger
FRMP	Forest Resource Management Project
FSP	Forestry Sector Project
GBM	Green Belt Movement
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographical Information System
GoB	Government of Bangladesh
Ha	Hectare(s)
HEED	Health Education and Economic Development
HHs	Households
INRM	Integrated Natural Resource Management
IPAC	Integrated Protected Area Co-management
IRG	International Resources Group
IUCN	International Union for Conservation of Nature
JJS	Jagrata Juba Shangha
km	Kilometer
km ²	Square kilometer
LDF	Landscape Development Fund
LMMAS	Locally Managed Marine Areas
LWS	Local Wildlife Sites
M	Meter
M ²	Square meter
LNP	Lawachara National Park
MEA	Millennium Ecosystem Assessment
MoEF	Ministry of Environment and Forest

NACOM	Nature Conservation Management
NBSAP	National Biodiversity Strategy and Action Plan
NCS	National Conservation Strategy
NEMAP	National Environment Management Action Plan
NGOs	Non Governmental Organisations
NP	National Park
NSP	Nishorgo Support Project
NTFP	Non-Timber Forest Products
PA	Protected Area
PAs	Protected Areas
PBSA	Participatory Benefit Sharing Agreement
PRA	Participatory Rural Appraisal
RF	Reserved Forest
RIMS	Resource Information Management System
RoW	Right of Way
RRA	Rapid Rural Appraisal
RDRS	Rangpur-Dinajpur Rural Service Bangladesh
spp.	Species (plural)
SEHD	Society for Environment and Human Development
SEMP	Sustainable Environment Management Programme
SPSS	Statistical Package for Social Sciences
SRF	Sunderbans Reserve Forest
SSSI	Sites of Specific Scientific Interest
SWS	Sunderbans Wildlife Sanctuary
TFF	Tree Farming Fund
TWS	Teknaf Wildlife Sanctuary
TK	Taka (Bangladeshi currency)
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNFCC	United Nations Framework Convention on Climate Change
UNSD	United Nations Sustainable Development
USAID	United States Agency for International Development

WCMC	World Conservation Monitoring Centre
WCPA	World Commission on Protected Areas
WDPA	World Database on Protected Areas
WHC	World Heritage Convention
WPC	World Parks Congress
WS	Wildlife Sanctuary
WTO	World Tourism Organization
WWF	Worldwide Fund for Nature
yrs	Years

CHAPTER 1: INTRODUCTION

This chapter describes the background, benefits of, and current threats to effective governance of protected areas, as well as gaps in the current protected area management system. It then offers a rationale for the study as well as research aims and questions. An outline of the thesis appears at the end of the chapter.

1.1 Background of the Study

The setting up of Protected Areas (PAs) represents one of the main strategies for conservation of species and is central to international political and economic commitments to protect biodiversity and natural resources. A protected area is “*A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*” (Dudley, 2008:60). PAs exist in many shapes and sizes, including no-take sanctuaries, sacred natural sites, peace parks, multiple use landscapes and seascape (Bertzky *et al.*, 2012). It may be a wetland, a tropical or deciduous forest, cultivated landscape of value, an alpine region, a savannah, a marine area or any number of other types of natural or partly modified ecosystems or any combination of types of ecosystems (Phillips, 1998).

Conservation biologists define PAs as predominantly natural areas established and managed in perpetuity through legal or customary regimes primarily for the conservation of biological diversity and natural resources (William *et al.*, 1990). However it is now recognised that PAs are also important for socio-economic reasons. They have a significant role in promoting sustainable use of resources, protecting ecosystems, delivering ecosystem services and providing a broad spectrum of social and economic development opportunities (Mitchell and Ashley, 2010; Bertzky *et al.*, 2012). Today PAs are seen not only as a key tool for the conservation of nature, natural resources, and cultural landscapes but as a mechanism for delivering integrated sustainable development, combining the results of scientific research, wilderness protection, maintenance of environmental services and education and tourism to support the local economy (Phillips, 1998; Mose and Weixlbaumer, 2007; Mitchell and Ashley, 2010; Bertzky *et al.*, 2012; Getzner *et al.*, 2012; Niedzialkowski *et al.*, 2012; Thapa, 2014).

For the purposes of this research the key principles of Protected Area Management Plans must be understood as the basis for scrutiny of particular aspects, notably the extent to which local people

have participated in plan development and to which their concerns and needs have been met. It is generally accepted that any Protected Area management plan should include a description of the entire geographical area over which the park extends, highlight the issues and notable features, the aim of management, the rationale behind the management decisions and detail the actions that are required to achieve the aim(s) (e.g. ANZECC, 2000; Phillips, 2000; Thomas *et al.*, 2003;). ANZECC (2000) stated that the principal intention of management planning is the interpretation and incorporation of a variety of policies, treaties, strategies, business plans and legislative requirements into an environmental overlay. This then provides the necessary framework to guide the management of a specific reserve and provide assurance to the local community that it is being managed appropriately. The management plans that form the focus of this research exhibit these characteristics. ANZECC (2000) also asserted that improved incorporation of management planning procedures and plans with policy and strategy frameworks, and financial and development planning processes are vital if management planning is to serve as the important framework for guiding management action for specific regions. Consequently the management of PAs involves consideration of socio-economic, biophysical, cultural, and administrative factors and the involvement of a wide range of stakeholders. It is vital that all aspects of the management of PAs are regularly monitored and evaluated as the results and feedback of research become available through an iterative process and on the basis of integrated management planning. In addition, effective planning and management has been found to require significant active community support and involvement, which is a key to good practice in planning projects (ANZECC, 2000). However, efficient management usually includes strategic partnerships and engagement with a range of stakeholders, particularly those dependent on the site's resources (Hockings *et al.*, 2000). These perspectives on the nature of Protected Area Planning form the backdrop for the present research. Each study area has a management plan that forms the framework for guiding management action and which involves the interplay of a range of stakeholders that forms an important focus for the research.

Six categories of protected area have been recognized by the IUCN (1994). Under the IUCN management categories, PAs are given varying status recognising various levels of human settlement, and natural features. The different levels of PAs are categories 1a and 1b, in which human activities are not allowed; as well as zones II, III and IV which are compatible with human settlement, in sustainable balance with natural resources and are expected to take account of the community's needs (Borrini-Feyerabend *et al.*, 2004). In India, National Parks and Wildlife Sanctuaries have been established under the Indian Wildlife Act, 1972 (Sharma *et al.*,

2005). Tinangol in Malaysia is an example of a category II forest PA, and is managed by communities for water catchment protection. Pulmari, in Argentina, is an example of a category IV protected area which is governed using intervention management by communities to protect their resources (Borrini-Feyerabend *et al.*, 2004). There are many different forms of management for PAs, for example Community-Conserved Areas (CCA) declared and run by local communities; and, Co-Managed Protected Areas (CMPA) governed by the transboundary and collaborative management of several different stakeholders (Borrini-Feyerabend *et al.*, 2004).

It is now accepted that PAs should be multifunctional and that the process of monitoring and evaluation must be derived from a wide range of disciplines (Leverington *et al.*, 2008; Kolahi *et al.*, 2014). Evaluation is *“The judgement or assessment of achievement against some predetermined criteria (usually a set of standards or objectives); in this case including the objectives for which the protected areas were established”* (Hockings *et al.*, 2000: 3). Evaluation is essential as PAs face numerous threats (Hockings *et al.*, 2000); it is not only a technique for uncovering problems, it is also vital for recognizing when things are going well. The general uses of evaluation are: encouraging adaptive management, improving project planning, and, promoting accountability (Hockings *et al.*, 2000). In protected area management globally, the importance of community participation has developed since conservation of natural resources became a significant issue of concern (Andrade and Rhodes, 2012; Niedzialkowski *et al.*, 2012; Gardner *et al.*, 2013; Rashid *et al.*, 2013; Chowdhury *et al.*, 2014). Monitoring and evaluation systems should be integrated into all the national PAs management plans, as this is required under Article 8 of the Convention on Biological Diversity (CBD) (Hockings *et al.*, 2000). Well planned and effectively managed systems of PAs are an essential instrument for reducing biodiversity loss while delivering environmental supplies and ecosystem services that support sustainable development (Ervin *et al.*, 2010). In the context of Bangladesh and this research, there are questions about the quality of planning and effectiveness of management that need to be addressed in order to support sustainable development and to maintain ecosystem services.

Internationally, the requirement to evaluate protected area management success has become increasingly well recognised (Leverington *et al.*, 2008; Coad *et al.*, 2013). However, it has been argued that currently protected areas in both developed and developing countries do not have enough protection (Leverington *et al.*, 2008). There are requirements to demonstrate to what extent PAs are a successful strategy for conservation and improvement of the socioeconomic conditions of people living in, and adjacent to, PAs (Leverington *et al.*, 2008). Evaluation of protected area management plans is essential if managers are to understand what works and what

does not, helping them to build upon best ideas and practices. Both positive and negative experiences in the evaluation process can be used as a reason to gather knowledge, and allows continuous development of the plan and can permit understanding of future threats and opportunities (Leverington *et al.*, 2008). This is a central focus of the research presented in this thesis.

1.2 Benefits of Protected Areas

There are many benefits to be derived from PAs, aside from protecting and managing renewable resources. These include contributing to the natural environmental balance, stabilising climate regimes, preventing soil erosion, regulating floods, and stabilising hydrological systems (Collins *et al.*, 1991; Kettunen and Brink, 2013). Protected areas can protect national heritage, can be a sustainable source of wealth for current and future generations and can provide opportunities for education and scientific research. PAs can also contribute to the development of a tourism industry, which has the potential for great economic benefits; for example, in 1995, gate fees for the Serengeti National Park were more than \$1million (Emmerton and Mfunda, 1999). In order to benefit local people tourism requires cohesiveness and flexibility, it should be accessible to the needs of the community, and, responsive to changing situations (Eagles and McCool, 2002). Benefits from these schemes could take the form of development projects such as construction and rehabilitation of infrastructure and could include support for small local enterprises and entrepreneurs (Emmerton and Mfunda, 1999; Ezebilo and Mattsson, 2010; Holden, 2013; Leung *et al.*, 2014). PAs also provide for people's recreational and outdoor activities, thus contributing to physical and mental well-being. In addition, PAs are significant as a means of ensuring compliance with national and international agreements and obligations (Crofts, 2009).

The primary purpose of PAs is to safeguard and secure the future of species, habitats, and natural systems and processes. Nature, landscapes and cultural manifestations can all be celebrated in a protected area (Crofts, 2009). Recently, the importance of PAs has been rising in the context of environmental services and human benefits (Crofts, 2009). PAs represent the core of the world's political and financial commitment to conserve biodiversity with natural and associated cultural resources; therefore PAs are the main part of official conservation policy and practice (Phillips, 2004; DeFries *et al.*, 2007). Scholars have found that PAs have reduced conversion of natural land cover in 75% of 147 countries (Joppa and Pfaff, 2011). Worldwide, they store 15% of the terrestrial carbon stock, help in reducing deforestation, species and habitat loss, and support the livelihoods of over one billion people (Bertzky *et al.*, 2012).

In summary, protected areas can provide an extensive range of values and benefits including:

- Biodiversity: ecosystem, habitat, species, genetic –including agro-biodiversity resources
- Cultural values, including: those that contribute to conservation outcomes (e.g. traditional management practices upon which key species have become dependent) and those that are themselves under threat; this could also include languages
- Disaster risk reduction, climate regulation
- Landscape nature and features
- Traditions – social consistency
- Moral and religious values – including wilderness
- Create opportunities for recreation
- Income from tourism

(Stolton, 2009; Ezebilo and Mattsson, 2010; Bertzky *et al.*, 2012; Gardner *et al.*, 2013; Kettunen and Brink, 2013; Thapa, 2014; Leung *et al.*, 2014).

1.3 Threats to Protected Areas

Currently protected areas face a series of serious threats including poaching, encroachment, illegal logging, and collection of non-timber forest products (IUCN, 1999; WWF, 2004). Threats encompass conditions of either human or natural origin that cause significant damage to PAs resources, or are in serious conflict with the objectives of PA management. Threats such as poaching or loss of habitat arise directly from human activities. Indirect threats include, for example, soil erosion, and competition by exotic species and chemical pollution. Exotic plants and chemical pollution are of bigger concern in more developed countries (Williams *et al.*, 1990). According to various scholars the most common threats in PAs are:

- Global climate change
- Over-harvesting of biological resources
- Unregulated tourism and recreation
- Encroachment and development
- Fire
- Pollution
- Infrastructure for energy and transportation
- Invasive species
- Mining and quarrying

- Inappropriate resource management policies
- Weak institutional capacity

(Ervin, 2003a; Dudley *et al.*, 2007; Leverington *et al.*, 2008; Lawrence *et al.*, 2012; Oli *et al.*, 2013; Mishra, 2013; Chowdhury *et al.*, 2014; Gandiwa *et al.*, 2014; Rao *et al.*, 2014).

IUCN (1999) surveys in a range of countries have revealed a variety of other factors threatening protected areas. These include lack of financial resources, shortage of staff and staff training, inadequate institutional capacity, lack of political support, inadequate communication with, and involvement of, local inhabitants in implementing management plans, lack of co-ordination with managing organisations, inadequate legal frameworks, insufficient enforcement tools, incomplete land-use plans, and poor definition of protected area boundaries.

In Bangladesh, protected areas are subject to many of these threats and the research reported herein focuses on how the various stakeholders involved perceive the effectiveness of protected area planning and management aimed at countering these threats. However, the threats are perceived differently by the different stakeholders. For example, the Forest Department officials think that the communities in and adjacent to the Park/Wildlife Sanctuary are creating the problems while the communities have the opposite view.

1.4 Gaps in Protected Area Management Systems

The significant achievement of extending protected area coverage has not been free from controversy and conflict. Many protected areas are under pressure from continuing human use, and have been progressively eroded in terms of their ability to protect and even maintain their boundaries. The issues generally originate from ecological insufficiency and socio-economic incompatibility of the protected area network and these concerns are addressed in the following sections.

1.4.1 Ecological inadequacy

Despite increased coverage over the last 40 years, the global protected area network is not yet sufficient to protect the full range of ecosystems and species on earth (Myers, 1999; MEA, 2005a; Bertzky *et al.*, 2012). Many established protected areas are not properly managed or are insufficiently funded to fulfill their management objectives (Dudley and Parish, 2006). In many countries, the PA system is not yet representative of the ecology, with only some ecoregions well covered by PAs while others remain unprotected (Barr *et al.*, 2011). Protected areas fail to address the specific conditions necessary for the long-term species survival or ecosystem

functioning when protected areas are too small, or too isolated (Dudley and Parish, 2006). Currently, less than 2% of some bioregions such as the tropical dry forests of Mexico, the Mediterranean habitats of Chile, and the temperate grassland of Southern Africa, are protected (Brooks *et al.*, 2004). A global gap analysis suggested that within existing protected area systems, at least 1,300 species, including more than 700 threatened ones receive no protection (Rodrigues *et al.*, 2003). Marine and freshwater biomes are poorly represented, amounting to just (about) 0.5% of the total area (Chape *et al.*, 2008). Marine PAs do not represent all the ecoregions important for conservation (Toropove *et al.*, 2010). Many PAs face management, governance and financial challenges and half of world's most important sites for biodiversity are still vulnerable (Bertzky *et al.*, 2012).

Scholars have argued that the existing gap in biodiversity conservation is mainly due to a mismatch between the locations of protected areas and biodiversity-rich areas (Budhathoki, 2012). Originally, the majority of protected areas were not created with the main purpose of biodiversity conservation in mind and so have not always been biologically rational (Brandon *et al.*, 1998; Chape *et al.*, 2008). Rather they were declared as protected areas as they were not suitable for human use and were in remote areas with minimal land use conflicts (Adams, 2005). Evidence has also revealed that most of the existing protected areas are not large enough to ensure long-term conservation of species requiring an extensive home range to maintain their genetic viability (Dudley and Parish, 2006; Maiorano *et al.*, 2008). The biodiversity hotspots and existing global conservation prioritization templates have been inadequate to address the threat from the effects of human induced climate and land use change (Lee and Jetz, 2008). According to Dudley *et al.*, (2005:3) the overall situation in global protected area systems is as follows.

- The protected area system is incomplete and does not cover all biomes and critical species.
- Protected areas are not fulfilling their biodiversity conservation objectives.
- Participation of local communities in the establishment and management of protected areas is insufficient.
- Protected areas in developing countries are inadequately funded.

In order to achieve long-term conservation objectives, appropriate, strategic and rational actions are required. The establishment of protected areas has to be based on the application of the best available data and tools (IUCN, 2005). In tropical rainforests, strategically there is a need to expand and strengthen the coverage of PAs (Rodrigues, *et al.*, 2003). There is a need to give priority to the expansion of protected areas in South Asia and to consolidate existing protected

area networks in Africa and South America (Rodrigues, *et al.*, 2003). The global community states its intentions via universal and local conventions, the efforts of global NGOs and others in support of the development of PAs. The international paradigms for protecting the best places for biodiversity are the UNESCO World Heritage programme, and the Convention on Biological Diversity. Their mission is to evaluate and highlight the many values of biodiversity and place authoritative biodiversity knowledge at the centre of decision-making. The World Database on Protected Areas (WDPA) is the basis for measuring global protection and priority setting. The UN Convention on Biological Diversity New Strategic Plan has a target (Aichi Biodiversity Target) of at least 17% of the land area and 10% of marine areas of each country protected by 2020 (Bertzky *et al.*, 2012). The areas which are important for biodiversity and ecosystem services should be effectively and equitably managed, ecologically representative, and well connected (Besancon, 2011; Bertzky *et al.*, 2012).

An ecological network is “*A coherent system of natural and/or semi-natural landscape elements that is configured and managed with the objective of maintaining or restoring ecological functions as a means to conserve biodiversity while also providing appropriate opportunities for the sustainable use of natural resources*” (Bennett and Wit, 2001:16). The notion of ecological networks has been strongly developed in Europe, particularly in the Netherlands and Germany where the chances for biodiversity conservation in semi-natural areas exterior to the Protected Area system are supported by strong traditions of land use planning (Boyd, 2004). An ecological network is widely recognised as an appropriate conservation response to a fragmented natural environment (Lawton, 2011). More than 250 ecological network initiatives have been started globally; including in Scotland, Wales and parts of England. These need to embrace a new, invigorating approach that reconstructs nature and produces a more resilient natural environment for the benefit of nature and peoples. While strong leadership from Governments is necessary, it is not solely the job of Governments (Lawton, 2011). Efficient and constructive involvement with the landowners and land managers is also essential. However this is a matter of improved co-operation between local authorities, local communities, statutory agencies, the voluntary and private sectors, farmers, other land-managers and individual citizens (Lawton, 2011). The PAs do not form a coherent and resilient network in the UK because:

- of size (77% of SSSIs and 98% of local wildlife sites are smaller than 100 ha)
- loss of certain habitats
- outside Natura 2000 sites and SSSIs there is inadequate protection
- under-management

- lack of connections in the countryside and
- isolation of sites, (Lawton, 2011).

The solutions are better management of existing sites, bigger sites, creation of more sites, enhancement of connectivity, and creation of new corridors (Lawton, 2011; Di Minin, 2013). In order to sustain biodiversity PAs need to be managed in a consistent network rather than as isolated habitat islands, particularly in the face of climate change (Rands *et al.*, 2010). These are issues of concern in the case study areas that are the focus of this research.

1.4.2 Socio-economic incompatibility

Overall, there is a consensus in conservation communities on what to conserve and where to establish PAs for the protection of biological diversity (Budhathoki, 2012). The role of protected areas in securing biodiversity and human well-being is well recognised (Wilson, 2006; Aziz *et al.*, 2013). But there is some confusion between conservation targets, and the approaches required to achieve them (Redford *et al.*, 2003). Arguments for and against strict protection, and the role of local people in protected area management, have been crucial to all these debates. The focus is now shifting to what protected areas can deliver rather than on their creation (Stolton *et al.*, 2008). The role of local people and their perceptions of what protected areas have delivered in their regions are a key concern of the research presented in this thesis.

Internationally, the establishment of protected areas based on the wilderness concept has tended to result in the physical and monetary dislocation of local residents and indigenous communities (Schmidt-Soltau and Brokington, 2007; Bray and Velazquez, 2009; Andrade and Rhodes, 2012). The park-people conflict started to come out strongly when protected areas, following the exclusionary approach applied at Yellowstone (USA) in 1872, were adopted as mainstream conservation practice in developing countries, without giving consideration to local contexts (Lane, 2001; Pretty and Smith, 2004; Andrade and Rhodes, 2012; Niedzialkowski *et al.*, 2012). In the name of protection, the people once living in and around protected areas were either evicted from their ancestral homes, or restricted in their use of natural resources such as forests (Brokington *et al.*, 2006; Kubo and Supriyanto, 2010). For example in 1972, around one quarter of the total population of the Chitwan District of Nepal was evicted during the establishment of Chitwan National Park (Budhathoki, 2012). In India, 600,000 tribal people were displaced from the protected areas (Ghimire and Pimbert, 1997).

In developing countries, the livelihoods of the local communities often depend on the forest resources of protected areas. Exclusionary approaches do not take into account the social

ramifications of prohibiting access to local inhabitants. Conflicts between local livelihood systems and strict protected areas are almost ubiquitous because the rural poor have to endure the opportunity costs of total protection (Distefano, 2005; Dorji, 2009; Springer, 2009). Studies conducted in various parks around the world have revealed that poor farmers living adjacent to protected areas generally lose more than half of their per capita income because of damage caused by wildlife (Distefano, 2005; WWF, 2008). Human casualties resulting from human-wildlife competition in the same habitat, with limited natural resources, have become a serious problem. In Kenya, for example, more than 200 people were killed by elephants (*Elephas maximus*) in a seven year period (WWF, 2006). Likewise, on average 20-30 people are killed annually by tigers (*Panthera tigris*) in the Bangladesh Sunderbans (Ahmad *et al.*, 2009); such people fall prey to tigers while collecting fuelwood, golpata (*Nypa fruticans*), honey and while fishing inside the protected areas, with virtually no compensation available.

The disparity between local economic reality and conservation actions has created aggression and non-cooperation between local residents and protected area managers. Continued hostility is counterproductive to sustainable conservation efforts (Weladji and Tchamba, 2003). The strategy of locking up biodiversity in small parks, while ignoring wider social and political realities, is largely unsuccessful and a source of park-people conflicts (Songorwa *et al.*, 2000; Roe, 2003; Niedzialkowski *et al.*, 2012; Mishra, 2013). Currently conservation organisations recognise the importance of integrating people and their needs into conservation efforts (Pimbert and Pretty, 1997; McNeely and Mainka, 2009; Andrade and Rhodes, 2012; Niedzialkowski *et al.*, 2012; Aziz *et al.*, 2013; Rashid *et al.*, 2013).

1.5 Governance of Protected Areas

In biodiversity conservation, especially within PA management, governance is emerging as a key variable (Borrini-Feyerabend *et al.*, 2007, 2013; Ervin, 2007; Lockwood, 2010; Blanco and Razzaque, 2008; Niedzialkowski *et al.*, 2012; Oli *et al.*, 2013). It can be defined as a set of processes, procedures, resources, institutions and actors that determine how decisions are made and implemented (Macura *et al.*, 2013). According to Borrini-Feyerabend *et al.*, (2006: 116): “*Governance is a relatively new and powerful concept that people concerned with protected areas should understand and clearly distinguish from management*”. In 1992 the World Parks Congress in Caracas (Venezuela) fully recognised that different types of land owners (communal, individual or corporate) can play a crucial role in conservation, and this was in turn reflected in the guidelines on the IUCN PA categories (IUCN, 1994). At the World Conservation

Union's (IUCN) 5th World Parks Congress in Durban, South Africa in 2003, governance was established as a significant factor for achieving the environmental objectives, as well as social objectives of PAs (Balloffet and Martin, 2007). In the conservation discipline, 'Governance of Protected Areas' is a relatively new concept, first rising to prominence at the Durban Congress (Graham *et al.*, 2003), where a set of 'good governance' principles for PAs was developed (Table 1.1). Good governance is a prerequisite for effective protected areas management (Lockwood, 2010). Moreover, Borrini-Feyerabend *et al.*, (2006: 116) explained the difference between PA management and governance in the following way: "*Management is about what is done about a particular site or situation, governance addresses who makes those decisions and how*".

Table 1.1 Principles of good governance.

Good governance principles	Description
Legitimacy and voice	<p>Participation: All men and women should have a voice in decision making, either directly or through legitimate intermediate institutions that represent their intention. Such broad participation is built on freedom of association and speech, as well as capacities to participate constructively.</p> <p>Consensus orientation: Good governance mediates differing interests to reach a broad consensus on what is in the best interest of the group and, where possible, on policies and procedures.</p>
Accountability	<p>Accountability: Decision-makers are accountable to the public, as well as to institutional stakeholders. Accountability differs depending on the organizations and whether the decision is internal or external.</p> <p>Transparency: Transparency is built on the free flow of information. Processes, institutions and information are directly accessible to those concerned with them. Enough information is provided to understand and monitor institutions and their decision-making processes.</p>
Performance	<p>Responsiveness: Institutions and processes try to serve all stakeholders.</p> <p>Effectiveness and efficiency: Processes and institutions produce results that meet needs while making the best use of resources.</p>
Fairness	<p>Equity: All men and women have opportunities to improve or maintain their well-being.</p> <p>Rule of Law: Legal frameworks are fair and enforced impartially, particularly the laws on human rights.</p>
Direction	<p>Strategic vision: Leaders and the public have a broad and long-term perspective on good governance and human development, along with a sense of what is needed for such development.</p> <p>Embracing complexities: The historical, cultural and social complexities in which the long-term perspective is grounded are understood and effectively taken into account.</p>

(Borrini-Feyerabend, 2003)

In PA management, governance is a complex and relatively new way of thinking, with a variety of actors, different levels of power sharing, various formal and informal rules and vested interests (Macura *et al.*, 2013). However policy makers and practitioners increasingly recognize that governance plays a fundamental role in the long-term success of protected areas. Principles such as legitimacy, leadership, performance, accountability, and fairness form the framework of good governance. Moreover, sufficient and reliable funding is also important for effective management and good governance. The United Nations Environment Programme (UNEP) emphasized that stable, and adequate funding is a precondition for improved governance (UNEP, 2001). In a global survey of protected areas managers from 45 countries, it was found that involving and cooperating with stakeholder groups and obtaining sufficient funding are the top two challenges to achieving effective protected areas governance (Dearden *et al.*, 2005).

The governance of protected areas concerns the structures, processes and traditions that decide how power and responsibilities are exercised, how decisions are taken, and how stakeholders have their say (Graham *et al.*, 2003). In the last few decades, the earlier state-based ‘top down’ model has been replaced in some cases by various forms of collaborative management, partnership arrangements, delegated authority and community management (Lockwood, 2010). The notion of governance has also been useful in the formulation of categories for protected area governance types (Borrini-Feyerabend, 2004; Graham *et al.*, 2003). These governance types are related to the World Conservation Union’s (IUCN) system of PA categories which is based on the goal of protected area management (IUCN, 1994). There are four types of PA governance system such as government managed, cooperatively managed, private, and community protected areas (Borrini -Feyerabend *et al.*, 2007, 2013; Bertzky *et al.*, 2012). These four types of governance, together with the six IUCN categories of protected areas yields 24 different types and many more sub-types of PAs governance (Borrini -Feyerabend *et al.*, 2007) (Table 1.2). Each of these has different strengths and weaknesses, but all have a place in some protected area systems. Often, several actors share the authority, responsibility and accountability for a protected area (Bertzky *et al.*, 2012). There is a range with regard to decision-making and involvement among the categories of PAs, which is indicated in Figure 1.1.

Table 1.2 Protected area governance matrix.

Governance types PA categories	Government managed Protected Area			Co-managed Protected Area			Private Protected Area			Community Conserved Area	
	Federal or national ministry or agency in charge	Local/municipality ministry or agency in charge	Government delegated management (e.g. to an NGOs)	Transboundary management	Collaborative management (various forms of pluralistic influence)	Joint management (pluralistic management board)	Declared and run by individual land owner	Declared and run by non profit organizations e.g. NGOs, Universities	Declared and run by for profit organizations individual land owner	Declared and run by indigenous people	Declared and run by local people
Ia. A Strict Nature Reserve											
Ib. Wilderness Areas											
II. National Parks											
III. Natural Monuments											
IV. Habitat/Species Management											
V. Protected Landscape/Seascape											
VI. Managed Resource Protected Areas											

(Source: Borrini-Feyarabend *et al.*, 2007)

provision to ensure that the communities neighboring the forests are enabled to participate in decision making, combined with the absence of mechanisms to discourage corruption by officials (Zashimuddin, 2004; Biswas and Chowdhury, 2007).

The literature review for this research suggests that striking a good balance between protected area management plan objectives, and the diverse interests of various stakeholders, including the immediate needs of the local communities living in and around protected areas is a major challenge facing park managers all over the world. For the purpose of this research, a case study evaluation of protected area management planning in Bangladesh has been conducted. Bangladesh has been chosen as it has attempted to employ new planning processes and has experienced a significant increase in protected areas over the last decade, which has heightened the need for preparation of protected area management plans. The research began with an overview of the protected area management planning process in Bangladesh and continued with a critical reading of the protected area management plans and associated reports. This work was used as the basis for developing an evaluation of the protected area management plans in the case study areas by revealing the sort of indicators that could be used. To date there has not been any evidence-based, in-depth study of the evaluation of protected area management plans in Bangladesh, in terms of their linkages to the livelihoods and experiences of local communities living in and around protected areas. Therefore, this study contributes to the body of knowledge on the efficacy of existing outreach programs and the state of the linkages between local communities and National Park and Wildlife Sanctuaries in Bangladesh.

1.7 Aims and Research Questions

The aim of the research reported herein is to evaluate the impacts of the co-management approach, a feature of the management plans of the selected case study areas. Specifically the perceptions of local residents and other stakeholders within and adjacent to the PAs regarding the extent to which the objectives of the plans have been achieved. This research intends to contribute to the development of more effective PA management by uncovering the attitudes of local residents and other stakeholders towards PA management plans in Bangladesh.

It has been assumed that reducing the dependency of local people on forest resources and linking conservation benefits to local development would result in harmony between protected areas and local communities and, in turn, that this would facilitate enduring biodiversity conservation (CBD, 2010). This research attempts to test the validity of these assumptions in order to identify

whether the co-management approach, as adopted in Bangladesh, can be considered as a practical conservation strategy for both current and wider application. It will provide a basis for further research, planning, and action to improve the current protected area management planning and policy in the country.

Social research should involve elements of the unknown if it is not simply to duplicate what has already been established. A key strength of qualitative research is that it can explore unanticipated issues as these emerge (Pole and Lampard, 2002; Ritchie and Lewis, 2003). In practice, the relationships between study design, theory and data collection are iterative (Ritchie and Lewis, 2003). Therefore, the initial design of a qualitative research project is not a distinct stage, concluded early in the life of a study, but rather it is a continuous process requiring constant review and, potentially, modification of the approach(es) taken.

This research began by developing a basic understanding of the literature and discussing the general issues surrounding PA management; this led to the formulation of the research questions. After this 'desk study' phase, which included a review of the particular situation in Bangladesh, the initial field work 'scoping' stage was planned. This involved visiting five protected areas and talking to key actors involved in park management, as well as a knowledgeable journalists and an IUCN researcher. Upon return from the initial scoping visit and after some reflection, the tourism research question was modified to focus more sharply on the role of the co-management approach in encouraging the development of tourism in the study areas.

Research questions

1. What are the major issues in PA management in the study areas?
2. What strategies are available for the long-term conservation and management of the National Parks and the Wildlife Sanctuaries in the study areas?
3. Have the relationships between local communities and the Forest Department staff improved in PA planning and management in the study areas?
4. Have local communities developed alternative income generation activities through the management plans in the study areas?
5. Have tourism opportunities been harnessed more effectively in the study areas as a result of the co-management approach to Protected Area management?

1.8 Structure of the Thesis

Following this introduction, the body of the thesis is divided into nine chapters. Chapter two provides a review of the literature relevant to protected area management plans and their evaluation. This sets the context in terms of definitions, background literature and the conceptual framework which guided the research design and was used as a framework for analysis. Chapter three outlines the research methodology applied to achieve answers to the research questions posed. Chapter four describes the profile of each case study area. Chapters five and six present the study findings and the results of the investigations carried out in each case study area. Chapter seven presents a synthesis of the findings across the study areas. Chapter eight provides a discussion of the findings from the study. Chapter nine presents conclusions, including answers to the research questions, reflections on the methodology, policy implications and recommendations for further research.

CHAPTER 2: LITERATURE REVIEW

The concept of evaluation of Protected Area (PA) management plans and policies is complex and inter-disciplinary. A number of theoretical bodies of knowledge and resource management approaches can be drawn upon to create a conceptual framework for examining management plans and policy evaluation in practice. The theoretical underpinnings drawn upon for this study raise many questions, such as: why an evaluation is being undertaken, what are the influencing factors and opportunities, what are the approaches, and are there certain indicators to distinguish between ‘good’ and ‘bad’ conditions? The resource management approaches drawn upon for this study are integrated natural resource management (Margerum, 1997), ecosystem based management (Clarke and Jupiter, 2010), community based natural resource management (Bertzky *et al.*, 2012), and the new paradigm of PA management (Phillips, 2004; Bajracharya, 2008). The forestry policy, protected area management and co-management approach in Bangladesh are described in this chapter.

2.1 History of the Protected Area Concept

PAs have been the main strategy to protect wildlife and important biological resources. The aims of PAs include the sustainable use of natural resources, maintenance of ecosystem services and incorporation with broader social development practice, in conjunction with the core role of biodiversity conservation (Phillips, 2004). This is further demonstrated by the quotation below:

“Protected areas provide settings for contemplation, reflection and inspiration; invoke a sense of place; and facilitate feeling a connection to something beyond human concerns; and activities undertaken in protected areas are a fundamental health resource, particularly in terms of disease prevention.”

(Lookwood *et al.*, 2006:114).

In addition, the concept of PAs encompasses respect for cultural values and the need to involve indigenous and local communities in the management decisions affecting them. Professionals nowadays recognise that natural resources, people and cultures are intrinsically interlinked (Phillips, 2004).

The idea of protecting particular areas has been long established in human civilizations. In India, over 2000 years ago, royal decrees protected certain areas, and in Europe royalty have protected hunting grounds for over a thousand years (Phillips, 2004). In the nineteenth century, the protected area movement, as we now know it, originated in North America, Australia, New Zealand and South Africa, with other countries rapidly following. One of the first was established at Yellowstone National Park in the United States in 1872 (Phillips, 2004). Different countries took different approaches. In North America, PAs were about conservation of dramatic and inspiring scenery; in Africa, the preoccupation was with game parks, while in Europe the focus has been on landscape protection (Phillips, 2004). In 1972, the Stockholm Declaration of the United Nations Conference on the Human Environment endorsed the protection of a representative example of all major ecosystem types as a basic requirement of national conservation programs (Phillips, 2004). Since then, representative ecosystem protection has become a core principle of *in-situ* conservation, supported by key United Nations resolutions, which include the World Charter for Nature 1982, the Rio Declaration 1992, the Millennium Declaration 2000, Johannesburg Declaration 2002, and the Nagoya declaration 2010 (Borrini-Feyerabend *et al.*, 2013).

In 1994, the IUCN and the World Conservation Monitoring Centre (WCMC) published *Guidelines for Protected Area Management Categories*, in English, French and Spanish (IUCN, 1994). The guidelines were intended to alert governments to the significance of PAs and encourage them to develop systems of PAs with management aims adapted to national and local conditions (Phillips, 2004). Part I of the Guidelines provides a definition of a ‘protected area’, which is the basis of the system, for example:

“An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.” (IUCN, 1994).

If an area does not meet the definition, it is not a protected area as far as the IUCN is concerned. Any area that does conform should be capable of being assigned to one of the six categories set out in Box 2.1.

Box 2.1 IUCN Management Categories of Protected Areas (IUCN, 1994)	
Category	Description
I	Strict Nature Reserve/Wilderness Area: Protected area managed mainly for science or wilderness protection.
Ia	Strict Nature Reserve: Protected area managed mainly for science.
Ib	Wilderness Area: Protected area managed mainly for wilderness protection and recreation.
II	National Park: Protected area managed mainly for ecosystem protection and recreation.
III	Natural Monument: Protected area managed mainly for conservation of specific natural features.
IV	Habitat/Species Management Area: Protected area managed mainly for conservation through management intervention.
V	Protected Landscape/Seascape: Protected area managed mainly for landscape/seascape conservation and recreation.
VI	Managed Resource Protected Area: Protected area managed mainly for the sustainable use of natural ecosystems.

(IUCN, 1994)

The 1994 guidelines were based on some key principles. The basis for categorisation is by identification of the primary management aim; it does not imply that the aim is being met. While this system is international the names by which individual countries refer to PAs may vary; each category is vitally important and a degree of human involvement is implied (Figure 2.1) (Phillips, 2004).

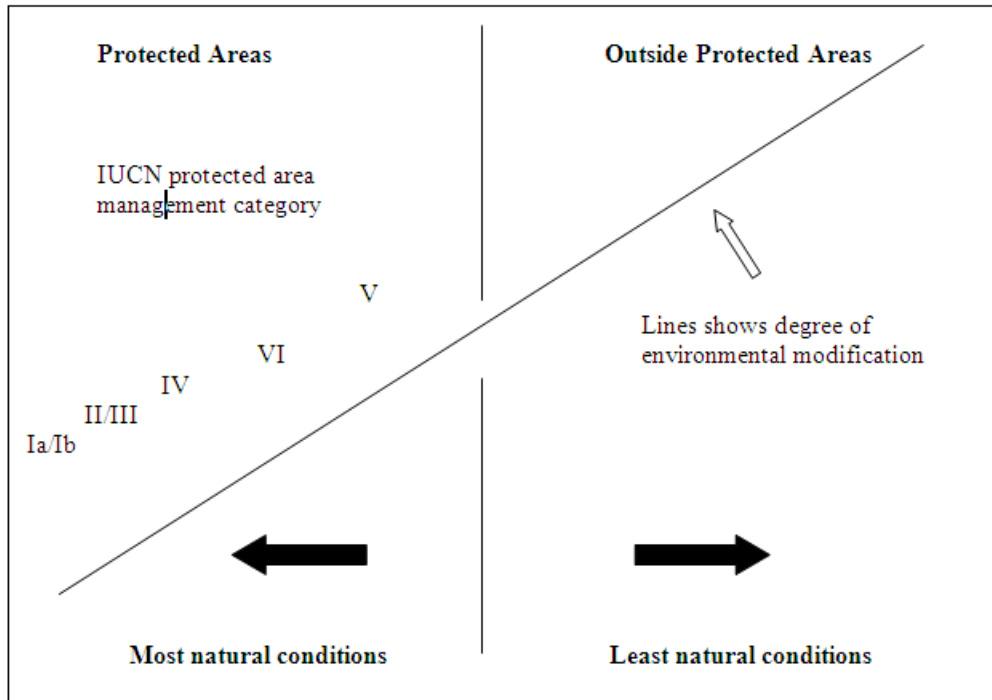


Figure 2.1 IUCN protected area categories and degree of environmental modification (Bishop *et al.*, 2004).

The IUCN protected area management categories system is based upon the primary aim and consequent management objectives which can be used to identify the most appropriate category as shown in Table 2.1.

Table 2.1 Matrix of management objectives and IUCN protected area management categories.

Management objective	Ia	Ib	II	III	IV	V	VI
Scientific research	1	3	2	2	2	2	3
Wilderness protection	2	1	2	3	3	–	2
Preservation of species and genetic diversity	1	2	1	1	1	2	1
Maintenance of environmental services	2	1	1	–	1	2	1
Protection of specific natural/ cultural features	–	–	2	1	3	1	3
Tourism and recreation	–	2	1	1	3	1	3
Education	–	–	2	2	2	2	3
Sustainable use of resources from natural ecosystems	–	3	3	–	2	2	1
Maintenance of cultural/traditional attributes	–	–	–	–	–	1	2

Key: 1 = Primary objective; 2 = Secondary objective; 3 = Potential objective; – = not applicable (IUCN, 1994).

Protected areas have now become a key indicator of international commitments to environmental protection such as the UN Convention on Biological Diversity (CBD) and Millennium Declaration. In the twentieth century, the idea of PAs expanded around the world, but the driving force has been different in different regions (Phillips, 2004). By the end of the twentieth century almost every country had adopted protected area legislation and a mechanism to designate sites for protection (Bishop *et al.*, 2004). Usually a combination of public, private, community and voluntary organisations are active in nominating these and lobbying for their protection (Phillips, 2004). There are international networks of PAs produced under global conventions (e.g. World Heritage and Ramsar Conventions) and regional agreements (e.g. Natura 2000 sites in Europe, NNR, LNR and SSSIs in England) (Phillips, 2004). Therefore, PAs have been set up for different reasons and in different situations. They range from wilderness areas to long-settled landscapes and are present in all kinds of terrestrial and marine habitats. They are recognized at national and global levels, and are known by many different names, but all are based on international agreements or national legislation (Phillips, 2004). However, PAs are owned by different interests and are run by different types of organizations (Phillips, 2004).

Worldwide, the number and extent of nationally designated PAs has increased dramatically over the past century (Phillips, 2004; IUCN and UNEP-WCMC, 2012). There are over 157,897 PAs covering more than 24 million square kilometers of land and sea (Figure 2.2) listed on the World Database of Protected Areas, covering nearly 13% of the world's terrestrial surface areas and 4% of the global marine area (Bertzky *et al.*, 2012; Oli *et al.*, 2013; Thapa, 2014). However, the 2010 biodiversity target is for at least 17% of the land area and 10% of marine areas of each country to be protected by 2020 (Besancon, 2011; Bertzky *et al.*, 2012). To meet this target with national PAs alone, an additional 6 million square kilometers of terrestrial and inland water areas would have to be designated; an area 10 times the size of Madagascar (Bertzky *et al.*, 2012).

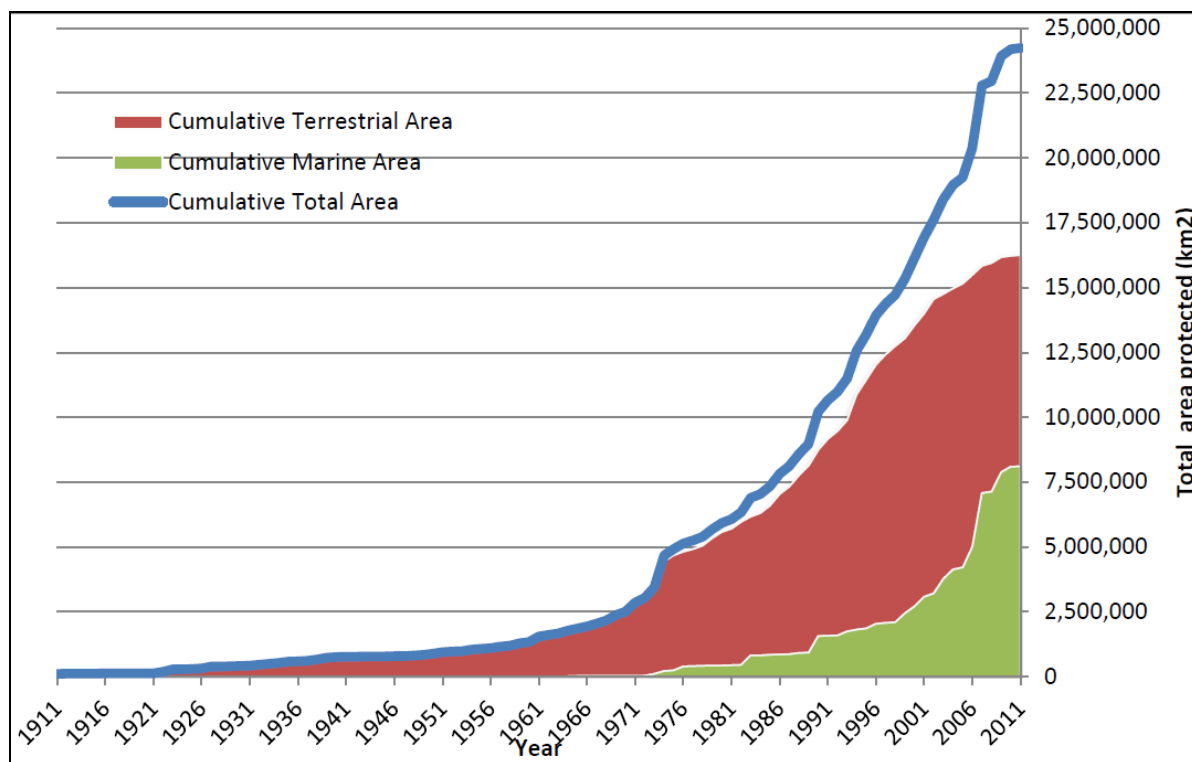


Figure 2.2 Growth in nationally designated protected areas (1911-2011)
(Source: IUCN and UNEP-WCMC, 2012).

2.2 Development of a Protected Area Management Plan

PAs can only be successful tools for wildlife conservation if they are managed effectively, to ensure that they safeguard valued features and achieve their objectives (Bertzky *et al.*, 2012; Dudley *et al.*, 2010). A management plan is a document which sets out the management approach and goals, providing the framework for decision making, and is applied in a protected area over a given period of time (Dudley, 2008; Thomas *et al.*, 2003). It details what is to be achieved and the rationale for the decisions made. The complexity of developing the management plan depends on the objectives of the protected area, the risks or threats to these objectives, the issues, and the level of stakeholder involvement (Thomas *et al.*, 2003). Plans can be presented in different formats reflecting the site, the purposes and requirements of managers and available resources (Eagles *et al.*, 2001). A participatory process can promote commitment and empowerment among stakeholders, as well as building capacity among them and encouraging sensible use of resources (Sandwith *et al.*, 2001). The inclusion of local communities was a key recommendation of the IVth World Parks Congress held in Caracas in 1992 (Thomas *et al.*, 2003).

A good management planning process supported by staff and local people can provide the following benefits:

- improved management of the protected area,
- improved use of financial and staff resources,
- increased accountability, and
- improved communication (Thomas *et al.*, 2003).

In PA management planning processes, involving people with an interest or a stake is - indeed- a standard of good practice (Thomas *et al.*, 2003). These people include local communities, user groups, interested individuals, local government officials, representatives of NGOs, commercial interests, and protected area staff (Thomas *et al.*, 2003; Niedzialkowski *et al.*, 2012). Benefits of involving people in management planning are as follows.

- Increased sense of ownership. Communities living in or near the protected area, visitors and other users of parks will feel a far greater commitment to park management objectives and practices if they have had the opportunity to be involved.
- Greater support for the protection of the area. The success of a plan will depend on public and political support. It is essential to maintain regular communication with the public on decisions that affect them, and on the protection and use of the protected area.
- Greater public involvement in decision-making, helping people to be aware of changes in management direction.
- Provides a mechanism for communication, where views, concerns and opinions on management of the area can be shared between the managers and stakeholders. This can lead to the identification and resolution of problems and to a greater understanding and support for the protected area (Thomas *et al.*, 2003).

Over time, management planning approaches have moved from a top down, professional led to a more inclusive approach, although the type and level of involvement varies with the aim and institutional structure of the management agency (Thomas *et al.*, 2003; Niedzialkowski *et al.*, 2012). In certain cases it may be desirable to make the management plan available to local communities in their own language where this differs from the official language (Thomas *et al.*, 2003). It is now considered that coordinated planning is essential if plans are to be translated into effective management. Ideally management plans should be prepared in conjunction with all stakeholders to ensure consistency of planning and management (Thomas *et al.*, 2003).

2.3 Paradigm Shifts in Protected Area Management

Historically, conservation has marginalised local people, under-appreciating the value they place on wild resources (Pimbet and Pretty, 1995, Hutton *et al.*, 2005). In many cases this has been accompanied by resettlement of the indigenous people, resulting in social conflict that has threatened conservation goals and led to reliance on smaller resource bases and illegal activities such as harvesting of wood and NTFPs, as well as poaching (Pimbet and Pretty, 1995; Oviedo and Brown 1999; Niedzialkowski *et al.*, 2012; Ayivor *et al.*, 2013; Mishra, 2013; Thapa, 2014). Central to the 2003 5th World Parks Congress (WPC) agenda was the attribution of authority to the institutions that were closest to the resource in question (Phillips 2004). At this event the World Conservation Union (IUCN) called for a new paradigm in PAs, looking towards a more community-based approach, respecting social, economic and cultural rights people have to their land and resources. This created a shift in the management of PAs, as community participation was beginning to be understood as a vital component of successful conservation (Pimbet and Pretty, 1995; Brechlin *et al.*, 2002; Niedzialkowski *et al.*, 2012; Chowdhury *et al.*, 2014). The new paradigm emphasizes cooperation among the central government, regional and local authorities, indigenous communities, private companies, and NGOs in the governance of protected areas (Niedzialkowski *et al.*, 2012; Borrini-Feyerabend *et al.*, 2013). Currently, most conservation organisations recognise the importance of incorporating people and their needs into conservation efforts (Pimbert and Pretty, 1997; McNeely and Mainka, 2009; Andrade and Rhodes, 2012; Aziz *et al.*, 2013; Mishra, 2013). This has caused a growth in community based conservation, which emphasises the need for active participation of, and support from, local communities, and their facilitated inclusion throughout protected area development. An example of a successful community managed protected area is Annapurna, in Nepal, which has successfully reduced deforestation from within the park in conjunction with local people gaining complete control over their natural resources (Bajracharya *et al.*, 2005). The generally accepted view now is that, “*conservation will only succeed if we can build learning institutions, organizations, and networks.....empower all stakeholders to fulfill their role in protected area management*” (IUCN, 2003:141). In particular, it is recommended that managers “*adopt mechanisms to enable representation and participation of all protected area stakeholders at national regional and local levels*” (IUCN, 2003:141). Other international measures promoting participation in environmental governance include the Rio Declaration on Environment and Development of 1992 (principle 10), the Convention on Biological Diversity of 1992, and the Aarhus Convention of 1998 (Niedzialkowski *et al.*, 2012).

Currently, the aims of PAs include the sustainable use of natural resources, conservation of ecosystem services and incorporation with broader social development practices that need to be fully integrated with the core role of biodiversity conservation (Phillips, 2004; Bertzky *et al.*, 2012). In addition, attention should be given to respecting cultural values, because these are often connected to biodiversity and are necessary to effectively involve indigenous and local communities in management decisions affecting them (Phillips, 2004; Pretty *et al.*, 2008; Aziz *et al.*, 2013). Professionals recognise that the natural resources, people and cultures are basically interlinked (Phillips, 2004; Roe *et al.*, 2013). In many countries communities have been disrupted and made insolvent by being forced to abandon the use of resources upon which their livelihoods depended, an action often taken without any compensation. In many countries, including the UK, it is clear that there are many disagreements between varied interests in the establishment and management of PAs (Crofts, 2009). The international policies are, at least in theory, committed to the eradication of poverty by setting up development programs alongside conservation initiatives (Phillips, 2004). Biodiversity conservation and poverty alleviation are two of the world's major challenges (Gardner *et al.*, 2013). Improving synergies between conservation and poverty alleviation is important, as it is a leading global conservation priority (Brooks *et al.*, 2004).

Since the first World Parks Conference in Seattle, Washington in 1962, there has been a shift in thinking about the planning and management of PAs (Phillips, 2003a, 2003b). In the early-to mid-1980's national park and protected area planning entered a different paradigm, the top-down conservation practice being remodeled to adjust to a participatory approach and to integrate development and conservation aims (Adams, 2001; Phillips, 2003b). A variety of participatory and integrated projects have been designed to address the needs of park dependent communities. Conservation discourses focus primarily on issues such as the impact of conservation activities (particularly protected areas) on affected local communities, the role of conservation organizations in poverty alleviation and the complex inter-relationship between biodiversity, ecosystem service provisions, and poverty (Gardner *et al.*, 2013). This new paradigm has been influenced by complex systems analysis, political ecology, sustainability, other fields such as conservation biology and landscape ecology, as well as the numerous challenges and opportunities that exist between PAs and their regions (Primack, 1993; Meffe and Carroll, 1997; Gutzwiller, 2002; Wiens and Moss, 2005). On the basis of this new approach the World Commission on PAs (WCPA) articulated the following vision for PAs:

“In this changing world, we need a fresh and innovative approach to protected areas and their role in broader conservation and development agendas. This approach demands the maintenance and enhancement of our core conservation goals, equitably integrating them with the interests of all affected people. In this way the synergy between conservation, the maintenance of life-support systems and sustainable development is forged. We see protected areas as vital means to achieve this synergy efficiently and cost effectively. We see protected areas as provider of benefits beyond boundaries-beyond boundaries on a map, beyond the boundaries of nation states, across societies, genders and generations.”

(Lockwood *et al.*, 2006: 677-678)

Integrated conservation development programmes have been implemented with the aim of reducing the impacts of protected areas on local communities by providing alternative resources and livelihood opportunities. This new paradigm moves away from the classic model of management with protected areas set aside for protection and enjoyment and effectively treated as islands. Table 2.2 outlines the main elements of the new paradigm for protected area planning and management.

Table 2.2 A paradigm shift in PA management.

The conventional understanding of protected areas	The emerging understanding of protected areas
Established as separate units	Planned as part of national, regional and international systems
Managed as “islands”	Managed as elements of networks (protected areas connected by ‘corridors’, ‘stepping stones’ and biodiversity-friendly land uses)
Managed reactively, within a short timescale, with little regard to lessons from experience	Managed adaptively, on a long time perspective, taking advantage of on-going learning
About protection of existing natural and landscape assets – not about the restoration of lost values	About protection but also restoration and rehabilitation, so that lost or eroded values can be recovered
Set up and run for conservation (not for productive use) and scenic protection (not ecosystem functioning)	Set up and run for conservation but also for scientific, socio-economic (including the maintenance of ecosystem services) and cultural objectives
Established in a technocratic way	Established as a political act, requiring sensitivity, consultations and astute judgment
Managed by natural scientists and natural resource experts	Managed by multi-skilled individuals, including some with social skills
Established and managed as a means to control the activities of local people, without regard to their needs and without their involvement	Established and run with, for, and in some cases by local people; sensitive to the concerns of local communities (who are empowered as participants in decision making)
Run by central government	Run by many partners, including different tiers of government, local communities, indigenous groups, the private sector, NGOs and others
Paid for by taxpayers	Paid for from many sources and, as much as possible, self-sustaining
Benefits of conservation assumed as self-evident	Benefits of conservation evaluated and quantified
Benefiting primarily visitors and tourists	Benefiting primarily the local communities who assume the opportunity costs of conservation
Viewed as an asset for which national considerations prevail over local ones	Viewed as a community heritage as well as a national asset

(Source: Phillips, 2004)

It is a broader view of PAs in three senses:

- (1) it includes a wider range of actors among those who initiate and manage PAs,
- (2) PAs are seen as part of a network including local as well as larger regions, and
- (3) there is a broader understanding of what a PA encompasses

(Dudley *et al.*, 1999).

There is greater emphasis on bottom-up approaches and a changing role for protected area managers, with the focus shifting from direction to facilitation (Dudley *et al.*, 1999; Nelson and Sportza, 2001).

2.4 Stakeholder Analysis

In any situation of policy making and planning, it is important to understand the range of interest groups involved in order to minimise conflict and achieve rational decisions. Overall, stakeholder analysis involves identification of the key interest groups that are likely to be affected by policy and planning decisions, gathering of data for analysis of particular interests and identification of trade-offs and conflicts that may have to be considered in project or plan implementation (Crosby, 1991; Grimble, 1998; Schmeer, 2000; Beukering *et al.*, 2007).

The process of stakeholder analysis allows researchers or managers to identify those stakeholders who would otherwise be marginalized or whose views and expertise might not be taken into consideration. According to Ozesmi and Ozesmi (2003), numerous stakeholder groups need to be directly involved to attain successful conservation and biodiversity outcomes. It typically begins by identifying relevant stakeholders for a given project or event, maps out their interests, and assesses the broader context in which they interact (Jones and Fleming, 2003). Stakeholders are, in the broadest sense, persons or organisations with a vested interest in a policy. Stakeholders can take the form of large groups or organisations operating at range of levels from local to international and can be public bodies, private groups or individuals. Stakeholders can be resource rich or poor and can both influence decisions as well as be affected by them (Schmeer, 2000; Chevalier, 2001; Beukering *et al.*, 2007; Forestry Commission, 2011). Sovacool (2008) states that there are three major benefits of undertaking stakeholder analysis: first, using this facilitates inclusion of stakeholders that might otherwise be overlooked or marginalized; second, there is a descriptive and normative approach to the process that can reveal power relationships and ensuing values; and third, the process can contribute to democracy by improving decision making as well as bringing legitimacy to the process by integrating specific knowledge held by stakeholders’.

Billgren and Holmen (2008) argue that engaging in stakeholder analysis makes it much more difficult to ignore less powerful stakeholders. The process can help in promoting local community participation which, coupled with top-down decision making, permits more all-encompassing and inclusive outcomes (Mushove and Vogel, 2005). The benefit of collaborative management, where both top-down and bottom-up approaches converge, is that there is enhanced engagement between stakeholders and the possibility of more successful management of a protected area. Fisher and Jackson (1998) argue that there needs to be fair and equitable treatment of the people who directly use the resources. Stakeholder analysis can also help managers of protected areas to develop deeper understanding of issues more effectively and communicate with them (Billgren and Holmen, 2008). Additionally, involvement of a stakeholder analyst gives the ability to see where potential conflicts may arise and thus prepare for negotiations (Gilmour and Beilin, 2007). Therefore, understanding stakeholder relationships can contribute to conflict avoidance and sound decision making that involves all groups. Bringing such conflicts, interests and motivations to the surface allows for multiple stakeholder values and objectives to come together (Rockloff and Lockie, 2004). In addition stakeholder analysis can help PA managers to respond to any social change within the life of the management plan and periodically repeating this could help to monitor interactions and socio-economic dynamics (Rastogi *et al.*, 2010).

2.5 Contemporary Management Approaches

The new paradigm has led to different types of approach that have been applied to natural resource management, such as integrated natural resource management (Sayer and Campbell, 2004; Frost *et al.*, 2006), ecosystem based management (Clarke and Jupiter, 2010), community based natural resource management (Leach *et al.*, 1999), and co-management (Borrini-Feyerabend, 2000). These are described below.

2.5.1 Integrated Natural Resource Management (INRM)

INRM is an approach to planning and management that places resource use problems and opportunities in a systemic framework with the aim of finding integrative solutions (Margerum, 1997). It stresses the integration of diverse values and perspectives, conflicting objectives, current and future needs, disciplines, scales, and competing programs (Lal *et al.*, 2001), conflict resolution (Hooper *et al.*, 1999), and the avoidance of fragmented, incremental management (Lal *et al.*, 2001). Integrated approaches require the adjustment of fragmented interests, jurisdictions,

ownership, management responsibility, social and ecological systems, and information (Slocombe and Hanna, 2007).

The focus of INRM has tended not to be on the natural resource itself, but the interactions of humans with each other and the decisions they make about managing resources (Lal *et al.*, 2001). INRM initiatives usually involve a coordinated authority of human activities in a defined region with agreed-upon objectives such as conserving or rehabilitating the environment, ensuring biodiversity, or minimizing land degradation (Hooper, 1997). Integrated approaches are distinguished from other comprehensive approaches to natural resource management by concentrating on key components and linkages within the system (Mitchell *et al.*, 2002). The literature on INRM emphasizes multiple scales of analysis and adaptive management as well as integration as the primary focus of management (Bellamy *et al.*, 1999; Slocombe and Hanna, 2007).

2.5.2 Ecosystem Based Management (EBM)

Ecosystem-based management aims to be a holistic approach to planning and management, giving a greater understanding of the relationship between humans and nature (Grumbine, 1997; Clarke and Jupiter, 2010). It is one approach to achieving integration in resource and environmental management; moreover it reflects the perspective of sustainability (Slocombe, 1993). Ecosystem based management emerged as a consequence of the development of some resource and environmental management frameworks such as multiple use management, watershed management, and complete land use planning (Slocombe and Dearden, 2002). Yaffee (1999) argued that there is a broad agreement among conservation organisations about the principles of ecosystem-based management. This is based on a common understanding of the complexity of ecological and social systems, appreciation of different spatial and temporal scales, ecologically derived limits, adaptive management, and the importance of shared decision making.

Grumbine's (1994) ecologically focused conceptualization of ecosystem based management is contrasted in the literature by researchers who stress more social and political aspects. As an example Cordell and Bergstrom (1999) argued that the scientists and PA managers who leave themselves out in their view of the ecosystem are incorrect; they should be included in any consideration of the function, structure, and evolution of those systems. Slocombe and Dearden (2002) argued that additional focus should be dedicated to the social features of ecosystem-based management, for instance benefits to humans, inter- and intra-organizational issues, and

developing real cooperation with stakeholder groups. EBM is established as a fundamental approach in development and administration of PAs (Danby and Slocombe, 2002).

The literature on EBM can provide PA managers with significant lessons with respect to inter-agency collaboration (Danby and Slocombe, 2002), stakeholder coordination (Margerum and Born, 2000), defining goals (Slocombe, 1998a), political and institutional considerations (Cortner and Moote, 1999; Cortner *et al.*, 1998), and the interaction of humans with ecological systems (Berkes *et al.*, 2003). However, it is not a solution for addressing all the challenges that PAs face. Numerous impediments have been identified to implementation including theoretical obstacles such as the way in which the ecosystem is defined (Slocombe, 1993); politics and bureaucracy and competition within and between agencies and governments and the poor use of available information (Slocombe, 1998b). It is not easy to understand ecosystem based management and the elements of ecosystem policy (Clark *et al.*, 1991); consequently, this may cause confusion in the protected area management organization.

2.5.3 Community Based Natural Resource Management (CBNRM)

Over the past 20 years, it has become extensively acknowledged that protected area management must include the collaboration and support of local communities (Wells and Brandon, 1992; Western and Wright, 1994; Leach *et al.*, 1999; Kellert *et al.*, 2000, Mukul *et al.*, 2010; Bertzky *et al.*, 2012; Porter-Bolland *et al.*, 2012). This has encouraged the development of ‘community-based conservation’ (Mehta and Kellert, 1998; Roe *et al.*, 2009), which emphasizes the function of local communities in decision making (Adams and Hulme, 1998). According to this approach, local communities should be active partners in PA management (Songorwa *et al.*, 2000).

The main principle of all of these approaches is that if conservation and development are to be achieved simultaneously, then the interests of both should be served at the same time. Some basic common characteristics of CBNRM can be identified as:

- A commitment to involve community members and local institutions in the management and conservation of natural resources;
- An interest in devolving power and authority from central and/or state government to more local, often indigenous, institutions and peoples;
- A desire to link and reconcile the objectives of socio-economic development and environmental conservation and protection;
- A tendency to defend and legitimize local and/or indigenous resource and property rights; and,

- A belief in the desirability of including traditional values and ecological knowledge in modern resource management (Kellert *et al.*, 2000).

Some critics of community-based approaches have argued for renewed emphasis on authoritarian enforcement of PAs to safeguard critically-threatened habitats and species (e.g. Terborgh, 1999). The question therefore remains as to whether the community-based approach really is effective in delivering conservation benefits. In Nepal, most of the PAs established initially adopted a strict protectionist approach, with the armed forces controlling any illegal activities. Despite some success in the protection of certain flagship species, a number of problems emerged, including poaching of protected species, and clashes between guards and local communities (McLean and Straede, 2003). To address these problems, over the past two decades the government in Nepal has introduced community-based approaches to protected area management. An example is provided by the Annapurna Conservation Area (ACA), where local communities are involved in conservation planning and management whilst being able to continue their traditional land-use practices. This approach has resulted in a successful reduction in deforestation within the park in conjunction with local communities gaining complete control over their natural resources (Bajracharya *et al.*, 2005). Likewise, evidence and experience from eastern and southern Africa and Brazil indicates that, although difficult, reconciliation between livelihood improvement and conservation of biodiversity is feasible and community based conservation remains a viable conservation option (Adam and Hulme, 2001; Haque *et al.*, 2009; Porter-Bolland *et al.*, 2012).

However, the results of CBNRM have been mixed with many projects falling well short of their expectations (Kellert *et al.*, 2000; Murphree, 2002). Some feel that this is caused by inappropriate execution, mainly with regard to the devolution of authority, liability (Murphree, 2002), and scarcity of knowledge (Wilshusen *et al.*, 2002). Several authors have argued that it is more useful to think of communities in terms of multiple actors with many different interests, the processes through which these actors interconnect, and the institutional arrangements that structure their communications (Agrawal and Gibson, 1999, 2001; Berkes, 2004). In other words, it is important to examine communities in terms of their governance. The CBNRM literature provides valuable lessons on how to involve communities in PA management (e.g. Borrini-Feyerabend, 1996) and reminds PA managers that regional activities must not be restricted to intergovernmental collaboration and that the pluralist, participatory approaches connected with CBNRM must also be utilized (Danby and Slocombe, 2005). Possibly the most important lesson arising from CBNRM is that the concept of community is complex, with

various actors and various interests, and that PA planning and management has to identify and overcome this difficulty by identifying and involving all stakeholders.

2.5.4 Co-management

This has been defined as

“The sharing of power and responsibility between the Government and local resource users”

(Berkes *et al.*, 1991: 12).

According to Borrini, co-management is defined as

“Co-management as a situation in which two or more social actors negotiate, define and guarantee amongst themselves a fair sharing of the management functions, entitlements and responsibilities for a given territory, area or set of natural resources”

(Borrini-Feyerabend, 2000:7).

Collaborative or co-management has been promoted as a way to bridge the gap between the PA management team and local stakeholders (Parr *et al.*, 2013). This is now acknowledged as an essential tool as it can establish and strengthen partnerships by involving relevant stakeholders in a meaningful way in planning and management. It is a broad concept that encompasses a variety of ways in which stakeholders can jointly develop and implement a management partnership. It is particularly relevant in situations where the active commitment and collaboration of stakeholders is necessary, and where access to the PA's natural resources is necessary for both local livelihood security and cultural heritage (Borrini-Feyerabend, 1996).

Co-management has allowed economic benefits to be received by local communities. It required that either alternatives to natural products are found or that these are made available from other sources to prevent them being extracted. This is intended to reduce the pressure on resources. It has tried to raise income levels by generating employment opportunities and alternative livelihoods, and to use PA resources to establish sustainable use practices through regulated access and licensed harvesting (Fisher, 2000). Co-management has provided an opportunity for demonstrating the value of PAs in alleviating poverty and providing sustainable livelihoods in rural areas that are largely deprived of such economic opportunities (ICEM, 2003).

2.5.4.1 Female participation in co-management planning

The inclusion of women in resource management offers a potential pathway for empowerment both within their private and public lives (Torri, 2010). It is now generally accepted in the development literature that policy and practice should be gender-sensitive¹ (Brody, 2009; Gallina, 2010; Espey, 2011; WWF-UK, 2012). In practice, however, women are largely absent from public decision making in natural resource management, protection, and conservation; yet women have significant potential for effective involvement in sustainable natural resource management and in the success of NRM policies and programmes (Di Ciommo and Schiavetti, 2012; Mwangi *et al.*, 2011; WWF-UK, 2012; Wuyep *et al.*, 2014). There is strong evidence that sustainable NRM improves when women take a more central role in resource management, and that they are successful in solving environmental problems in different parts of the world (WWF-UK, 2012; Wuyep *et al.*, 2014). Indigenous women in Nepal and Bhutan, for example, are recognized to play a crucial role in decisions regarding what to plant and what seeds to use; their particular knowledge concerning the value and diverse uses of plants for nutrition, food security, health, and income determines which plant varieties have to be conserved, based on their usefulness to the family and the community (Kiorboe *et al.*, 2005). In Bangladesh, too, women often have specialist traditional knowledge of the natural resources around them, such as the most appropriate plants and seeds, sustainable fishing, home gardening and rearing of small animals. If women are not included in the design of management policies and programmes this knowledge can be lost (Kiorboe *et al.*, 2005; Anoko, 2007; Di Ciommo and Schiavetti, 2012). Increasing women's participation in decision-making could, therefore, ensure greater success and sustainability of projects while suitably safeguarding natural resources and enhancing the shared benefits of their careful use (WWF-UK, 2012). Agenda 21 recommends an increase in the proportion of women involved as decision-makers, planners, managers, scientists and technical advisers in programs for sustainable development (UNSD, 1992).

The development literature suggests that there are key barriers to effective female participation in natural resource management, including: social and cultural attitudes that position the male as the head of the family, with the female in a subordinate position in terms of decision making; lack of formal education opportunity; lack of employment; lack of confidence and ability to voice opinions; as well as constraints on time due to responsibility for managing the household

¹ Gender-sensitive means recognising the differences, inequalities and specific needs of women and men within a specific context.

and raising children (Agarwal, 1997, 2001, 2007; Crewe and Harrison, 1998; Doss, 2001; German *et al.*, 2008; Di Ciommo and Schiavetti, 2012).

2.6 Conceptual Framework

A management plan is a document that sets out the approach and goals of management, with a framework for decision making, to apply in the PA over a certain period of time. In the planning process, the management objectives for the plan will generally be established in legislation (Thomas *et al.*, 2003). A management plan should be a concise document which identifies the key features, clearly establishes the management objectives to be met, and specifies the actions to be implemented; it also includes related documents pertinent to implementation such as zoning, visitor and business plans (Thomas *et al.*, 2003). The process of developing a management plan depends upon the objectives of the protected area, the risks or threats to these objectives, the extent of challenging interests, the involvement of stakeholders, and others. Whether the plan is simple or complex, sound planning principles must be used to guide the planning process and make sure that the finished management plan is a detailed and useful manuscript (Thomas *et al.*, 2003). A clear correlation has been recognized between good monitoring and evaluation systems and PAs where biodiversity is being conserved most effectively (WWF, 2004). Operating good monitoring and evaluation systems is assumed to guide improved decision making and so support the success in achieving objectives (Bertzky and Stoll-Kleemann, 2009). Management planning is a continuous iterative process with three main elements; these are preparation of a management plan, implementation of the plan, and monitoring and review of the plan.

The Millennium Ecosystem Assessment (2005) identified PAs as both a promising and efficient way to protect biodiversity and ecosystem services for the sake of humankind. The values of PAs for biodiversity conservation, protection of cultural heritage, maintenance of vital ecosystem services and stipulation of a variety of socio-economic benefits have been well recognised (Leverington *et al.*, 2008, 2010; Ervin *et al.*, 2010). In both developed and developing countries the declaration of PAs does not necessarily result in adequate protection, so the need to evaluate PAs management has become increasingly well recognised internationally (Ervin, 2003a; Hockings and Phillips, 1999; Hockings *et al.*, 2000). Therefore the success of management depends on robust planning, informed decision making and effective implementation of decisions (Phillips, 2004). Social concerns and capability should be integrated into the design process, with local people engaged as participants both in the initial stage and in evaluating the

appropriateness of PAs management systems and processes. Furthermore, PAs can be evaluated not just in terms of environmental objectives, but also for their capacity to distribute social benefits, as well as their implications with respect to human rights in the pursuit of conservation objectives (Phillips, 2004). Salafsky *et al.*, (2002) stated that unfortunately conservation lags far behind such disciplines as medicine in that most conservation practitioners rely largely on trial and error and anecdotal evidence rather than critical consideration of scientific principles and research to determine the specific conditions under which various intervention strategies are useful (Saterson *et al.*, 2004). Evaluating the success of protected area management is difficult, especially given the poor availability of data on ecological and social conditions and their changes over time (Naughton-Treves *et al.*, 2005).

Over the past fifteen to twenty years the value of evaluation in management and project cycles has been increasingly recognised in many fields of endeavour, including health and universal development in addition to conservation (Leverington *et al.*, 2008). The development and application of management evaluation has been strengthened by the interaction of theoretical and practical interests. In 1996 a task force was set up within the IUCN -WCPA and in 2000 they published a framework with guidelines for assessing the management of protected areas (Hockings *et al.*, 2000). In 2006, a second, considerably revised, edition of the IUCN-WCPA framework was released (Hockings *et al.*, 2006). This was based on the idea that management of PAs follows a system with six distinct stages: context, planning, inputs, processes, outputs, and outcome (Figure 2.3). The IUCN-WCPA framework begins with reviewing context and establishing a vision for site management, development through planning, and allocation of resources (inputs) such as funds, staff, developing infrastructure and, as a consequence of management procedures (process) in which management is conducted, eventually produces goods and services (outputs), the direct outputs produced by management, that result in outcomes, the extent to which objectives have been achieved (Hockings *et al.*, 2000; 2006). It was developed to provide overall guidance for the evaluation of management, the selection of suitable indicators and the analysis and application of assessment results (Coad *et al.*, 2013). The IUCN-WCPA framework relates closely to the linked and iterative stages of the management cycle. Evaluation should be explicitly considered at all stages in the framework. All six elements shown in Figure 2.3 are significant in developing an understanding of how efficiently PAs are being managed.

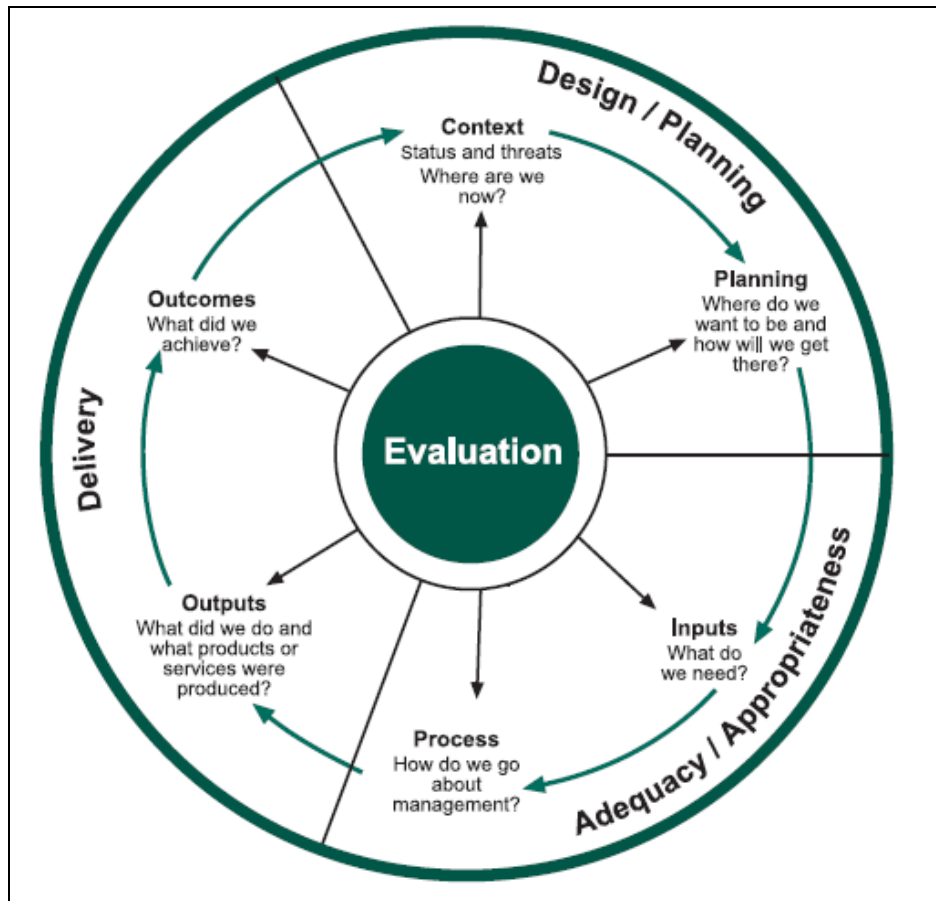


Figure 2.3 The management cycle and evaluation of PA management
(Source: Hockings *et al.*, 2006:12).

In general, this framework reflects three themes of management i.e. design issues relating to individual protected sites and to protected area systems, adequacy and/or appropriateness of the management systems and processes, and the delivery of the protected area objectives including conservation of values (Hockings *et al.*, 2006). This framework is summarized in Table 2.3. The purposes of monitoring and review are to identify whether the plan is being implemented successfully and whether the objectives are being met; to reveal the impacts of management; and to adapt the management actions in response. Wherever implementation runs into trouble, monitoring and review can be used to reorganize resources and refocus implementation on effectively achieving the objectives (Thomas *et al.*, 2003).

Table 2.3 IUCN-WCPA Framework for assessing management effectiveness of protected areas and protected area systems (Hockings *et al.*, 2006).

	Design		Appropriateness/Adequacy		Delivery	
Elements of management cycle	Context	Planning	Inputs	Process	Outputs	Outcomes
Focus of evaluation	Assessment of importance, threats and policy environment	Assessment of protected area design and planning	Assessment of resources needed to carryout management	Assessment of the way in which management is conducted	Assessment of the implementation of management programmes and actions; delivery of products and services	Assessment of the outcomes and the extent to which they achieved objectives
Criteria that are assessed	Significance/ values Threats Vulnerability Stakeholders National context	Protected area legislation and policy. Protected area system design. Protected area design. Management planning	Resources available to the agency. Resources available to the protected area	Suitability of management processes and the extent to which established or accepted processes are being implemented	Results of management actions. Services and products	Impacts: effects of management in relation to objectives

The IUCN-WCPA framework is functional at different levels depending on the situation, available resources and needs. Hockings *et al.*, (2000) proposed three broad levels of monitoring and evaluation i.e. context and planning; inputs and processes; outputs and outcomes. In this research the focus is on monitoring the extent to which the management plan objectives are being achieved by focusing on outputs and outcomes.

Monitoring, evaluation and review of management plans involves data collection by carrying out targeted monitoring programs, to evaluate progress towards achieving the objectives stated in the management plans against identified indicators. These, if clearly defined, provide easily measurable indicators and so meaningful feedback (ANZECC, 2000). In this research the measurable indicators are described in Chapter 3 (see section 3.2.3) and these are used to evaluate the selected management plan objectives in the case study areas. Clear, measurable, outcome-based management objectives are crucial, not only for an evaluation of management efficiency but also the whole of the management process (Hockings *et al.*, 2006). A flowchart for an evaluation system is given in Figure 2.4. This research project can be located in the part of the process marked by the blue box in Figure 2.4.

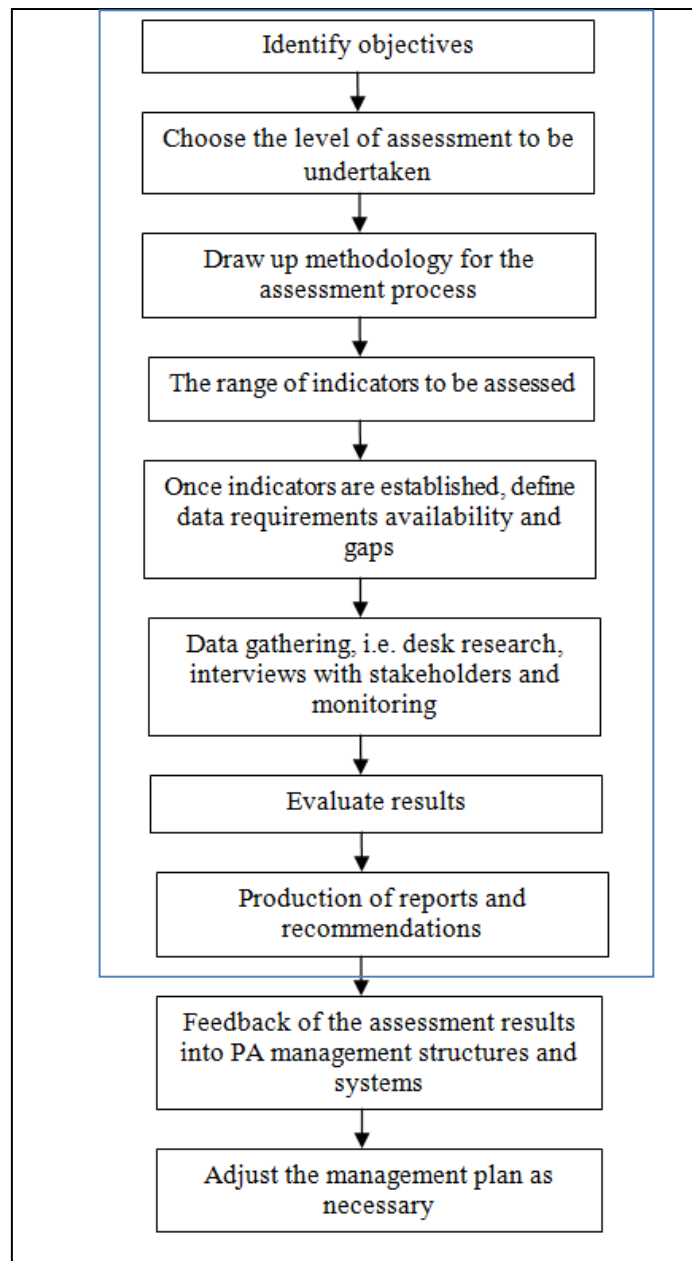


Figure 2.4 Flowchart for developing an evaluation system
(Adapted and modified from Hockings *et al.*, (2000).

In the past, various organisations restricted their monitoring to implementation of the management plan actions i.e. inspection of whether work has been carried out as specified in it. For example, a yearly report from the manager demonstrating this would be considered adequate to enable an assessment of how much of the designed programme has been completed. This information would then be used to inform the review of projects and work programmes for the

following year (Thomas *et al.*, 2003). In the UK the idea of ‘Common Standards Monitoring’ has been developed for designated nature conservation sites.² Parks Canada has a constitutional requirement to protect park integrity and to report in public on the extent to which this is being achieved (Thomas *et al.*, 2003). In Bangladesh the Forest Department has a specific monitoring section but currently this is not active due to lack of trained staff (Conservator of Forests, pers.com).

Assessments vary in method, location, current scope and level of detail. The scope of an assessment can vary from a specific topic, such as community relations, to all aspects of management. In addition the level of assessment varies according to the rationale, the scope, and the accessible economic and human resources (Leverington *et al.*, 2008). In this research the evaluation is of the outcomes set out in the IUCN-WCPA framework, i.e. what are the achievements against the stated objectives? A good evaluation system provides adequate data and gives information that can then lead to ideas to understand why outcomes have, or have not been achieved, and enables recommendations to be made to rectify this as appropriate.

2.7 Plan Evaluation and Monitoring

In general, Protected Area (PA) management plan evaluation is achieved by the assessment of a range of criteria, which are described by chosen indicators against approved objectives of a management plan. Evaluation is *“The judgement of the status/condition or performance of some aspect of management against predetermined criteria (usually a set of standards or objectives); in this case including the objectives for which the protected areas were established”* (Hockings *et al.*, 2006: xiii).

Indicators are used as a means to convey complex information about social, economic and environmental conditions in a simpler manner. They are also used in a broader context to provide an early warning signal of change, to diagnose the cause of environmental problems, and to evaluate the effects of development and conservation interventions (Dale and Beyeler, 2001). Indicators are defined as *“quantitative or qualitative variables that provide useful information about a criterion and can be used to help compile a picture of the status and trends in protected area effectiveness”* (Hockings *et al.*, 2006: xiii). Monitoring is defined as *“collecting information on indicators repeatedly over time to discover trends in the status of the protected area and the*

²www.jncc.defra.gov.uk/page-1745, accessed on 22.06.2011.

activities and processes of management” (Hockings *et al.*, 2006: xiii). Evaluation, monitoring, and planning are intimately connected processes which provide the basis for evaluating whether the management plan objectives are or not being achieved. An evaluation of management effectiveness is defined as “*the assessment of how well the protected area is being managed – primarily the extent to which it is protecting values and achieving goals and objectives*” (Hockings *et al.*, 2006: 1). The specific management plan objectives and associated indicators are discussed in Chapter 3.

2.8 Protected Area Management in Bangladesh

In Bangladesh various types of forests exist; these are hill, mangrove, Sal and village forests. The total area of forest land is 2.53 million hectares representing about 17.5% of the country’s area (Monoj, 2004) (Figure 2.5). Most of the forestlands are owned by the government, of which 1.53 million hectares are under the management of the Forest Department and the remainder is under the management of the Ministry of Land through Deputy Commissioners (Choudhury and Hossain, 2011). The total forest area and the forest land managed by the Forest Department are described in the Tables 2.4 and 2.5, respectively.

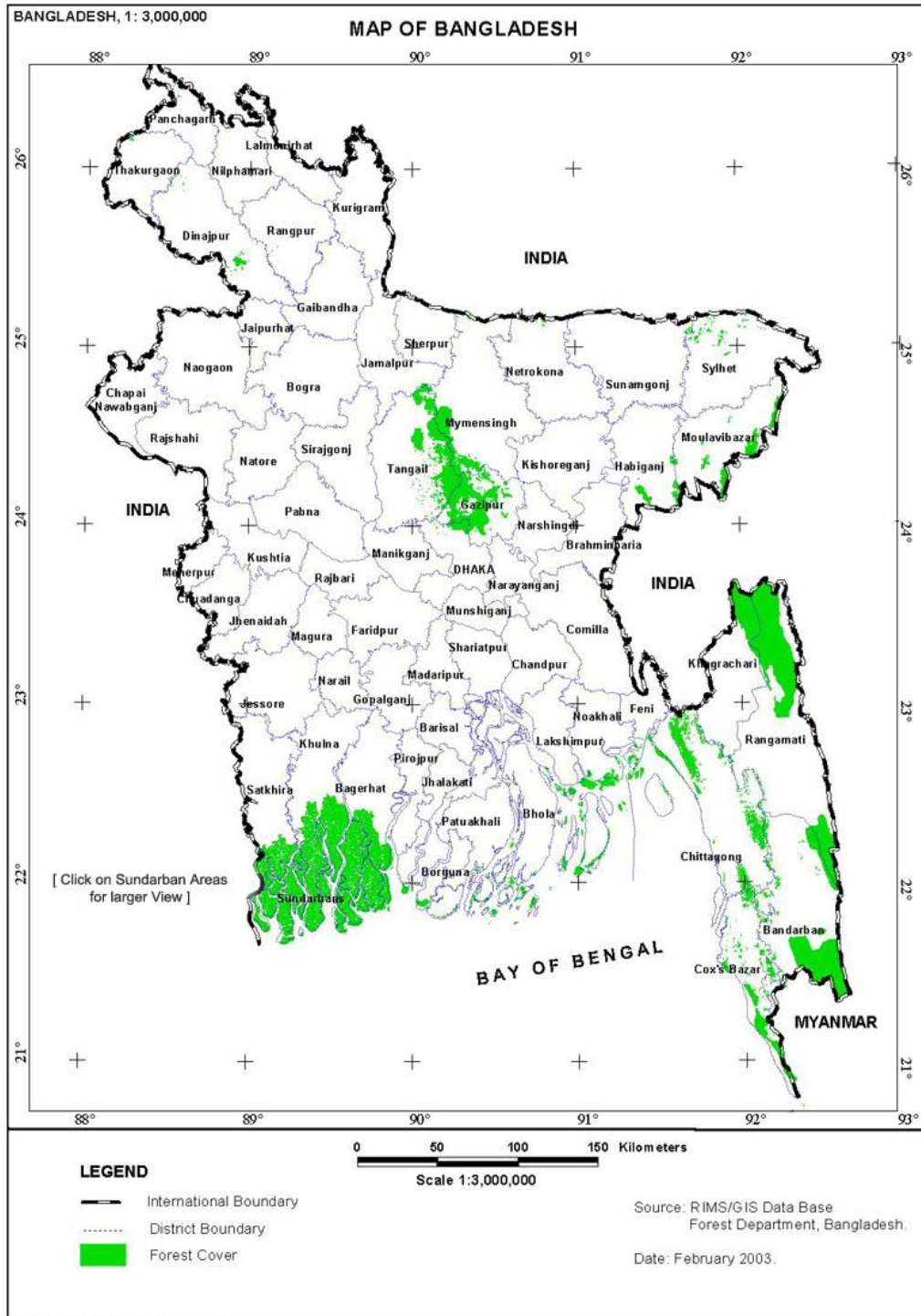


Figure 2.5 Map showing forest areas managed by Forest Department in Bangladesh (FDB, 2008).

Table 2.4 Forest area of Bangladesh.

Forest types	Area (m. ha.)	% with respect to country's area
Forest Department managed Forests	1.53	10.54%
Un-classed State Forests	0.73	5.07%
Village Forests	0.27	1.88%
Total	2.53	17.49%

(Monoj, 2004)

Table 2.5 Forest Department managed forest land.

Forest types area	Area (m. ha.)	% with respect to country's area
Hill Forests	0.67	4.65%
Natural Mangrove Forests	0.60	4.09%
Mangrove Plantations	0.14	0.97%
Sal Forests	0.12	0.83%
Total	1.53	10.54%

(Monoj, 2004)

The area of natural forest in Bangladesh has been significantly reduced and what remains is considered to be degraded and characterized by few species (Biswas and Choudhury, 2007). Various authors have attributed this to lack of co-operation between management authorities and forest dependent local communities, over-population, natural disasters, poverty, and corruption among the Forest Department staff (Zashimuddin, 2004; Biswas and Choudhury, 2007). Although the forestry sector has strong economic potential, the contribution from forest and related services to the country's Gross Domestic Product (GDP) is very low. Since the 1988 ban, timber felling has been forbidden in many forest areas, with low quality and productivity in the remaining forests (FAO, 2000). In 2004, the contribution was 2.3% (FAO, 2005a); but the data for 2008-2009 puts the figure at a mere 1.6% (BBS, 2010a).

2.8.1 Protected Areas of Bangladesh

In Bangladesh, three types of PAs have been created under the Bangladesh Wildlife Preservation Act, 1974. These are Wildlife Sanctuaries, National Parks and Game Reserves (Appendix 1), with the objective of conservation of biodiversity (*in situ*) and the natural environment within the various forest types. The Government has declared 15 National Parks and 13 Wildlife Sanctuaries (Appendix 2).

2.8.2 Biodiversity in Bangladesh

Bangladesh, the world's largest deltaic region, lies in the northeastern part of South Asia (Hossain, 2001). Geographically, it is near the Indo-Burma region which is one of the ten global hot-spots for biodiversity (Mittermeier *et al.*, 1998). Due to its unique geo-physical location, Bangladesh has an exceptionally rich biological diversity (Nishat *et al.*, 2002; Hossain, 2001). An estimated 5,700 species of angiosperms alone, including 68 woody legumes, 130 fiber yielding plants, 500 medicinal plants, 29 orchids, three species of gymnosperms and 1700 pteridophytes have been recorded (Firoz *et al.*, 2004). There are 113 species of mammals, more than 628 species of birds (both passerine and non-passerine), 126 species of reptiles, 22 species of amphibians, 708 species of marine and freshwater fish, 2493 species of insects, 19 species of mites, 164 species of algae and 4 species of echinoderms have been recorded (IUCN, 2000; Islam *et al.*, 2003).

2.8.3 The biodiversity-related international conventions in Bangladesh

In Bangladesh the conventions forming the framework for biodiversity conservation legislation are as follows.

CBD: The objectives of the Convention on Biological Diversity (CBD) are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from commercial and other utilization of genetic resources. The agreement covers all ecosystems, species, and genetic resources³.

CITES: The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) aims to ensure that the international trade in specimens of wild animals and plants does not threaten their survival⁴.

³<http://www.cbd.int/convention> accessed on 15/07/2010

⁴<http://www.cites.org/disc/what.php> accessed on 15/07/2010

CMS: The Convention on the Conservation of Migratory Species of Wild Animals (CMS, or the Bonn Convention) aims to conserve terrestrial, marine and avian migratory species throughout their range⁵.

Ramsar: The Convention on Wetlands (popularly known as the Ramsar Convention) provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. It covers all aspects of wetland conservation and recognises wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the wellbeing of human communities⁶.

WHC: The UNESCO World Heritage Convention is one of the most influential tools in international conservation. It is a cross-cultural concept and a critical common denominator for global heritage conservation. It focuses on the conservation on both cultural and natural properties of Outstanding Universal Value. The sites must meet set criteria, which include integrity, authenticity, protection and management⁷.

2.9 Development of Forest Policies in Bangladesh

In Bangladesh, the forest policy has been greatly influenced by political changes that have occurred in the country over a long period of time (Millat-e-Mustafa, 2002). In 1894, the first forest policy was declared by the British Government. The main features of this policy were that state forests are to be administered for public benefit through regulation of rights of the people living nearby. During British colonialism (1757-1947) the over-exploitation of forest resources started with a policy of clear felling followed by tree planting regeneration. After partition in 1947, the Government of Pakistan (including East Pakistan - now Bangladesh) declared its first national forest policy in 1955; this policy emphasized revenue earning from the forest sector (Choudhury and Hossain, 2011). Then in 1971 Bangladesh became an independent state and the first national forest policy was enacted in 1979, which focused on restructuring of the Forest Department, horizontal expansion of forests, optimization of timber extraction and setting up new forest-based industries (Millat-e-Mustafa, 2002).

⁵<http://www.cms.int> accessed on 15/07/2010

⁶<http://www.ramsar.org> accessed on 15/07/2010

⁷<http://www.whc.unesco.org> accessed on 15/07/2010

Until the formulation of the Forest Policy of 1994, the main objective of forest management was timber production. Increased human activities are adversely disturbing the forest habitats at an unprecedented rate through changes in land-use patterns that causes habitat loss, fragmentation, pollution or other disturbances. An intensive and comprehensive response is required to protect wildlife, landscapes, ecological interactions, and the evolutionary processes that previously sustained the forest ecosystem. The shift in emphasis from timber production has now moved to focus on ecological requirements, conservation of biological diversity, meeting legitimate consumption needs of local communities and other services from forests (Alam, 2009).

2.9.1 Major policies and legislation relating to biodiversity conservation in Bangladesh

A range of legislation, policies and initiatives have provisions for regulating harvesting and protecting both plants and animals in Bangladesh (Ali and Ahmed, 2001; Kothari *et al.*, 2000). These are listed below:

- **Bangladesh Wildlife (Preservation) (Amendment) Act, 1974**

The Bangladesh Wildlife (Preservation) Order, 1973 was promulgated under Presidential Order No. 23 in 1973 and was subsequently enacted and amended as the Bangladesh Wildlife (Preservation) (Amendment) Act, 1974. The law provides for the preservation, conservation and management of wildlife in Bangladesh.

- **Bangladesh Forest Act, 1978 and subsequent amendments**

The law provides protection and development of forests. The Government may assign reserved forest status to any forest land or wasteland, or any land suitable for afforestation, which is the property of the Government. Subsequently, the Forest Law has been amended and updated a number of times in response to changing needs. The Forest Act, 1972, the Forest (Amendment) Act 1990 and the amendment in 2000 may be mentioned in this regard. The Forest (Amendment) Act of 2000, under which the Government formulated the Social Forestry Rules (SFR) 2004, is considered a milestone for the implementation of social forestry in Bangladesh. The SFR were subsequently amended in 2010 to support more equality in participant selection criteria, particularly women and the poor, and increasing benefit sharing by adjusting Participatory Benefit Sharing Agreements (PBSA) (Appendix 3).

- **National Conservation Strategy (NCS), 1986**

Its primary goal was to provide a national strategy for conservation of biodiversity. It provides specific strategies for sustainable use of natural resources.

In 1994, the current forest policy of Bangladesh was enacted; and showed an important shift towards people-oriented forestry and determination of the Government to protect and develop forest resources through people's participation (Millat-e-Mustafa, 2002). This was a community based forestry management approach, supported by a number of international organizations, such as the Food and Agriculture Organization (FAO), United Nations Development Program (UNDP), and Asian Development Bank (ADB) (Biswas and Chowdhury, 2007). The policy statements reveal the following features:

- Horizontal expansion of forest to bring 20% of the land area under forest by 2015.
- Emphasis on planting trees on village areas, newly built up mudflat areas, roadsides, railway track sides and embankments.
- Public and NGO participation in forest expansion and management
- Emphasis on urban forestry
- Special attention to the Chittagong Hill tracts
- Acknowledgements of the importance of biological diversity and Protected Areas.
- Promotion and development of forest-based small-scale enterprises.

(Alam, 2009).

- **National Environment Management Action Plan (NEMAP), 1995**

The MoEF (The Ministry of Environment and Forest) prepared the NEMAP, which is based on a comprehensive participatory planning process ranging from grassroots to the highest level of government. Inputs were provided from local communities, government agencies, non-governmental organizations, professional groups, academics, parliamentarians, lawyers and journalists. The NEMAP provides the policy framework and action plan for environmental development in combination with a set of broad sector guidelines.

- **The Bangladesh Environment Conservation Act (ECA), 1995**

The Bangladesh Environment Conservation Act of 1995 was enacted for environmental conservation, environmental standard development, environmental pollution control and mitigation. The ECA 1995 is the main legislative framework relating to environmental protection in Bangladesh.

- **Sustainable Environment Management Programme (SEMP), 1998**

This was supported by the UNDP and implemented by MoEF (Ministry of Environment and Forest) for a five year period, from 1998 to 2002 and was the response developed from the concerns, needs and actions identified through the National Environment Management Action Plan (NEMAP) process. It focused on community-based resource management in wetlands, and the major aspect was to involve the local community in the planning and implementation of activities for the management of natural resources that maintain biodiversity and human well-being.

- **National Biodiversity Strategy and Action Plan (NBSAP), 2005**

As a signatory party to the CBD Bangladesh has prepared a NBSAP, which has been implemented and executed by different government and non-governmental conservation organizations.

In Bangladesh, the development of forest policy has been the result of gradual amendments to reflect changing desires and circumstances over more than a decade. During the age of empire the focus was on timber production. At present the main focus is on a community based participation in an attempt to balance livelihood development of local communities and biodiversity conservation of the forest. The land-use policy of Bangladesh, for example, does not conform well to forestry activities (Choudhury, 2003). There is a lack of co-ordination between the land administrating agency of the Government and the Forest Department. The Deputy Commissioner deals with the land on behalf of the Land Ministry, and tends to lease out land to the private sector without any consideration of the impacts, which is contrary to the Forest Policy of 1994 and often leads to conflict with the Forest Department staff (Choudhury and Hossain, 2011).

2.10 Social Forestry in Bangladesh

In the early 1980s, the Forest Department of Bangladesh first introduced community based social forestry management to alleviate poverty and regenerate forests and this has proved to be successful (Zashimuddin, 2004; Muhammed *et al.*, 2005; Muhammed *et al.*, 2011; Jashimuddin and Inoue, 2012; Rashid *et al.*, 2013). Since the mid-1980's, a total of 30,666 ha of woodlot plantations, 8,778 ha of agroforestry plantations, and 48,420 km of strip plantations have been established by the Forest Department under the social forestry programs; approximately 19,790 ha of woodlot and agroforestry plantations, as well as 8,566 km of strip plantations, have been harvested, distributing about US\$18.91 million among 85,900 beneficiaries (Jashimuddin

and Inoue, 2012). Despite the success, this approach suffers from, for example, lack of skilled manpower, non-participation of local people from policy to implementation, bias in the selection of beneficiaries and lack of transparency in managing project funds (Muhammed *et al.*, 2005; Choudhury and Hossain, 2011; Jashimuddin and Inoue, 2012). The beneficiaries of social forestry are the landless poor or those having land less than 50 decimal⁸, impoverished women, poor indigenous people, and freedom fighters. The plantations established under the social forestry program were harvested at the end of a ten year rotation and the products sold and distributed according to clause 20 of the Social Forestry Rules (2004). In the case of woodlot and agroforestry plantation on land under the control of Forest Department, beneficiaries and the Forest Department each get 45% with the remaining 10% deposited as the Tree Farming Fund (TFF). The basic idea behind the TFF is to achieve sustainability and reduce dependency on donor funds for the re-establishment of the next plantation crop (Jashimuddin and Inoue, 2012).

2.11 Development of Co-management in Bangladesh

In 2003, the Forest Department of Bangladesh introduced the Nishorgo Support Project (NSP), in collaboration with the United States Agency for International Development (USAID) enhance biodiversity conservation in protected areas through the involvement of local communities (Fox and Moustafa, 2013). Nishorgo wanted to empower local communities to sustainably access benefits from protected areas as a way to counter huge extraction of forest resources (Roy and DeCoss, 2006). It also wanted to increase protected area numbers and improve infrastructure, policy development, strengthen institutional systems and building stakeholder capacity (Fox and Moustafa, 2013). This ran from 2003-2008, it has reduced the gap between Forest Department and local communities which existed for decades (Fox and Moustafa, 2013). It offered an opportunity for local communities to get involved in protection and management activities of protected areas, and also created self-employment opportunities through alternative income generation activities. But these activities did not achieve adequate momentum due to lack of funding and community participation, due to the complex bureaucratic system of the government of Bangladesh. Integrated Protected Area Co-management (IPAC) is a continuation of the Nishorgo Support Project which ran from 2008-2013, and has embarked on the strategic goal of scaling-up natural resource co-management at the policy and operational level by achieving recognition, acceptance and integration of this approach in PA management plans. It also

⁸ 50 decimals = ½ acre (200 ft by 100 ft)

supports sustainable natural resource management and biodiversity conservation to promote responsible, equitable economic growth and good environmental governance. The principal involvement of government is the Ministry of Environment and Forests, and the Ministry of Fisheries and Livestock (IRG, 2010).

In Bangladesh, the co-management committees in PAs consist of 19 members, both male and female, selected by the co-management council following government guidelines and constitution (Appendix 4). The Forest Department officials are the conveners of this multi-stakeholder body (Chowdhury, 2008). Encouraging sustainable biodiversity conservation in protected areas is the primary responsibility of the co-management committee and this is undertaken by facilitating effective partnerships with stakeholders (Chowdhury, 2008). Drawing from an entirely different context, Arnstein (1969) provides a useful model that helps to characterize the different degrees of participation communities can experience in decisions that affect their lives. In Arnstein's ladder, participation is portrayed as occupying different rungs of a ladder, ranging from non participation on the bottom rung, through various higher rungs of manipulation and informing, to the upper rungs of more meaningful partnership or co-operation. The co-management approach to planning has the potential to represent the higher rungs of Arnstein's ladder, but the success of a co-management plan depends on various factors; for example, identification and involvement of appropriate stakeholders, as well as the type of collaboration and equality of treatment of the different participants (Castro and Nielsen, 2001). Without adequate participation of the community in the co-management process it is unlikely that the objectives of co-management can be achieved. Therefore time and resources are necessary to involve them in the decision making process and they must be able to obtain sufficient knowledge about the benefits they will get from being involved in the process (Hossain and Karim, 2005). Successful examples of co-management programs have been observed in many countries including Australia, India, Nepal and Tanzania (Castro, 1997; Castro and Nielsen, 2001; Roe *et al.*, 2009). In Australia nearly 25% of the national reserve system is governed by indigenous peoples through co-management systems with government agencies (Australian Government, 2011). However, no evaluation of the success of this type of approach has been carried out in Bangladesh; a gap that this research aims to address.

2.12 Summary

Currently the PAs in Bangladesh have not been effective in conserving the rapid decrease in biodiversity (Mukul *et al.*, 2008). The major reasons for this policy failure include institutional and management deficiencies, lack of political commitment, inappropriate policy instruments, poor co-ordination, dependency on external financial and technical assistance, corruption and land use conflicts (e.g. Mohammed *et al.*, 2008; Chowdhury *et al.*, 2014). While a rising human population that exceeds the local and regional carrying capacity poses various socio-economic threats to forests, other factors may be even more critical. Bangladesh, for example, is highly dependent on external funding to carry out programs to conserve forests and associated wildlife. Disruption of those funds, or redirection of them to other needs, can have significant negative effects on many environmental and sustainability initiatives. Progress also depends on co-operation, commitment and maintenance of effective programmes through political changes and shifts in philosophy. While developing countries can usually formulate judicial forest policies, they are often unable to maintain the actual pace of implementation. It is not unusual for conflicts to develop between policies relating to different sectors. Promotion and implementation of locally derived, grass-root strategies, including participatory forestry management, co-management of protected areas and forestry and environmental education, are likely to have a positive impact on the future of forests in Bangladesh, despite the current pitfalls and negative directives that often dominate current policy. The considerable pressures on the PAs in Bangladesh indicate that an evaluation of the management plans and the planning process is vital if the remaining biodiversity in Bangladesh is to be conserved and the livelihood conditions of the local people are to be developed.

This chapter has reviewed the existing state of knowledge about protected area management planning; has shown the subject to be both complex and lacking in consensus. In the following chapter, the overall approach to the research, required to address the research aims and questions, is discussed including the data sources, methods and techniques.

CHAPTER 3: METHODOLOGY

This chapter describes, explains and justifies the overall methodology and the particular methods and techniques adopted to investigate the research questions presented in Chapter one. The selection of the most appropriate research strategies and methods is central to the task of successfully addressing research questions (Cresswell, 2009).

3.1 Rationale for the Use of a Case Study and Mixed Method Approach

Given the background described in the previous chapters a case study approach was adopted for this research. The research methods literature acknowledges both the strengths and weakness of the case study approach (Cresswell, 2009; Danzin and Lincoln, 2008; Stake, 2008; Yin, 2009), but for the purposes of this research, it was determined that the in-depth and rich material that could be derived from a case study approach, outweighed the potential problems around representativeness that are sometimes raised in the literature (Cresswell, 2009; Stake, 2008; Yin, 2009). Within this overall approach a combination of qualitative and quantitative research methods were used for the purposes of the research. Evaluation of the case study management plans involved a variety of lines of enquiry, including examination of attitudes, perceptions and behaviours held by various stakeholders as well as information on economic activities. In order to be able to research deeply into the experiences of the various stakeholders, particularly the village residents, methods such as focus group discussions and interviews were combined with a more formal questionnaire survey approach; this represents a form of mixed methods that permitted a better in-depth critical evaluation of the multiple views of the respondents than any single approach (Daymon and Holloway, 2011). It is important to consider both methods because this reduces the errors in research results (Robson, 2002). A mixed method approach can help to produce an in-depth analysis based on evaluating positive and negative views and by facilitating a critical analysis of the key issues associated with each of the protected area management plans. The combination of approaches permits the researcher to derive the best information from the range of stakeholders involved and from a range of other secondary sources. Together, the approaches represent a more powerful ability to uncover and analyse important issues than either approach would on their own (Cresswell, 2009; Newing, 2011).

Qualitative methods can be used to explain thought processes and emotions which are difficult to achieve through more conventional research methods (Strauss and Corbin, 1998). There are

various tools used for qualitative research that are well documented in the literature, e.g. focus group discussions, individual interviews, and observations (Miles and Huberman, 1994). In the context of the present research, the ability to engage meaningfully with often shy or even suspicious village residents in remote areas was enhanced by the use of focus group discussions and interviews. These helped to uncover attitudes and behaviours that would otherwise have been difficult to discern through a questionnaire survey alone. Additionally, however, the questionnaire survey, as a form of quantitative methodology, was also appropriate because it enabled the collection of standardized data and permitted cross-study area comparisons.

3.2 Desk Study

At the outset of the research, a desk study was carried out in order to obtain background and contextual information. This included secondary data such as forestry department planning and research documents, IUCN and other international reports, and academic research papers related to protected area management. Based on the desk study, an initial decision was made on selection of the protected areas to visit for a scoping study, a process described in section 3.2.2 below.

3.2.1 Documents and literature review

The researcher has undertaken a document and literature review to assemble a theoretical and conceptual foundation for the present research, as described by Oliver (2003). After a general literature review, presented in Chapter 2, the research involved the collection of background information about the protected areas, their management, the evaluation of protected area management plans, and their history. This secondary information involved reports, historical data, a range of policy documents, conference papers, and peer-reviewed journal publications. The important secondary information relating to national and international organizations such as IUCN, UN, CBD, and others was collected from web sites. Moreover, accessible information (i.e., ethnic groups, socio-economic conditions, climatic and physiographic conditions, existing land use pattern and management system of the forest), the maps and relevant information of National Park and Wildlife Sanctuary were collected from various literature, organizations (e.g., Forest Department, IPAC), the internet, and through personal contact. Some demographic data was collected from the local Union Parishad sources.

3.2.2 Selection of Protected Areas for the Study

Every protected area has a unique mix of contextual factors and all of them face a rapidly changing world including climate change, invasive species, natural ecosystems fragmentation, increasing urbanisation and demands upon natural resources (Ervin *et al.*, 2010). Understanding and evaluating protected areas must occur within the context of global change. Yin (2009) argues that there is a need for case studies, arising from the desire to understand complex social phenomena; these permit cross-case comparisons and allow more meaningful generalization than a single case study would permit (Yin, 2009). In case studies, the multiple sources of evidence allow the investigator to address a broader range of historical and behavioural issues (Yin, 2009). Moreover, the multiple sources of evidence are helpful for the development of converging lines of inquiry, a triangulation process and corroboration (Yin, 2009).

The desk study showed that Bangladesh has 28 protected areas distributed across the seven major administrative divisions of the country. Six protected areas were selected from four of the divisions for the scoping study; these were Modhupur National Park; Bhawal National Park; Lawachara National Park; Satchari National Park; Teknaf Wildlife Sanctuary, and the Sunderbans (East) Wildlife Sanctuary. The selection of these areas was based on accessibility and safety of the researcher, although upon arrival in Bangladesh it was found that Modhupur and Bhawal National Parks did not have any management plans in place and were therefore omitted from the scoping visit.

Prior to travelling to the scoping study areas to conduct interviews and field observations, profiles were created for each one; these were developed further during the scoping visits. One important outcome of the scoping visit was the decision to omit Satchari National Park as it was found to be very similar to Lawachara in its profile. Therefore the remaining three areas were finally selected for the research. The three selected case study areas are distinctly different from one another; they have diverse profiles and are situated in different parts of the country, i.e. Lawachara National Park in Sylhet Division, Teknaf Wildlife Sanctuary in Chittagong Division and Sunderbans Wildlife Sanctuary in Khulna Division. In each study area, the following information was collected during the scoping visit:

- An enhanced area profile
- A list of key contacts; the management planning process can give a functional link between the PA's manager and those with an interest in the area, its administration and

gives a view of the key audience with whom the manager wants to communicate, as well as clarifying the key issues in each area.

- A list of actors relevant to the management plan in the region; and,
- A categorization of participants based on occupation or relationship to the National Park, Wildlife Sanctuaries, local community, and NGOs.

3.2.3 Use of evaluative indicators

In this research, four common objectives present in each of the management plans were selected for evaluation (Table 3.1). The objectives selected represent the main issues of concern in protected area management in the study areas. Measurable indicators were selected in order to permit an evaluation of the extent to which the plan objectives are being achieved (Table 3.2). Underpinning this approach is an effort to gauge the extent to which circumstances have changed in the period before and after the implementation of the co-management based approach to the plans. It should be acknowledged that drawing definitive conclusions about the impacts of plans is difficult, particularly in light of the attribution problem – typically the problem of determining what patterns can be attributed to planning policies rather than to broad social and economic forces, or which policy caused which effect (McGibbon, 1990). On top of this, the difficulties may be compounded by ambiguous or absence of historical records, base line and time series data. However, this does not negate the importance of attempting to evaluate the impacts of a planning intervention. Assuming that government should be open and accountable, the justification for government activity, including planning, must always be in terms of its effects. Even though it may be difficult to discover what the effects actually are, it is necessary to try to determine what difference is made by plans and policies (Popper, 1945; Reade, 1983; Sillince, 1986). Moreover, the attribution problem can be countered where the focus is placed on the attitudes, perspectives and real experiences of the local residents in the research setting (Garbarino and Holland, 2009).

This research adopts an indicator based approach to the evaluation of the implementation of plans in areas where local residents have not traditionally been included in decision making processes. Indicators have been selected in an attempt to assess the real impacts of planning on local people, on whom they potentially have a significant impact. The rationale for the selection of indicators is outlined below.

With respect to Objective 1, which refers to biodiversity, the decision was taken to focus on perceptions about the impact of the plans rather than on a biological survey of species diversity, which was beyond the scope of this research project. Here the degree of awareness about the biodiversity implications of the co-management approach and evidence for environmental education, which could result in changes in attitudes and behavior, particularly reduction in illegal activities, was investigated.

Objective 2 is focused on developing the co-management approach through partnership and benefit sharing. The indicators adopted to measure improvement in these aspects are firstly the numbers of respondents actively involved in co-management committees measured by attendance at monthly meetings; and secondly the number reporting they have benefited from the introduction of the co-management approach.

Objective 3 concentrates on alternative livelihood opportunities. This indicator is based on evidence for an increase in new opportunities, and the number of respondents that received training, and the types of new activities available to them.

Objective 4 considers the development of tourism as a commercial activity. This is related to Objective 3 but is treated separately as it features as a specific objective in the Management Plans. The indicators used to determine the extent of tourism development include the establishment of infrastructure such as walking trails, information centres, ticket offices, tourist lodges and provision of trained ecotour guides.

Table 3.1 The selected objectives for the case study areas.

Sunderbans Wildlife Sanctuary	Teknaf Wildlife Sanctuary and Lawachara National Park
<p>Objective 1. Protect, restore, sustain and enhance the biodiversity of the SRF and its interface landscape.</p>	<p>Objective 1. Develop and implement a co-management approach that will ensure long-term protection and conservation of biodiversity within the Park, while permitting sustainable use in designated zones by local people as key stakeholders.</p>
<p>Objective 2. Support and improve community based co-management approaches for the activities taking place in the SRF and its surrounding landscape</p>	<p>Objective 2. Conserve the biodiversity of the Park by following a co-management approach based on building partnerships with all the stakeholders and sharing benefits with local communities and key stakeholders.</p>
<p>Objective 3. Provide for resilience-based food security through provision of a variety of subsistence uses including fisheries, values, benefits, products, and services, while ensuring the sustainable supply of these resources for future generations.</p>	<p>Objective 3. Implement income generation activities for sustainable livelihood development and enhance skills of local stakeholders.</p>
<p>Objective 4. Provide for and enhance eco-tourism and visitor recreation opportunities.</p>	<p>Objective 4. Encourage eco-tourism in suitable zones and develop visitor amenities.</p>

Table 3.2 Details of evaluative indicators.

<p>Indicators used to evaluate Objective 1 (Biodiversity conservation)</p> <ul style="list-style-type: none">• Evidence of improved conservation education and awareness of biodiversity conservation issues• Evidence of changes in attitudes and behaviour such as reduction in illegal activities (poaching, illegal logging)
<p>Indicators used to evaluate Objective 2 (Development of the co-management approach)</p> <ul style="list-style-type: none">• Feedback from local residents on active membership of the co-management committee and attendance at monthly meetings• Feedback from local residents on the issue of improved ability to raise issues of concern at formal meetings• Local residents' perceptions of improvement in benefit sharing
<p>Indicators used to evaluate Objective 3 (Improving the range of livelihood generating opportunities available to the local communities)</p> <ul style="list-style-type: none">• Evidence of the establishment of alternative income generating activities• Evidence of increasing opportunities to develop new skills• Types of new activities as cited by local residents
<p>Indicators used to evaluate Objective 4 (Tourism)</p> <ul style="list-style-type: none">• Evidence of establishment of tourist facilities such as walking trails, information centres, provision of trained tourist guides, tourist lodges (number, types, location)

3.3 The Research Design

Data was collected in two phases (Figure 3.1). The first phase was between August and September, 2010 and the second phase was between June and September, 2012. The research methodology is summarised graphically (Figure 3.1).

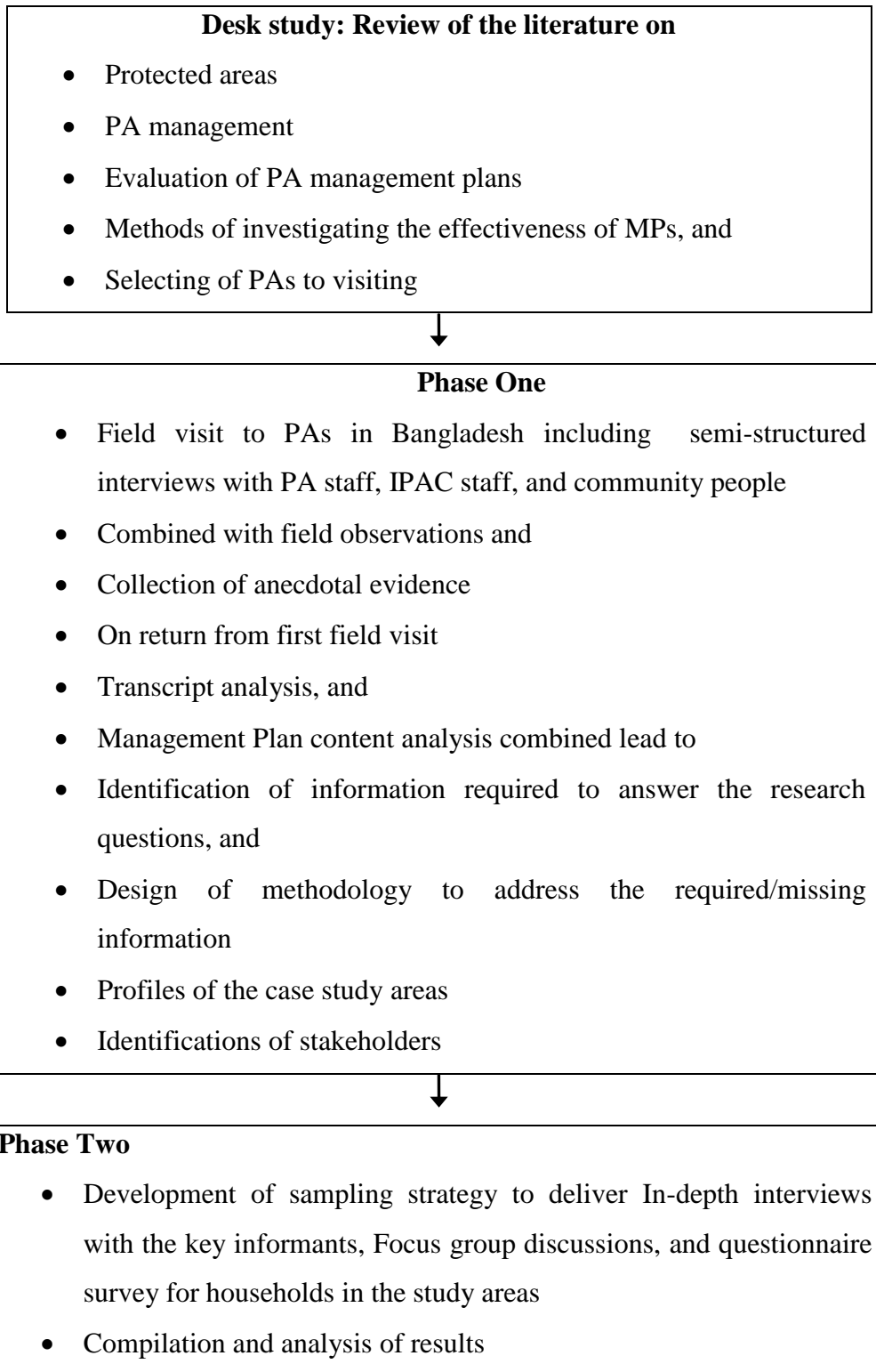


Figure 3.1 Flowchart of the research methodology.

3.3.1 Fieldwork phase 1

The profiles created during the desk study included the identity of the key contacts in each area. An itinerary was created before leaving the UK, including visits to each of the protected areas and meeting with these key contacts. This enabled semi-structured interviews to be undertaken, as well as visual observations, and informal collection of anecdotal evidence.

3.3.1.1 Semi -structured interviews

Semi-structured interviews are designed for a variety of purposes, such as obtaining information from a particular person with expert or advantaged knowledge, to exploring the views of a sample of people from a particular population (Newing, 2011). In this investigation, the interviews were structured using a schedule that focused on themes related to the conceptual framework for the protected area management plans. It comprised open ended questions that provided the opportunity to obtain insights into issues that could not be expressed in a few words. It is also useful to uncover particular perspectives and to learn about any complex conditions in the study areas (Newing, 2011). The semi-structured interview format is also a useful tool to capture how and what the participant thought of his/her domain (Barrio *et al.*, 1999). It creates an opportunity to investigate how the individual's view is influenced by their relationship with natural resources (Patton, 1990; Babbie, 1997; Danzin and Lincoln, 2003). In this research the semi-structured interviews were used to uncover the views of the key informants regarding the management planning process, the current threats to protected area management, the co-management approach in the case study areas, and whether the plans are successful or not in attaining the management plan objectives.

The key informants were drawn from different stakeholders i.e. the Forest Department staff, IPAC staff, and some community members with interest and engagement in matters related to the protected area management. Most interviews lasted between 30 and 45 minutes, during which detailed handwritten notes were taken and then typed as transcripts.

3.3.1.2 Analysis of the semi-structured interviews

The transcript analysis mainly focuses on the regularities and essential features in the interviews and this is referred to as discourse analysis or conversation analysis (Silverman, 2010). In order to analyse the interviews and generate conclusions from the research, all data were organized by production of transcripts for the comparison and checking of reliable patterns. At first the raw data collected by semi-structured interviews were organized and prepared for data analysis. This

involves organization into a simply accessible format, reviewing field notes, reading the collected materials and arranging the data into different categories through the sources of information to build the narrative account, then describing and interpreting the data (Creswell, 2009; Silverman, 2010). Content analysis of interview transcripts was completed to uncover the richness of local insights into management planning issues and to compare the perspectives of different stakeholders on the issues. Qualitative content analysis involves a process designed to compress raw data into categories, themes, and patterns based on suitable inference and interpretation. This process uses inductive reasoning, by which themes and categories emerge from the data through the researcher's careful examination and constant comparison (Patton, 2002). Bryman stated that qualitative content analysis is "*Probably the most prevalent approach to the qualitative analysis of documents. It comprises a searching-out of underlying themes in the materials being analyzed*" (Bryman, 2004: 392).

Three strategies were used to verify the accuracy of the findings. First, triangulation was employed by using different data sources (interviews, observations, and documents) to build a strong explanation for the themes identified. Rich descriptions were used to convey the findings to provide the reader an element of communal knowledge (Creswell, 2009).

3.3.1.3 Field observations

Field observation is important in academic research while interviewing both local communities and park staff (Patton, 1990). Observational evidence is frequently helpful in providing additional information about the area being studied (Yin, 1994); it is a useful tool for validation as it helps in cross-checking the answers of respondents (Margoluis and Salafsky, 1998). Moreover it is essential to verify statements by uncovering observed actions (Burns, 2000). In the research site visits were undertaken to identify the impact on the ground and to cross-check the information collected from the interviewees. The researcher also attended the committee of the community patrolling groups, village conservation forums and the beneficiaries of social forestry as an observer in phase 2. Notes and photographs (where appropriate) were taken during both phases of the research.

In the case study areas, the activities of betel leaf cultivators, fisherman, fish businessmen, Rohingyas⁹, human settlement, level of land degradation, illegal timber felling, and grazing were

⁹ The Rohingya are a Muslim minority population living mainly in the state of Arakan, in Myanmar (Burma).

recorded. Additionally, forest products that were carried back home by the people were also recorded to assess the level of their dependency on forest resources. Photographic images of the case study areas were taken so these could be analysed to find out the current issues and challenges. Upon return to the UK all the sources of information were combined to inform the second phase of field work.

3.3.1.4 Stakeholder analysis

Approaches to stakeholder analysis vary, depending on the project context, although all such analysis involves identification, categorization and analysis of the relations between stakeholders and their relationship to the project under consideration (Reed *et al.*, 2009). Stakeholder participation can be defined as involvement of individuals and groups in the process of decision-making or planning, enabling them to influence decisions. Since the participation in itself does not lead to results, careful advance planning is required. The key question in participatory planning is the selection and the manner of including stakeholders (Kapoor, 2001; O'Rourke, 2005). The stakeholders in protected areas are, generally speaking, all the people with an interest in the place either because it affects them or because they exert influence upon it either directly or indirectly. The stakeholders can be individuals or groups active at all the levels, from local to global (Freeman, 1984; Clarkson, 1995; Grimble and Wellard, 1997; Chevalier, 2001; Buanes *et al.*, 2004.).

Thorough stakeholder investigation and analysis involves collating data through interviews and survey methods, which is costly to both researcher and participants (who give their time) (Weible, 2006). Prell *et al.*, (2008) criticise stakeholder analysis and participatory methods on the basis that even if all stakeholders are adequately identified, not all may be able to contribute to the process because of time or financial constraints.

Beukering *et al.*, (2007:30) categorised stakeholders into the following three priority groups. First, primary stakeholders who experience the impacts of the project most severely either on their livelihoods or well-being; they often have little power to influence the outcome of the decision making process and are likely to include on-site resource users or residents, such as local businesses and local community groups, as well as less well defined groups such as the poor, landless or itinerant workers; second, secondary stakeholders who are the people with the power to make the decisions and to shape the outcome, but who are unlikely to be directly impacted by the decision; this group tends to comprise government departments and ministries; third, external stakeholders who are not impacted significantly by the project, but whose interests

are affected. These people may be influential and have the power to influence the outcome and may include land developers, multi-nationals investing in the area, environmental NGOs or charities, trade groups and lobbying organizations.

In the context of this study, local people are the primary stakeholders and government institutions are secondary stakeholders; both are directly impacted by the decisions. Working with data collected from these two groups was, therefore, intended to help identify institutional and local issues for the management of the park and sanctuaries that form the focus of this study. A stakeholder analysis was carried out in the three study areas and the stakeholder lists for each one are presented in appendices 12, 13 and 14.

Institutional analysis

During stakeholder analysis the researcher needs to understand how important institutions are in terms of their mandate to act in park and sanctuary management. Stakeholder ‘importance’ means their degree of involvement in achieving the agreed objectives of the park/wildlife sanctuary management plans. Stakeholder ‘power and influence’ relates to the potential for people and organisations to either support or disrupt the engagement process and, ultimately, the management objectives (Forestry Commission, 2011).

In this research the relative degree of importance and influence of each stakeholder group was defined by the researcher as follows.

Low: No mandate to act and little power or influence over environmental issues. There is little or no power to affect people and events in relation to environmental management policy.

Medium: Some mandate to act and some power to affect people and events.

High: Full mandate/authority to rule on environmental issues. For example, Divisional Forest Officers, Conservator of Forests and the like. These are people with the power to affect others and events based on the access to statutory, financial, and human resources in relation to environmental management; they are involved directly and indirectly in policy formulation; regulation, advocacy; coordination other bodies and issuing permits.

Analysis of local residents’ dependency on forest resources

The researcher needed to understand the degree to which the local residents were dependent upon forest resources for their livelihoods and income.

The degree of dependence on particular livelihoods was defined by the researcher on the basis of the percentage of the sampled population actively engaged in an activity:

Low:	0-20%
Medium:	21-40%
High:	> 40%.

It is also noted that the local people do not have the direct capacity to influence policy although they exert indirect influence on the environment. An example is female fuel wood collectors who depend on collecting this from the forest as they have no other source. The only alternative would be to purchase it from the local market. In this case it would have been collected by others engaging in this as a commercial, rather than as subsistence, activity. The impact on the resource would be broadly similar, however commercially motivated fuelwood collection is likely to be more intense (i.e. the collectors could be carrying this out for their whole working day) whereas for domestic use it is likely that the collector has many other daily activities and so will be collecting less and this is likely to be from an area close to the point of use. Collection will be on foot and carried; no vehicles or equipment other than hand tools are likely to be involved.

3.3.2 Fieldwork phase 2

The case study area profiles created before phase 1 of the field work (the original desk study) were revisited, revised and three areas were selected, on the basis of existing management plans and accessibility for further, in depth investigation. Developing these profiles enables the gaps, i.e. the missing information, to be highlighted and a strategy for acquiring this to better understand the situation, to be developed. The detailed descriptions of the case study area profile and stakeholder analysis are presented in Chapter 4 and 6, respectively.

3.3.2.1 Case study villages

Twelve villages were selected based on three criteria. First, high livelihood dependency on the forest regardless of location inside or outside the boundary (two of the study areas, Teknaf and the Sunderbans, are designated Wildlife Sanctuaries so all the villages are necessarily outside the Sanctuary). The second criterion was proximity to the boundary, selected to see whether this affected the relationships between residents and park/sanctuary officials. In the case of Lawachara National Park this involved selecting some villages within the park and comparing them with villages up to 10 km outside it. Villages within 0-2.0 km of the Wildlife Sanctuaries were considered as effectively inside because of the degree of reliance on the forest resources for

their livelihoods. Those between 2.0-10.0 km from the Sanctuary boundary were regarded as outside. The final consideration was the accessibility of the villages to the researcher, both practically and with respect to personal safety (Table 3.3).

On the basis of the criteria described above, four villages were selected in each case study area. The only villages inside the park in Lawachara National Park are Lawachara Punji and Magurchara Punji so these were selected, along with Dolubari and Baghmara villages located outside it. In Teknaf Wildlife Sanctuary Sheyallarghona and Kerontoli villages were selected due to their proximity to the boundary (the ‘inside’ villages), with Madhya Leda and Jadimura, in the 5 km to 10 km zone, as the ‘outside’ ones. In the Sunderbans Wildlife Sanctuary, Sarankhola and Baddamari villages were ‘inside’ the sanctuary, with Bakultola and Hoglabunia ‘outside’ it.

Table 3.3 Selected villages in the case study areas.

Case study area	Lawachara National Park	Teknaf Wildlife Sanctuary	Sundarbans Wildlife Sanctuary
Inside village	Lawachara Punji	Sheyallarghona	Sarankhola
	Magurchara Punji	Kerontoli	Baddamari
Outside village	Dolubari	Madhya Leda	Bakultola
	Baghmara	Jadimura	Hoglabunia
Total = 12 villages			

In relation to the categorization of communities, Table 3.3 shows that there is a difference in the communities in terms of their position (i.e. inside or outside the park/sanctuary boundary). The general characteristics of the case study villages are presented in Table 3.4.

Table 3.4 Summary of the main features of the study villages.

Study area	Village	Households	Population (estimate)	Main economic activities	Main ethnic group
Lawachara National Park	Lawachara punji	23	152	Betel leaf farming, NTFPs collection,	Khasia (Christian)
	Magurchara punji	41	260	Betel leaf farming, NTFPs collection	Khasia (Christian)
	Dolubari	84	530	NTFPs collection, business, agriculture	Tipra (Hindu)
	Baghmara	300	2020	NTFPs collection, business, agriculture	Bengali (Muslim)
Teknaf Wildlife Sanctuary	Shaillarghona	55	300	Fishing, day labour, NTFPs collection	Bengali (Muslim)
	Kerontoli	180	1120	Fishing, day labour, NTFPs collection,	Bengali (Muslim)
	Madhyaleda	49	298	Fishing, day labour, NTFPs collection, agriculture	Bengali, Rohingyas (Muslim)
	Jadimura	450	2750	Fishing, day labour, NTFPs collection, agriculture	Bengali, Rohingyas (Muslim)
Sunderbans Wildlife Sanctuary	Sarankhola	530	3365	Fishing, NTFPs collection, business, agriculture	Bengali (Muslim)
	Bokultola	400	2470	Fishing, NTFPs collection, business, agriculture	Bengali (Muslim)
	Boiddamari	64	384	Fishing, NTFPs collection, Prawn/shrimp farming	Bengali (Muslim)
	Hoglabunia	70	450	Fishing, NTFPs collection, Prawn/shrimp farming	Bengali (Muslim)

3.3.2.2 Rationale for the selection of techniques and methods

After selection of the villages three techniques were identified to develop this phase of fieldwork; in-depth interviews with the key contacts, focus group discussions and a questionnaire survey for the households.

On the basis of secondary data and the first phase of field work the techniques previously described were selected as suitable for subsequent data collection. Collection of future data implies that a theoretical position may appear in the course of research and may urge the collection of further data to answer the research questions (Bryman, 2004). Therefore, constructing a questionnaire (Appendix 5) and identifying key contacts in order to collect the missing information on the second field visit was appropriate. The face to face questionnaire survey for households in selected villages, focus group discussions with different stakeholders both males and females, and in-depth interviews with the key informants were suitable for the subsequent data collection.

Prior to embarking on the second phase of the research, the proposed methods were reviewed and approved by the University of Greenwich Research Ethics Committee. Before any survey was carried out all the participants were provided with a participant information sheet in both English and Bengali (Box 3.1, Appendix 6). All participants were assured that their participation was voluntary, that they could withdraw at any time, anything said would be treated as confidential and no individual or household could be identified. Interview tapes and other material would be disposed of carefully when no longer required.

In this research the key informants selected for in-depth interviews were local elders, school teachers, Forest Department staff, NGO staff, a journalist, furniture shop owner, and local Union Parishad member. Interviews were arranged by prior appointment, with the help of a locally recruited research assistant. It is accepted practice to identify appropriate local contacts to gain access to the field work subjects and facilitate effective communication, particularly villagers (Feldman *et al.*, 2003; Johl and Renganathan, 2010; Newing, 2011). The local research assistants played a key role in identifying key contacts and, in some case study areas, worked closely with the researcher as guide and general assistant. The employment of local research assistants enabled access to local communities that could often be suspicious of outsiders, even those from the same country but from outside the region. Use of the field assistants also helped to minimize research costs compared to involving research assistants from further afield. The purpose of this interview (in-depth interviews with key informants) was to collect information relevant to the

research project and to reveal anything previously unexpected that might be relevant to the study. The details of the techniques used in phase 2 of the field work are described in the following section.

3.3.2.3 In-depth interviews

In-depth interviews are useful for collecting detailed information about an individual's views on a specific plan, program or circumstances, and to explore new issues as they arise (Mack *et al.*, 2005; Boyce, 2006). In-depth interviews can provide a greater range of data than any other type of interview format (Fontana and Frey, 2003). The key informants were local people who have extensive knowledge of the local environment, situation and events. The interviews were conducted with the key informants to identify their attitudes and perceptions towards the issues raised during the previous field visit, trying to ascertain whether there was a gap in understanding and attitudes between the communities and the NGOs, and what they think about the governance and management of the National Park and Wildlife Sanctuary (see Appendix 7).



Plate 3.1 Researcher at a key informant interview.

3.3.2.4 Focus group discussions (FGDs)

Focus group discussions are a form of qualitative research where a group of people are brought together and are invited to discuss certain issues. From the discussions, the researcher is able to

identify various attitudes towards the issues and may be able to uncover other issues or concerns of which they were not previously aware. These group discussions enable participants to share their experiences and ideas with each other as well as the researcher and so their knowledge, attitudes, and activities can be explored more fully. Focus group discussions bring out contrasting views, encourage reflection and frequently make people understand the reasoning behind the views they express; they are exceptional in producing ideas and opinions and in revealing the reasoning behind these (Newing, 2011; Remenyi, 2011). The conversations do not take place between the researcher and the focus group members but rather between the group members themselves, and these may involve debate that can create a dynamic which causes them to reflect on their ideas as they speak and thus lead to more interesting insights on the research topic (Remenyi, 2011). These group discussions enabled cross-examination of the information provided by various stakeholders through in-depth interviews, semi-structured interviews and questionnaire surveys.

The focus group discussions in this research involved between six and eleven people, lasted from one to two hours, and focused on particular discussion themes related to the research questions (see Appendix 8). The participants included community members, Forest Department staff and other stakeholder groups, both males and females, with an interest in the forest and related to the protected area management issues. They were required to be knowledgeable about the subject matter related to the research question under discussion, namely the emerging issues in different case study areas (Remenyi, 2011). Equal numbers of men and women were invited to participate in the focus group discussions in Lawachara National Park to ensure equal representation. However fewer women attended, with the reason given that they were busy with betel leaf processing and household work.



Plate 3.2 Researcher at female focus group discussions.

The focus group discussions were conducted by invitation, a research assistant helped to invite the people, the gatekeeper helped to identify the possible participants. The venue was selected on the basis of participant's interest and included the yard of a house, a tea stall, and a community school. During discussions, the researcher acted as a facilitator and encouraged lively input and interaction between the participants. Although the researcher is a Bangladeshi national, it was necessary on some occasions for the research assistant to help with interpretation of some local languages, particularly in two villages in Sylhet and in one in Teknaf. Field note reflections were written by the researcher immediately after the focus group meetings; since these are particularly useful when the transcript of the focus group is written up (Remenyi, 2011). The focus group discussions began with an introduction (Box 3.1) that explained the purpose of the study, the likely duration of the group discussion, and expressed the expectation that every member would be able to contribute. The researcher introduced herself as an independent researcher using the introduction detailed in Box 3.1; the comment about how long the process would take, given verbally, altered depending whether it was a focus group (1-2 hours) or a questionnaire interview (30-45 minutes). Refreshments were provided to the participants prior to focus group discussions. The discussions always ended with an expression of appreciation to the participants.

Box 3.1 Participant Information Sheet

Dear participant,

My name is Salma Ahmed and I am a PhD student at the University of Greenwich, UK. I am currently carrying out my research on “An evaluation of protected area management planning and policy in Bangladesh”. This research is being supervised by Dr Mike McGibbon, Principal Lecturer in Geography (Tel.0044 020 83319729, email- mm07@gre.ac.uk) and Dr Debbie Bartlett, Senior Lecturer in Environmental Conservation (Tel.004402083318478, email-d.bartlett@gre.ac.uk). The aim of the project is to evaluate management needs and practices for protected areas in Bangladesh, in light of lessons that might be learned from a consideration of the situation in the UK and other parts of the world. Identification of the most appropriate tools to enhance the effectiveness of protected area management will contribute to knowledge transfer and capacity building within the context of protected area management in Bangladesh, which will be beneficial for the Protected Area managers, stakeholders, and communities.

I beg to request your cooperation by answering the questionnaire. This will take 30-45 minutes and with some general questions regarding your background, age, and education. Your response will help to improve the overall management of the protected area. The review is not intended to find fault with individual staff. Your participation in this study is voluntary and you can withdraw at any time. I will hold all of the information that you provide securely and will use it only for the purpose of my research and for no other purpose. If you are happy to participate in the research, sign the consent form and return it to me. All information provided by you will be stored anonymously. All data collection, storage and processing will comply with the principles of the Data Protection Act 1998 and a promise of confidentiality that no individual or individual household will be identifiable through the analysis, interpretation and write up of the thesis. Interview tapes and other material will be disposed of carefully when no longer required. This study has been reviewed and been approved by the University of Greenwich Research Ethics Committee. If you have any queries about the research, or would like to be kept up to date with the results later in the year, you can email me at: as05@gre.ac.uk.

Many thanks in advance for your help and time.



Plate 3.3 Participant with information sheet.

3.3.2.5 Face to face questionnaire survey for households

The questionnaire survey is possibly the most widely used social science method and is employed to collect data on a set of pre-defined variables from a large number of people (Newing, 2011). They are considered to be a quick, low-cost and easy way to collect data. A well designed questionnaire is a vital research tool and when correctly used, they are a powerful technique in academic research (Remenyi, 2011). However the types of questions depend on the information required to answer the research questions. In social surveys, various approaches are used such as postal survey, self-administered questionnaires, web surveys, or telephone interviews (Neuman, 2006).

In this research, the questionnaires were administrated face-to-face, using an interview style approach to ask a range of closed and open-ended questions. For any household questionnaire survey the sample survey selection is crucial. In this context the term ‘household’ relates to people living within the same building and generally these groups were found to be based on extended family units. These often feature three generations; in all of these areas it is traditional for a new wife to move into her husband’s family home. The first step in choosing the sample was choosing a target population (at the household level) and to select a sample in such a way that the conclusions would be valid. Village households were selected as the focus for the surveys. Simple random sampling is the best option in order to achieve a representative sample

(Newing, 2011); and it is considered as easy and cost effective. It is used when the population is uniform or has similar characteristics, e.g. main economic activity (Walliman, 2011), as was used in the majority of this research. Before the questionnaire survey commenced village households' maps were collected from the local Union Parishad office and each was assigned a number. In villages with less than 100 households a random numbers table was used to select a 50% sample of the households (see Appendix 9). In villages with more than 100 households a systematic sampling approach was used. During systematic sampling the first household was selected by using the random number table and then every n^{th} number of household was selected subsequently (see Appendix 9). In Dolubari village (300 households) in Lawachara National park, every 5th household was selected for sampling. In Jadimura (450 households) and Kerontoli villages (180 households) at Teknaf Wildlife Sanctuary, every 10th and 6th household, respectively was selected. In Sarankhola (530 households) and Bokultola (400 households) villages in the Sunderbans Wildlife Sanctuary, every 10th household was selected. By using systematic sampling, the sample size of this study represents 10% to 20% of the households.

The household questionnaire surveys were administered by the researcher with the help of research assistants who were recruited with the help of village leaders. The local research assistants were given training in the basic principles of interview administration and probing techniques (Babbie, 1990). This approach helped in overcoming respondent shyness and suspicions regarding strangers to uncover the perceptions and attitudes of the local residents more effectively.



Plate 3.4 Researcher administering a questionnaire survey to a respondent at Magurchara punji.

3.3.2.6 Questionnaire pre-testing

Questionnaire pre-testing was conducted in the case study areas to test the wording of the questionnaire, sequencing and layout; as well as to estimate the survey time and likely response rate (Babbie, 1990; Burns, 2000; Punch, 2000; Nardi, 2006). The researcher tested the questionnaire on three or four local residents selected randomly in each of the case study areas. The result was that some questions were rephrased to improve their clarity.

3.4 Data Analysis

This section describes the qualitative and quantitative data analysis techniques adopted in this research. A brief overview of qualitative and quantitative data analysis is provided, leading to choice of type of analysis to reduce data with a large number of variables to a smaller number to help in interpretation.

3.4.1 Qualitative analysis

In qualitative analysis, the core activity of the researcher is to build a narrative account describing and interpreting what was found from the different interviews (in-depth interview, focus group discussions, and open ended questions). This process involves an intensive interrogation of the data i.e. reading of the gathered material. The recorded interviews were transcribed into the computer. The transcripts were analyzed in three steps. First, open coding was used to identify ideas, themes, and concerns (Neuman, 2006). Each interview was coded with general topics, a simple but time consuming process. Second, similar codes were grouped together as concepts. Subsequently the concepts were grouped together into themes. The codes, concepts and themes were compared; constant comparison of codes, concepts and themes were employed throughout the analysis until all possible ideas had been synthesised to form the discussion and conclusion (see an example in Appendix 10). A triangulation approach was used to verify the accuracy of the findings, using different data sources (interviews, observations, and documents) to build a strong justification for the identified themes. This enabled rich description to be used to express the findings (Creswell, 2009).

3.4.2 Quantitative analysis

In this research, the questionnaire data were analyzed by coding the variables then importing into the SPSS (Statistical Package for Social Science) version 20.0 software package. Descriptive

statistics were used to summarize the data and reveal important themes and behaviours (see Chapter 6). Additionally, an attempt was made to explore whether strong statistically significant relationships exist between variables; that is, relationships in which one variable is dependent upon another, rather than relationships occurring due to chance. Following Nardi (2006) and Newing (2011), cross-tabulations were carried out in conjunction with the Chi Square test and Pearson's r (a Pearson goodness-of-fit test); these were deemed to be suitable as the data involved were nominal and ordinal.

3.5 Local Challenges for the Research Methods

Due to the nature of the research and the socio-political characteristics of each study area, the researcher faced some particular problems in uncovering reliable narratives. Although the researcher is fully bilingual (Bengali/English), language barriers were encountered with the Khasia people in Lawachara National Park, and in Modhya Leda village, Teknaf Wildlife Sanctuary, where some of the respondents spoke in a local dialect rather than Bengali. This required the appointment of local research assistants to facilitate access to the villagers and allow effective communication. Information had to be translated from the local language to Bengali and then transcribed into English. While it is possible to argue that the local assistants could have mis-translated statements made by villagers, this possibility was minimized by ensuring those selected were educated to an appropriate level, were trained by the researcher and understood both the purposes of the study and the questions they were asking. While it is accepted that nuances could be missed in this situation, the value of the local assistants outweighed the potential problems; moreover, where possible, interactions were recorded to permit considered translations. Overall, however, the access that was possible for the researcher as a Bangladeshi national, assisted by local field assistants permitted interactions with local communities that would otherwise have been much more difficult to achieve.

Another problem faced by the researcher was an initially suspicious and sometimes aggressive response to the researcher from villagers who suspected that the researcher was in fact a Forest Department staff member. In one case in Baghmara, this consisted of angry villagers milling around the researcher having wrongly associated her with the Forest Department. The researcher, aided by the field assistant, was able to explain her role as an independent researcher and thus to calm the situation. This situation helps to illustrate the difficult nature of relationships between the villagers and Forest Department. At the same, the researcher faced the challenge of convincing suspicious Forest Department representatives of the value of the study, as well as the

challenge of overcoming defensive and partial answers to questions posed to Forest Department staff. It was only by triangulating the information provided by each of the stakeholder groups that it was possible to uncover reliable narratives and identify material that represented prejudicial attitudes of one group towards another. Contacts with NGOs and village elders also helped to provide more balanced views on the local situations. In light of the challenges discussed above, the establishment of trust and good lines of communication were essential elements in the research approach; this meant taking care and time to carefully explain the purpose of the research.

Pressure of work associated with the timing of the Betel leaf cultivation meant that some of the focus group discussions planned, in Lawachara Punji and Magurchara Punji, could not be carried out. In addition, the very traditional culture encountered meant that it was sometimes impossible to hold separate focus group discussions for male and female villagers; this was the case in Baghmara where even as a Bangladeshi female, the researcher was viewed as an outsider and therefore not permitted access to a female only group. The problem of access to respondents was also exacerbated as the fieldwork overlapped with Holy Ramadan. This emphasizes the importance of the timing of fieldwork and the effect this has had on the overall results must be considered.

Underpinning the central aim of the research is the need to understand the impacts of management plans. It is difficult for respondents to measure change as personal perspectives and perceptions may reflect personal bias, anger, anxiety, politics and lack of awareness (Patton, 1990). Nonetheless, it is important to note that this research consciously attempts to recognize the management programme outcomes from the perspectives of local communities and other stakeholders. The following chapter presents in detail profiles of the case study areas.

CHAPTER 4: PROFILES OF THE STUDY AREAS

4.1. Background

Bangladesh is a small South Asian country located between 20° 34' and 26° 38' north latitude and 88° 01' and 92° 41' east longitudes, surrounded by India on the North, Northeast and the West and the Bay of Bengal on the South (Figure 4.1). The total geographic area of Bangladesh is about 14.40 million hectares of which 13.46 million hectares are land and 0.94 million hectares are rivers and other inland water bodies. Bangladesh is one of the most densely populated countries, with more than 150 million people in an area of 147,570 square kilometers (BBS, 2009; 2010a). In 1998, it was anticipated that if the current rate of population growth, 1.6 percent per year, continued, then by 2020 the population of Bangladesh would reach 170 million, with more than 1200 people per square kilometer (World Bank, 1998). This growing population puts intense pressure on the country's natural resources and contributes to serious environmental degradation and deforestation. The forest cover has fallen to less than 8%, from about 15% a few decades ago (WTB, 2009).



Figure 4.1 Map of Bangladesh (Choudhury, 2010).

As stated in Chapter 3, the rationale behind the study area selection was to include one national park and two wildlife sanctuaries (Figure 4.2).

The areas selected are:

- Lawachara National Park
- Teknaf Wildlife Sanctuary and
- The Sunderbans Wildlife Sanctuary.

These are described in the following sections.

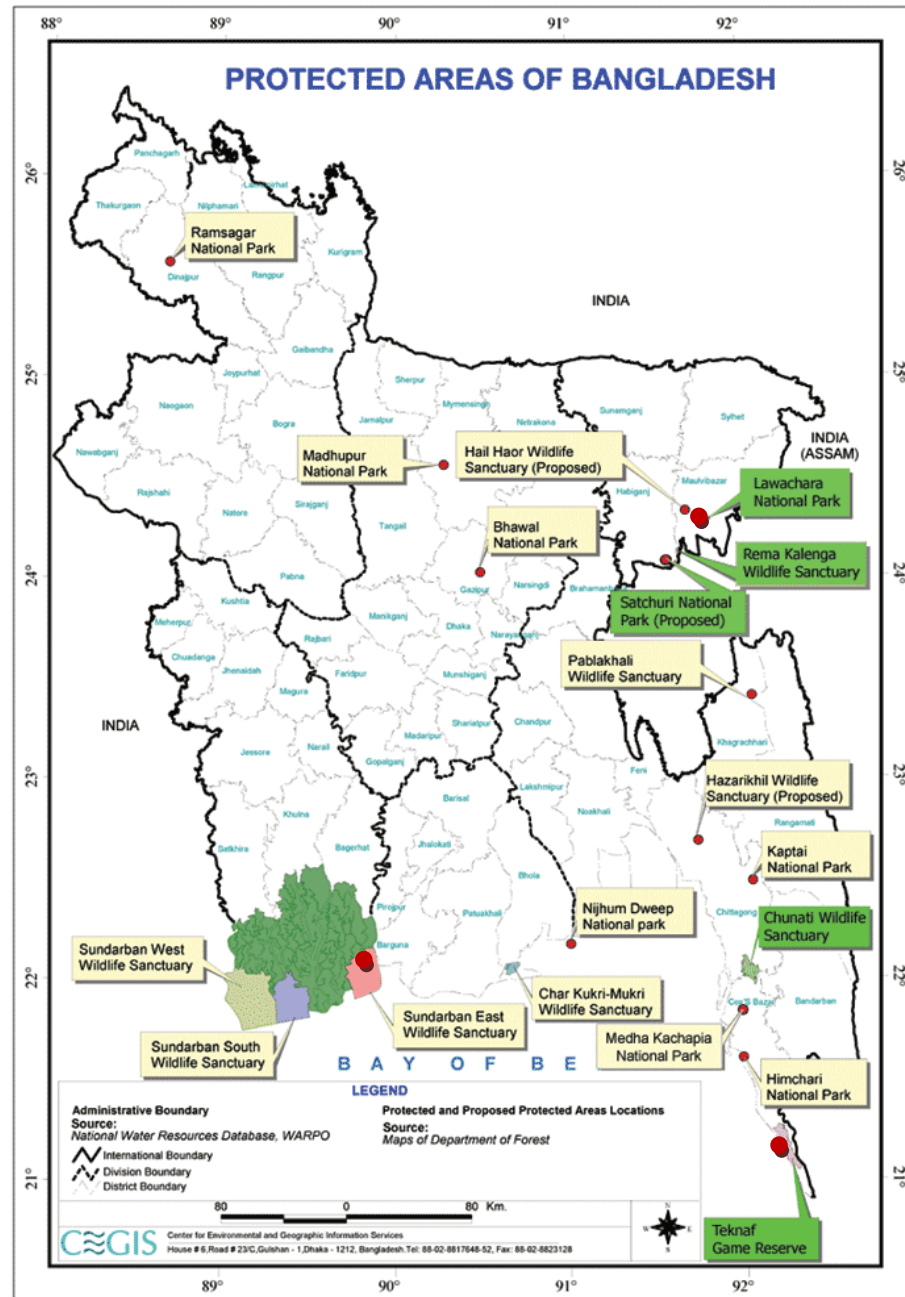


Figure 4.2 Map showing PAs of Bangladesh (Mukul *et al.*, 2008).

4.2 Lawachara National Park

Lawachara National Park is located approximately 160 km Northeast of Dhaka and 60 km South of Sylhet in Kamalganj Thana in Moulovibazaar District. It is almost 8 km east of Sreemongal (FDB, 2006). The National Park was notified in 1996 under the Wildlife (Preservation) (Amendment) Act, 1974, with a total forest area of 1250 ha (Figure 4.3). It lies in between $24^{\circ}30' - 24^{\circ}32' N$ and $91^{\circ}37' - 91^{\circ}39' E$.

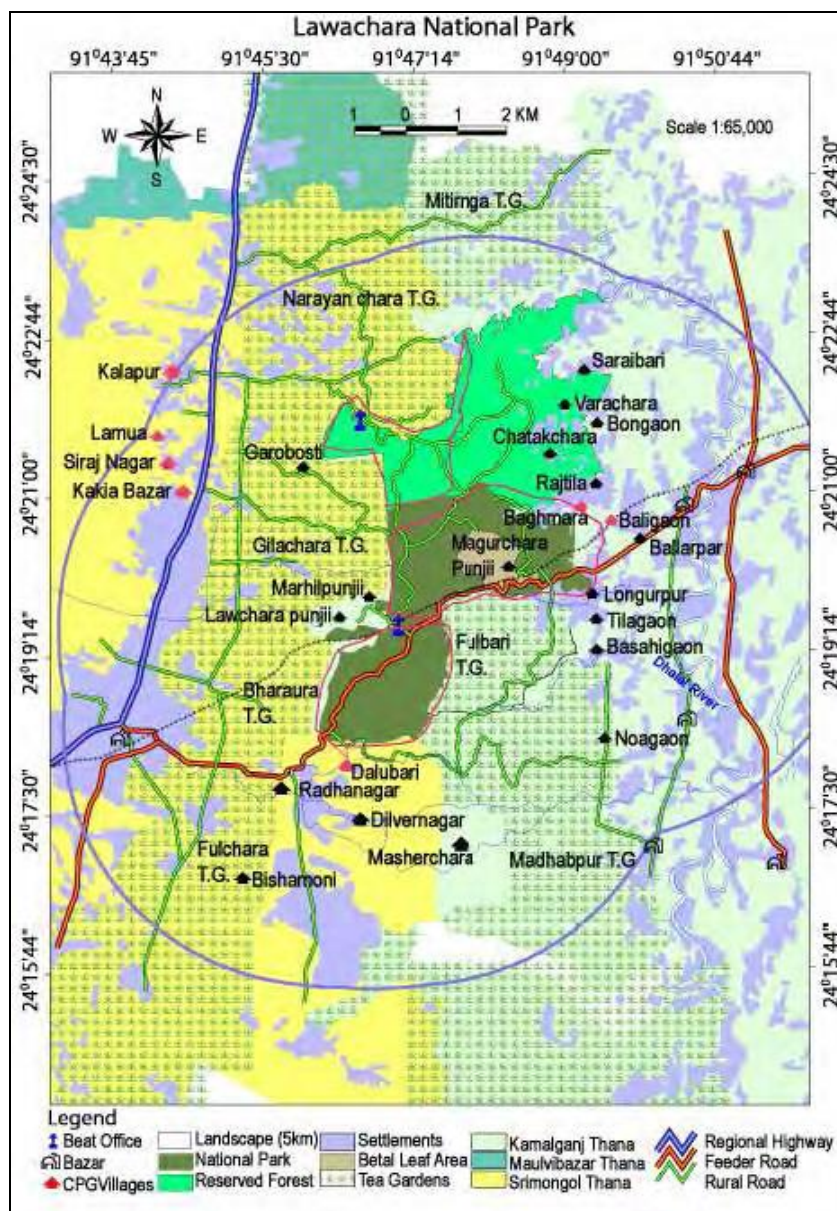


Figure 4.3 Lawachara National Park (FDB, 2006).

4.2.1 Biophysical context

The reserve forest originally supported mixed tropical evergreen and semi-evergreen forests, which over the period have been substantially altered due to heavy biotic interference and the

plantations of exotic species established after clear-felling of natural vegetation. Encroachments of reserve forest have resulted in change of various low lying areas into paddy cultivation. Consequently, the forest habitat has been fragmented, adversely affecting the wildlife by restricting their movements through a barrier effect.

In Lawachara National Park the climate is warm and humid, but the weather is cool and pleasant during winter, characterized by three seasons – winter, summer and monsoon rains. On average the temperature varies between 26.8°C and 36.1°C. The humidity is high in the Park throughout the year, with monthly average humidity varying from 74% in March to 89% in July. There is heavy dew during winter when rainfall is low. The area covered by the Park is one of the wettest in the country and so the rainfall is quite high with an annual average of approximately 4,000 mm, with maximum rainfall falling from June to September.

The Lawachara National Park covers an area of low hills formed primarily from soft sandstone, and originally supporting a vegetation cover of mixed tropical evergreen forests (Alam, 1998). A major portion of Sylhet forest division lies within the Surma-Kushiara floodplains, which are of alluvial origin, composed of clay and sand in varying proportions. This is a low lying area with smooth and broad ridges and basins, which are subject to deep flooding and the shallow basins (haors) may remain wet even during the dry season. The area has been formed from the sediments brought down by rivers draining from the neighboring hills of India. The soils are heavy, silty loams and clays and strongly acidic.

4.2.2 Biological context

Biologically the forest is exceedingly valuable as it is located in the high rainfall bio-geographic zone resulting in evergreen and semi-evergreen forests. The park includes numerous features of the biodiversity of the north-eastern subcontinent, and has various endemic plants. The Park is home to the ‘Khasia’ tribe with their customary forests based livelihood. Forest villages (Lawachara punji and Magurchara punji) of the ‘Khasia’ tribe were traditionally recognized within the West Bhanugach Reserve Forest to ensure a regular labor supply for forestry activities include harvesting and raising plantations. Dolubari village, inhabited by the ‘Tipra’ tribe, is situated on the periphery of the park. The forests are significant in regulating water flows and checking soil erosion. In fact, the conservation of biodiversity inside the park is extremely significant since the forests form important catchments and is designated historically as a head water reserve for many rivers and numerous water bodies. They are part of a network of

transnational watersheds of Sylhet with strong forest water communications that have local implications.

The socio-economic value of the park is significant since a number of ethnic minorities inhabit the forest and the surrounding areas on which they depend for their livelihoods (FDB, 2006). Biological values and conservation priorities include protecting important flora and fauna, maintaining habitat connectivity, the presence of threatened and endemic species, and improving degraded habitat. The Park gives important scope for wildlife education and research, nature interpretation and conservation awareness (FDB, 2006). The Park is also a possible source of eco-tourism, aesthetic values, dense high forests, historical and cultural values, scenic beauty and ethnic diversity (FDB, 2006).

The Lawachara Park is classified into the tropical evergreen and semi-evergreen biogeographic zone. The park has been included in the Sylhet hills bio-ecological zone by the IUCN, Bangladesh. The influence of microclimatic and edaphic factors including rainfall, humidity, sunlight and soil is predominant in the forests of Lawachara (FDB, 2006).

The Lawachara National Park and its interface landscape include terrestrial, aquatic and forest ecosystems. In Lawachara National Park six types of habitat and thier interface landscapes have ben identified (FDB, 2006); they are as follows:

- High forests represented by the remaining patches of natural forests,
- Plantations including the monoculture of exotics,
- Grasslands and bamboos,
- Wetlands,
- Tea estates, and
- Cultivated fields.

Numerous animal species (mammals, birds, reptiles and amphibians), both forest-dwelling and wetland-associated species, of diverse genera and families are found in the forests. Lawachara national park and the adjoining reserve forest are home to 237 species of avifauna reliant on good forest bushes and cover (FDB, 2006). Large mammals such as tigers, leopards, bear, wild dogs and sambar have disappeared from the park due to habitat degradation and hunting. However, viable populations of many small and medium-sized mammal species that can survive in limited forest areas and/or disturbed or secondary habitats e.g., jackals (*Canis aureus*), small cats (*Felis chaus*), barking deer (*Muntiacus muntjak*), wild pigs (*Sus scrofa*), gibbons (*Hoolock*

gibbons), langurs (*Trachypithecus pileatus*), and hanumans (*Nycticebus coucang*) are found. A variety of other groups of fauna such as reptiles, fishes and amphibians are present. In water bodies, aquatic species including turtles and frogs are found. In Lawachara the Hoolock gibbon is used as a key species for the development and implementation of forest management and conservation measures (FDB, 2006).

4.2.3 Socio-economic context

Overall, there are 26 villages in the vicinity of the park, as shown in Figure 4.4. Two of these, Magurchara punji and Lawachara punji are located within the park, four villages are just outside the forest and the others are between one and three km away. The park is home to several indigenous communities namely 'Khasia', 'Monipuri' and 'Tripura'. While the Khasia communities live inside the park, the other two live adjacent to it. Magurchara punji was established in 1950 and is inhabited by 40 households; Lawachara punji was established in 1940 consists of 23 households (FDB, 2006). Four tea estates border the park, namely Fulbari, Khaichara, Jakchara and Gilachara; there are others nearby.

In Lawachara, the social infrastructure is poorly developed. The neighboring villages lack basic facilities such as clean drinking water, telecommunications and electricity; health and education facilities are inadequate. Usually they use fuel wood for cooking purposes and tube-wells as a source of drinking water. Several NGOs and two banks provide micro-credit to local people with loans mainly given for agriculture. NGOs provide credit mainly for income generation activities, i.e. small business, fish culture, poultry, and livestock rearing.

The 'Khasia' communities in villages inside the park are mostly engaged in betel leaf cultivation and wage labor for their livelihood (NACOM, 2003). The remaining villages are located just adjacent to the park boundaries; their main occupation is agriculture (Hossain, 2007). Most of the people of the local community are extremely poor (85-90%) (De Cosse, 2006). They use the forest resources for their subsistence and commercial use. The 'Tipra' ethnic group in Dolubari village depends primarily on pineapple and lemon cultivation, and wage labor. In some other villages around 60% of people are involved in agricultural related professions (NACOM, 2003).

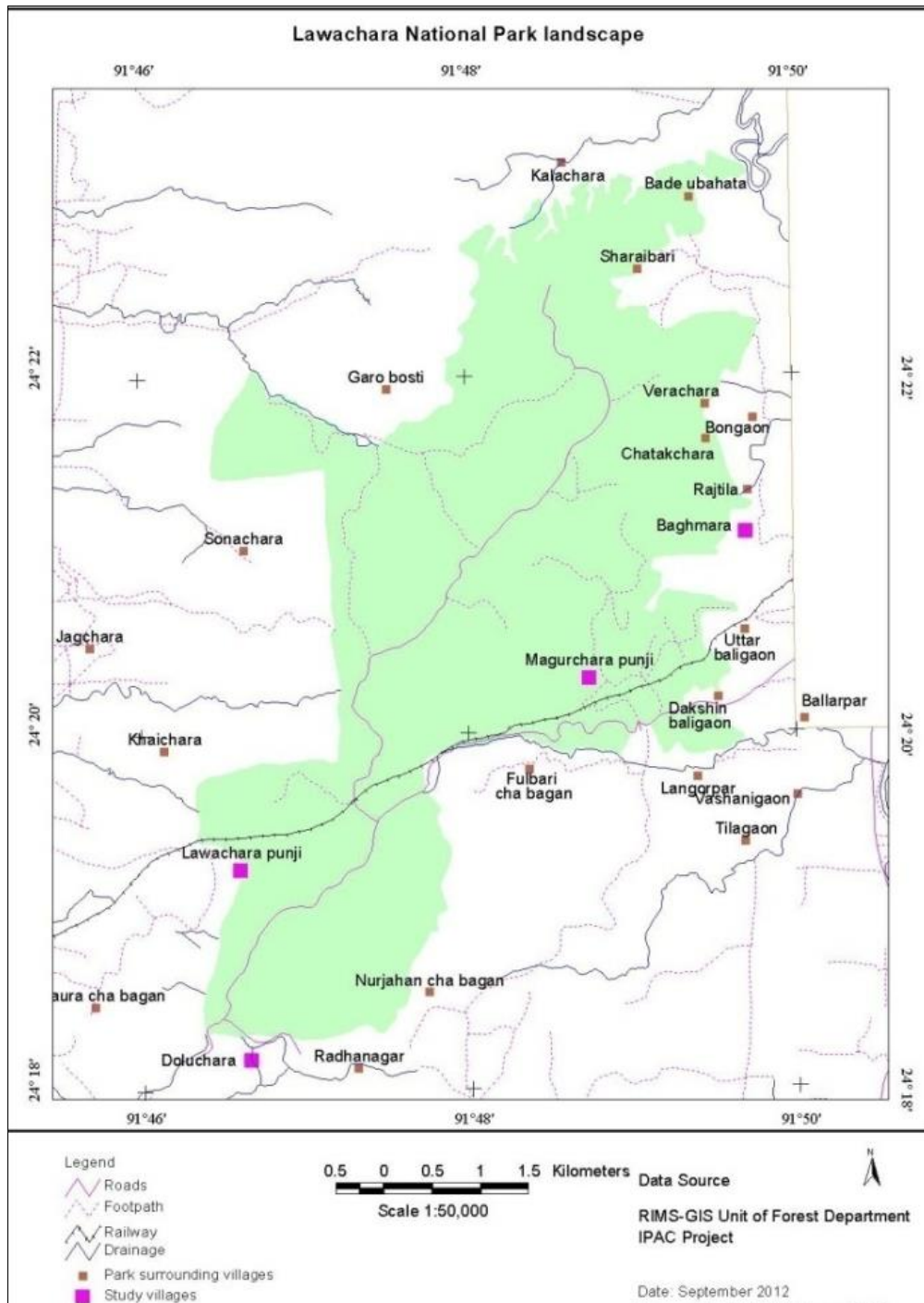


Figure 4.4 Lawachara National Park landscape showing case study villages.

4.3 Teknaf Wildlife Sanctuary

Teknaf Game Reserve was established in 1983 and has a total area of 28,688 acres (11,610 ha). It covers 10 reserve forests spread over three forest ranges in the Cox’s Bazar Forest Division (GOB, 1984; FDB, 2006). In 2009, the Government declared the game reserve as a Wildlife Sanctuary (GoB, 2009a). It measures roughly 28 km north-south and 3-5 km east-west (FDB, 2006). It is bordered on the east by the Naf River and on the south and west by the Bay of

Bengal (Figure 4.5). To the north it borders on other parts of the Cox's Bazar South Forest Division and Myanmar. The Sanctuary lies between 20° 52' and 21° 09' north latitude and between 92° 09' and 92° 18' east longitude and runs along the entire eastern length of the forest from north to south, along the Teknaf highway. Another road runs along the entire western boundary of the forest, along the beach between Cox's Bazar and Teknaf town.

4.3.1 Biophysical context

In the past the Teknaf Wildlife Sanctuary contained mixed tropical evergreen and semi-evergreen forests which, over the past, have been considerably changed because of serious biotic pressure (FDB, 2006). Forest land encroachments have resulted in the change of many hills and low areas into paddy farming and settlements. Consequently, the habitat has degraded and fragmented adversely affecting the elephants by restricting their movements via a barrier effect. However, in places, good natural re-growth, particularly of ground flora and middle storey, has come up due to favorable climatic conditions, thereby enhancing the *in-situ* conservation value.

In Teknaf Wildlife Sanctuary the climate is warm and humid, characterized by 3 seasons- winter, summer and monsoon. On average the temperature varies between 15.4°C and 25.4°C. Throughout the year the humidity is high with monthly average humidity varying from 27.6% in April to 98.6% in August. The area covered by the Wildlife Sanctuary is wet as a result of high rainfall with an annual average of 3,314 mm, with most falling during June to August from South-West monsoon. Pre-monsoon cyclonic storms are accompanied by high winds and rains, which can cause substantial damage to property and trees.

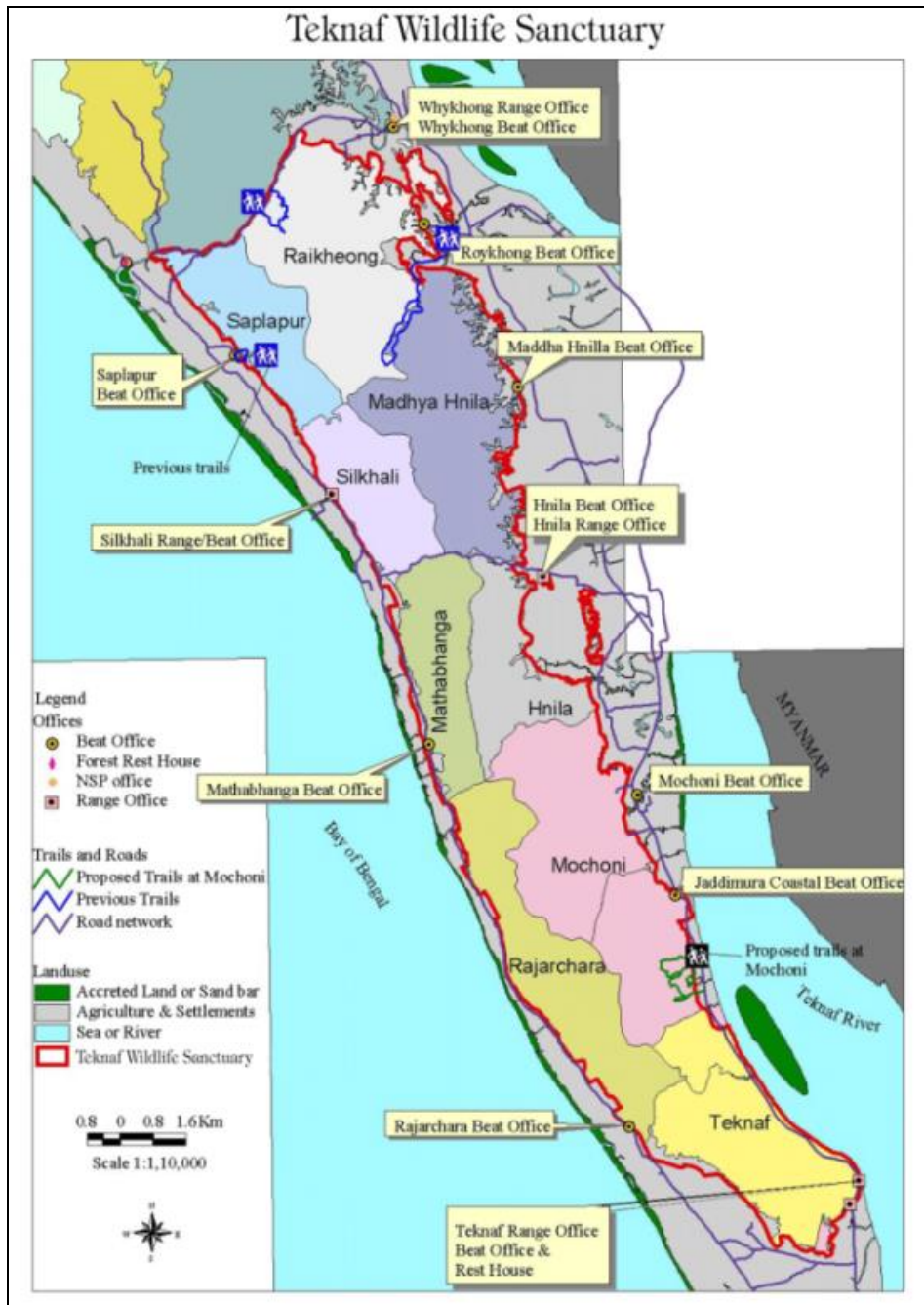


Figure 4.5 Teknaf Wildlife Sanctuary (FDB, 2006).

The hills of the Wildlife Sanctuary are composed of upper tertiary rocks with three representative geological series: Surma, Tipam and Dhupitila (FDB, 2006). The soils vary from clay to clayey loam on level ground, and from sandy loam to coarse sand on hilly land; the soils developed on the unconsolidated sandstone of the low hills are brown, loamy and acidic with steep slopes; the presence of semi-consolidated rocks at shallow depth hinder deeper penetration of tree roots in these soils. Low mountains are separated by broad valleys, making the land irregular and the slopes precipitous (FDB, 2006).

4.3.2 Biological context

The forests of Teknaf Wildlife Sanctuary are in the high rainfall bio-geographic zone, including wet evergreen and semi-evergreen forests. They are home to ethnic groups with their traditional lifestyle reliant on existing natural resources. Teknaf Wildlife Sanctuary is one of the largest PAs in Bangladesh, exceeded in size only by the combined Sunderbans Wildlife Sanctuaries and Pablakhali Wildlife Sanctuary (FDB, 2006). The forest-water interactions are very important because the forests play a significant role in regulating water flows, preventing soil erosion and protecting coasts. They are part of watersheds with strong forest-water connections that have local, national and international implications.

The Teknaf Wildlife Sanctuary has a very high level of biodiversity, containing important flora and fauna. The gazetted Wildlife Sanctuary area, neighbouring reserve forests and adjacent coastal areas, comprise a broad variety of habitats within a comparatively dense area, including representative, but increasingly fragmented and degraded, examples of evergreen and semi-evergreen hill forests. There are tidal mudflats and mangrove vegetation alongside the Naf River to the east, and broad sandy and rocky beaches along the Bay of Bengal to the west (FDB, 2006). These habitats support high biodiversity, have long been recognized for their elephants (*Elephas maximus*), and was established as a Game Reserve specifically for their protection.

Biological values include providing shelter for biodiversity comprising important flora and fauna, elephant habitat connectivity, presence of threatened and endemic species, and improvement of degrading habitat. The main ecological functions are catchment conservation of rivers/streams and water bodies, coastal conservation, control of soil erosion, irrigation and agricultural production and environmental amelioration (FDB, 2006). The Wildlife Sanctuary provides significant scope for wildlife education and research, nature interpretation and conservation awareness. It is also a potential source of eco-tourism, nature-based recreation, aesthetic values, dense high forests, historical and cultural values, and scenic beauty. Conservation values of the Wildlife Sanctuary are regional and transnational, but also with local implications (FDB, 2006).

In Teknaf Wildlife Sanctuary the tropical wet evergreen and semi-evergreen plant species include *Dipterocarpus sp.* The sanctuary is characterized by high rainfall and in places, a multi-tier vegetation assemblage of rich biodiversity. The following eight broad types of habitats are recognized in Teknaf Wildlife Sanctuary (FDB, 2006) and the surrounding landscape:

- high forests represented by the remaining natural forests,
- plantations including the monoculture of exotics,
- grasslands and bamboos,
- wetlands,
- tidal mudflats and mangrove vegetation along the Naf River ,
- sandy beaches to the west,
- cliffs and steep slopes, and
- cultivated fields and settlements.

These habitats support what is considered to be the highest biodiversity in Bangladesh (a documented total of 290 species of plants, 55 species of mammals, 286 species of birds, 56 species of reptiles and 13 species of amphibians) (FDB, 2006). The water bodies and swampland harbour important fish species, water birds and amphibians. The cultivated fields (mainly of paddies) and grasslands harbour mammals, ground birds and reptiles.

The tropical evergreen forests are found in deep valleys where wet conditions exist with shade. The tropical semi-evergreen forest predominates on the hills and flat lands. Evergreen species are more frequent in the lower stories; the canopy has a high proportion of species that are deciduous during dry season including *Artocarpus chaplasha*, *Dipterocarpus turbinatus*, *Elaeocarpus floribunda*, *Albizia procera*, *Dillenia pentagyna*, and *Swintonia floribunda*. Shrub, cane and bamboos species, and a number of fodder and fruit bearing plants occur. In large savannah areas, sun grass (*Imperata spp.*) is also present.

The elephant population probably represents 20-30% or more of the total number of wild elephants currently remaining in Bangladesh (FDB, 2006). These are of high conservation importance as they are considered to be endangered within both Asia and in Bangladesh. A number of animal species (mammals, birds, reptiles and amphibians), both forest dwelling and wetland-associated species, of different genera and families are found here. It is home to avifauna of many species dependent on good undergrowth and forest cover. The forest reserve supports herpetofauna, including frogs, toads, turtles, lizards, snakes and a rich diversity of other groups of fauna such as invertebrates and fish. Large mammals such as tigers, leopards, bears, wild dogs and sambar have disappeared from the Reserve due to habitat degradation and fragmentation. However, viable populations of many small and medium sized mammal species that can survive in limited forest areas and/or disturbed habitats e.g., jackals (*Canis aureus*),

small cats (*Felis chaus*), barking deer (*Muntiacus muntjak*), and wild pigs (*Sus scrofa*) are found in the remaining habitat (FDB, 2006).

4.3.3 Socio-economic context

A total of 115 villages depend on Teknaf Wildlife Sanctuary for their livelihoods. Fifty three villages (46%) are located inside the reserve boundaries, the rest are adjacent to or outside the forest area (Figure 4.6). The total population of Teknaf Upazila is 152,557, including 125,651 rural residents, of whom 64,530 are male and 61,121 are female (Bari and Dutta, 2004). The influx of Rohingya refugees from neighboring Myanmar during late 1991 and early 1992 resulted in a direct population increase on the Teknaf Peninsula, increasing the pressure on the forest resources which were already seriously exploited (FDB, 2006).

The socio-economic values of this area are important as a number of communities including ethnic minorities reside within and around the forests on which they depend for their livelihood opportunities. The social infrastructure is poorly developed. The neighboring villages' lack basic human needs such as clean drinking water, telecommunication, electricity and education facilities are inadequate. As an alternative to electricity or gas, fuelwood is the main domestic energy source in the villages. In terms of education and health care, the case study villages have primary schools and a pharmacy with basic drugs. The main household income in this area is agriculture and fishing; there are other income sources such as day labour, small business, fuelwood collection, and carpentry. Micro-credit is available from different NGOs including BRAC, ASA, SHED, Grameen bank, and Krishi bank.

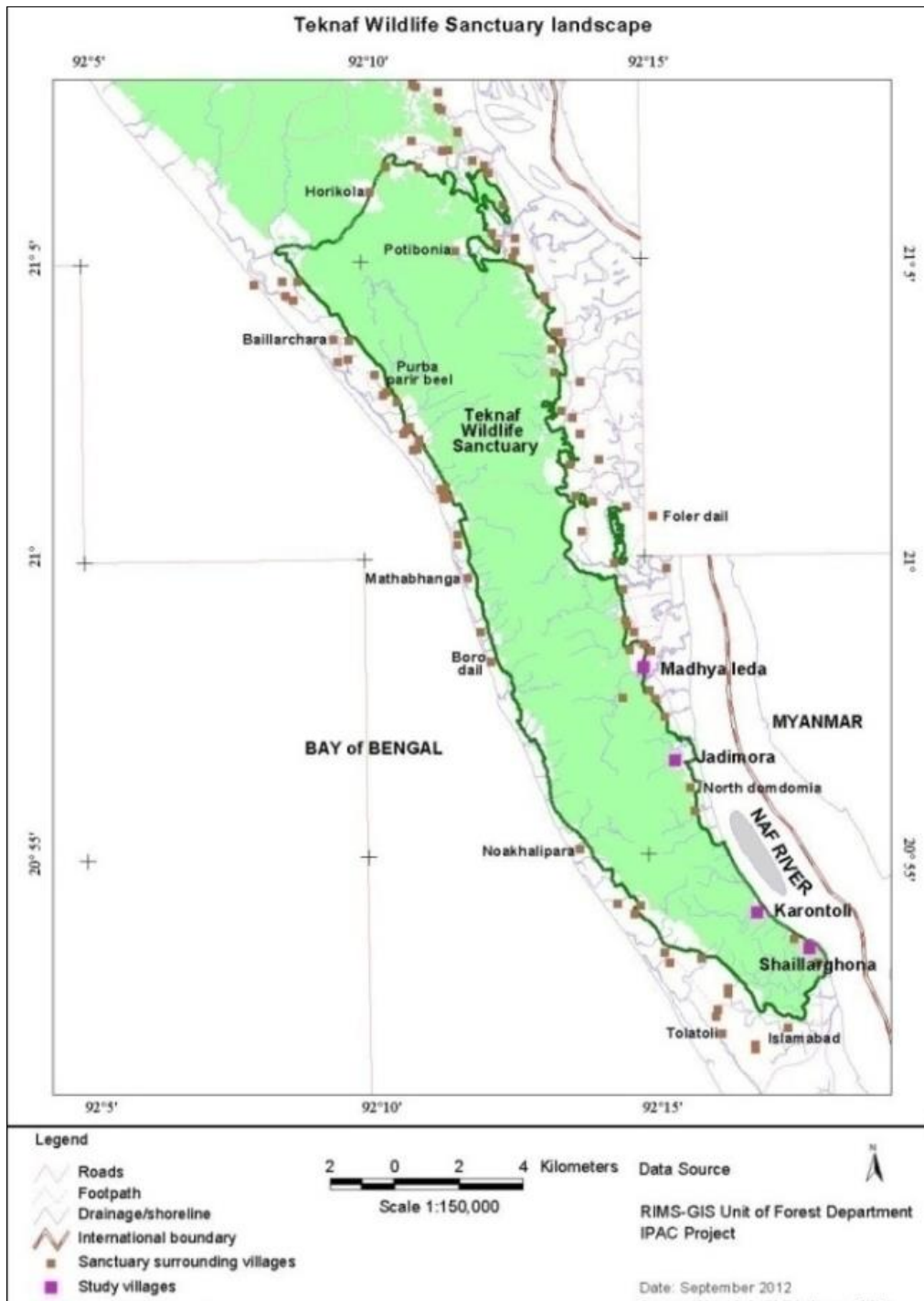


Figure 4.6 Teknaf Wildlife Sanctuary landscape showing case study villages.

4.4 The Sunderbans Wildlife Sanctuary

The Sunderbans is the largest mangrove forest in the world. Some 60% of the forest is in Bangladesh and 40% in India (Figure 4.7). In the 1870's, the portion in Bangladesh was declared the Sunderbans Reserved Forest (SRF). It is now managed by the Forest Department (FD) of the Ministry of Environment and Forests (MoEF). The entire Sunderbans is now Reserved Forest,

established under the Indian Forest Act, 1878. On 6th December 1997, UNESCO declared the forest a ‘World Heritage Site’. It is also a RAMSAR site.

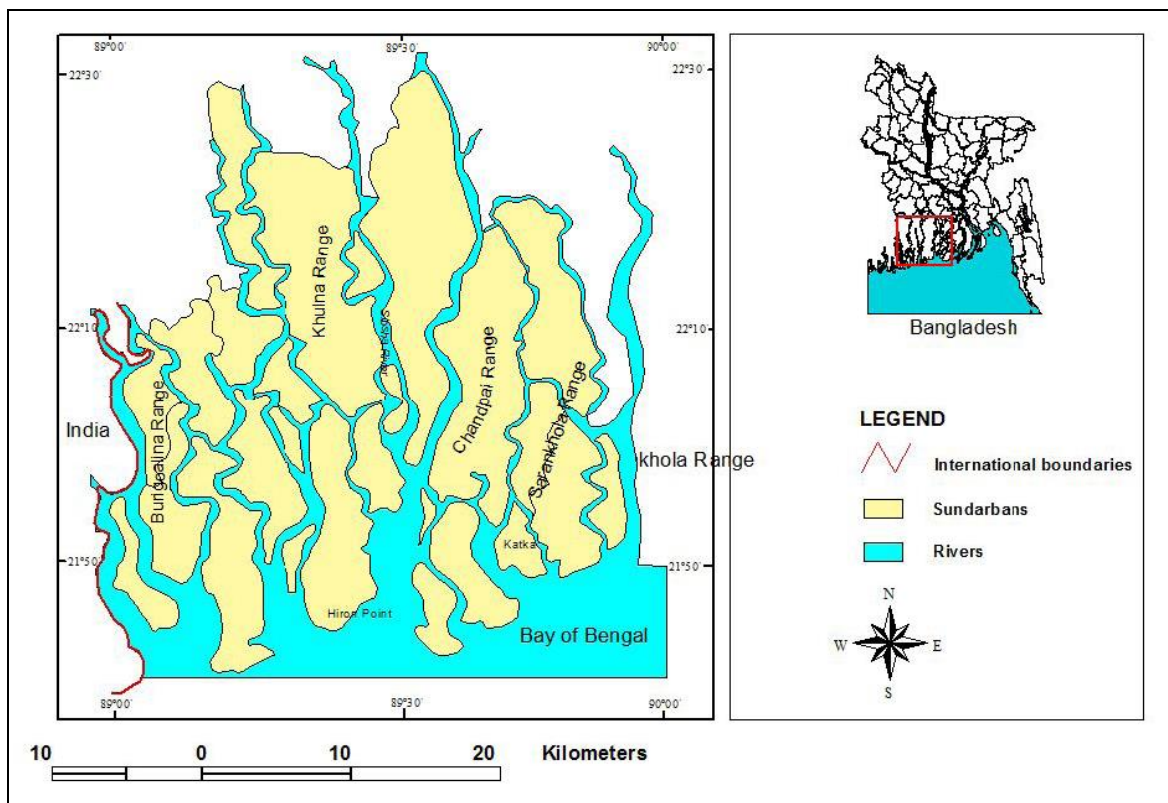


Figure 4.7 Location of Sunderbans in Bangladesh (FDB, 2010).

The total area of the wildlife sanctuaries was extended in 1966 and three parts Sunderbans East, West, and South Wildlife Sanctuaries were established in 1977 under the Bangladesh Wildlife (Preservation) (Amendment) Act, 1974 (Figure 4.8). For the purpose of this research, this term refers to the Sunderbans East Wildlife Sanctuary. It covers an area of 31,227 ha.

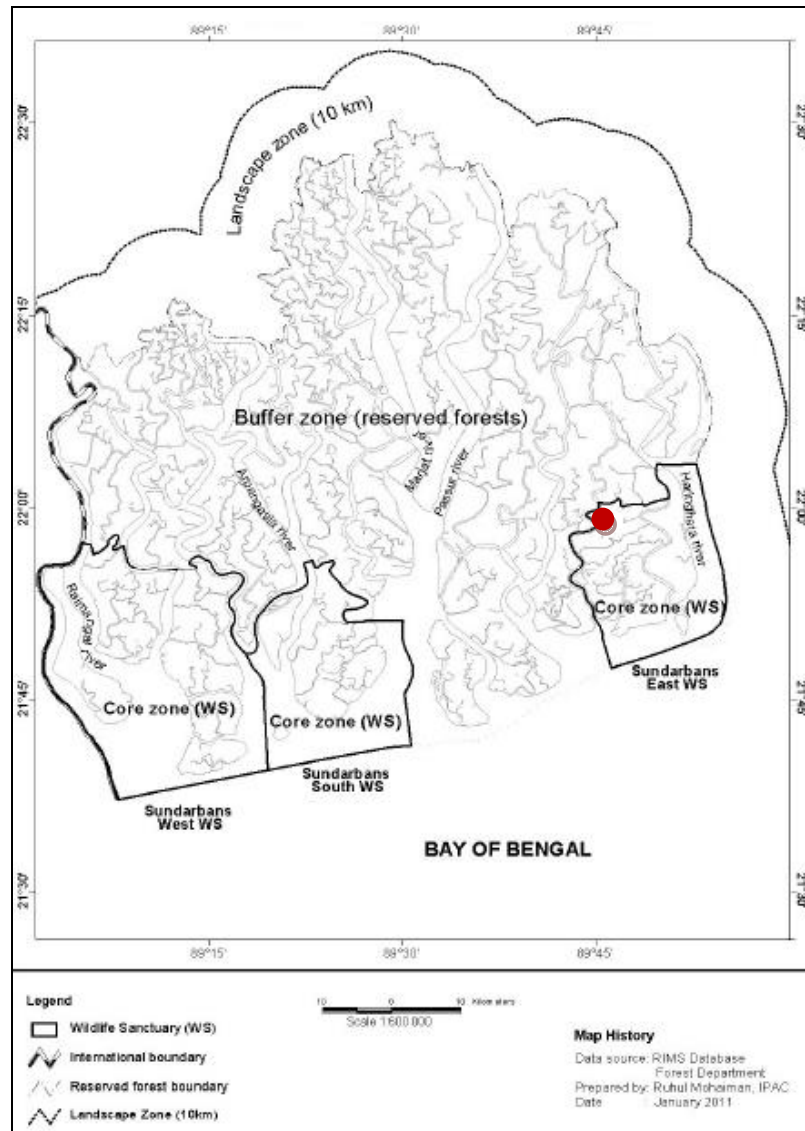


Figure 4.8 Wildlife Sanctuaries in the Sunderbans Reserved Forests (FDB, 2010).

The transport system in the area is comprised of air, railway, road and water and is moderately efficient. People travelling to the area can take the aeroplane to Jessore or the boat from Dhaka or any land transport vehicle including the train to the cities/districts and vicinities of Khulna, Satkhira, Bagerhat, Pirojpur, Jhalakati, Patuakhali, Barguna and other neighboring places. Transportation toward and inside the Sunderbans and the three Wildlife Sanctuaries is by small to medium sized surface water transport vehicles. Most of the river channel network is passable, except during severe storms or cyclones (FDB, 1998). Domestic passengers and cargo boats from Dhaka, in addition to international cargo vessels, travel to the port of Mongla, Khulna via the Passure River from the Bay of Bengal. However, all boats have to be led by a guide boat of the Bangladesh Port Authority at Hiron Point starting from the Bay of Bengal to the mouth of the Passure River up to Mongla port in order to ensure secure passage through this Sunderbans River

(FDB, 1998). The Forest Department Divisional Offices at Khulna and the field offices in the Sunderbans use speedboats, cruisers, motorboats and launches.

4.4.1 Biophysical context

The Sunderbans mangrove forest stretches about 100 km from east to west and about 80 km from north to south at its broadest and longest part. The Sanctuaries are low lying deltaic tidal forests, flat to slightly undulating, most of which are flooded during high tides and the monsoon. They are intersected by wide rivers which can be several kilometers in width and overlapped by many creeks (locally known as khals) which are the only means of access into the areas. These channels fragment the land surface which hinders movement of people by foot; it is muddy most of the time (FDB, 1998).

The deltic formations of Sunderbans comprise countless drainage systems of creeks and canals with tidal flats positioned in between. Furthermore there are some small, marshy lands over mean tidal level, tidal sand bars mostly towards the sea and vegetated islands with a network of tidal channels (FDB, 1998). Erosion and accumulation occur as part of a continuous natural process, with the mangrove vegetation affording stability to the whole ecosystem. Biotic factors play an important role in physical coastal evolution. A range of wildlife habitats have developed, including beaches, estuaries, permanent and semi-permanent swamps, tidal flats, tidal creeks, and coastal dunes. The most important phenomenon is the changing of the main course of the Ganges. Twice daily inundation, due to the tides, is another factor, which keeps the ecology in a state of dynamic activity. The mangrove species grow on new soil deposited on uncompacted sediments derived from the upper catchment from the Himalayas and the Ganges-Brahmaputra flood plains (FDB, 1998).

The climate in Sunderbans is moist sub-tropical, and tempered by the sea. The four major seasons are pre-monsoon (March-May), monsoon (June-September), post-monsoon (October-November) and the dry winter season (December-February). The temperature varies between 21°C and 30°C. Rainfall is heavy, between of 1640 and 2000 mm annually, and the humidity averages 70-80%, due to the proximity of the Bay of Bengal. During the monsoon half of the Sunderbans can be under water. Rising sea levels also increase saltwater intrusion affecting the proportion of brackish to fresh water forest.

In 2004, the tsunami effects in Bangladesh were severe; however those of the July and September monsoon floods and cyclone 'Sidr' in November 2007 were catastrophic. The

strongest effects were felt between the Passure and Baleswar rivers in the East Sanctuary. Cyclonic winds reached 220 kph with a 6.5 m storm surge which took over 5,000 lives, destroyed some one million homes, livestock, rice fields, forests and the fishing industry (FDB, 2008). Such storms strongly highlight the protective function of the coastal forest but also the vulnerability of the Sunderbans to the effects of climate change. The cyclone 'Aila' which hit Bangladesh on 25th May, 2009, caused serious damage as a tidal surge broke through poorly maintained coastal embankments; it affected around three million people, and is still having a devastating effect, with many people still without fresh drinking water, shelter, or a means to make a living (Jahan, 2012).

The soil is silty clay loam and the subsoil consists of substitute layers of clay and sand which are at greater depths compacted with sandstone. The surface soil of the forest area consists of close tenacious clay except near the sea, sandy patches are very infrequent. In the east wildlife sanctuaries there is no fresh supply of silt each year, even the surface soil has settled down to a hard mass, and the ground is unfavourable for tree growth (FDB, 1998).

4.4.2 Biological context

The Sunderbans Reserve Forest (SRF) constitutes 52% of the forest estate of the country and contributes about 41% of the total forest revenue (FDB, 1998). Apart from providing timber and firewood resources, it is also a source of food, fish, medicinal plants, crustaceans, palm leaves, honey, wax and shells. There is an increasing demand for recreation and tourism (FDB, 1998). The SRF serves as a coastal defense from cyclones and tidal surges and borders cultivated lands traversed by tidal rivers, canals and streams. It represents the major single carbon asset for the GoB to offer in carbon markets. A range of non-timber forest products such as golpata, cane, and grass are removed from the SRF. The 12,000 km of river in the SRF generate a huge amount of fish, shrimp, and crabs. Additionally, the Bay of Bengal is home to an important sea fishing industry whose store originates in the Sunderbans (FDB, 2010).

The ecological significance of the SRF is linked with its biodiversity and ecosystem services. The SRF is home to 425 species of wildlife, including 300 species of birds and 42 species of mammals (FDB, 2010). The Sunderbans gives direct economic benefit to the region, and the tiger (*Panthera tigris*) is deeply embedded in the Bangladesh culture (Rahman 2000; Miah *et al.*, 2003; Barlow, 2009). Most importantly, the Sunderbans provides essential ecological services such as (1) sediment trapping and land formation, (2) protection of human lives and habitation from cyclones, (3) acting as a breeding area for fish and other aquatic species (4) oxygen

production, (5) waste recycling, (6) food supply, and (7) carbon cycling (Iftekhar and Islam 2004b; Biswas *et al.*, 2008; Barlow, 2009; FDB, 2010). These functions are increasingly at high risk due to climate change and sea level rise. The environmental significance of the SRF has been documented and its conservation and management is an obligation under a number of international treaties and conventions to which Bangladesh is a signatory such as the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on the Conservation of Migratory Species of Wild Animals (CMS, or the Bonn Convention), and the Ramsar Convention on Wetlands. Both ecologically and economically the Sundarbans ecosystem is extremely important as a breeding area for key fisheries including those of the Bay of Bengal. In recent years, concerns have been voiced by fishermen over the declining stocks and productivity of fisheries and there are signs of extensive illicit gathering of crustacean larvae (FDB, 2010). While there is insufficient monitoring of fish stocks, fishermen are spending more time and effort to capture fewer, smaller, fish. The resources as well as increasing numbers of resource users are a condition that must be solved (FDB, 2010). The different levels of salinity in the Sunderbans biogeographic zone have caused considerable differences in plant growth and development and affect in plant dominance (FDB, 1998). Two main land cover types reflecting this are fresh water forest, and brackish water forest (FDB, 1998).

Taking a biogeographic zoning approach, five types of habitat can be identified in the three Sanctuaries, i.e. shore, low mangrove forest, high mangrove forest, open land/grassland, and estuarine-riverine (FDB, 1998, 2010). The low mangrove habitat type is a flooded or tidal area generally characterized by low vegetation composed of small trees and shrubs. This habitat harbours important amphibians, reptiles, birds and mammals, e.g. the royal Bengal tiger (*Panthera tigris*), spotted deer (*Axis axis*), wild boar (*Sus scrofa*), rhesus monkey (*Macaca mulatta*), otter (*Enhydra lutris*), and jackal (*Canis aureus*) (FDB, 1998).

The high mangrove forest habitat type is generally characterized by tall vegetation consisting of medium to large trees including Sundri (*Heritiera fomes*), Gewa (*Excoecaria agallocha*), Passur (*Xylocarpus mekongensis*), Keora (*Sonneratia apetala*), and Baen (*Avicennia officinalis*). This habitat harbours important amphibians, reptiles, birds, arboreal and terrestrial mammals. It is found mostly in the East Sanctuary and some in the South Sanctuary (FDB, 1998). The grassland/openland habitat type includes land that is regularly flooded, characterized by grassland consisting mainly of sungrass (*Imperata spp.*) with some *Imperata cylindrica*. Most is found in the East Sanctuary with some in the South and West Sanctuaries (FDB, 1998). The

estuarine-riverine habitat type is found at the mouths of rivers and on muddy riverbanks which are normally flooded during high tide. This is the main habitat of the estuarine crocodiles (*Crocodylus porosus*) which abound in the Sanctuaries (FDB, 1998). This habitat type is found in all the Sanctuaries.

In Sunderbans the trees are characterized by 22 families representing 30 genera. The most important tree species are Sundri (*Heritiera fomes*), Gewa (*Excoecaria agallocha*), Passur (*Xylocarpus mekongensis*), Keora (*Sonneratia apetala*), Baen (*Avicennia officinalis*), Kankra, (*Bruguiera gymnorrhiza*), Dhundal (*Xylocarpus granatum*), Golpatta (*Nypa frutican*), Goran (*Ceriops decandra*), Hantal (*Phoenix paludosa*), Shingra (*Cynometra ramiflora*), Khalsi (*Aegiceras corniculatum*), Bholā (*Hibiscus tiliaceus*), Hargoza (*Acanthus ilicifolius*), Nuniagach (*Aegialitis rotundifolia*) and Ananta kata (*Dalbergia spinosa*) (Iftexhar and Islam, 2004). The total growing stock of Sundri (*Heritiera fomes*) is around 10.6 million m³ from 1983-1996 (Canonizado and Hossain, 1998). *Heritiera fomes* is the most significant species of the Sunderbans, although the domination of this forest type is declining as it is affected by 'top-dying disease'. This was, in the early 1990s, affecting about 20.18 million *Heritiera* trees over 198.5 km² (Rahman, 1995). Four hundred and fifty three animal species are officially listed as residents in the Sunderbans (Iftexhar and Islam, 2004). Additional sources report over 120 species of fish, 290 species of birds, 42 species of mammals, 35 reptiles and 8 amphibian species for the Sunderbans, representing 36-37% of the birds, 28-30% of the reptiles, and 33-34% of the mammals of the country (Iftexhar and Islam, 2004). The Sunderbans is the largest residual habitat of the famous Bengal Tiger (*Panthera tigris*), and is well known as a tiger conservation site (Iftexhar and Islam, 2004). The forest also provides habitats to the Otter (*Enhydra lutris*), Squirrels (*Callosciurus pygerythus*), the Rhesus Macaque (*Macaca mulatta*), Spotted Deer (*Axis axis*), Barking Deer (*Muntiacus muntjak*), and Wild Boar (*Sus scrofa*). In the rivers and sea, there are a number of Dolphin species (Iftexhar and Islam, 2004). Tigers have been the focus of an ecosystem-level plan, which has not been implemented (Seidensticker and Hai, 1983). They were a key species targeted for protection under the Sunderbans Biodiversity Conservation Project (an Asian Development Bank initiative), although this failed to make any long-term impact (Barlow, 2009). Currently there are a number of national NGOs working in the village areas bordering the Sunderbans, and research and conservation activities being carried out by the Forest Department in partnership with organizations including the University of Minnesota, the Zoological Society of London, and the Wildlife Trust of Bangladesh.

4.4.3 Socio-economic context

The Sunderbans East Wildlife Sanctuary consists of 46 villages comprising about 25,990 households and a population of about 142,835 (FDB, 2009) (Figure 4.9). The Sunderbans Reserve Forest provides a buffer for the lives, livelihoods and assets of the 3.5 million people who live in its immediate vicinity and who are directly involved in collecting forest products. Several million people benefit from these activities (Tamang, 1993; Islam and Wahab, 2005; Kabir and Hussain, 2008).

The social infrastructure is poorly developed. The villages lack basic facilities such as clean drinking water, telecommunication, electricity and inadequate education facilities. Fuelwood is the main domestic energy source. In terms of education and health care, the case study villages have primary schools and a pharmacy with basic drugs. Micro-credit is available from different NGOs, the major credit providing NGOs are BRAC, ASA, Grameen Bank, World Vision, Caritas, and Pradipon.

For centuries, local people have entered the Sunderbans to collect a wide range of forest produce, and extraction of resources is fundamental to the current economic well-being of local communities (Blair, 1990; Tamang, 1993; Rahman, 2000; Miah *et al.*, 2003; Islam and Wahab, 2005; Barlow *et al.*, 2009). More than half a million people live on the collection of fuelwood and NTFPs, fishing is a mainstay and there are large business interests that deal in fish, crab, shrimp, and prawns (Seidensticker and Hai, 1983; Chakrabarti, 1987b; Siddiqi, 1995; Islam and Haque, 2004; FDB, 2010). Fishing is generally carried out using small (1-4 man) craft within the forest or larger vessels along the coast. Shrimp fry collection is a huge export driven industry that dominates the economy in many border villages (Islam and Haque, 2004). The giant tiger shrimp (*Penaeus monodon*) has particular value; the larvae is collected by local people using fine mesh nylon nets (Sarkar and Bhattacharya, 2003; Islam and Haque, 2004). The landscape provides varied sources of livelihood, which are not commonly available in other parts of Bangladesh such as honey and golpata (*Nypa fruticans*) collection; agriculture is still the main support of the economy in this area. The honey collection season starts on April 1st every year, when 8-9 man teams set off in hand-paddled boats to search for bee hives. The honey is economically important for local communities, particularly in the west, where most of the collection takes place (Chakrabarti, 1987a). In some areas, people also enter the forest for firewood, timber, grazing livestock, and poaching of animals (JJS, 2003). The forest users, including Forest Department staff, face dangers from tigers, crocodiles, local pirates called 'dacoits', and cyclones (Curtis, 1933; Hendrichs, 1975; JJS, 2003).

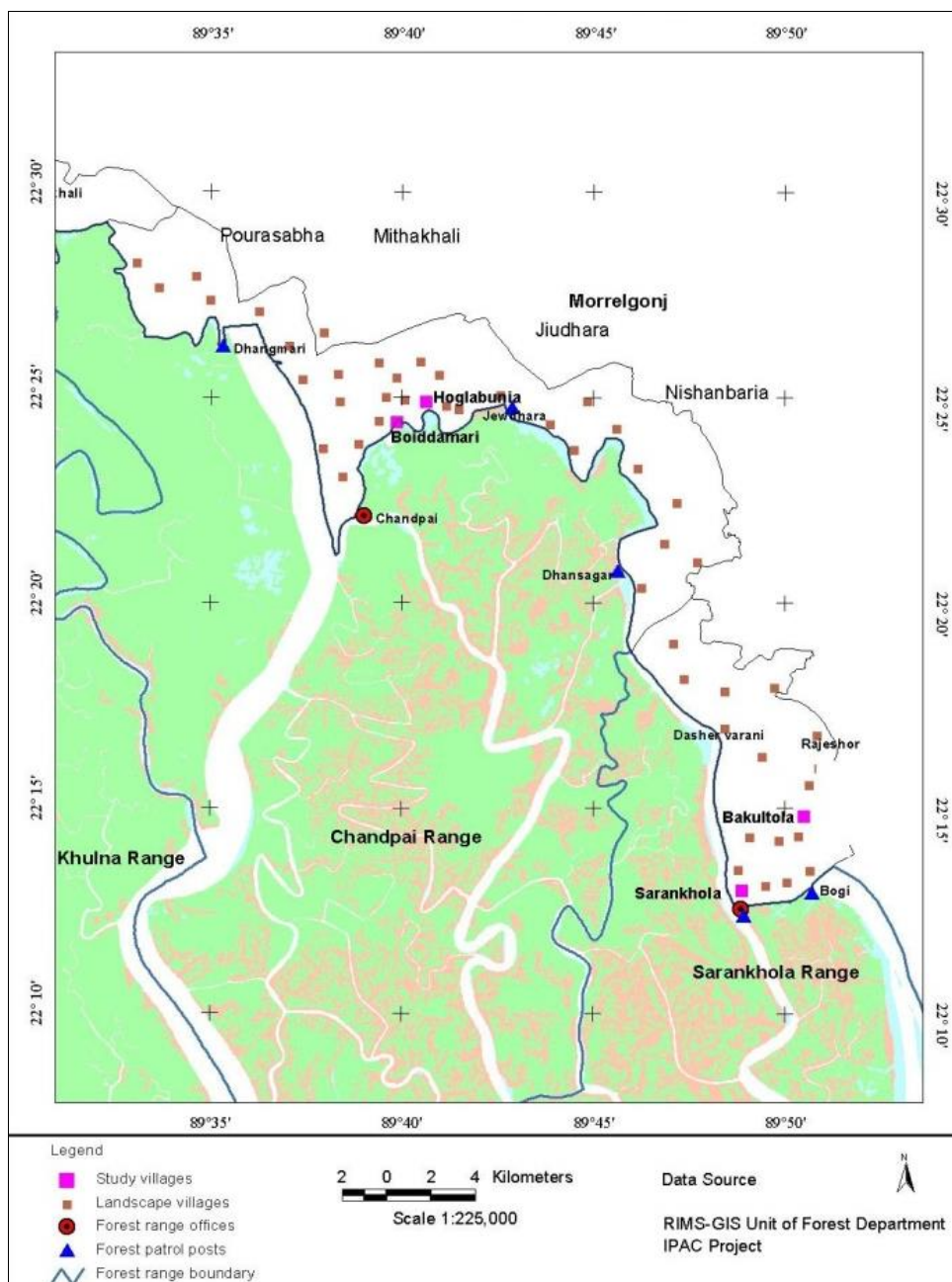


Figure 4.9 Case study villages in the Sunderbans East Wildlife Sanctuary.

Local community culture has been shaped by Islam, Hinduism, and local beliefs about the relationship of communities and the forest. People still use a variety of religious and other spiritual approaches to increase their safety in the jungle (Eaton, 1990; Jalais 2008, Barlow, 2009). Prior to entering the forest, blessings are requested from local spiritual/religious leaders and offerings are made to forest deities such as Banbibibi, Dakshin Rai, and Badi Ghazi Khan (Eaton, 1990). Local shaman called ‘gunin’, as well as other local spiritual leaders, supply blessed pieces of red cloth and other charms to keep villagers safe during their trip to the forest.

Gunins accompany some user groups, particularly honey collectors, for the duration of their trip (Barlow *et al.*, 2009).

A summary of the key characteristics of all three study areas is presented as a table in Appendix 11. The profiles presented in this chapter provide the backdrop against which the research results can be interpreted. The results are presented in Chapters 5 and 6, starting with a discussion of the scoping phase of the research in Chapter 5.

CHAPTER 5: RESULTS AND DISCUSSION FOR THE FIRST PHASE OF FIELD WORK

In this chapter the findings and discussion for each of the case study areas are described in turn. These are derived from a combination of personal observations and interviews conducted while on the scoping visit, together with secondary information collected from a range of documentary and archival sources. The themes developed during the analysis provide the basis for subsequent discussion.

5.1 Lawachara National Park

Two Forest Department staff members, three local residents, and two NGO staff members were interviewed. The coding of Forest Department staff members, local residents, and NGO staff is presented below (Table 5.1).

Table 5.1 Coding of interviewed people.

Position	Coding
The senior Forest Department officer (male)	L1
The Forest Department officer (male)	L2
A Local person (female)	L3
A Local person (female)	L4
A Local person (male)	L5
A NGO staff member (male)	L6
A NGO staff member (male)	L7

5.1.1 Conservation conflicts in the National Park

The key conservation conflicts identified by interviewees (L1, L2, L6, and L7) are poaching, illegal timber felling, betel leaf cultivation, grazing, and fuel wood collection by local people. Betel leaf cultivation is the main source of income for the Khasia community who live inside the park (FDB, 2006). The Forest Department staff member (L1) stated: *“Fuelwood collection and betel leaf cultivation are threats to the forest”*. The IPAC staff member (L6) responded by saying: *“Illicit tree felling is the main threat, and is the result of the dependency of local people,*

who are experiencing poverty, on forest resources. Political pressure is also a threat to the forest”.

5.1.1.1 Timber extraction

This is considered to be the major cause of the destruction of the forest. According to the Forest Department (2009) many people from surrounding villages are directly involved in illegal extraction of timber from the forest. The villages most involved in timber extraction are Baghmara and Baligaon, which are the closest to the National Park (FDB, 2009). The timber fellers are mainly poor men who carry out this activity to support their livelihoods. They mostly cut down medium size trees such as Teak, Chapalish and Garjan at night and during the rainy season when access to the forest is difficult and forest patrols are limited (FDB, 2009).

5.1.1.2 Fuelwood collection

This is a major and visible action in the Lawachara National Park. It is a year round activity, although it mostly occurs during the dry months, by villagers from both inside and adjacent to the National Park. The Forest Department reported (2009) that about 80% of the villagers depend on the forest for their household fuelwood requirements, with about 10% entirely dependent on this for their livelihood. The fuelwood collectors are mainly women and children, but sometimes include jobless adult men (FDB, 2009). According to local people, an average of 200-250 people collect fuelwood daily, although the number may sometimes exceed 500 (FDB, 2009).

5.1.1.3 Betel leaf cultivation

This is a traditional activity of the ‘Khasia’ tribe who live inside the park boundaries, it has become a part of the economic, social and cultural life of all households; they grow Betel vines on the indigenous trees of the forest. The cultivation practice includes the lopping of the branches each year and weeding the area. Betel farming covers a huge area, over more than hundred hectares and thus has a huge impact on the forest. On the other hand, cultivation of betel leaf is the major source of income for the forest villagers, who are very poor and have limited alternative income opportunities (FDB, 2009).

5.1.2 The effectiveness of the co-management approach

Almost all respondents (L1, L2, L3, L4, L6, and L7) stated that the co-management committee is active in the park, with IPAC arranging monthly meetings where the elected representatives of the community and stakeholders can actively be involved in decision making processes. The

Forest Department staff member stated: *“The co-management council consists of 55 members from different sectors, and there is also a co-management committee (CMC) which consists of 18-20 members. Each month a meeting is held to discuss previous actions and future programmes. Initially the whole of the entry fee was collected by the Government as revenue. Now this is divided into two halves, so that 50% is given to the CMC for the development of tourist facilities and local activities”* (L1). The park staff members are positive about the activity of the co-management committee. However, a local resident (L3) provided a contrasting view: *“We only attend the monthly meeting to share our problems, although these are not solved by the committee”*. In Lawachara National Park both male and female community patrolling groups and forest user groups have been set up (FDB, 2006). The involvement of women in the co-management committee is negligible, although the role of women is significant for enhancing livelihood conditions (FDB, 2006). The findings of this research indicated that in all the case study areas the level of education attainment and monthly income of females is lower than that of males where males tend to be more educated and earn more money than females; most of the women are busy with their domestic chores and child raising activities; these could be the barriers for women to effectively participate in natural resource management, as already mentioned in the literature review (see section 2.5.4.1).

5.1.3 Relationship between the Forest Department staff members and the local communities

The Forest Department staff and the local people (L1, L2, L3, L4, and L5) stated that the relationship between the Forest Department staff members and the local people is friendly. Examples of the views expressed included those of the Forest Department staff member (L2) who stated: *“The relationship between the forest department staff and local people is good”*. The local people also mentioned that the relationship has improved. A local inhabitant (L3) illustrated this view in the following way: *“We are happy to live inside the park. The forestry department staff are good to us and we do not feel that we are underprivileged. We have medical facilities; there are no constraints to maintaining our religious beliefs and cultural values inside the park”*. Another local inhabitant (L4) confirmed the positive attitude of residents in the following way: *“We cultivate different types of fruits inside the park, such as jambura, bohera, horitoki (local names) and banana. We are also engaged in betel leaf cultivation. My husband owns a tourist shop which was supported by the Co-management committee, in the park and both my son and daughter are ecoguides who were trained by the Nishorgo project. We are happy to live here”*.

5.1.4 Tourism potential

The Forest Department staff member (L1) stated that the park has tourism potential. Some tourism facilities were observed such as provision of eco-guides, and 30 minute, 1 hour, 3 hour, and 4 hour foot trails. There is one guest-house, one student dormitory, and an information centre, but this is merely a building with no facilities (Plate 5.1). However, it is potentially important as a resource for increasing public awareness about biodiversity and protected areas. The ticket counter was observed, but it is currently an unused building (Plate 5.1). A tourist shop was observed (Plate 5.1) but it sells only food; this could help local people by becoming an outlet for the sale of their hand made products.



Interpretation centre

Ticket counter

Tourist shop

Plate 5.1 Tourist facilities in the Lawachara National Park.

Lawachara National Park is already familiar to tourists in Bangladesh. The nearby town of Sreemongal offers good quality lodging facilities and it was observed that a five star hotel is under construction. The senior forest department staff member (L1) articulated a view, also held by other respondents, that unplanned tourism causes an enormous threat to the park. Analysis of the carrying capacity of the park could contribute to minimizing that problem. The involvement of the private sector is crucial in every phase of the development of ecotourism, but to date participation of the local and Bengali communities is insignificant. Research has shown this could improve livelihoods and could also benefit biodiversity conservation by taking pressure off forest resources (Ahsan, 2007). The Forest Department could take some initiatives to increase the tourist facilities, such as to develop the display center, introduce bill-boards, direction signs for trails, and better trained guides to promote the National Park (FDB, 2006).

5.1.5 Implementation of alternative income generation activities

The Forest Department and the NGO staff members (L1, L2, L6, and L7) all raised the issue of alternative income generation training for local communities. For example, the NGO staff

member (L6) stated that: *“The village women in Satchari and Lawachara National Parks are skilled in weaving attractive and colorful cloth. IPAC is working with Aarong, a fair trade organization dedicated to disadvantaged artisans, particularly underprivileged rural women, by promoting craft skills”*. The Forest Department staff member (L2) indicated: *“The Forest Department provides training to encourage alternative income generation including mushroom cultivation, apiculture, poultry, fishery, tree nursery, weaving, basket making, handicraft making, jam, jelly and juice preparation, and growing lemons, medicinal plants and different types of vegetables”*. The local people responded that previously they had cultivated different types of fruits inside the park, such as jambura, bohera, horitoki and banana and are also engaged in betel leaf cultivation (L4).

5.2 Teknaf Wildlife Sanctuary

Two Forest Department officers, one local person, and two NGO staff were interviewed. The coding is presented below (Table 5.3).

Table 5.2 Coding of interviewed people.

Position	Coding
The senior Forest Department officer (male)	T1
The Forest Department officer (male)	T2
A Local person (male)	T3
A NGO staff member (male)	T4
A NGO staff member (male)	T5

5.2.1 Conservation conflicts in the Wildlife Sanctuary

During the field visit all respondents (T1, T2, T3, T4, and T5) reported that currently Rohingya refugees are the main threat to the forest. One of the NGO staff (T4) summed this up when he stated that: *“Currently Rohingya refugees are the main threat to the forest; there are not enough forest staff to protect the forest from rohingya pressure”*. Another NGO staff member (T5) stated: *“The Rohingya Refugees are a serious threat in Teknaf Wildlife Sanctuary, the Rohingya Refugees arrived from neighboring Myanmar during the latter part of 1991 and early part of 1992, which resulted in population increase on Teknaf, therefore the forest resources are exploited heavily”*. Other threats are also present. The Forestry Department staff member (T1) stated: *“Encroachment by agriculture and conversion of forest such as for betel leaf plantations, grazing by cattle, buffalo, goats and sheep is a threat in the Wildlife Sanctuary”*. The main

source of conflict among local people is centered on land disputes, over both legal and illegally occupied land, money lending, other financial business, and cattle grazing. Among the forest villagers, most conflict arises regarding the boundaries of encroached forestland.

5.2.1.1 Timber extraction

Another important resource that is extracted from the Wildlife Sanctuary is timber (Plate 5.2). The most important commercial timber species used to be Garjan (*Dipterocarpus sp.*), Jarul (*Lagerstroemia speciosa*), Gamar, Chapalish (*Artocarpus chaplasha*), Toon (*Toona sp.*), Koroï (*Albizia procera*), Civit, Champa, Simul, Chandul, and teak. Now harvesting of these timber species is not permitted. There are significant conflicts between the Forest Department and local people, particularly with tree fellers' from various villages. Sometimes there is aggressive face-to-face conflict during patrols. Some trees are collected as building material for houses and also for making fishing boats. A number of Rohingyas are also involved in illegal felling (FDB, 2006).



Plate 5.2 Timber and fuelwood are collected from the forest.

The NGO staff member (T4) stated that there are some armed gangs in Hnilla, Teknaf and Whykong who are involved in illegal felling of trees. In addition, it is believed that the police, BGB (Border Guard of Bangladesh) and Forest Department are involved with illegal tree felling. The local people felt that the check post has a link with the illegal tree fellers or timber traders (FDB, 2004). Timber merchants, local political and influential persons are indirectly involved in tree felling; they usually engage Rohingya and other poor villagers in tree feeling paying them on a daily basis (FDB, 2006).

5.2.1.2 Fuelwood collection

Almost all respondents (T1, T2, T4, and T5) were of the opinion that fuelwood collection is a major issue. The NGO staff member (T4) confirmed this: “*Fuelwood collection from the forest*

is common, with large numbers of women involved. This is mostly for household consumption. IPAC are trying to involve local people in developing fuelwood plantations in their yards and this is combined with the introduction of efficient stoves, which consume less wood". Most fuelwood collectors are poor and female, and some are children; they live in villages that are located inside or neighboring the sanctuary and increase their income by selling fuelwood. It is a year round activity, but most occurs during the dry season. FDB (2004) confirm that the Tongchoinga Tribe and Rohingyas are fully dependent on fuel wood selling for their livelihood.

Besides local household use, local tea stalls, restaurants and particularly local brickfields, of which there are eight, use a large amount of fuelwood. Sometimes fuelwood merchants and brickfield owners engaged day labor for collecting fuelwood, increasing pressure on the sanctuary (FDB, 2004).

5.2.2 The effectiveness of the co-management approach

The Forest department staff and other stakeholders (T1, T2, T3, T4, and T5) confirmed that the co-management council and co-management committee exist. The co-management approach builds partnerships with stakeholders and shares benefits with local communities. In the Teknaf Wildlife Sanctuary both male and female Community Patrolling Groups (CPGs) and Forest User Groups (FUGs) are recognized through the co-management committee. One of the NGO staff members (T3) stated: *"After the establishment of the community patrolling group, the illegal activities in the forest have reduced. The co-management committee now gets 50% of the park revenue from the government for community development and to enhance tourist facilities"*.

5.2.3 Relationship between the Forest Department staff members and the local communities

Almost all respondents (T1, T2, T3, and T4) reported that the relationship is better now than it was before. The Forest Department staff member (T1) stated: *"We have a friendly relationship with local people, although there are sometimes minor conflicts during patrols"*. However, over bearing behaviour of the Forest Department staff towards the local people was reported by local interviewee (T3) and some conflicts have continued since the introduction of co-management (FDB, 2009).

5.2.4 Tourism potential

There are some tourist attractions such as elephant riding, Naf river bank, sea beach, wetlands, guest houses, ethnic villages, the Kudum Cave trail which is famous for bats and Toingya Hill

which is about 400 feet above sea level. The Forest Department staff member (T1) stated: *“The Teknaf Wildlife Sanctuary has both a tourist shop and ticket counter but they are just buildings, they are not actively manned. There is also an information centre, with sign boards and an active, safe, dormitory where students stay while doing their research”* (T1) (Plate 5.3). This suggests that there is potential for more productive use of the facilities.



Plate 5.3 Tourist facilities in the Teknaf Wildlife Sanctuary.

There is, however, a problem with smugglers and bandits which causes fear amongst the tourists. For visitor attractions, care has to be taken to protect the local traditions and culture of tribal people by avoiding interfering. There are two eco-cottages, and several eco-guides to help tourists. The NGO staff member (T4) said *“IPAC have a plan to build an Eco-cottage for tourists”*. Local communities need additional technical assistance to manage the impact of tourism on their areas and, where possible, the opportunity to manage tourism by special consideration from the Forest Department.

5.2.5 Implementation of alternative income generation activities

The Forest Department and NGO staff members (T1, T2, T4, and T5) indicated that they provide some alternative income generation training to the local communities. The NGO staff member (T4) mentioned: *“IPAC provided protection, restoration and income generation training to the local people. Women are also trained as a patrol group. The success rate of the project between 2004 and 2008 was 50%. IPAC has created 5 ponds inside the reserve forest for fish farming as a further contribution to livelihoods. After the establishment of community patrolling group, the illegal activities inside the forest reduced”*. During the field visit it was reported by the Forestry Department staff (T1, T2) that they provide some alternative income generation activities such as nursery, homestead gardening, fish culture, weaving, basket making, handicraft making, lemon cultivation, poultry, cattle and goat fattening, and some horticulture. But these types of activities are not sufficient for sustainable livelihoods, and they are not able to reduce the dependence of the local communities on the forest.

5.3 Sunderbans Wildlife Sanctuary

Two Forest Department officers, three local people and two NGO staff members were interviewed. The coding of Forest Department, local people and NGO staff is presented in Table 5.5 below.

Table 5.3 Coding of interviewed people.

Position	Coding
Senior Forest Department officer (male)	S1
Forest Department officer (male)	S2
A Local person (male)	S3
A Local person (male)	S4
A Local person (male)	S5
A NGO staff member (male)	S6
A NGO staff member (male)	S7

5.3.1 Conservation conflicts in the Wildlife Sanctuary

Population pressure, poaching, increasing salinity, climate change and fishing with poisonous chemicals such as DDT are the main threats in the Sunderbans according to respondents. Five (S1, S2, S3, S6, and S7) of the seven respondents replied that fishing and poaching of wildlife are serious threats inside the forest. The Forest Department staff member (S1) stated: *“Population pressure, salinity, climate change and fishing are the main threats in the forest. Increasing the number of forest staff to patrol the river and canal could reduce the illegal gathering of forest products”*. Currently the Sunderbans is facing a new challenge from poachers who chop down the trees to sell as charcoal to brickfields. The district police and forest staff seized 20,000 kg of wood illicitly extracted from the Sunderbans, from two charcoal burning ovens at Tafalbari in the Sarankhola sub-district, about five km from the forest area (The Economic Times, 31st October, 2010). Law enforcement is not effective in the Sundarbans; poachers are very active in killing animals. Trading of hides, teeth and bones is very profitable and these are smuggled across the border because of high demand in India and Myanmar (Daily Sun, 9th March 2011). The Forest Department staff mentioned that criminals were identified in

the Sunderbans, who were involved in removing logs without permission (The Daily Star, 10th March, 2011).

5.3.1.1 Tiger-human conflict

Worldwide, the Bangladesh Sunderbans suffers the highest levels of human death by tiger attacks (Barlow *et al.*, 2009). Each year between 25 and 40 people are killed by the tigers (*Panthera tigris*) and on average 2 or 3 tigers are killed by the local people annually (FDB, 2010). The Forest Department staff does not have equipment, particularly tranquilizer darts to manage the tiger population. The Divisional Forest Officer stated that during the last 10 years, tigers killed 204 people, whereas the local people living in the neighboring areas of the Sunderbans killed a total of 16 tigers. The Forest Department staff member (S1) mentioned that occasionally the tigers come out of the forest for fear of attack by poachers, or in search of food and water. (S1) continued: *“Tigers go into the nearest village for fresh drinking water, because this is scarce inside the forest due to salinity intrusion. This is a danger to the forest”*. It was reported that intrusion of hungry tigers has increased and has led to the killing of more than 11 big cats and deaths of at least 100 men during the last five years. Currently the forest areas are affected by environmental degradation and over exploitation of forest resources, squeezing of forest areas due to expansion of human habitation in and along the edge of the forests and extensive poaching of wild animal especially the deer. Research by the Wildlife Trust of Bangladesh (WTB) found that the population of deer species has drastically reduced, resulting in the scarcity of food for tigers. The Tiger Action Plan for Bangladesh has described the main management objectives and strategic actions for the management of tigers to achieve long-term conservation of tigers in Bangladesh (FDB, 2010).

Four (S1, S2, S6, S7) of seven respondents indicated that due to insufficient staff and a lack of modern equipment it is difficult for the Forest Department to protect the forest and apprehend thieves. A Forest Department staff member (S2) mentioned: *“It is necessary to increase the number of personnel and to conduct skill development training”*.

According to a recent study by the Wildlife Trust of Bangladesh (2011) over 10,000 deer are poached and consumed per year by people living in the eight upazilas adjacent to the forest. Moreover, illegal poaching and the trade to supply the increasing demand for tiger body parts for use in traditional Asian medicines directly threaten tigers. Manpower shortages and other logistic support make it difficult for the Sunderbans Forest Division to protect the forest and their

resources. The divisional forest officer said that at present there are only 940 employees in the division despite the sanctioned posts being 1160. The implemented co-management practices through co-management councils and committees aims to reinforce protection efforts against illicit tree felling, fishing, and poaching of wildlife including tigers and deer (FDB, 2010). Local people are involved in the tiger-human conflict mitigation plan. Currently, Bangladesh is setting up a special task force comprising a 300 strong team to save the Tigers and other wild animals from the poachers in the Sunderbans. The Divisional Forest Officer (Sunderbans East Division) said that they had tried to control the tiger and deer poaching; however, they are not always successful due to shortage of staff, lack of vehicles, inadequate funding and lack of logistic support. He also mentioned that it is quite illogical to chase a gang of 40 to 50 robbers with a team of only 4 or 5 forest guards. In addition it is impossible to patrol the waterways with the existing manpower. Despite the extreme risks of forest protection, the Government does not provide a risk allowance to the Forest Department staff which reduces their motivation.

5.3.1.2 Fishing

Indiscriminate fishing, particularly with poisonous chemicals such as DDT, is another source of conflict reported by both the Forest Department staff and local people. The Forest Department staff member (S1) stated: *“Fishing is the main threat in the forest and, during fishing, the fisherman use wood sticks to mark their positions, a further threat.”* (Plate 5.4). This requires the sourcing of wood from the forest, adding to the other demands on this finite resource. The fishermen (S3, S4, and S5) said they now catch less fish than previously (Plate 5.5). One local people (S3) stated: *“My main livelihood is fishing; currently fish are decreasing. We caught more fish in the past. The people in the area are very poor and need more sources of income”*. There are signs of extensive illicit gathering of crustacean larvae, but little monitoring of fish stocks (FDB, 2010).



Plate 5.4 Fisherman uses stick.

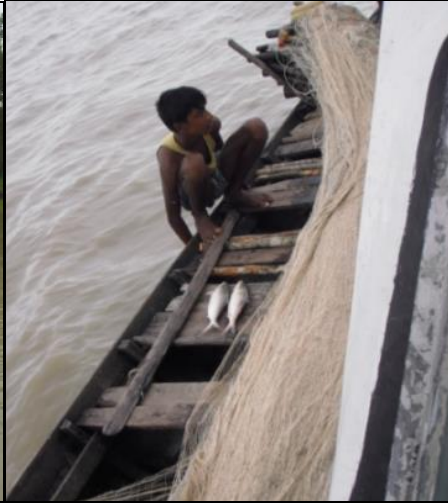


Plate 5.5 Fisherman with fewer fish.

5.3.2 The effectiveness of the co-management approach

The Sunderbans Wildlife Sanctuary has a co-management council and a co-management committee, but no specific evidence was found for the conservation of biodiversity through this approach. All seven people (S1-S7) spoken to replied that the co-management committee is active. The Forest Department staff member (S1) confirmed this: *“The co-management committee is active here and we have monthly meetings; I am one of the committee members”*. However, no clear evidence was found for a partnership with stakeholders. Local people derive some benefits through co-management by entry fee collection to the park, but there was no evidence of benefit sharing with other stakeholders. One local resident (S4) stated that: *“IPAC has arranged monthly co-management committee meetings but these do not solve our problems. They do not even provide our transport cost, so local people are unable to attend these meetings”*. The Protected Area management policy makers and stakeholders, the Ministry of Environment and Forest, Forest Department staff, researchers and NGOs are prevented from implementing co-management policies efficiently due to the lack of official appreciation of the current role of local people.

5.3.3 Relationship between the Forest Department staff members and the local communities

The Forest Department staff mentioned that currently they have a friendly relationship with local people although previously this was not so good. One of them (S2) commented: *“The relationships between the forestry department staff and the local people are better than before, now the local people are interested in participating in park management”*. Currently the Forest Department is trying to involve local people in wildlife conservation and improve their

livelihoods through the co-management approach. The local inhabitant (S4) summed up the positive attitude of local residents: *“Now we have a good relationship with the Forest Department staff”*.

5.3.4 Tourism potential

The potential of tourism was well articulated by one of the Forest Department staff members (S1) who stated: *“The tourism potential is high in the Sunderbans Wildlife Sanctuary. There are eco-guides, a watch tower, walking trail (Plate 5.6), the deer and crocodile breeding centres (Plate 5.7) although these alone are not sufficient to attract a viable industry”*. The tourism industry has a potential to provide extensive benefits to this forest (FDB, 2006). However, no systematic analysis of the impact of tourism on the ecosystem or neighboring communities is possible, nor is there any conservation research due to a lack of funding; moreover, there is no tourism plan for the reserve, a point picked up by one of the NGO staff members (S6), who stated *“In the Sunderbans a specific plan is crucial to attract more tourists while at the same time conserving the biodiversity of the forest”*. The facilities for tourists include various guest houses, established by the Forest Department, the dormitory of the Bangladesh Port Harbor Authority and the quarters of Bangladesh Naval Base, both at Hiron Point, the dormitory of the Bangladesh Port Authority and Hotel Pasur of Bangladesh Parjatan Corporation, both at Mongla (FDB, 2010). In Khulna city, there are good quality hotels where tourists can prepare for trips into the Sunderbans (FDB, 2010).

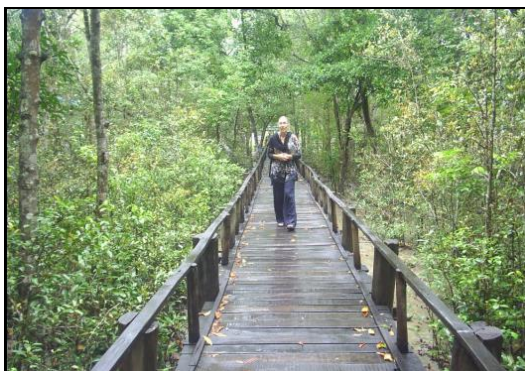


Plate 5.6 Walking trail.



Plate 5.7 Crocodile breeding centre.

5.3.5 Awareness and livelihoods programs

In the Sunderbans East Wildlife Sanctuary the alternative income generation activity (AIGA) opportunities differ from community to community. The AIGAs recognized by the FD and IPAC staff are aquaculture, poultry, cow and goat rearing, tailoring, cultivation of vegetables and

fruits, horticulture/tree nursery, and handicrafts. Community patrolling groups have been proposed on the northern and eastern side of the Sunderbans Reserve Forest by following approved joint patrolling guidelines (FDB, 2010). Sustainable use of non-timber forest products including grasses, golpata, honey, wax and fish have been proposed to allow for authorized consumption in return for contribution to protection efforts. These protection efforts could increase through communication, public awareness, and the access of stakeholders to livelihood activities in the surrounding villages (FDB, 2010). Recognition of the importance of such initiatives is illustrated by the following statement made by a member of the Forest Department (S1): *“The Government is planning to start a ‘SEALS’ project (Support Environment and Livelihood Security) for environmental as well as local community support”*. Both the two Forest Department staff members (S1 and S2) mentioned that the Government is not supportive enough of the management of the forest, suggesting there is a need for greater political will and resources from a higher level of government.

5.4 Summary for the First Phase of Fieldwork

This phase of the research identified that there are some significant issues around the relationship between forest department staff and local people and the involvement of stakeholders in co-management. It was also apparent that there were some conflicts regarding understanding of the conservation objectives and differences in the management of tourism potential. The way the strategy for co-management was addressing these issues was not clear. Detailed analysis of the interview transcripts combined with desk study and observations enabled the following list of key issues to be identified.

- The management plans have very similar aims, objectives and text for all the PAs.
- Constraints to implementing these differ depending on socio-economic context.
- There are multiple stakeholders, but these are different in each case study area
- The perceptions of local people and Forestry Authority staff regarding the purpose of the PA are different.
- Monitoring of the effectiveness of the plans did not appear to be taking place.

The findings enabled a plan for further research to be developed to investigate these aspects in more depth to understand the impact of management planning, particularly the co-management policy on local communities and to see if other issues emerged. This is the basis of the second phase of this research.

CHAPTER 6: RESULTS FOR THE SECOND PHASE OF FIELD WORK

In this chapter the findings for the Lawachara National Park, Teknaf Wildlife Sanctuary and Sunderbans Wildlife Sanctuary are presented. These are derived from a combination of in-depth interviews with key informants, focus group discussions and face to face questionnaire surveys of village residents, together with secondary information collected from a range of documentary and archival sources. In Chapter 7, a synthesis of the research findings is presented in order to compare the different study areas. Then, in Chapter 8 the findings for each study area are discussed in more detail. Chapter 6 is organised into three major parts, with each part subdivided into seven sections. Each section begins with a description of the socio-economic characteristics of the sample population (6.1.1, 6.2.1 and 6.3.1), before moving to an assessment of the degree of stakeholder participation in the management planning process (6.1.2, 6.2.2 and 6.3.2). Identification of conservation conflicts inside the National Park and Wildlife Sanctuaries are presented in sections 6.1.3, 6.2.3 and 6.3.3. A discussion of the effectiveness of co-management approach is presented in sections 6.1.4, 6.2.4 and 6.3.4. Then the impacts of management plans on the National Park and Wildlife Sanctuaries are discussed (sections 6.1.5, 6.2.5 and 6.3.5). Institutional and political issues are discussed in sections 6.1.6, 6.2.6 and 6.3.6, then tourism concerns are presented in sections 6.1.7, 6.2.7 and 6.3.7; the chapter closes with a short summary in section 6.4.

6.1 Lawachara National Park

In Lawachara National Park, the key informants for in-depth interviews were Village Headmen, Village Elders who, for the purposes of this research, are defined as older and more knowledgeable village residents rather than persons with a formal position of authority, Forest Department staff, NGO staff, a journalist, a furniture shop owner, a community patrol leader, a local Union Parishad member and three high level informants representing major NGOs, and a well known environmental researcher (D-KI-1 to D-KI-3 in Table 6.1). All of the key informants were male, which can be explained by an absence of any female higher level Forestry Department staff in the case study area and by reluctance on the part of female village elders to speak with the researcher, deferring instead to their male counterparts. The key informants are listed in Table 6.1.

Table 6.1 List of key people for in-depth interviews.

Category	Gender	ID
Co-management committee member (village elder)	M	L-KI-1
Mantri (village headman)	M	L-KI-2
Mantri (village headman) and co-management committee member	M	L-KI-3
Community patrolling leader (former)	M	L-KI-4
Village doctor (village elder)	M	L-KI-5
Divisional Forest Officer	M	L-KI-6
Beat officer	M	L-KI-7
Local Journalist	M	L- KI-8
Community patrolling group leader (former)	M	L-KI-9
Founder of wildlife rescue centre	M	L-KI-10
IPAC site facilitator	M	L-KI-11
Union Parishad member and Furniture shop owner	M	L-KI-12
CEO (IPAC)	M	D-KI-1
Researcher (IUCN)	M	D-KI-2
CEO (Arannayk Foundation)	M	D-KI-3

Five focus group discussions were conducted. Two mixed focus group (male and female) discussions, one in Lawachara punji and another one in Magurchara punji. In Dolubari village separate male and female focus group discussions were conducted; in Baghmara village one male focus group discussion was held. Details of the focus group discussions that were conducted in the case study areas are listed in Table 6.2.

Table 6.2 Summary of the focus group discussions in the case study areas.

Focus Group ID	Study village	Focus Group		
		Mixed Group	Male Group	Female Group
L-FG-1	Lawachara Punji	9 (6 M, 3F)	x	x
L-FG-2	Magurchara Punji	8 (5 M, 3F)	x	x
L-FG-3 L-FG-4	Dolubari		7	8
L-FG-5	Baghmara		9	x
Total = 5 Focus Group Discussions				

One hundred and thirty nine questionnaires were completed; the details are listed in Table 6.3. The details of implementation of the key informant interviews, focus group discussions and questionnaire survey were described in Chapter 3.

Table 6.3 Survey respondents.

Village	Total households	Questionnaires completed		
		Male	Female	Total
Lawachara Punji	26	9	5	14
Magurchara Punji	48	14	9	23
Dolubari	90	25	19	44
Baghmara	300	38	20	58
		86	53	Total= 139

6.1.1 Socio- economic characteristics of the respondent households

In Lawachara and Magurchara Punji most of the villagers are dependent on betel leaf cultivation, with contribution from other minor activities such as lemon cultivation and day labour. In Dolubari, the majority of the villagers cultivate lemons and pineapples; some families also grow ‘Jum’ (paddy), or are small businessmen, weavers, and day labourers. In Baghmara, most are farmers or engaged in business, such as running small grocery shops, rickshaw pulling, and cycle and rickshaw repairing shops. The social characteristics and livelihoods of the respondents are presented in Tables 6.4 and 6.5. The respondents represent a reasonable mix of male and female,

particularly in light of the common problem of female reluctance to take part in surveys. The respondents also represent a good spread across the age ranges, particularly for the male respondents. The education levels of the respondents varied across villages (Table 6.4), although generally male respondents tended to be more highly educated than females. There is a significant difference between education attainment of men and women (Appendix 15).

Table 6.4 Social characteristics of respondents in the case study villages.

Village	Sample size	Gender (%)		Age category (%)										Education (%)									
		M	F	18-27		28-37		38-47		48-57		>57		Illit		PS		SSC		HSC		Gr	
				M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Lawachara Punji	14	64	36	14	14	36	7	0	7	7	7	7	0	12	14	27	15	25	0	0	7	0	0
Magurchara punji	23	61	39	13	0	17	17	13	17	9	4	9	0	11	13	28	17	14	9	8	0	0	0
Dolubari	44	57	43	2	2	7	9	18	18	25	11	5	2	13	10	28	20	14	11	0	2	2	0
Baghmara	58	66	34	5	0	10	2	20	20	16	12	14	0	12	15	20	15	20	2	9	2	5	0

M= Male, F= Female, Illit= Illiterate, PS= Primary school, SSC=Secondary school certificate, HSC=Higher secondary certificate, Gr=Graduate

Table 6.5 Livelihoods of the respondents in the case study villages.

Economic activity (%)	Lawachara Punji (N=14)		Magurchara punji (N=23)		Dolubari (N=44)		Baghmara (N=58)	
	M	F	M	F	M	F	M	F
Betel leaf cultivation	43	36	43	30	x	x	x	x
Fuelwood collection	14	14	13	17	18	21	19	22
Agriculture	x	x	x	x	32	16	29	14
Business	7	0	4	0	12	4	14	3
Service	7	0	4	0	5	2	12	2
Day labor	0	7	4	4	5	3	8	4
Other	7	7	13	4	17	5	10	4

Note: in some cases, there are multiple responses by the same respondent.

The respondents' monthly income varied moderately across the villages (Figure 6.1). The Lawachara respondents tended to be somewhat less well off than those in the other villages, while there is little difference between Magurchara, Dolubari and Baghmara. Overall, when compared to the national monthly per capita income of Bangladesh which is 13,580 Taka (\$175)¹⁰ these are all poor communities. Within the communities there are also significant differences between male and female incomes, with males earning more (Appendix 16) (Figure 6.2).

¹⁰www.indexmundi.com/bangladesh

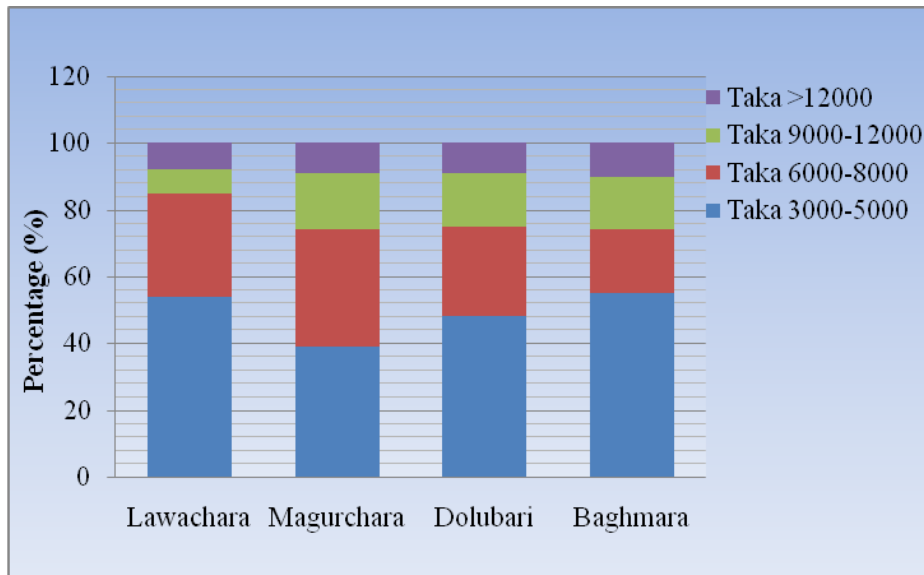


Figure 6.1 Monthly incomes of survey respondents (Bangladeshi currency 131.68 Taka=1 £).

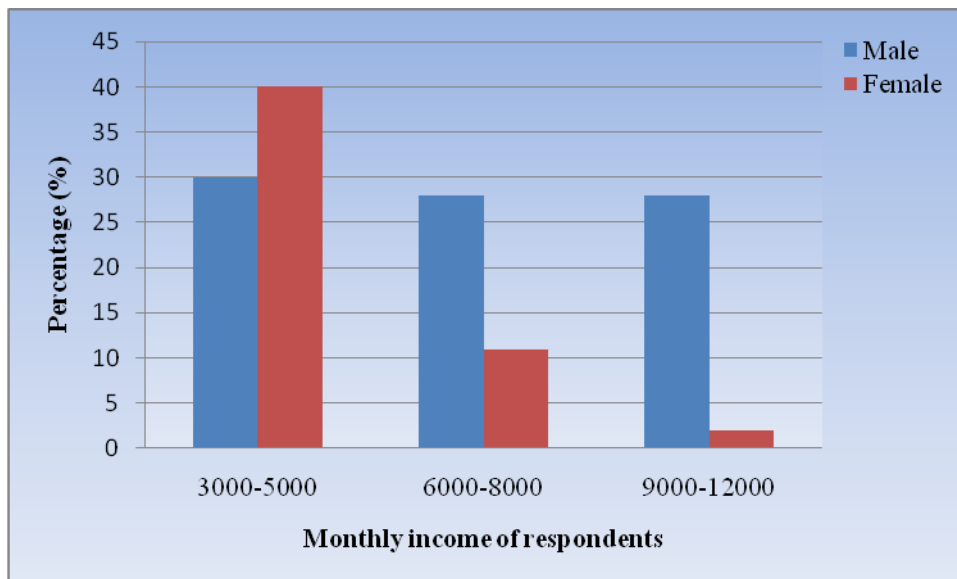


Figure 6.2 Monthly income of males and females.

6.1.2 Participation in the planning process

Participation of respondents in the management planning and attitudes towards participation in the planning process are explored through responses derived from interviews with key informants, comments drawn from the focus group discussions and the results of the questionnaire survey.

6.1.2.1 Responses from key informants

Key informants from within the Lawachara study area (excluding the high level Dhaka based informants) were asked if they were aware of the existence of a management plan for the

protected area they lived in and about their involvement in the management planning process. All were (12) aware of it but only 42% (5) had been actively involved in the management planning process.

In Lawachara punji the village headman (L-KI-3) summed up the general situation regarding awareness of the management plan when he stated:

“Yes, I know about the management plan inside the Lawachara National Park and I am also a member of the co-management committee. I was there when it was formed and I remain there as the representative of our tribes. I can see that some of their concepts and projects are good although I don’t agree with all of their policies.”

The headman was capturing a common situation in which people know of the co-management committee and may have some involvement, but do not necessarily agree with their approach or policies.

6.1.2.2 Responses by focus group members

The focus group members were asked if they were aware of the management plan and their involvement in the management planning process. In all four villages respondents were neither aware of the management plan nor involved in the planning process. However, some were aware of the co-management approach inside the park.

A male focus group member (L-FG-1) summed up how the majority of focus group members felt when stating:

“We are not aware of the management plan for the park or about its importance.”

A female focus group member (L-FG-4) added:

“We are not aware of the management plan for the park.”

These extracts are indicative of the problem within the communities that people do not have effective knowledge or active involvement in the management planning process.

6.1.2.3 Questionnaire survey of villagers

Eighty-eight percent (122) of respondents were not aware of the existence of the management plan (Figure 6.2). Among those who stated that they were aware of the existence of the management plan, none were actively involved in the management planning process. Statistically

there is a significant difference between male and female responses, with males showing more awareness than females (Appendix 17) (Figure 6.4).

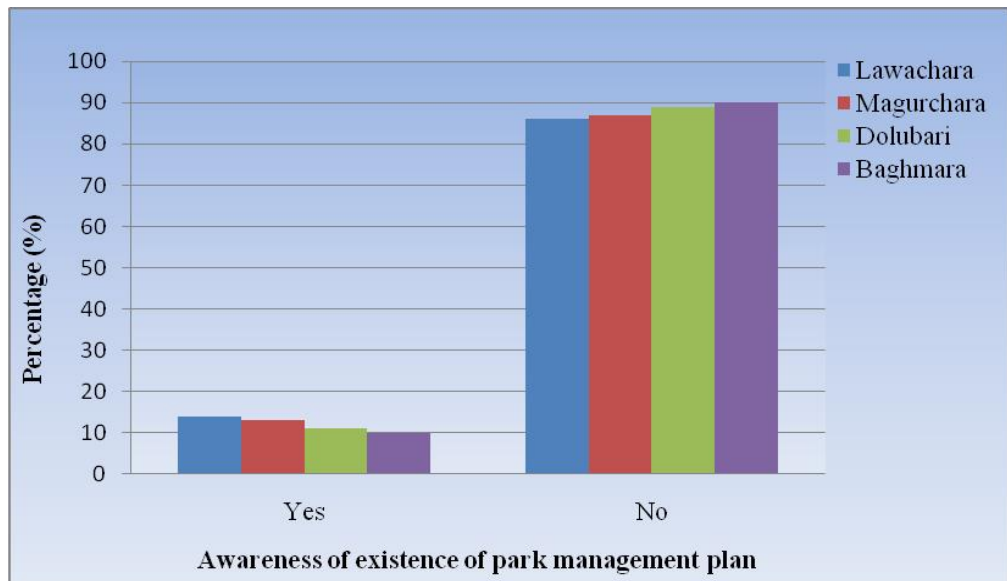


Figure 6.3 Awareness of local villagers about the park management plan.

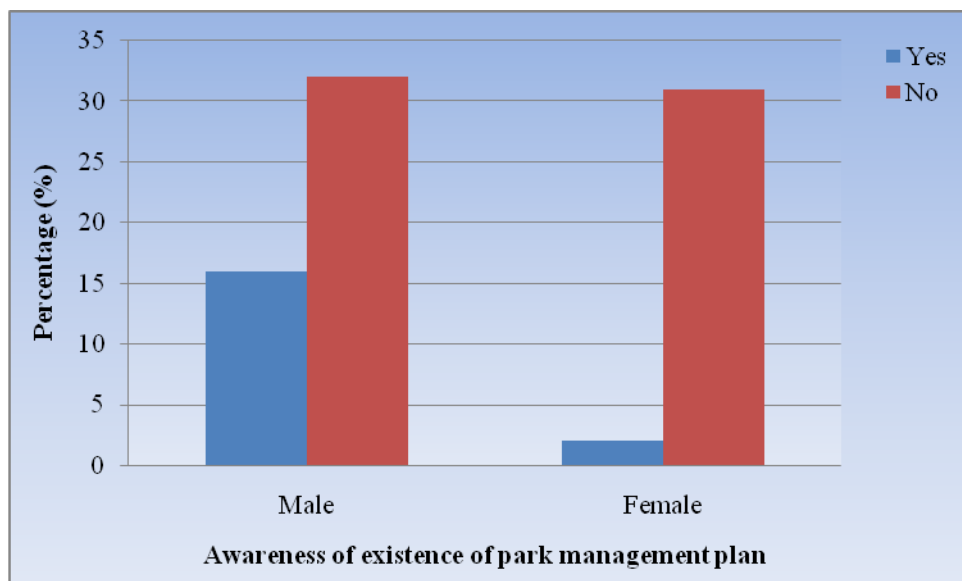


Figure 6.4 Awareness of management plan by males and females.

From the above results it is clear that local residents were not greatly involved in the management planning process. The Forest Department staff and the key decision makers had not consulted with local communities, and there was a lack of integration between local communities and forest management.

6.1.3 Conservation conflicts inside the National Park

The conservation conflicts inside the park are presented from the perspective of the interviews with the key informants, the information derived from the focus group members and the questionnaire survey results.

6.1.3.1 Interviews with key informants

Conflicts identified by the key informants included illegal timber felling, fuelwood collection, and a poor relationship between Forest Department staff and local residents; these varied across the different villages. In Lawachara and Magurchara punji illegal tree felling and fuelwood collection predominated. In Dolubari and Baghmara villages there was, in addition, a poor relationship between Forest Department staff and local residents. In Lawachara and Magurchara punji some key informants stated that the conflict between the Forest Department staff and the local people was due to the attitude of the Forest Department staff. Conflicts, particularly with those engaged in betel leaf cultivation and collection of fuelwood are illustrated by the following extracts.

The Forest Department staff member (L-KI-6) stated:

“Villagers are gradually occupying more of the forest area using the land for betel leaf cultivation and lemon gardens.” This statement represents the general view of the forestry staff.

In Magurchara punji the village headman (L-KI-3) provided a response that illustrates the situation from the perspective of local residents:

“The Forest Department looks at us as an opponent. We live here on lands that have passed to us our ancestral lineage. Over the last 80 or 90 years, the number in our families has increased although we are still trying to survive on the same area of land. For this reason, we have expanded the land we cultivate by 5 or 10 acres. I do not think this has caused any damage to the forest but; rather this management makes a positive contribution to it. [...] our small expansion is the only subject of conflict with the Forest Department. In all other ways, our relationship to the Forest Department is quite good and we always cooperate with them when they need our help.[...]The Kashia’s are Christian, although they previously believed in Naturalism and so continue to adore trees and include these in their worship. The Kashia’s worship of nature means they can never do anything to harm and, when the forest was developed under the British Empire it was the Khasia people who were employed to plant the trees. Because of this history, our people asks why the Forest Department oppose them collecting fuel wood? It is only there due to their previous commitment. [...] Our tribes have no connection to the illegal tree-fellers;

why would we fell trees when these are necessary for betel-leaf farms. We want to save trees for the sake of our own interest, for our survival and, rather than felling trees, we plant them in empty spaces.”

The above statement represents the general view of the local communities and illustrates their tradition of stewardship of the forest. In Dolubari, the village elder (L-KI-5) argued that the villagers only collect fuelwood for their own use and summed up the local view in the following way:

“We cannot survive a single day without fuel wood as the women would not be able to cook. But we never sell it in the market. Our ancestors would not teach us that. This is our forest; I personally planted many of the trees. Cutting the tree you planted yourself makes you feel bad. How can someone hijack their own plantation?”

In Baghmara, people were very angry with Forest Department and IPAC staff. A local resident (L-KI-9) illustrated this anger:

“The Forest Department has filed cases randomly to both good and bad people, so the villagers are very annoyed with them and with IPAC. No one is held accountable for this and it is resulting in the harassment of innocent people by police. The situation could become serious at any time.”

This seems to suggest that the Forest Department cannot distinguish between people who are good stewards of the forest from those who are engaged in damaging activity. The local residents appear not to appreciate that small individual increases in occupancy of the forest by many people amount to potentially significant damage. The other side of the argument is presented by an employee (L-KI-6) of the Forest Department:

“The relationship between Khasia people and the Forest Department is good. The main problem is that the Khasia are occupying and building houses on large area of land which belongs to the Forest Department. They are claiming that the land was their ancestor’s. There is a benefit as timber thieves are not able to cut down any trees in the areas they are living as they become dangerous when confronted. However, if we continue to allow them to extend their holdings to accommodate their growing families over time, the forest will cease to exist.”

The above statement suggests that the Forest Department views the local communities as ultimately destructive because of continuing occupation of forest land, construction of new houses, and expansion of betel farms and lemon gardens, while at the same time, the local communities maintain that by being present to engage in betel farming they help to save the

forest. In Baghmara village, local residents reported that the Forest Department used the police to harass local communities, and filed cases against them whether they were involved or not in illegal activities.

Forest Department employee (L-KI-7) illuminated another aspect of local relationships when stating that conflicts in the forest are due to political and local pressure:

“There is no conflict with the local people but only with the thieves. It is a matter for regret that NGOs, political leaders and others support the illegal activities. If I as a forestry official, catch thieves, and then high officials free them I cannot do anything.”

This is supported by an indicative statement from a local journalist (L-KI- 8), who stated:

“...the people from Baghmara were mostly illegal tree fellers. [...] when any tree felling happened, the Forest Department tries to find the culprit but if they cannot then they just accuse people from Baghmara who have previously been convicted (or accused) of tree felling.”

Problems associated with an unhealthy relationship between those tasked with patrolling and managing the forest and those engaged in illegal activity are illustrated by the following statement from an IUCN researcher (D-KI-4):

“The forest management of Lawachara has failed due to the involvement of local people in the community patrolling group (CPG) and co-management committee. At the beginning each patrolling group member was paid 150 taka per night; but this stopped. This was resented and as they all knew by then the location of trees that could be stolen easily this is exactly what happened [...] the thieves were the CPG members. The main reason for the destruction of the forest is responsibility; if no one is accountable then the task will never be successful. This is exactly what’s happening in Lawachara. Neither co-management committee nor Forest Department wants to take responsibility for the tree thefts although both IPAC and Forest Department claim it is the result of their work if any success in the forest; when there is any problem, then they blame each other.”

The above statements suggest that the Forest Department and co-management committee have been unable to take necessary action against the illegal tree fellers, due to local influence. On conflicts and encroachments, almost all key informants felt the management plan had failed to address the problems of illegal tree felling, fuelwood collection, the poor relationship between Forest Department staff and local residents, and political pressures. All agreed this was due to lack of adequate conservation education for local residents, failure to engage them in park

management planning, and lack of alternative livelihood facilities. The impact of political pressure and lack of co-ordination at village level was also felt to influence effective implementation of the management plan.

6.1.3.2 The views of the focus group members on conservation conflicts

The main conflicts and encroachments varied across the four villages. In Lawachara and Magurchara punji the main conflicts were illegal tree felling, betel leaf cultivation, and a requirement that local residents must guard the forest without payment, indicating difficulties in relationships with the Forest Department and police. A focus group member (L-FG-1) illustrated the problem with forest staff and local residents due to forest patrol without payment:

“A long time ago an agreement was made with the park authority that we will live in this area and cultivate our crops and in return we will guard the forest every night. Initially this was merely to help the Forest Department but this was later made mandatory. The villagers complain about night duty even in bad weather, without reward. Can a mother get asleep when her son went out for duty at night?”

Another focus group member (L-FG-1), from the same group, commented on the network of tree fellers:

“The illegal tree fellers are from outside villages mainly from Baligoan and Baghmara. It is not possible to steal trees without the consent of forest staff. However, the tree fellers have a mutual understanding with the police.”

In Magurchara punji, the main conflicts were illegal tree felling, and betel leaf cultivation. A focus group member (L-FG-2) illustrated the general situation, when he stated:

“You know the situation of our country, corruption is everywhere. The Forest Department is no different and this means there are tree thieves here. Some of the forest staff are associated with and assist the thieves; this is why the forest is vanishing very fast. In the areas we occupy and cultivate betel leaf, trees are maintained; in some other areas there are no trees at all.”

In Dolubari, the main conflicts were illegal tree felling, and fuelwood collection, a focus group member (L-FG-3) summed up the general situation, when he stated:

“In the past there were a number of big trees and hills in the forest but now there are none. The forest has nearly been destroyed. The Forest Department has filed cases against those responsible but there is no remedy as these people escape punishments due to the weakness of

law and absence of witness. If anyone is arrested for cutting two trees, then, when he returns from custody he will cut down five trees to recover the cost of the trial.”

Another in the same group (L-FG-3) stated the activities of local influential people:

“People who initiate the theft of trees are very powerful and rich but those who actually cut the trees are very poor, they do this work for a small payment. It is the initiators who are the real culprits responsible for de-forestation.”

From the above statements it is clear that Forest Department staff also involved influential local people with illegal tree felling inside the forest. Law enforcement had very little impact on the overall situation; in some cases it made conditions worse. Illegal loggers were used by influential local people to collect forest resources.

In Dolubari village a focus group member (L-FG-3) stated that tree felling was also happening due to easy transportation. He stated that currently illegal tree fellers use trucks to carry their trees, for example:

“The illegal tree fellers now come with trucks, although previously trees were carried on their shoulders. This was hard work so 5 or 6 people were needed to take out one tree. In the past 10 people took one tree now one person can take 10 trees.”

From the above statement it is clear that an easy transportation facility is also responsible for illegal logging.

A concrete roadway and railway was observed inside the park which may make it easy to carry illegally felled trees, causing damage to wildlife when they cross the road and also makes them suffer noise pollution (Plate 6.1).



Plate 6.1 Concrete roadway and railway inside the park.

In Baghmara the main conflicts were the poor relationship with the park staff and illegal tree felling. Here a focus group member (L-FG-5) stated:

“There is no point of making a fence (Forest Department), if the fence itself is harmful for the garden. The truth is that the protecting authority is doing harm to the forest. Fence is eliminating the park while the innocent people are blamed and prosecuted. We give our effort to save the forest while others enjoy the benefit. If anyone protests he faces a serious situation and may die and will definitely face legal prosecution, with cases lodged against the protester and even the children of the protester will be named in the case.”

Another from same group (L-FG-5) illustrated the reason for the poor relationship between local residents and Forest Department staff, when he stated:

“Actually the forest authority and Nishorgo staff used to safeguard the forest. Forest authority is responsible to take on legal action. Nishorgo people have never filed any case about the stealing of trees. In reality there are some unscrupulous people, backed by the forest authority, who participate in stealing trees. Forest authority files case against innocent village people this is the main reason behind the disagreement between the villagers and the Forest Department. The criminals in association with the forest authority or supported by them have filed false cases against the innocent villagers who have actually tried stop the stealing. For these reasons the villagers are united against the Forest Department and those who have destroyed the forest by stealing trees and who have now become the rich men of the locality.”

The above statements suggest that local people feel that the Forest Department is, in part, responsible for the destruction of forest. Although they are supposed to conserve the forest, some of them are involved in illegal activities inside the forest. Influential local people and political pressure are also responsible for this.

6.1.3.3 Survey responses to conservation conflicts

Table 6.6 presents the conflicts identified by the respondents in the four villages. In Lawachara and Magurchara villages, the main conflict is betel leaf cultivation. In all four villages combined, other conflict issues are – restriction on park resources (62%), illegal tree felling (28%), and poor relations between local residents and Forest staff because of perceived mistreatment of local people by the Forest Department staff (29%). There were no significant differences between male and female responses.

Table 6.6 Conflicts identified by survey respondents.

Park-people issues (%)	Lawachara punji (N=14)		Magurchara punji (N=23)		Dolubari (N=44)		Baghmara (N=58)		Overall average (%)	
	M	F	M	F	M	F	M	F	M	F
Restriction on park resources	36	28	39	26	36	23	38	22	37	25
Illegal tree felling	14	7	17	9	16	11	26	14	18	10
Poor relations between local residents and Forest Department staff	14	7	13	9	14	11	28	19	17	12
Betel leaf cultivation	43	36	48	35	0	0	0	0	20	18
Lemon / pineapple cultivation	0	0	0	0	11	9	0	0	3	2
Jhum cultivation	0	0	0	0	11	7	0	0	3	2
Other	11	8	13	5	16	4	21	6	15	6

Note: on some issues, there were multiple responses by the same respondent.

In all four villages the majority (88%) of people felt that before the management plan was implemented conflicts were moderate to low. Baghmara had the highest level of perceived conflict (18%) (Figure 6.5).

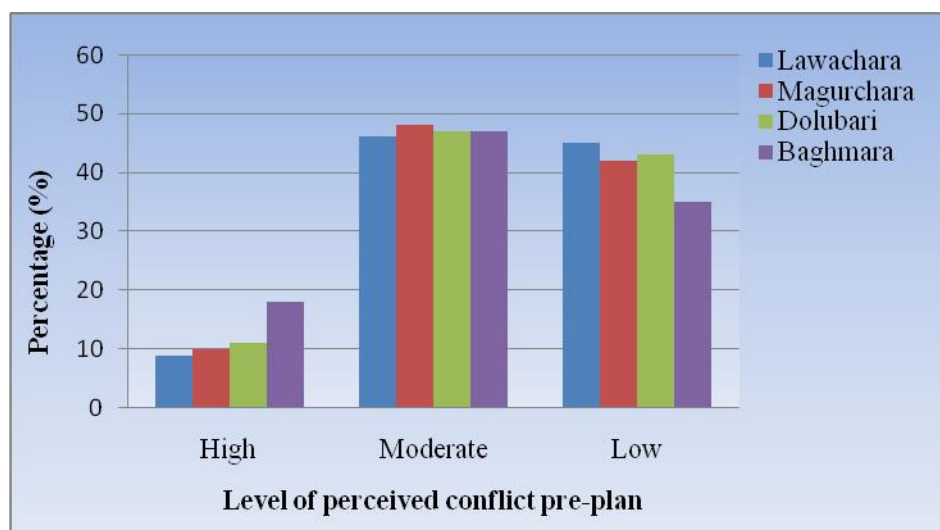


Figure 6.5 Perceived level of pre-plan conflict in case study villages.

Since the plan has been implemented the perceived level of conflict has increased in all four villages (Figure 6.6), with the greatest increase in Baghmara (53%).

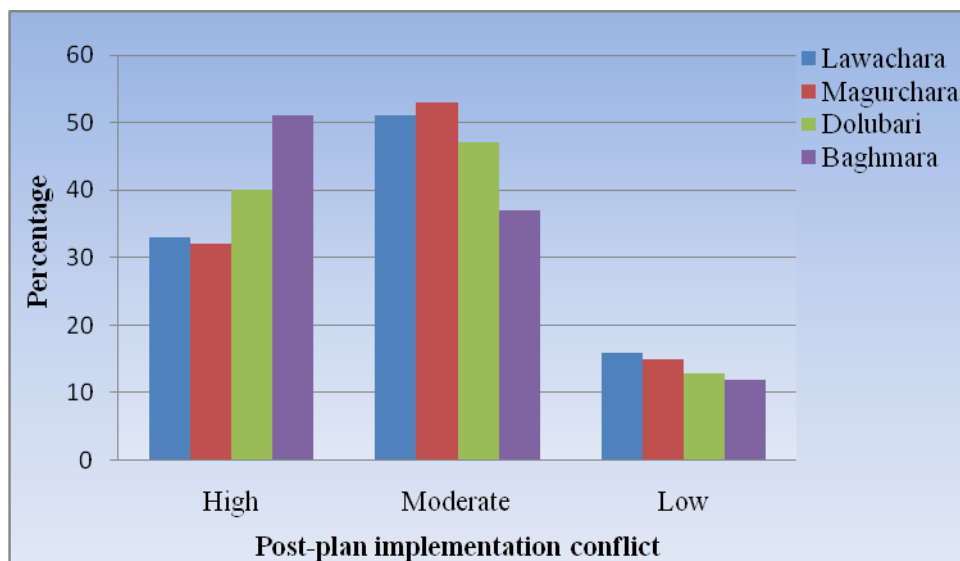


Figure 6.6 Perceived direction of change in conflict post-plan implementation.

The results suggest that the level of conflict has increased. There is little to suggest that the plan has led to any appreciable decrease in conflict. The differences in pre- and post-plan conflict reported in the questionnaire survey were statistically significant (see cross-tabulation results in Appendix 19). However, this tends to mask the fact that the Forest Department is beginning to recognize the pressures faced by the local communities and as a result relationships, while poor, are improving (see section 6.1.5.1); however, at the same time the pressures on the forest resources continue to grow due to the on-going increase in population.

The questionnaire respondents were asked to identify the types of encroachments occurring in their villages, from a list of options (agriculture, grazing, human settlement and others). Across all four villages, the cultivation of crops was the most prominent concern (Figure 6.7), although expansion of settlements was also seen as being significant, particularly in Lawachara and Magurchara punji.

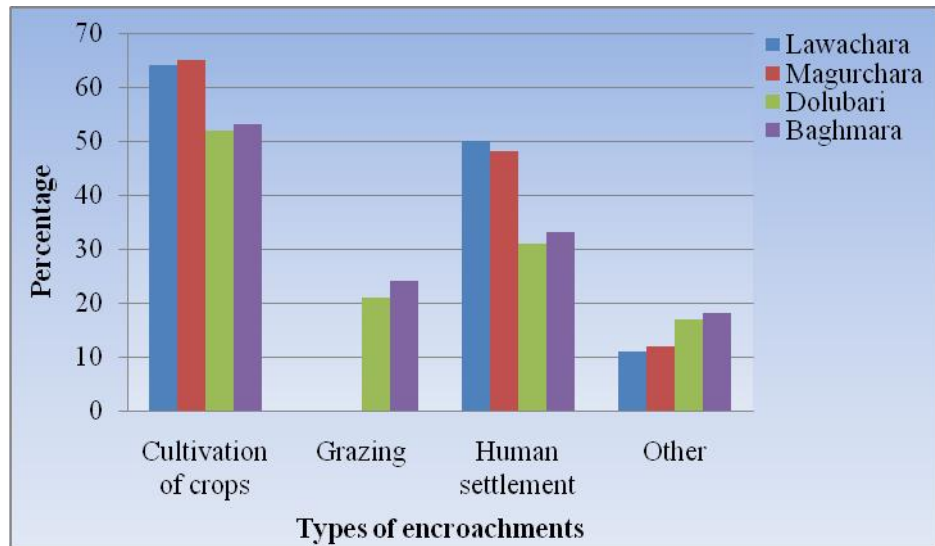


Figure 6.7 Main types of encroachment inside the park.

Across the four villages, 15% of respondents felt that before the plan was implemented encroachment was high, 53% that it was moderate and 32% low (Figure 6.8). There were no significant differences between male and female responses.

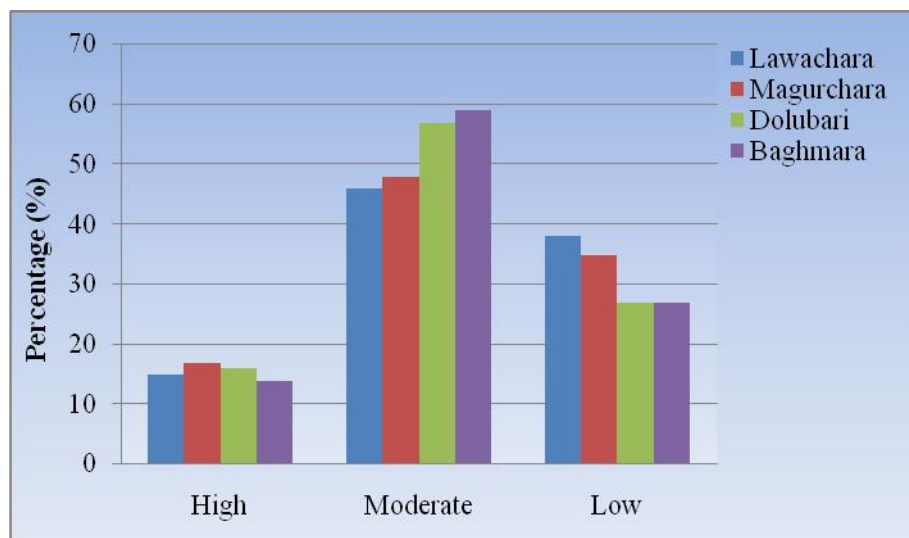


Figure 6.8 Perceived pre-plan encroachments inside the park.

When asked if encroachment been affected by the plan, 34% of respondents felt that the situation had not improved (or that encroachment had increased), while only 17% felt that it had decreased since the plan was implemented (Figure 6.9).

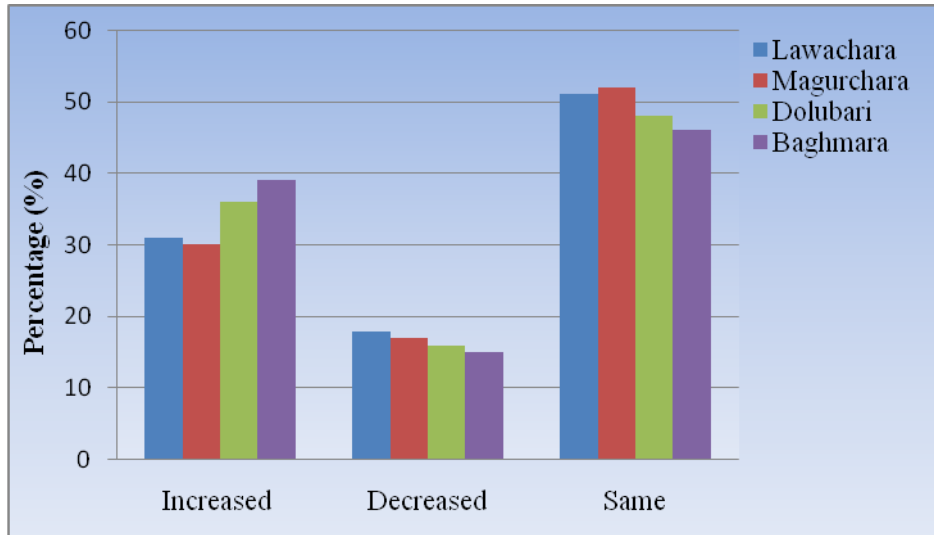


Figure 6.9 Perceived changes in encroachment inside the park post-plan implementation.

The above results suggest that encroachments were a problem before the implementation of the management plan, and remain so, casting doubts about the effectiveness of the management plan in controlling encroachment.

During field visits fuelwood collection and illegal timber felling were observed in the Lawachara National Park (Plates 6.2, 6.3 and 6.4). Saw mills and furniture shops were also observed in the vicinity of the Lawachara. Destruction of crops, encroachments into reserves for forest resources, and grazing were evident during field visits.



Plates 6.2 and 6.3 Fuelwood collection and storage for daily use in Lawachara National Park.



Plate 6.4 Encroachment inside the Park.

6.1.3.4 Suggestions for addressing conflict

The key informants suggested that conservation education programs were required to increase the awareness of local people, promote alternative economic streams to reduce dependency on forest resources, facilitate the involvement of local people and other stakeholders in decision making and developing a better relationship between local people and Forest Department staff.

The CEO of Arannayk Foundation (D-KI-6) illustrated the significance of public awareness, necessity of alternative livelihood opportunities, and utilization of modern technology thus:

“I think we need to increase the awareness of local people regarding the forest. In the past they were paid to cut trees, but in the future they will be paid to protect the forest. Some poor people collect fuel wood or cut 1-2 trees from the forest, to sell in the market, in order to survive. We are trying to provide them with a livelihood in order to prevent this. [...] if there is financial stability, then the forest will be safeguarded. So funds are allocated for them and the money is repayed as the community feels it is their own money. Thirty to forty people have formed a council to organize how this money is lent out with the poorest getting loans first. There are some conditions, for example whoever takes out 10,000 taka must plant 20 trees in their garden, at their own expense. This will reduce dependence on the forest as their fuel and food needs can be satisfied from these trees. [...] Nowadays, remote sensing is used to collect images of the forest and highlight change to the local people and to formulate future steps and plans.”

In Lawachara punji, a focus group member (L-FG-1) summed up the general situation when he stated:

“Our family is expanding, increasing expense, but our land is not expanding. Our income is not increasing so how can we survive? If we get some more land we can live on that.”

One focus group member (L-FG-3) from Dolubari added:

“Day by day we are becoming poorer. The land is divided among the new generation; the soil is losing its fertility. There are many empty spaces in the forest where there were trees in the past. These could be distributed for us to plant trees and, later, collect fire wood here we might get some money from this when the trees are bigger.”

Another focus group member in the same group (L-FG-3) stated:

“We said to the forest officers that we cannot stop collecting fuel wood as we cannot get it from anywhere.”

A focus group member from Dolubari village (L-FG-4) added:

“I need to collect occasionally from the forest as my garden does not produce enough. If the Forest Department gave us permission to collect from the forest on a controlled basis it would be better.”

In Dolubari village a focus group member (L-FG-4) provided a response that illustrates the situation from the perspective of local residents:

“At present our population is increasing day by day. We have no more lands or trees so we are in real need because of this my son may steal a tree. I may be able to control him for a few days but not for a long time, we want a partnership with the forest.”

The above statements suggest that the ongoing increase in population has a great impact on forest resources; livelihood insecurity also affects illegal logging in the forest. Rehabilitation of illegal loggers through provision of access to alternative income generating opportunities could be useful to tackle this problem.

The suggestions made by the questionnaire respondents are presented in Table 6.7. Across all four villages combined, an average of 74% of respondents focused on economic benefits as a way of reducing conflict. Overall, 41% suggested that involvement of local people in management planning is the key to reducing conflict; 33% suggested implementation of effective law enforcement; 21% suggested conservation education; 21% mentioned developing

relationships between local people and forest staff, and 25% wanted permission to collect forest resources in a controlled way. There are no significant differences between male and female responses.

Table 6.7 Questionnaire survey respondents' suggestions for reducing conflict.

Suggestions (%)	Lawachara punji (N=14)		Magurchara punji (N=23)		Dolubari (N=44)		Baghmara (N=58)		Overall average (%)	
	M	F	M	F	M	F	M	F	M	F
Economic benefit	38	33	36	34	39	38	42	37	39	36
Involve local people in management planning	22	14	26	13	29	14	30	15	27	14
Implement effective law and enforcement	19	10	21	9	25	11	26	10	23	10
Give permission to local people to collect forest resources in controlled basis	10	11	12	10	13	14	13	16	12	13
Conservation education	11	10	13	9	11	9	12	8	12	9
Develop relationship between local people and forest staff	8	6	10	7	15	10	18	11	13	9
Other	12	8	13	8	16	9	18	11	15	9

Note: on some issues, there are multiple responses by the same respondent.

6.1.4 Perceived effectiveness of the co-management approach

These are described using the material from the informant interviews, focus group discussions and the questionnaire survey from sections 6.1.4.1 to 6.1.4.3.

6.1.4.1 Responses from key informants interviews

All of the key informants were aware of the co-management approach.

Typical of the attitude displayed toward the co-management approach by those interviewed was this statement from a village elder (L-KI-1) in Lawachara punji:

“The co-management Committee is doing some work in the forest such as repairing roads and bridges, arranging trails for half hour, one hour, three hours.....and they have formed a community patrolling group to save the forest. However there has been serious damage since formation of the community patrolling group.”

Here the interviewee is indicating that they see the co-management committee as contributing to a problem that led to the forest being damaged. A village headman (L-KI-3) from Magurchara punji added to the sense that the community was not necessarily benefitting from the co-management actions of the co-management committee when he stated:

“I remain in the co-management committee representing our tribes. But I do not find it good that the tree-fellers have been made members of the community patrolling group. What an irony that those with lifelong involvement in tree-felling are in the group! I was shocked to see it was effectively permission to the tree-fellers to enter the forest.”

The village headman is demonstrating frustration that a group of people known for their damaging behaviour has been brought into the community patrolling group and, as a result, given free rein to engage in damaging tree felling.

A local journalist (L-KI-8) confirmed these views:

“The co-management committee recruits community patrolling group members who were illegal tree fellers. This gives them a chance to guard the forest without any training. So what happened? They destroy the forest as now they have official permission to enter the forest and do illegal activities.”

This suggests that an unintended consequence of the creation of the co-management committee has been to legitimize otherwise illegal tree felling which has damaged the forest. A Forest Department staff member (L-KI-6) provided a different perspective when he stated that the co-management committee formed the community patrolling group to guard the forest. It was thought that if they included all the thieves in it, tree theft would stop. Their occupation would be changed, thus also changing their thinking and mindset, which would contribute to better forest conservation. In fact, the opposite situation has developed. Some members of the community patrolling group have become very powerful, almost a form of mafia. Without informing the Forest officer, they have joined with thieves and sold trees illegally. Sometimes they blackmailed the Forest Department staff members, making them scared of those engaged in the illegal activity and so they do not dare take any steps against them.

The Forest Department staff member (L-KI-6) also mentioned that:

*“The co-management committee is not a problem. The problem is our thinking and greed.
Anyway, now the situation is under our control. Before, if we caught a tree-thief, we were put under pressure. But now there are no such pressures. Basically, the co-management committee, and the Forest Department work together to keep the situation under control.”*

It seems that the Forest Department staff face political pressure, so despite their willingness, they cannot take harsh action against the alleged people.

When he was asked how the co-management committee becomes effective, he (L-KI-6) replied:

“To make the co-management committee more powerful and effective, negotiation is needed with the IPAC workers, local people, and Forest Department staff. This would enable the co-management committee to play a more effective role.”

The CEO of IPAC (D-KI-1) illustrated the positive activities of co-management, when he stated:

“Not all the community patrolling group members are good. Some do not like to work. In many places they were dependent on the forest, felling trees, and taking fuel wood. But, by our activities, most have come to the right way, even though some are still felling trees. In social work 100% success is hard to achieve, 60% or 70% might be said to be progress. There are many complaints about the community patrolling group despite the fact that it is working. There was high occurrence of tree felling in Lawachara, but now this has reduced. I have a statistics regarding this matter. Previously 1800 trees were felled per year, now this is only 400 so it is still occurring.”

The researcher from IUCN (D-KI-4) illustrated about political and institutional pressure, when he stated:

“The co-management has committee given the ‘certification of theft’ to the local people; and tree thieves have been given the responsibility to protect the forest. I would say that if resources of the forest have increased as the result of co-management committee, then CMC is a good thing, if it has decreased, then CMC is a bad thing. Do you feel it has increased? Not at all! All these projects are part of the conspiracy to destroy our forest resources; and our ministers are directly involved in this conspiracy.”

The above statements suggest that the national political pressure and corruption is also responsible for the destruction of forest resources, it is not merely a local issue.

6.1.4.2 Responses from focus group members

The focus group members were asked about the co-management approach. Fifty eight percent (24) of them were aware of it, of those 46% (11) stated that they received some benefit from it, although it is inadequate.

A focus group member (L-FG-3) from Dolubari village summed up the general situation about the co-management, when he stated:

“The biggest achievement by the co-management committee is some roads have been constructed.”

A focus group member (L-FG-5) illustrated the formation of community patrolling group, when he stated:

“The co-management committee formed the community patrolling group among the village people. All the members of the committee are burglars. They are stealing the trees in association with the Forest Department staff. They formed the community patrolling group to save the forest, but in reality all of them are thieves.”

Another in the same group (L-FG-5) illustrated the general political situation in this area, when he stated:

“The current co-management committee president is the brother of the chief whip of the present Government. He became the president by the power of the Government not by selection by villagers, so he does not know the situation and tricky issues used by the notorious people of the village.”

The above statements suggest that the co-management committee did some work on infrastructure development, and provided some facilities to the local communities. However, there was a mistake in the formation of community patrolling group members. Therefore, the forest is damaged mostly by them. The co-management approach is not able to work effectively due to influential political pressure.

6.1.4.3 Questionnaire survey responses

Respondents were asked whether they were aware of the co-management approach. In all four villages combined, 66% (92) were aware and 34% (47) were not aware of the approach (Figure 6.10). The male and female responses are quite similar.

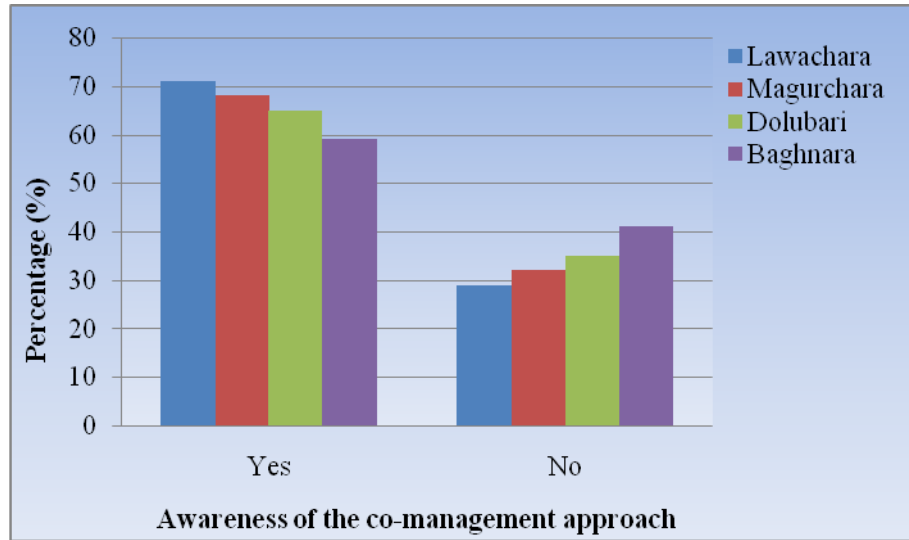


Figure 6.10 Villagers' awareness of the co-management approach in the park.

In all four villages combined, 66% (92) were aware of the co-management approach, of those 44% (40) indicated that they had benefitted from it; while 56% (52) indicated that they had not (Figure 6.11).

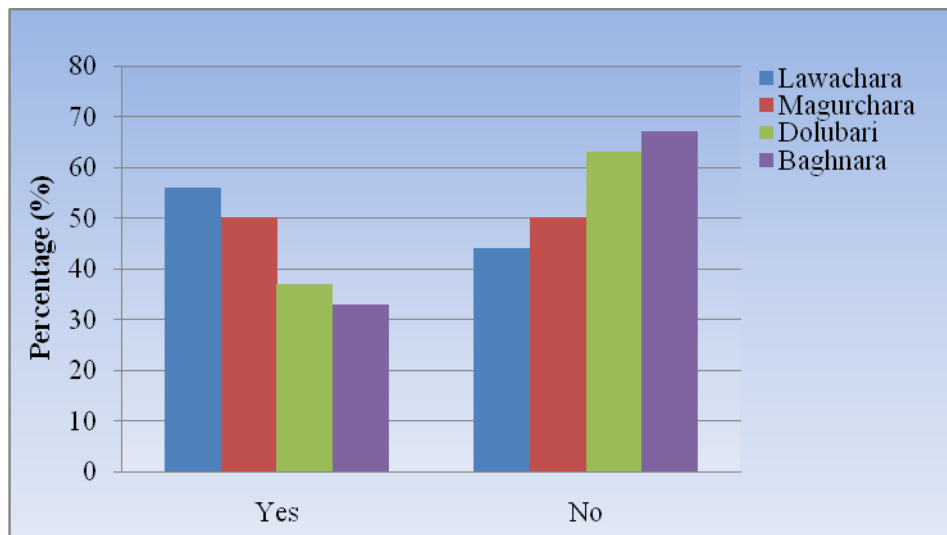


Figure 6.11 Percentage of respondents who felt benefitted as a result of the co-management approach.

Fifty six percent (52) of the local residents did not feel advantaged by the co-management approach, of those 64% (28) were disadvantaged by it (Figure 6.12). The respondents to the questionnaire survey from villages outside the park boundary felt they were disadvantaged by the plan to a greater extent than those from villages inside it (Figure 6.12).

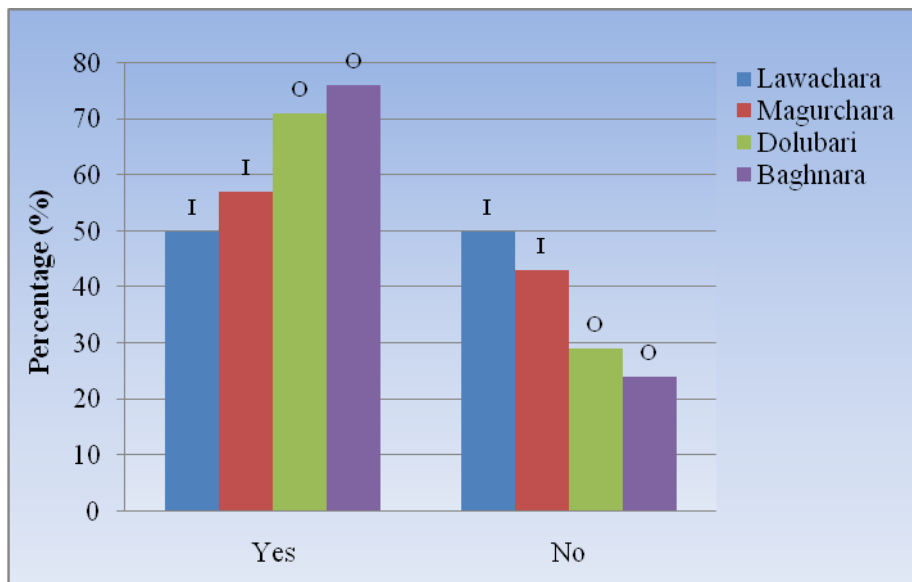


Figure 6.12 Percentage of respondents who felt disadvantaged as a result of the co-management approach. (I= village inside the park, O=village outside the park).

6.1.5 Impact of the management plan

The impacts of the management plan are discussed in sections 6.1.5.1 to 6.1.5.4 using information derived from key informants interviews, the focus group discussions and the questionnaire survey.

6.1.5.1 Relationship between the Forest Department staff members and the local communities

Diverse opinions were expressed by the key informants on this issue; those from villages inside the park stated that their relationship with the Forest Department staff members was good, however those from villages outside the park, replied the opposite.

In Lawachara punji the village elder (L-KI-1) stated that they always had a good relationship with the Forest Department staff members, even back in the Pakistan era when they used to participate in forest plantation. He also said:

“We do not have any conflict with the forest officers, but this depends on the mentality of the individual officers. Now the officers are good, they always support us and help us with difficulties we have. Before, although we did not have any clash with previous forest officers, relations were not friendly.”

In Magurchara punji the village head man (L-KI-3) illustrated the typical attitude displayed toward their relationship with the Forest Department staff:

“We expanded our lands inside the forest up to 5 or 10 acres. I do not think this expansion damaged the forest rather it has saved the place. The Forest Department staff members think that if the area under the control of villagers is expanded, that they (the Forest Department staff) will suffer because they will then not be able to benefit from illegal and corrupt tree felling. This is the only conflict with the Forest Department. In all other directions, our relations with the Forest Department are quite good. We always cooperate with them when they stand in need.”

On the other side of the argument, the Forest Department high official (L-KI-6) stated that the relationship with the ‘Khasia’ is not bad, but there is a problem with the Khasia illegally occupying a large area of land that belongs to the Forest Department.

In Dolubari, the village elder (L-KI-5) displayed anger with the Forest Department staff, when he stated:

“We are the descendants of the Tipra Maharaja and have lived here for more than 70 years but now we are a marginal community. We are surviving on the pity and mercy of others. Our wishes and views are not honored. This reserve forest is our wealth. How can we steal it? when our poor people collect fuel wood from the forest they accused us.”

In Baghmara, the key people (L-KI-9) said that the local people are angry with the Forest Department staff, because they filed cases against them. He also mentioned the Forest Department arranging harassment of innocent people by the police.

A focus group member (L-GF-3) illustrated the situation, when he stated:

“We had a good relationship with the forest officers and still have this. There are no thieves in this village and we never had thieves before. In previous days when the forest department people came to our village we used to treat them well with tea. Now they do not come to our village very often.”

The indicative statements presented above represent a complicated situation in which relationships seem to vary according to the local situation between villagers and Forest Department staff members. The most problematic relationships seem to be in Baghmara and Dolubari (both outside the park boundary), whereas in Lawachara punji and Magurchara punji (both inside the park boundary), the relationships appear to be less difficult. Possible explanations for these differences are discussed in Chapter 8.

The questionnaire survey respondents' views on the relationship between local inhabitants and Forest Department staff tend to support the above statements (Figure 6.13). The responses from Baghmara, outside the park, suggest a less positive relationship, with 76% of respondents stating that their relationship was very poor. The male and female responses are quite similar on this issue.

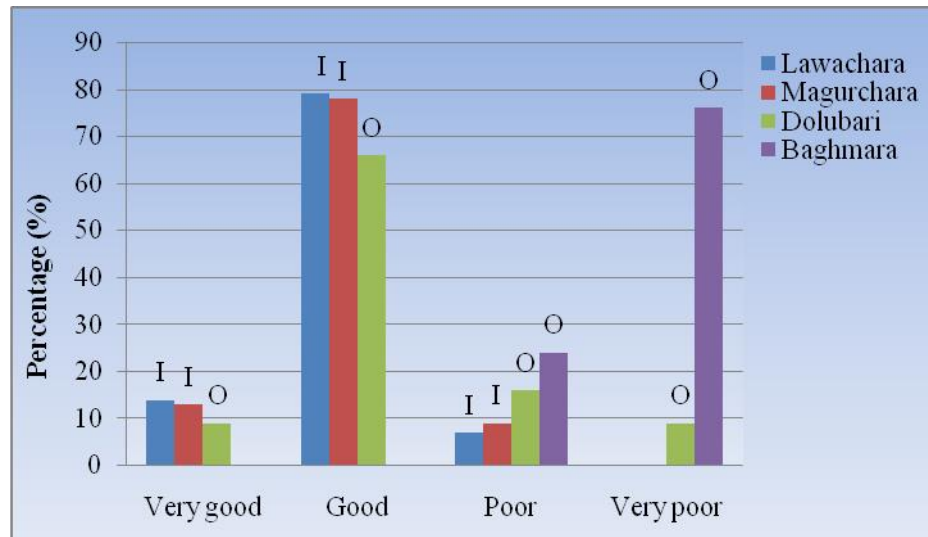


Figure 6.13 Respondents' views on the relationship between Forest Staff and local inhabitants (I= village inside the park, O= village outside the park).

From the above results it was concluded that the villagers inside the park have a good relationship with the Forest Department staff.

6.1.5.2 Conservation education

Almost all key informants said that the Forest Department does not provide a conservation education program for the local residents, although a few stated that the co-management committee provided some.

A focus group member (L-FG-3) illustrated the benefit of the co-management approach, when he stated:

“We received some training on public awareness organized by the co-management committee. At least now we know that deforestation is a threat to the environment.”

The local people were asked whether they had experienced any conservation education program provided by the Forest Department. In all villages combined, 18% (25) responded that such a programme had been provided, while 82% (114) responded that it had not (Figure 6.14).

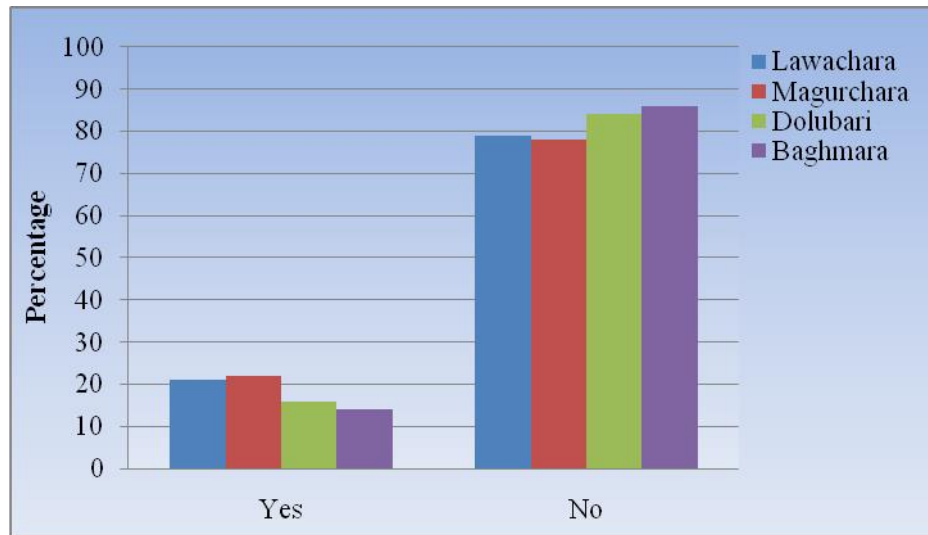


Figure 6.14 Respondents’ views on experience of conservation education programs.

The above results suggest that while there may have been some awareness raising training provided through the co-management committee as part of a conservation education programme, overall the great majority of respondents have not received conservation education training. This suggests that conservation education is likely to have had limited impact on encouraging more environmentally responsible behaviours.

6.1.5.3 Implementation of alternative income generation activities

The key informants and focus group members were asked whether the local inhabitants had received any training or other encouragement from the Forest Department to develop alternative livelihoods. Almost all the key informants said this had not happened although local inhabitants had received some financial benefit from the Arannayk Foundation.

The village elder (L-KI-1) illustrated the typical view about alternative livelihood opportunities in the following way:

“The Forest Department had not arranged any alternative livelihood training for us. Some people of our village got some money from Arannayak Foundation.”

A focus group member (L-FG-3) illustrated the necessity of alternative livelihood opportunities: *“One of our villagers went to the forest to collect fuel wood and was arrested and sent to custody. One co-management committee member lodged a counterfeit case against him. The Forest Department could introduce alternative livelihood opportunities to reduce forest dependency.”*

Another in the same group (L-FG-3) added:

“We want work; we do not like to go to the forest if we have any alternative.”

From the above extracts it is clear that livelihood insecurity driven by poverty and unemployment is the critical problem in this area, alternative livelihood opportunities could reduce the reliance of local communities on forest resources.

The respondents to the questionnaire survey were asked if they had received any alternative income support provided by the Forest Department. In all villages combined, 16% (22) responded that they had received some benefits through the co-management and Arannayk foundation, while 84% (117) responded that they had not (Figure 6.15).

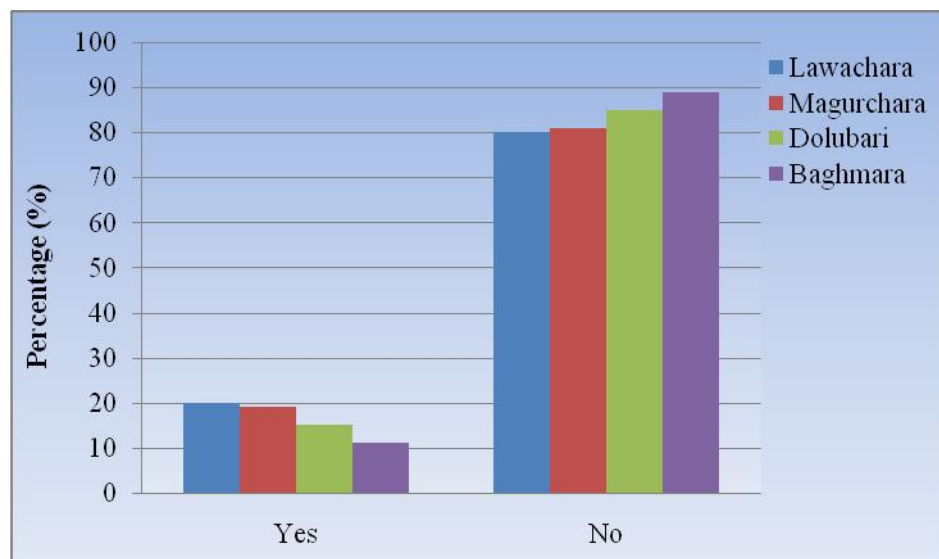


Figure 6.15 Respondents’ views on experience of alternative income generation activities.

6.1.5.4 Benefit sharing

Almost all the key informants were not aware of benefit sharing with local people. The key informant (L-KI-3) illustrated his unawareness about the benefit sharing for development of local residents:

“To my knowledge, the co-management committee gets one half of the Government revenue, and the Government gets the other half. This goes to the Government fund, but I do not know where the co-management committee’s share goes. I know that a yearly plan is made for the purpose, and the money is spent according to this but it is not clear how the money is spent for the development of local people.”

The Forest Department high official (L-KI-6) was asked how 50% of the revenue was spent for the development of local communities. He stated:

“50% of the revenue is meant to go to the people. But we need to do a lot of development work within the park. I have said that a hotel should be built in the village so that tourists can stay there. They can also buy utensils, and dishes which are needed for weddings. The village conservation forum could hire these utensils in exchange for money. Some litter bins and seats have been placed in the park area.”

Almost all the focus group members stated that they did not receive any benefit from the Forest Department, although they acknowledged that they received some from the co-management and Arannayk Foundation, but it is inadequate. A focus group member (L-FG-1) stated:

“We do not get any benefit from the Forest Department. But we do get some from the Arannayk Foundation (NGO).”

From the above statement it is suggested that local communities received some benefits through co-management and the Arannayk foundation.

Questionnaire respondents were asked whether they agreed or disagreed with the statement that benefit sharing had occurred for the development of local communities. In all villages combined, only 2% (3) agreed that they had received benefit, 31% (43) disagreed, with 67% (93) strongly disagreeing (Figure 6.16). There are no statistically significant differences between male and female responses.

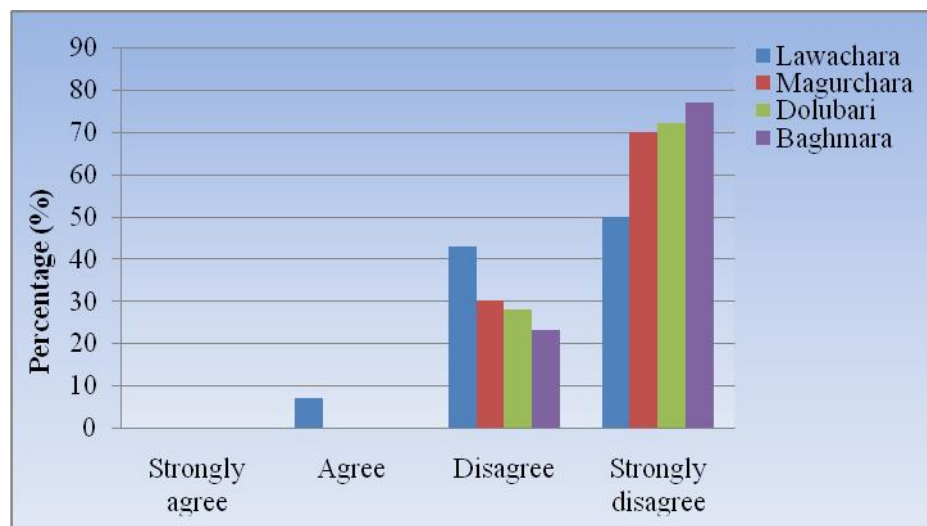


Figure 6.16 Villagers’ responses when asked to agree or disagree that benefit sharing is happening to the local communities by the Forest Department.

6.1.6 Institutional, political and local issues

The influence of institutional, political and local issues are discussed in sections 6.1.6.1 to 6.1.6.3 from the perspective of the interviews with the key informants, the information derived from the focus group discussions and the results of the questionnaire surveys.

6.1.6.1 Responses by key informants

These reported almost identical opinions about the limitations and corruption of the Forest Department, political and local pressure, and law enforcement inside the park.

A village elder (L-KI-1) presented a typical response when stating:

“If Government laws are implemented, then everything would be fine. If we inform the beat or range officers about tree thefts, then they ask for a written statement to be filed but if I do this with my name, then the thieves would find and kill me. So, people cannot complain even if they see tree-thefts. If this cannot be changed how will the forest improve? Basically, the protector is the predator. The forest department staff needs to stop their business.....When plantation started my father and grandfather planted various types of trees. We also used to cultivate various trees here. None of those are existing now. The only ones to be seen are on the road-sides, inside the forest is empty. We all are thieves. Nishorgo and IPAC may have positive intentions, but our theft is ruining everything. If the father is a thief, then the son would be a thief too.”

The founder of the Wildlife Rescue Centre (L-KI-10) commented on the influential pressure and weakness of law enforcement:

“The local influential people will take the trees away by using lorries while the local people are not allowed a single piece of fuel wood from the forest; this cannot be a lawful, law should be equal for everyone. Either all or none should be allowed in the forest. What kind of law is it which permits you to lease out forest lands to one person while at the same time sending another to jail for collecting some fuelwood?”

The former Community Patrolling Group leader (L-KI-4) added that law enforcement is not so strong to protect the forest from the influential people. He continued:

“During patrolling we caught the illegal tree fellers and handed them over to the forest staff. It is their (Forest Department) duty to take them to court. Among the group of 20, 5 said that they were tree fellers but the remaining 15 said they were not, so were let go. Sometimes I fight with

the tree fellers, see my hands and legs are broken. The law and enforcement is not strong enough to save the forest.”

The local journalist (L-KI-8) reported that an honest forest officer is not able to work effectively under political pressure. He stated:

“Currently there are many problems inside the park, such as the shortage of Forest Department staff, the park is large but the forest guards are few in number. So it is not possible for them to patrol the forest. And these people are not skilled. Recently tree felling is increasing. The existing law and its enforcement is not enough to save the forest. Political pressure is strong with local leaders changing their political view according to the current Government.....There are about one thousand furniture shops in Sreemongal and Komolgong district and these claim they get trees legally from the Forest Department by auction. So the question arises how many auctions occurred in a year.”

Key informant (L-KI-10) illustrated the way to protect the forest, when he stated:

“The honest will of the government and the honesty and efficiency of the administration can save the forest. To save the bio-diversity, honesty is the only remedy.”

From the above statements it is clear that the government’s law enforcement is not adequate to manage the forest appropriately. The bureaucratic system and local political pressure is also responsible for this. The existence of saw mills and furniture shops surrounding the park is a contributory factor to the damage to the forest. An honest willingness of government to take the necessary action against illegal activities to save the forest would be useful.

6.1.6.2 Responses from focus group members

The focus group members were asked about current law enforcement, almost all of them commented on the influence of local powerful people.

In Dolubari, a focus group member (L-FG-3) stated that locally powerful people are engaged in illegal activities:

“The forest staff also faces dangers. People who organize the tree felling are local and powerful leaders. If they were prevented from taking a tree then the next day they might kill the forest officer. They are government officers but they cannot put their life at stake. They have their family and children. That is why honest forest officers is not a remedy to the tree theft.”

Another focus group member in the same group (L-FG-3) added:

“How will the law be implemented? The second officer, Officer- in-charge of the police station and the Thana Nirbahi officer (TNO) all accept bribes. The Chairman also needs bribes and all of them have an expensive car. There is no implementation of law in the whole country so how can it be implemented in the forest?”

The above statements suggest that sometimes an honest forest officer could not take the necessary steps due to local influential pressure and inadequate law enforcement.

6.1.6.3 Questionnaire survey responses

The respondents were asked whether they agreed or disagreed with a statement that current law enforcement is strong enough to save the forest. In all the villages combined, 6% (8) agreed, 36% (50) disagreed, with 58% (81) responding that they strongly disagreed (Figure 6.17). There is no statistically significant difference between male and female responses on this issue.

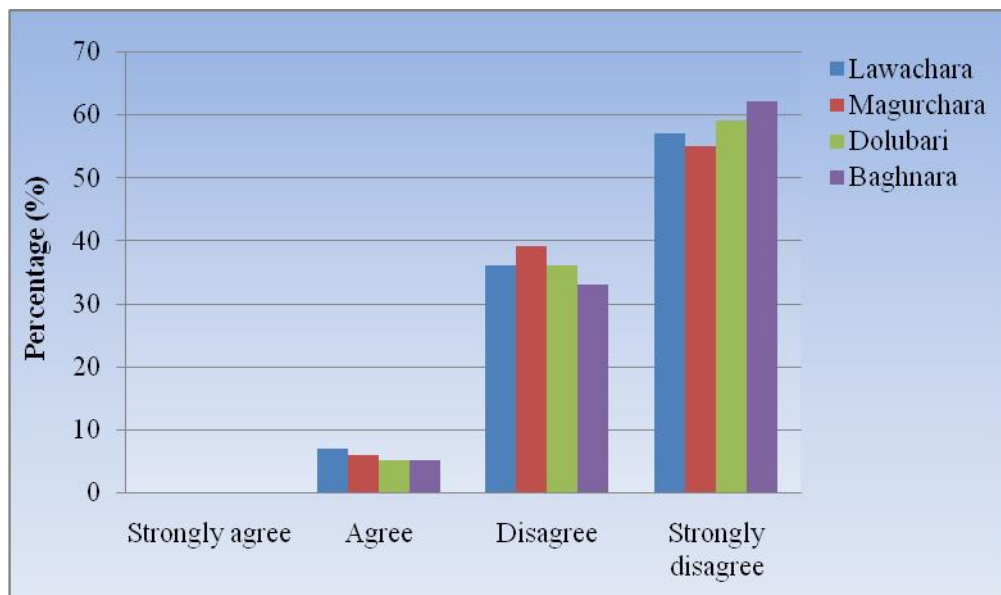


Figure 6.17 Villagers’ responses when asked to agree or disagree that law enforcement is strong enough to save the forest.

6.1.7 Tourism issues

In this study area, the park authorities do not appear well prepared to reduce the impact of unplanned tourism although they are attempting to enhance the tourism potential of the park, for the benefit of local communities and biodiversity conservation. The park lacks a site-specific tourism management plan and dedicated staff, although tourism is the main source of income for

the park. The visitor facilities have not been improved. In this context the key informants and village inhabitants were asked about the impacts of tourism.

6.1.7.1 Responses from key informants

The key informants were asked about the impacts of tourism, most of them reported the effect of unplanned tourism. In Lawachara punji the village headman (L-KI-2) illustrated this situation, when he stated:

“During the peak season you would not be able to stand in my yard. The tourists become a heavy crowd in the forest. With so many people roaming around, then what is the condition of the forest! There are different trails given for walking but they are not followed. If the tourists want to go to the deep forest then they should be with local guides; this should be mandatory. Tourism has to be systematic and they must follow the way to walk, because small trees are dying under their feet and the animals are hiding and moving to the deep forest. Sometimes tourists get robbed.but not only the forest is affected but we also are affected. We are betel leaf cultivators and when we go to the betel leaf gardens, we clean ourselves, and wear different clothes than those we wear at home because there is a virus which can spread very quickly. But tourists do not understand this and damage the plants by ripping the betel leaf. In the past, the roaring of the gibbons could be heard but now you need to go to deep forest early in the morning.”

In Lawachara punji the villagers are disturbed by the tourists, the village elder (L-KI-1) stated:

“Tourists normally come to our village. They are a burden. Sometimes they enter into our houses, even to the bed room and destroy our privacy. If there was a gate to enter our village then it would be easier for us to control them.”

In Magurchara Punji the village entry gate was observed to avoid unwanted people in their village (Plate 6.5).



Plate 6.5 Entry gate in the Magurchara punji.

In Magurchara punji the villagers were also unhappy, the village headman (L-KI-3) stated:

“It is our hope that many tourists come here, but there are no guidelines to enable them to enjoy Lawachara National Park, as it is a wildlife area. I have seen in India how beautifully they handle this and control it successfully. Only the genuine tourists should be permitted to enter the forest and no one should be allowed to picnic in the wildlife area. I have put this forward several times in our meeting. They said there are some picnic spots. So, in my opinion, it is good that the number of tourists increases, but we should pay attention to how this can be planned better. We suffer some damage from tourists because they are curious about the life of tribes.”

The local journalist (L-KI-8) added:

“Currently the number of tourists is increasing but it is not planned, so it creates lots of problems. It should be controlled from the entry gate of the park.”

In Lawachara punji the village elder (L-KI-1) illustrated the use of revenue from tourism:

“The revenue is split, 50% goes to the Government and 50% to the co-management committee for local development and infrastructure. The co-management committee provides some facilities such as ticket counter, litter bins and sitting bench inside the park.”

In Magurchara punji the village headman (L-KI-3) added:

“The co-management committee gets half, and the other half goes into the Government funds, but I do not know more about the co-management committee’s share although, I know there is an annual plan for this purpose. But I do not know how the money is spent.”

From the above statements it is indicated/possible that the villagers inside the park are disadvantaged more than the villagers outside, as tourists enter their betel farm and spread virus disease. Some tourist facilities were observed, although they appear inadequate.

6.1.7.2 Responses by focus group members

In Lawachara and Magurchara punji almost all the focus group members said that they are disadvantaged by the tourists. While in Dolubari and Baghmara village the focus group members said that their villages are outside the park, not so many tourists visit their village, so they are not adversely affected.

In Magurchara punji a focus group member (L-FG-2) summed up the general situation when he stated:

“Betel leaf plants are vulnerable to virus infection. When tourists visit, it spreads from one garden to another. We shower before entering the betel leaf gardens and take another after finishing work. We have different clothes for wearing at work and at home.”

6.1.7.3 Questionnaire survey responses

The respondents were asked whether they had benefitted from, or were disadvantaged by tourism. In all villages overall, 28% (39) stated that they had benefitted (Figure 6.18), and 48% (67) responded that they had been disadvantaged (Figure 6.19). These research results indicated that the villagers inside the park were disadvantaged more than the villagers outside the park (Figure 6.19). There is no statistically significant difference between male and female responses.

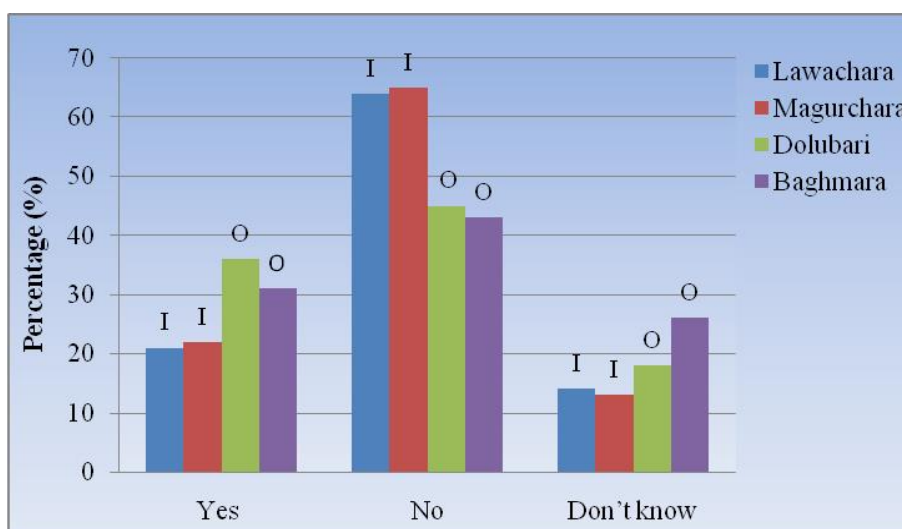


Figure 6.18 Percentage of respondents who felt that they benefitted from tourism.

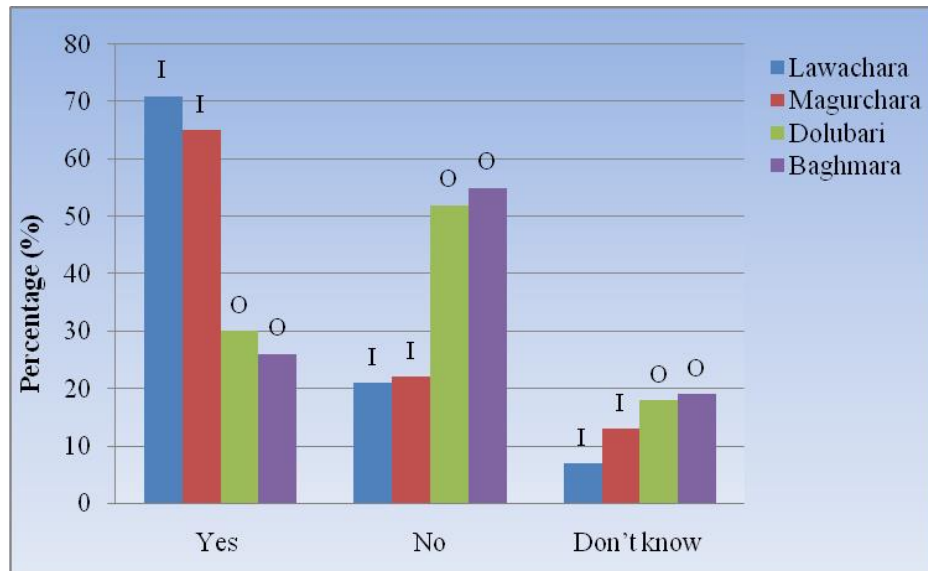


Figure 6.19 Percentage of respondents' who felt that they were disadvantaged by tourism (I = Village inside the park, O = Village outside the park).

6.2 Teknaf Wildlife Sanctuary

In the Teknaf Wildlife Sanctuary, the key informants for in-depth interviews were a village elder, Forest Department staff, NGO staff, a community patrol group leader and group member, a journalist, a fuelwood businesswomen, the secretary of a community patrol group, a Union Parishad member, a field manager of the Ministry of Environment and a high level key informant representing major NGOs (D-KI-1). The list of participants for in-depth interviews which were conducted in the case study villages are presented in the Table 6.8.

Table 6.8 List of key informant for in-depth interviews.

Category	Gender	ID
Union Parishad Chairman (former), Secretary of the Co-management committee	M	T-KI-1
Head teacher/ Homeopathic doctor/ Village elder	M	T-KI-2
Community patrolling group leader	M	T-KI-3
Community patrolling group member	M	T-KI-4
Union Parishad Member	F	T-KI-5
Co-ordinator (Integrated Protected Area Co-management)	M	T-KI-6
Range Officer	M	T-KI-7
Beat Officer	M	T-KI-8
Divisional Forest Officer	M	T-KI-9
Field Manager (Ministry of Environment)	M	T-KI-10
Secretary of community patrolling group	M	T-KI-11
Journalist	M	T-KI-12
Journalist	M	T-KI-13
Fuelwood arotdar (businesswomen)	F	T-KI-14
CEO (IPAC)	M	D-KI-1

Eight focus group discussions were conducted, two for each village, one involving male and one involving female participants. A list of focus group discussions which were conducted in the case study areas is presented in Table 6.9.

Table 6.9 Summary of the focus group discussions in the case study areas.

ID	Study village	Focus Group	
		Male Group	Female Group
T-FG-1 T-FG-2	Sheyallarghona	9	11
T-FG-3 T-FG-4	Kerontoli	7	6
T-FG-5 T-FG-6	Madhya Leda	7	7
T-FG-7 T-FG-8	Jadimura	7	8
Total = 8 Focus Group Discussions		30	32

One hundred and twenty one questionnaires were completed, the details are presented in Table 6.10.

Table 6.10 Survey respondents.

Village	Total households	Questionnaires completed		
		Male	Female	Total
Shaillarghona	55	13	10	23
Karontoli	180	17	12	29
Modhayaleda	49	14	10	24
Jadimora	450	25	20	45
Total=121		69	52	121

6.2.1 Socio-economic characteristics of the respondent households

The villagers are mostly dependent on fishing, day labour and fuelwood collection. However in Shaillarghona and Karontoly, fishing and small businesses such as small grocery shops, rickshaw pulling, and cycle and rickshaw repair are also important. The social characteristics and livelihoods of the respondents are presented in Tables 6.11 and 6.12. The respondents represent a reasonable mix of male and female, despite the common problem of female reluctance to take part in surveys. The respondents also represent a good spread across the age ranges, particularly for the male respondents. The education levels of the respondents varied across villages (Table 6.11), although generally male respondents tended to be more highly educated than females and there is a statistically significant difference between them (Appendix 20).

Table 6.11 Social characteristics of respondents in the case study villages.

Village	Sample size	Gender (%)		Age category (%)										Education (%)							
		M	F	18-27		28-37		38-47		48-57		>57		Illit		PS		SSC		HSC	
				M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Shaillarhona	23	57	43	4	4	13	22	26	17	13	0	0	0	22	35	33	6	0	3	0	0
Karontoli	29	59	41	3	3	14	17	24	14	17	7	0	0	24	31	30	10	4	0	0	0
Madhyaleda	24	58	42	8	4	17	21	17	12	17	4	0	0	17	29	33	13	8	0	0	0
Jadimora	45	55	45	2	2	11	16	27	20	13	7	2	0	18	27	29	14	7	2	2	2

M= Male, F= Female, Illit= Illiterate, PS= Primary school, SSC=Secondary school certificate, HSC=Higher secondary certificate

Table 6.12 Livelihoods of the questionnaire respondents in the case study villages.

Economic activity (%)	Shaillarghona (N=23)		Karantoli (N=29)		Madhyaleda (N=24)		Jadimora (N=45)	
	M	F	M	F	M	F	M	F
Fishing	30	0	24	0	19	0	21	0
Day labor	28	11	29	9	32	8	31	7
Fuelwood collection	15	20	16	18	17	21	19	26
Business	14	8	21	7	16	5	17	7
Agriculture	0	0	0	0	13	4	14	4
Other	12	8	13	8	15	4	18	5

Note: in some cases, there are multiple responses by the same respondent.

The monthly income of respondents' varied moderately across the villages (Figure 6.20). The respondents in Moadhyaleda and Jadimora tended to be less well-off than those of other villages, while there is a little difference between Shaillarghona and Karantoli. Overall, when compared to the national monthly per capita income in Bangladesh, these are all poor communities. Within the communities there are statistically significant differences between male and female incomes (Appendix 21), with males earning more than females (Figure 6.21).

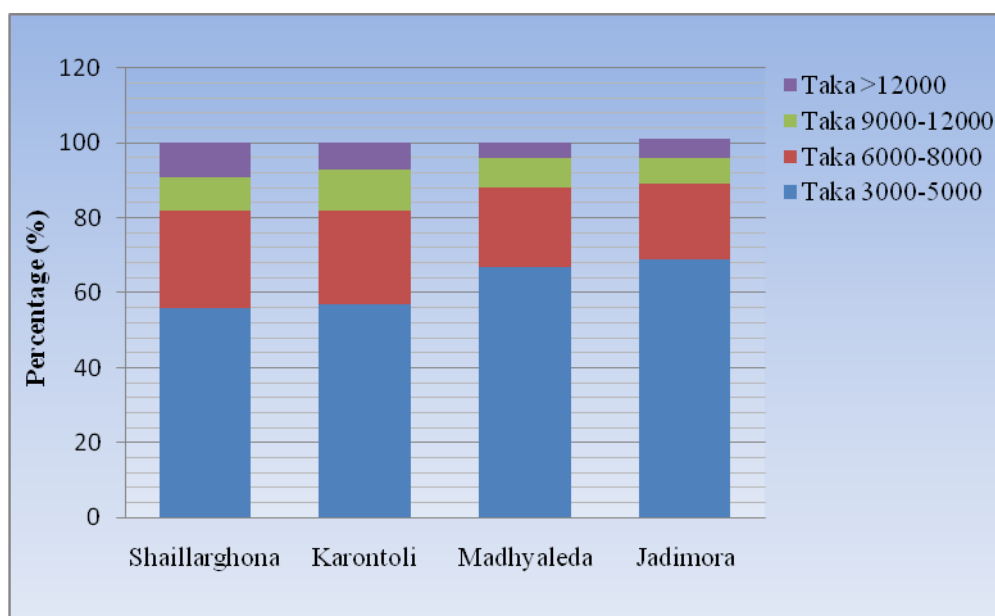


Figure 6.20 Monthly incomes of respondents (Bangladeshi currency 131.68 Taka= £1).

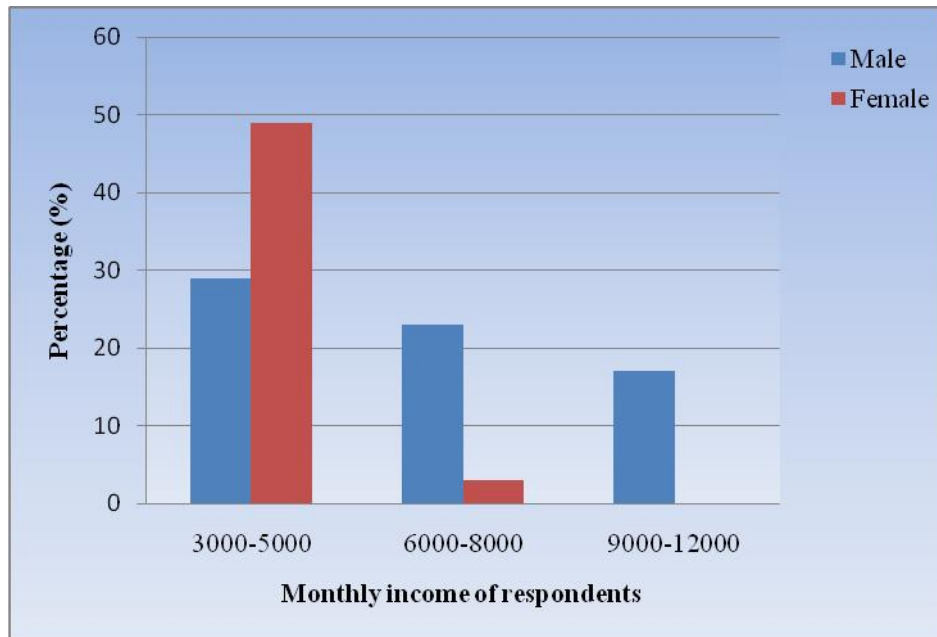


Figure 6.21 Monthly income of males and females.

6.2.2 Participation in the planning process

Participation of respondents in management planning and their attitude towards participation in the planning process were explored through responses from key informants interviews, comments derived from the focus group discussions and the questionnaire survey results.

6.2.2.1 Responses from key informants

Key informants within the Teknaf study area (excluding the high level Dhaka based informant) were asked if they were aware of the existence of a management plan for the protected area they lived in, and if they had been involved in the management planning process. All of the respondents were aware of the plan, but only half (7) had been actively involved in the planning process.

In Teknaf Wildlife Sanctuary the Union Parishad Chairman (T-KI-1) summed up the general situation, when he stated:

“I know about the management plan and I am also Chairman of the co-management committee.”

6.2.2.2 Responses by focus group members

The focus group members were asked whether they were aware of the management plan and their involvement in the planning process. In all four villages the focus group members were neither aware of the management plan nor involved in the planning process.

Typical of the comments made is this statement from a male focus group member (T-FG-3):

“We do not know anything about the management plan or its function.”

The above statement indicates the problem within the communities that local residents do not have effective knowledge and active participation in the management planning process.

6.2.2.3 Questionnaire survey of villagers

Overall in all four villages, 13% (16) males responded that they were aware of the management plan and 87% (122) both male and female responded that they were not (Figure 6.22). Among those who stated that they were aware of the existence of the management plan, none of them were actively involved in the management planning process. Statistically there is a significant difference between male and female responses (Appendix 15), with males being more aware than females (Figure 6.23).

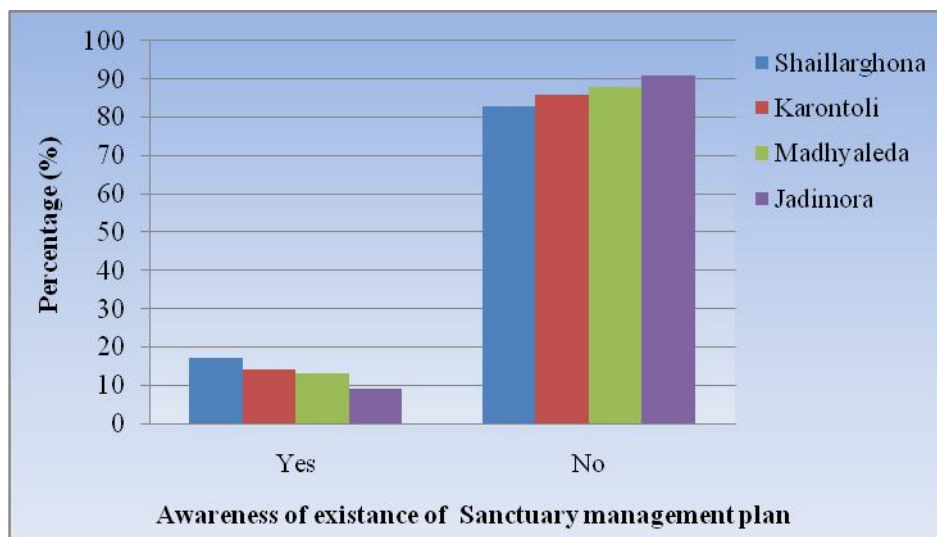


Figure 6.22 Local villagers' awareness of the management plan.

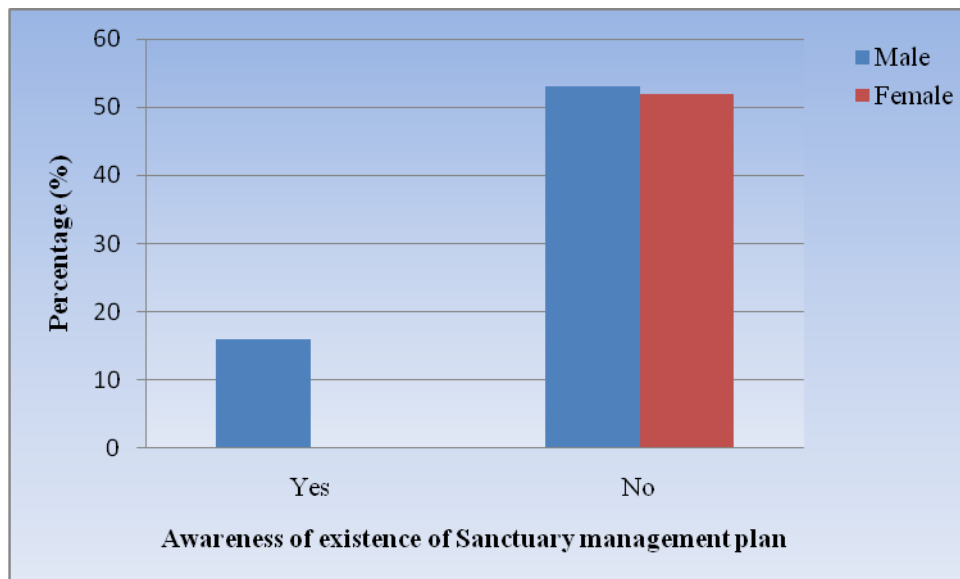


Figure 6.23 Awareness of management plan by males and females.

From the above results it is apparent that local residents were not involved in the management planning process. There was a lack of integration between local communities and forest management, as the Forest Department and other decision makers had not consulted effectively with local communities.

6.2.3 Conservation conflicts inside the Wildlife Sanctuary

The conservation conflicts in the Sanctuary are presented from the perspective of the interviews with the key informants, the information derived from the focus group members and the questionnaire survey results.

6.2.3.1 Responses from key informants

The key informants said that the conflict between the local residents and Forest Department resulted from the dominating behavior of the Forest Department staff members. Some said that the financial condition of local residents is very poor, with most depending on forest resources for their livelihoods, but they are restricted from entering the forest so conflicts occur. The field manager of Ministry of Environment and Forestry (T-KI-10) stated:

“The people here have two sources of earnings, first the sea and then the forest. The financial condition of people is deteriorating and this is having an impact on the forest.”

The fuelwood businessmen (T-KI-14) illustrated the general view of the situation caused by Rohingya refugees, when he stated:

“The Rohingyas are cattle thieves; and, as they work as day labourers for low wages they take jobs from other local workers. The Rohingyas also sell banned drugs in the locality and so are damaging the younger generation. The worst thing is that the Rohingya women are involved in anti-social activities.”

The Union Parishad Chairman (T-KI-1) stated his view of the actual situation which is happening and responsible for the destruction of forest:

“Brick fields, Rohingyas and hill cutting; these are the three main reasons behind the destruction of the forest. Some Forest Department staff are assisting in all of these.”

The local journalist (T-KI-12) also illustrated the alleged destructive activities by the Rohingyas:

“The Rohingyas are involved in all misdeeds, including the destruction of the forest. They work as day labourers for low wages, they take jobs from other local workers. They are corrupting the youth by intoxication with alcohol and ‘yaba’¹¹”.

The CEO of IPAC (D-KI-1) stated the limitations of the Forest Department:

“..... the main threat is over population that increases illegal tree felling, and fuel wood collection. We could handle the situation if there was a little control. Nonetheless, tree felling is still occurring. [.....] the Forest Department has few resources. Then there comes the turn of the Local Government. It is really a cumbersome task to manage them.”

The above statements indicate that a variety of conflicts were reported, i.e. Rohingya refugees, illegal timber felling, fuelwood collection, limitation of the Forest Department, and the influence of local government. Illegal tree felling and fuelwood collection occur in all four villages. Rohingya refugees are mostly in Madhyaleda and Jadimura, although it is also an international issue. In some cases Forest Department staff are also part of a network of politically and economically strong actors engaged in corrupt practices.

6.2.3.2 The views of focus group members on conservation conflict

When the focus group members were asked about the conflicts issues in their area, the main conflicts and encroachments identified by them varied across the four villages.

¹¹ Yaba is a tablet containing a mixture of methamphetamine and caffeine, it is highly addictive. Burma (Myanmar) is the largest producer of this in the world.

Rohingya refugees were said to cause great damage to the forest and local communities, a focus group member (T-FG-1) illustrated the general situation, when he stated:

“The Rohingyas damage the forest most. They collect fuel wood and sell it to the local market, they clear hills and establish habitats, and send cattle to graze in the forest.”

Another focus group member (T-FG-1) in the same group added:

“With the help of Rohingyas, the local influential people cut trees and clear forest for agriculture and settlement.”

Another focus group member (T-FG-7) illustrated the impact of the latest influx of Rohingya, when he stated:

“I am unemployed now. My daily wage was Taka 150.00, but the Rohingyas do the same work for Taka 50.00. If the employers get a person for 50.00 Taka, why would they employ me for more?”

A female focus group member (T-FG-6) added:

“Because of the Rohingyas, my husband lost his day-labourer job. Now I maintain the house by sewing caps.”

From the above extracts it is indicated that forest and local communities are seriously affected by the activities of Rohingyas. There is competition for jobs with Rohingya refugees and this has an impact on the livelihood opportunities, including clearing hills, illegal logging, fuelwood collection, and building new houses.

Almost all focus group members said that the forest trees are used in the brick fields, but there is no one to prevent this. A focus group member (T-FG-5) stated:

“If anybody goes against the brick field owners, they just hand over a bundle of money, then everything is alright.”

Another in the same group (T-FG-5) added:

“The brick field owners are the most powerful and rich men of this area, so nobody can speak against them. The Forest staff are often involved with them.”

From the above two statements it is indicated that the brick fields and local political influence are also responsible for the destruction of forest.

Conflicts also occurred between local communities and Forest Department staff when local poor people collect fuelwood from the forest. A focus group member (T-FG-2) summed up the general situation by responded:

“... 80% of local people collect fuelwood for personal use and 20% collect it to sell in the market. These are poor and they cannot live without selling it.”

Another focus group member (T-FG-7) stated:

“Every day 100s of people enter the forest to collect fuel wood. There is a lady in our village who sells fuel wood and her house is packed with it. Anyone including market traders can purchase fuelwood from her” (Plate 6.6).

The fuelwood businesswoman (T-KI-14) stated:

“My husband is disabled, following cancer one of his legs had to be removed. The fuelwood business maintains my family. I earn taka 500.00 a day although some times this is less. Local people especially Rohingya women sell fire wood to me. After collecting it in the morning I pay them cash. Sometimes they take their fire wood to the highway and wait for customers. [.....] the local Member of Parliament has ordered that three lorries of fire wood should be allowed to go to the market daily to meet the local demand. It has been reported in the papers that the Border Guard of Bangladesh allow 6 to 7 lorries per day in exchange for bribes.”



Plate 6.6 Fuelwood stored inside the house.

From the above statements it appears that the local poor do not have other means than the forest for fuelwood and most of them collect fuelwood for their livelihoods.

6.2.3.3 Questionnaire responses on conservation conflicts

The issues which were identified in the questionnaire survey are presented in Table 6.13. These suggest that Rohingya refugees, restriction on access to park resources, and illegal timber felling are the main issues of park-people giving rise to conflicts (Table 6.13).

In all four villages combined, restriction on park resources was the most important at 75%, followed by Rohingya refugees, 71%, illegal timber felling, 45%, and a poor relationship between Forest Department and local residents 25%. The female response rate to some extent is lower than male, but there was no significant difference between their response rates.

Table 6.13 Conflicts identified by survey respondents.

Park-people issues %	Shaillarghona (N=23)		Karontoli (N=28)		Madhyaleda (N=24)		Jadimora (N=45)		Overall average (%)	
	M	F	M	F	M	F	M	F	M	F
Rohingya refugees	39	22	41	24	46	33	49	31	44	28
Restriction on park resources	48	35	52	31	42	29	42	20	46	29
Illegal timber felling	30	17	31	21	25	17	22	18	27	18
Poor relationship between Forest Department staff and local residents	13	9	14	10	17	8	15	13	15	10
Other	15	5	16	8	15	6	18	6	14	6

Note: in some issues, there are multiple responses by the same respondent.

Before the management plan was adopted, in all four villages 49% of the respondents felt that conflicts were moderate; 37% felt low, and 14% perceived that it was high (Figure 6.24).

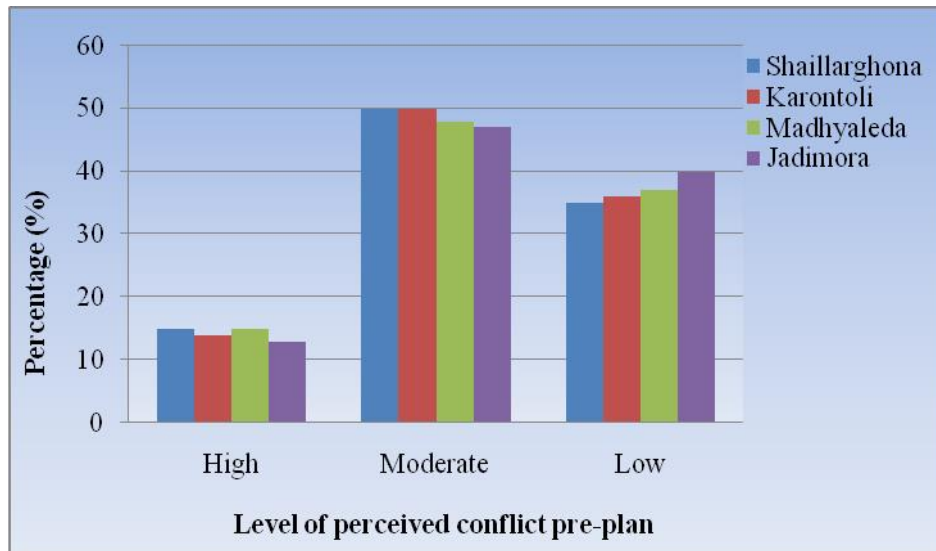


Figure 6.24 Perceived level of pre-plan conflicts in case study villages.

Since the plan has been implemented the perceived level of conflict has increased in all four villages (Figure 6.25), with the greatest increase in Jadimora (53%).

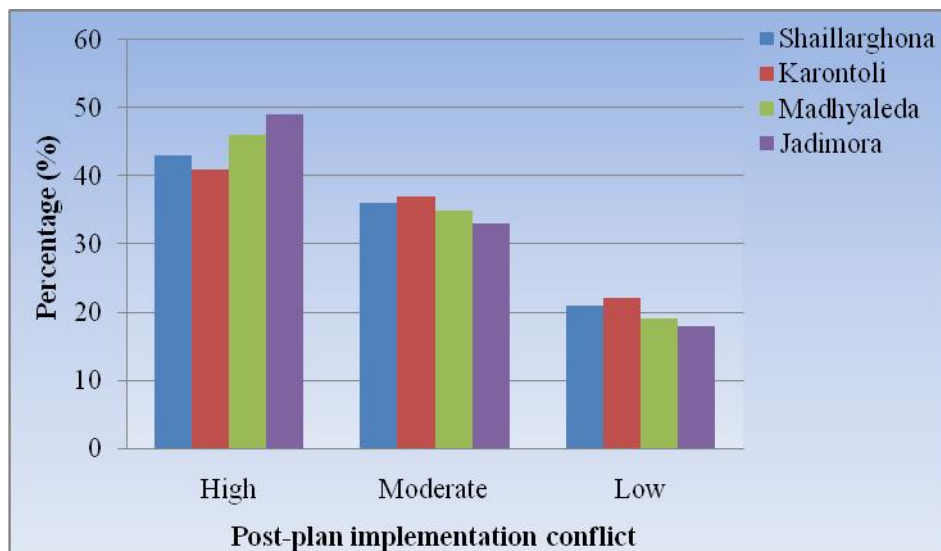


Figure 6.25 Perceived direction of change in conflict post-plan implementation.

The results suggest that the level of conflict has increased. The differences in pre- and post-plan conflict reported in the questionnaire survey were statistically significant (see cross-tabulation results in Appendix 17).

The questionnaire survey respondents were asked to identify the types of encroachment occurring in their villages. Across all four villages, the expansion of human settlement was the most prominent concern (Figure 6.26), although grazing was also seen as significant. It is also noted that for some issues, there are multiple responses by the same respondent.

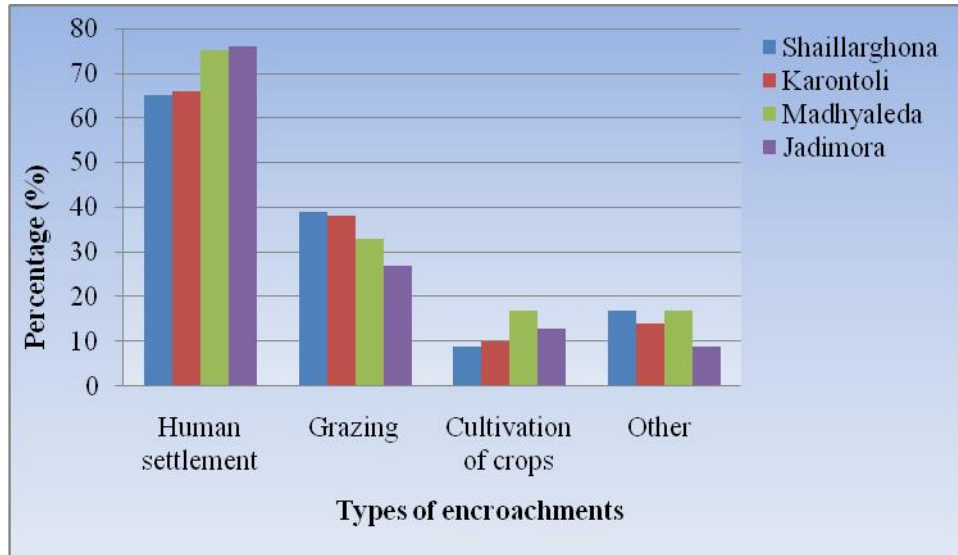


Figure 6.26 Main types of encroachment.

Across the four villages, the majority (85%) felt that before the management plan was implemented encroachment was moderate to low and 15% felt it was high (Figure 6.27). There are no significant differences between response rate by male and female.

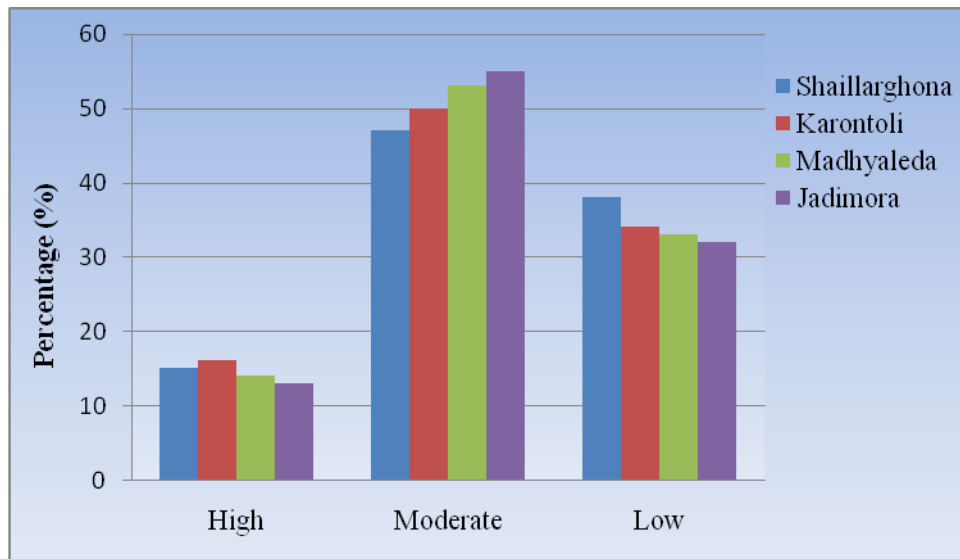


Figure 6.27 Perceived pre-plan level of encroachment.

When the respondents' were asked if encroachment had been affected by the management plan, 45% of respondents felt that encroachment had increased; 40% could not see any change and 15% felt it had decreased (Figure 6.28).

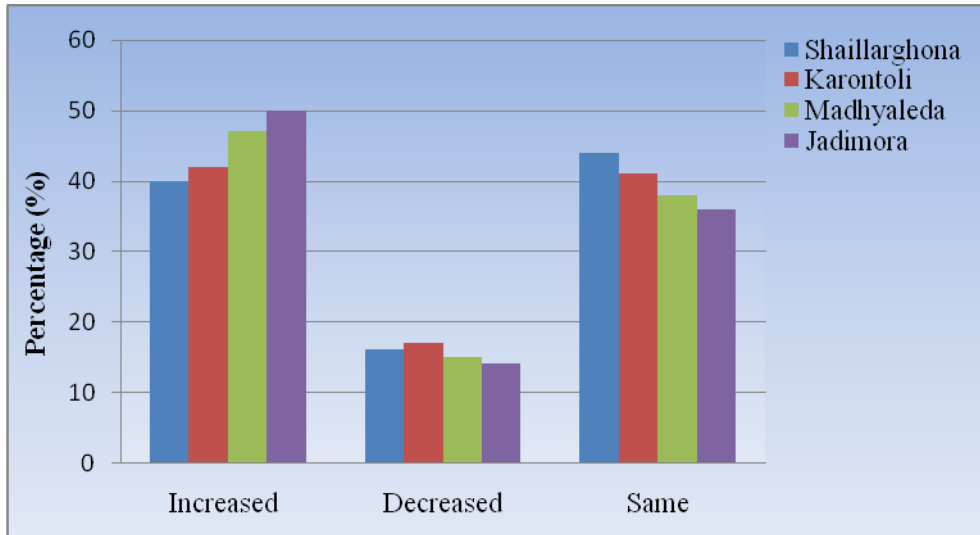


Figure 6.28 Perceived changes in encroachment in the Wildlife Sanctuary post-plan implementation.

A number of challenges to conservation were personally observed within the boundaries of the Sanctuary. These include encroachment in the form of grazing, clearing hills, new settlement development, fuelwood collection, illegal timber felling and brickfields in Teknaf (Plates 6.7, 6.8, 6.9 and 6.10).



Plate 6.7 Collected fuelwood kept adjacent to road for selling.



Plate 6.8 Hill clearing and human settlement.



Plate 6.9 Encroachment by grazing and agriculture.



Plate 6.10 Encroached forest land.

6.2.3.4 Suggestions for addressing conflicts

The key contacts suggested that conservation education programs were needed to increase public awareness; promote economic benefits to reduce dependency on forest resources; facilitate involving local people and other stakeholders in decision making process; implement effective law enforcement, and developing a better understanding between local people and Forest Department staff.

The Forest Department is the main authority with the responsibility for protecting the forest, but some Forest Department staff members are part of a network of politically and economically strong actors engaged in corrupt practices. The Union Parishad Chairman (T-KI-1) illustrated the insincerity and unfair activities of some Forest Department staff members when he stated:

“Development would be possible if the Forest Department wanted it, and if they were honest; it also requires local people and forest staff to work together and for there to be a compromise between the IPAC and forest staff. Currently neither is accepting the other and if this is not solved, then development is impossible. Sometimes the forest staff members behave like rulers of local people; they should act as friends instead.”

The local journalist (T-KI-12) illustrated the importance of education in the task of saving the forest:

“To protect the forest, people around it need to be 100% aware of the issue. If even only 10% are planning to destroy the forest, then we can’t protect it. Lack of education leads to a lack of awareness so, people cannot judge whether their actions are good or bad. Then, the local influential people can involve these uneducated people in their misdeeds (illegal activities).”

A focus group member (T-FG-1) illustrated the necessity of alternative livelihood facilities to reduce the forest dependency, when he stated:

“Our family size and expense is increasing daily, and we are becoming poorer. Previously we collected forest resources, now we are restricted from entering the forest so how we can survive? If we had an alternative income source it would be better.”

From the above statements it is suggested that generating environmental education facilities could increase public awareness and encourage local residents to protect the forest. Moreover, providing alternative livelihood facilities has the potential to reduce the dependency of local communities on the forest.

The suggestions made by the questionnaire respondents are presented in Table 6.14. In all four villages combined, an average of 82% of respondents focused on economic benefits as a way to reducing conflict. Overall, 50% suggested implementation of effective law and enforcement; 44% suggested conservation education; 37% mentioned developing the relationship between local people and forest staff; 22% suggested involving local people in the management planning process, and 18% wanted permission to collect forest resources in a controlled way. There is no significant difference between male and female responses.

Table 6.14 Questionnaire respondent's suggestions for reducing conflict.

Suggestions (%)	Shaillarghona (N=22)		Karontoli (N=28)		Madhyaleda (N=23)		Jadimora (N=43)		Overall average (%)	
	M	F	M	F	M	F	M	F	M	F
Economic benefit	43	39	42	40	41	42	42	39	42	40
Implement effective law enforcement	27	18	29	17	33	19	36	20	31	19
Conservation education	22	19	24	19	25	18	26	21	24	20
Develop relationship between local people and forest staff	18	14	20	16	21	18	23	17	21	16
Involve local people in management planning	11	7	13	8	18	8	16	7	15	7
Permission local people to collect forest resources in controlled basis	8	6	10	8	9	8	12	9	10	8
Other	12	5	15	7	12	6	16	9	14	7

Note: on some issues, there are multiple responses by the same respondent

6.2.4 Perceived effectiveness of the co-management approach

Stakeholder awareness of, and participation in, the co-management approach are described using the material derived from the key informant interviews, focus group discussions and the questionnaire survey from sections 6.2.4.1 to 6.2.4.3.

6.2.4.1 Responses from key informants interviewed

All (14) of the key informants stated that they were aware of the co-management approach, and 50% (7) had been actively involved in the planning process.

The Union Parishad Chairman (T-KI-1) exemplified the situation with the following statement:
“The work of the co-management committee is neither good, nor bad in reality. If everyone was sincere, then co-management would have been more effective. If we knew how much money was allocated to our area, what it was supposed to be for and how it is being used it would be helpful, then we could be more effective.”

The above statement suggests that the effectiveness of the co-management approach has been hindered by a lack of transparency and accountability in Teknaf.

The Ministry of Environment field manager (T-KI-10) added:

“Although the co-management committee has taken some steps for local development it is not enough to address the need. In short, they are not active in every village. Forest protection cannot be achieved by creating awareness in only 10,000 out of 50, 000 people.”

Some public awareness has been increased through the activities of the co-management committee. The IPAC coordinator (T-KI-6) illustrated the achievement of co-management when he stated:

“We are around 70% successful in this area. We have explained to local communities that the forest is their friend and that they should tell us if anyone cuts trees. We have to catch the thieves together. We have created nishorgo shohayok¹² in every village as well as village conservation forum committees. We are providing different training, education, and grants and are able to raise awareness among people; even illiterate women can now talk about carbon trading.”

The local journalist (T-KI-12) added:

It is true that some awareness has increased because of the co-management committee, although it is not enough. Previously, you could cut trees and take them away by van openly, even in front of the BGB (Border Guard of Bangladesh), but now if even one tree is stolen, the news spreads. It is becoming impossible.”

The statements above suggest that opinions are mixed regarding the effectiveness of co-management. The Union Parishad chairman and the Ministry of Environment Field Manager provide a fairly critical appraisal of the activities of the co-management committee, particularly around transparency and accountability. At the same time, however, the committee is making

¹²Nishorgo shohayok are people trained by IPAC, who provide monthly conservation education programmes to the local residents

some progress as illustrated by the more positive comments of the IPAC coordinator and the local journalist. The implication is that the efforts of the co-management committee to introduce and encourage more environmentally responsible practices are insufficient in the face of the large population involved.

6.2.4.2 Responses from focus group members

Fifty percent (31) of the focus group members were aware of the co-management approach. Of those, 44% (27) replied that they received some benefit from the plan, although the extent of the benefit has been limited.

A focus group member (T-KI-7) summed up the general situation, when he stated:

“The co-management committee gave me thread to make fishing nets, but it was not enough to make one full net. So, two of us have had to make one net together.”

The above statement suggests that co-management can provide some benefit to the local communities, although it is very limited compared to the size of the population.

6.2.4.3 Questionnaire survey responses

Respondents were asked if they were aware of the co-management approach. In all four villages combined, 57% (69) were aware and 43% (52) were not aware of the approach (Figure 6.29). Of those who were aware of the plan, 45% (31) had benefitted from it; 55% (38) had not (Figure 6.30). There was no significant difference between male and female responses about the co-management approach.

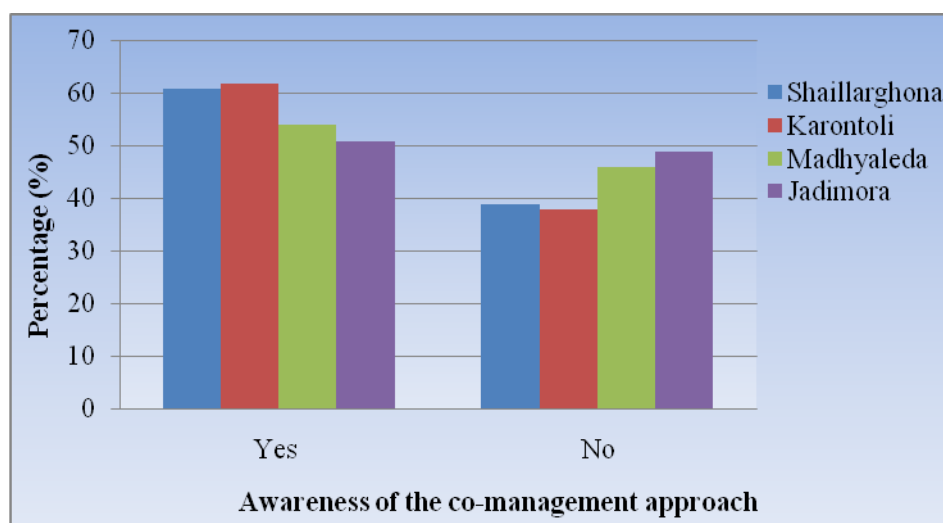


Figure 6.29 Local residents’ awareness of the co-management approach.

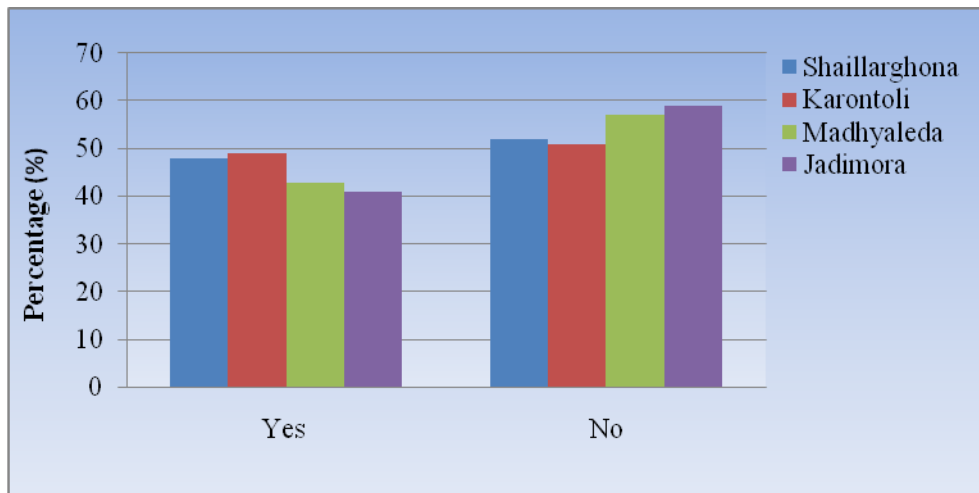


Figure 6.30 Percentage of respondents who felt they benefitted as a result of co-management approach.

In all four villages combined, the majority of the respondents felt that they had not been disadvantaged by the co-management approach. However, it is important to note that sizeable minorities of the respondents in each area felt actively disadvantaged (Figure 6.31). The sense of being disadvantaged comes from the view that co-management was providing some but not all with benefits and that they felt left out.

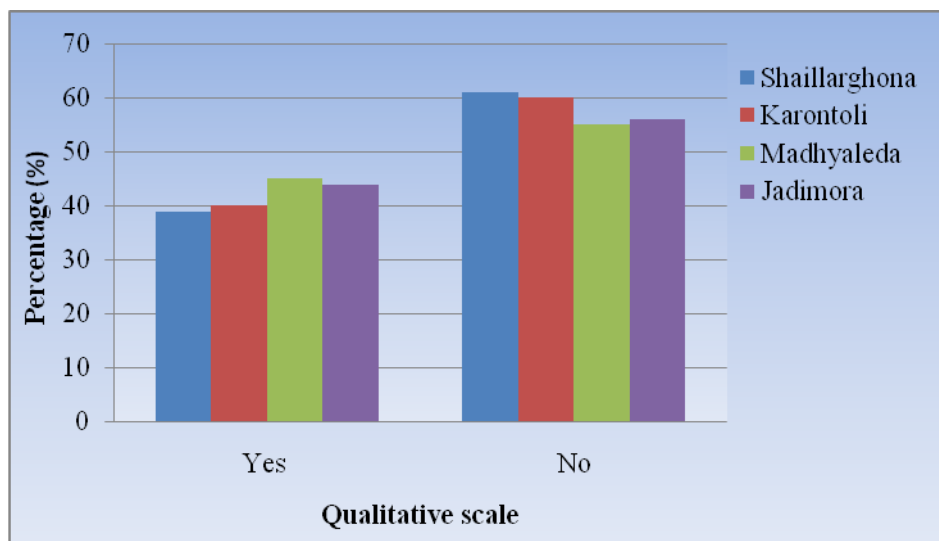


Figure 6.31 Percentage of respondents who felt disadvantaged as a result of co-management approach.

6.2.5 Impact of the management plan

The impacts of management plan are discussed in sections 6.2.5.1 to 6.2.5.4 using information from key informants, the focus group discussions and the questionnaire survey.

6.2.5.1 Relationship between the Forest Department staff members and the local communities

Diverse opinions were given by the key informants on this issue. The Union Parishad Chairman (T-KI-1) stated that the relationship between local residents and Forest Department staff is not good enough, he continued:

“The forest department and local people blame each other for the destruction of the forest.by honest actions by the forest department staff, their relationship could be improved. The forest staff need to face the local people, talk to them, understand their problems and listen to their suggestions.”

The local journalist (T-KI-12) added:

“The forest staff who are involved in illegal activities have a relationship with ordinary people that is neither good nor bad; their relationship with the thieves, political leaders, brickfield, and sawmill owners is good.”

However, a focus group member (T-FG-1) responded:

“We do not have any quarrel or conflict with the Forest Department but have a peaceful relationship. We are not involved in any crime of any sort. So there is no legal case against our name. We are rather in peace.”

Another focus group member (T-FG-6) added:

“We have a good relationship with the Forest Department staff. We do not cut trees or clear land and they praise us for this.”

From the above statements there is an indication that the relationship between local residents and Forest Department staff members is not good. The perception of local residents is that the Forest Department staff members have a good relationship with influential interest groups that can provide bribes or other illegal payments.

Questionnaire survey respondents were asked about the relationship between local people and Forest staff. In all four villages combined, 52% responded as good, 30% replied as poor, 11% replied as very poor, and 7% responded as very good, (Figure 6.32). There is no significant difference between male and female responses.

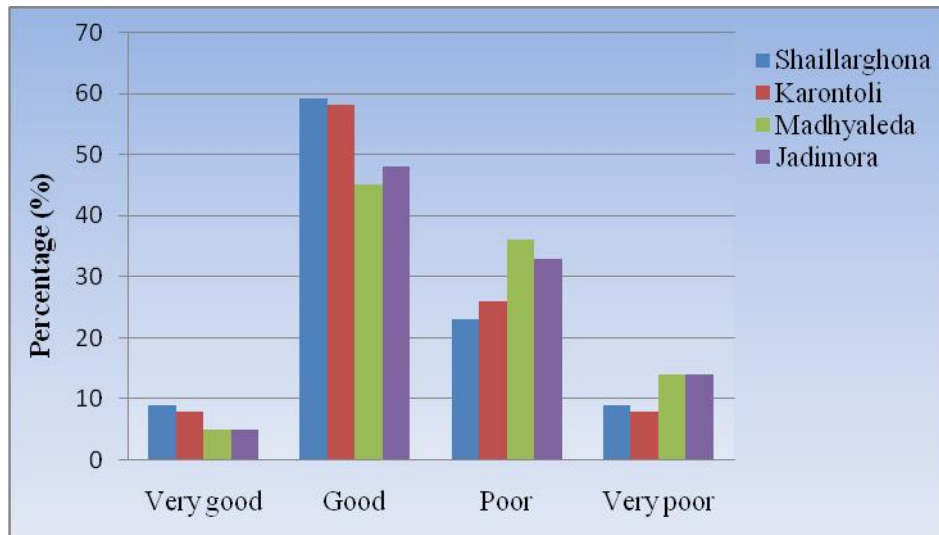


Figure 6.32 Questionnaire respondent’s views on the relationship between Forest staff and local inhabitants.

6.2.5.2 Conservation education

The majority of key informants stated that the Forest Department does not provide a conservation education program for the local communities, although a few of them responded that co-management provided some.

A focus group member (T-FG-4) stated the benefits of co-management approach:

“We received some training on conservation awareness programs through the co-management. Now we are more aware that we need to save the forest for our own benefits.”

The local people were asked whether they had experienced any conservation education program provided by the Forest Department. In all four villages combined, 24% (33) responded that they had received a conservation education program, while 75% (104) stated that they had not (Figure 6.33).

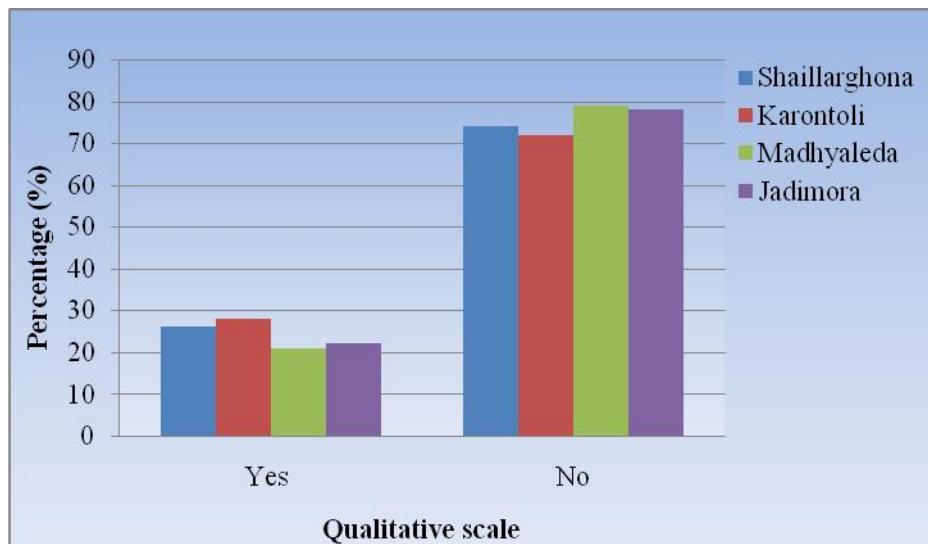


Figure 6.33 Questionnaire respondents who had experienced conservation education programs.

6.2.5.3 Alternative income generation activities

The key informants and focus group members were asked if the local people received any alternative livelihood training or other encouragement from the Forest Department to develop alternative livelihoods. Most said that the Forest Department had not provided any alternative livelihoods assistance.

The CEO of IPAC (D-KI-1) stated that the general situation is caused by lack of funds:

“We don't have sufficient money to work in 115 villages. There are many people, we can't work with all of them. It needs a lot of money and livelihood opportunities too. The demand is far more than we can cater for. For example, there were four hundred families in one village, we gave young fish to five families, and a sewing machine collectively to three families. Do you think this is sufficient? Not at all! If we were give this level of aid to each of these 115 villages, you would be amazed at the cost. Many have received training, but they have no access to jobs or capital, therefore they cannot apply this. Because of the lack of funds, many plans for Teknaf could not be realised.”

A focus group member (T-KI-7) illustrated the necessity of alternative livelihood:

“I am a fisherman but have neither a fishing-net nor a boat. What can I live on? I just need a job.”

Another focus group member (T-KI-8) added:

“My husband was a fisherman. But there are no fish in the rivers, he is jobless. I run a small shop but, if we could get a small loan, we could buy a refrigerator and make more money by selling cold drinks to tourists and the general public.”

From the above statement it is suggested that Forest Department can help local residents by providing loan facilities with low interest, although there are not enough funds to provide this.

The respondents were asked in the questionnaire survey whether they had received any alternative livelihood training from the Forest Department. In all four villages combined, 15% responded that the Forest Department provided some training via the co-management committee, while 85% responded that they had not received any alternative livelihood training (Figure 6.34).

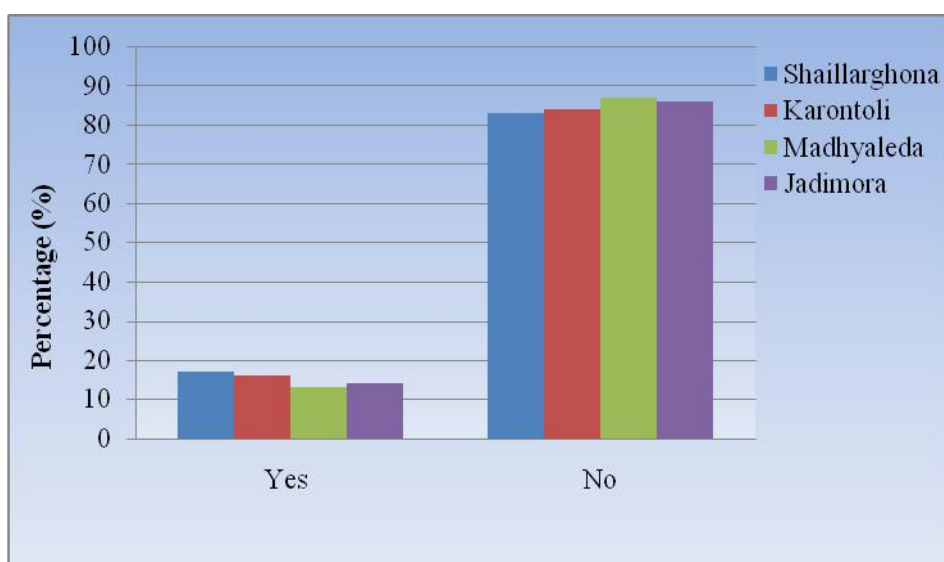


Figure 6.34 Questionnaire respondents who had experienced alternative income activity.

6.2.5.4 Benefit sharing

Almost all key informants and focus group members stated that that they were not aware of benefit sharing in the local communities.

The Union Parishad Chairman (T-KI-1) illustrated the general situation, when he stated:

“Half of Government revenue goes to Government funds and half to IPAC for the local development. Instead of this being distributed local people received no money.”

The above statement indicated that benefit sharing is not happening within the local resident community.

The Union Parishad Chairman (T-KI-1) also illustrated the difficulties associated with benefit sharing when he spoke about a social forestry plantation in Teknaf. Social forestry plantations are supposed to meet the forest product needs of local residents (e.g. firewood) and to improve their socio-economic condition, yet the chairman stated:

“The activities of social forestry plantation have failed because of political influence, lack of transparency in managing funds and bias in the selection of beneficiaries.”

A local journalist (T-KI-12) mentioned:

“Social forestation is partnership forestation with local communities who are poor, landless and freedom fighters. The Forest Department staff (range officer) finalizes the list of shareholders of social forestation. There is a selection bias of shareholders; the local Forest Department staff has often been influenced by the interests of local political leaders, the elite, timber traders and other powerful people to include their preferred person in the social forestry process.”

The statements above represent a situation in which the genuine landless poor are unable to join the social forestry plantation program because Forest Department staff members are selecting certain people for inclusion in the plantation project due to political pressure. A local journalist stated that some politicians at the local and district levels are putting pressure on the Forest Department to ensure that their political supporters are amongst those granted social forestry project membership. In addition, some local Forest Department staff members appear to be facilitating membership in return for bribes.

Almost all the focus group members stated that they did not receive any benefit from the Forest Department, although they acknowledged that they received some benefit from the co-management approach, however the benefits are not spread widely enough in the population. A focus group member (T-FG-1) illustrated this with the following statement:

“We did not receive any benefit from the Forest Department. Co-management gave some benefit but it is inadequate.”

During the field visit, a social forestry plantation was observed in the Teknaf Wildlife Sanctuary (Plate 6.11).



Plate 6.11 Social forestry plantation in the Teknaf.

Questionnaire respondents were asked if they agreed or disagreed with the statement that benefit sharing had occurred. In all four villages combined, 75% responded that they strongly disagreed, 23% disagreed, and 2% agreed (Figure 6.35). There are no significant differences between male and female responses.

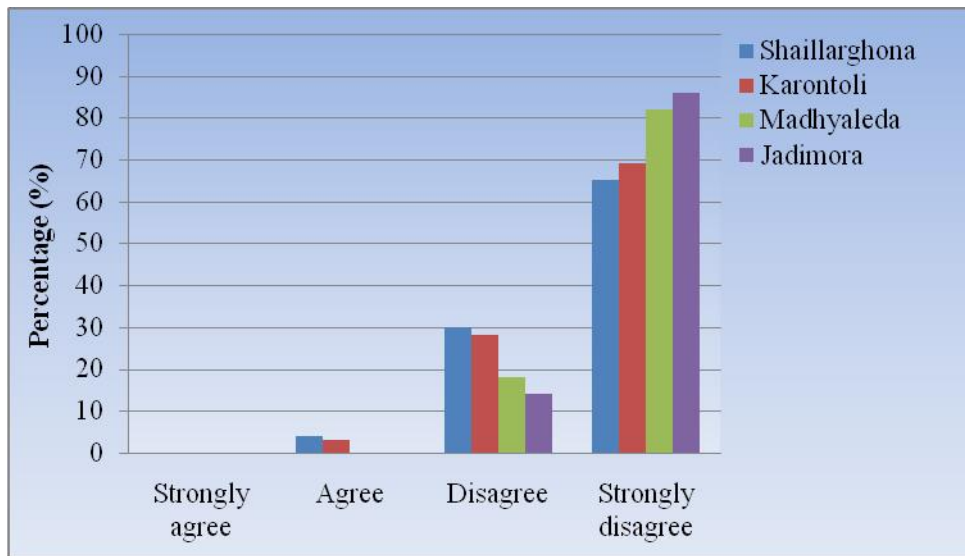


Figure 6.35 Villagers responses to the statement that benefit sharing is happening in the local communities.

6.2.6 Institutional, political and local issues

The influence of institutional, political and local issues are discussed in sections 6.2.6.1 to 6.2.6.3 using information derived from key informants, the focus group discussions and the questionnaire survey results.

6.2.6.1 Responses from key informants

The key informants reported, almost unanimously, on the limitations and corruption of the Forest Department, a flow of political pressure downwards from central to district and local level, and lack of law enforcement in the Wildlife Sanctuary. Some key informants stated that the Forest Department did not cooperate with the development of tourism: the Union Parishad Chairman (T-KI-1) illustrated the situation when he stated:

“The Forest Department does not pay the community patrolling group members and Nature Park entry gate collectors. If there were not many tourists, then the illegal practices of selling fuel wood, operating saw mills and brickfields would not be publicized. This is the reason for some not wanting tourist development.The community patrolling group members who are on duty all night were paid 5 taka but that has stopped now. They do their duty in the darkness of the night, in the rain, without any weapon and many have been injured in attacks by tree thieves. The question is if forest and IPAC officers get salaries of between 40 and 50 thousand taka, then why shouldn't the patrol members get even 5 taka for working all night? One spent 3000 taka on the hospital fees after being injured, but the co-management committee paid him only 300 taka.”

However, another side of the argument was presented by an employee (T-KI-9) of the Forest Department:

“It is not our duty to pay the community patrolling group, the co-management committee is responsible for paying them.”

The IPAC coordinator and co-management committee member (T-KI-6) added:

“I am allocated 5 taka, so I will give them 5 taka. If they (community patrolling group member) expect 500 taka, then should I provide extra from my own pocket?...They are required to perform their duty for free for 3 reasons. First, most have received a 3,000 taka grant, secondly there are many grants for future livelihoods and thirdly they are part of the social forestry initiative.”

The Union Parishad Chairman (T-KI-1) provided a response that illustrates the general situation: *“The Forest Department are the protectors of the forest. The Government has given them this power. But, they have misused this power and participated in all sort of destructive activities such as helping the brick field owners, failing to oppose the Rohingyas who cut plants in the name of fuel wood collection, clear forest and provide trees to sawmills, the Forest Department has full information on all these activities but (take no legal action) most of the time they did not take any legal actions against them. They (Forest Department) are restricted by political pressure.”*

The IPAC coordinator and co-management committee member (T-KI-6) stated:

“Integrated protected area co-management committee (IPAC) members are trying to raise awareness of the local people. The forest staff don’t want this as, if people catch any tree thieves and take them to the police, then the forest staff’s hidden activities would be revealed. This is why some forest staff oppose IPAC’s work.”

The local journalist (T-KI-13) added:

“Some local influential people have five or six Rohingya wives each, so they support Rohingyas by certifying they are residents if they are arrested by the police.”

To improve the current situation the IPAC coordinator and co-management committee member (T-KI-6) stated:

“Forest staff have to fulfill their duty with sincerity. The Rohingya problem has to be solved and sawmills and brickfields should be investigated and closed down.”

From the above statements it is suggested that some Forest Department staff members are corrupt, and involved with locally influential people. Other factors such as inadequate law enforcement, local and political influence, and lack of coordination between the Forest Department staff and the co-management committee members are causing damage to the forest.

6.2.6.2 Responses from focus group members

In all four case study villages almost all of the focus group members were of the opinion that corrupt people were released from jail as a result of the intervention of locally influential people (political leaders, and Forest Department staff). Moreover, there is a suggestion that locally powerful people may be involved in illegal activity.

A focus group member (T-FG-5) summed up the general situation, when he stated:

“If a Rohingya is caught red handed stealing a tree, they can get released through the actions of influential people, who are in fact involved in this crime.”

From the above statement it is clear that local influential pressure is responsible for the destruction of forest. These power relationships are a reflection of the traditional culture of the area. The social and political structure is hierarchical and sees different groups occupying different positions of power and influence; this is being reflected in the difficulties of wildlife sanctuary management, including undermining implementation of the co-management approach. To overcome this challenge a genuine change in political will and effective application of the law would be required, which may prove beyond the current regime.

6.2.6.3 Questionnaire survey responses

The respondents drawn from the local population were asked in the questionnaire if they agreed or disagreed with a statement that current law and enforcement is strong enough to conserve the forest. The results (Figure 6.36) suggest that in all four villages combined, 63% strongly disagreed, 30% disagreed, and 7% agreed. There is no statistical significant difference between male and female responses on this issue.

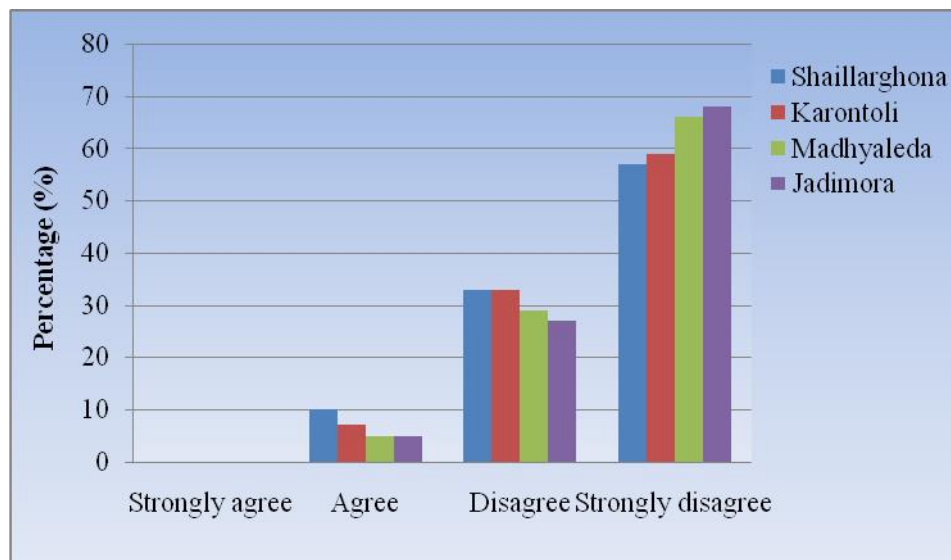


Figure 6.36 Villagers responses regarding strength of law enforcement.

6.2.7 Tourism issues

The Sanctuary lacks a site specific tourism management plan or dedicated staff although tourism is the main source of income for the Sanctuary. The visitor facilities have not been improved,

although it has an interpretation centre and dormitory for visitors. In this context the key inhabitants and village residents were asked about the impacts of tourism.

6.2.7.1 Responses from key informants

When the key informants were asked about the impacts of tourism, 31% of them responded that there are a lot of opportunities to attract tourists, but that the visitor facilities are inadequate. The Union Parishad Chairman (T-KI-1) captured this situation when he stated:

“To increase tourists, we need facilities to attract them. Elephants cannot be seen anywhere else in Bangladesh so, if they wanted, the Forest Department could have turned this into a profitable business. A system for collecting entrance fees is required, but neither the co-management committee nor Forest Department staff are looking into this. A gate fee collector was employed for the last three years, he hasn’t been paid any wages. This is our tourism industry!”

The IPAC coordinator (T-KI-6) added to this, stating:

“Tourism is a seasonal industry between November and April. Numbers are increasing now, but not significantly. Teknaf should be the tourist hotspot of Bangladesh if it was not for the short-sightedness of the Government.”

From the above statements it is suggested that there is tourism potential in Teknaf, but it is not happening due to a lack of government initiative.

6.2.7.2 Responses by focus group members

All the focus group members said that they would benefit if there were more tourists. Typical comments drawn from the focus group members that illustrated this sense of the benefits of tourism include a focus group member (T-FG-8) who stated:

“If tourists came, we could sell our bamboo and cane handicrafts.”

Another person (T-FG-8) in the same group added:

“Currently tourists come here for just 5-6 months when my husband works in tourist ship; like many other people my husband is jobless now. If we had tourists all year long, then there would be permanent jobs.”

The above statements indicate that local residents wish that tourism could help them by generating livelihood opportunities.

6.2.7.3 Questionnaire survey responses

Local respondents were asked whether they felt they benefitted from tourism. In all four villages combined, only 26% responded that they had benefitted (Figure 6.37). When, they were asked whether they are disadvantaged by tourism, the majority (77%) replied that they had not been disadvantaged (Figure 6.38). There are no significant differences between male and female responses.

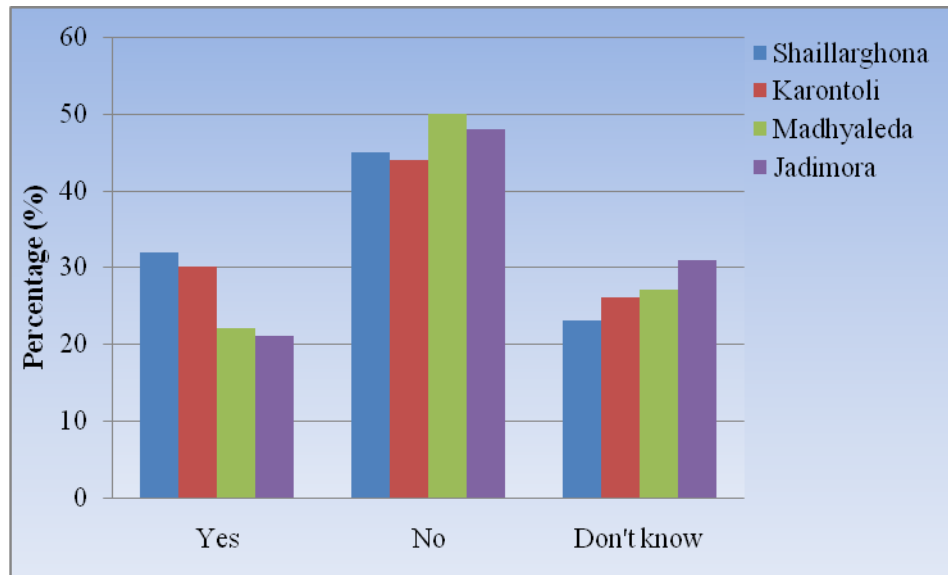


Figure 6.37 Percentage of respondents who felt that they benefitted from tourism.

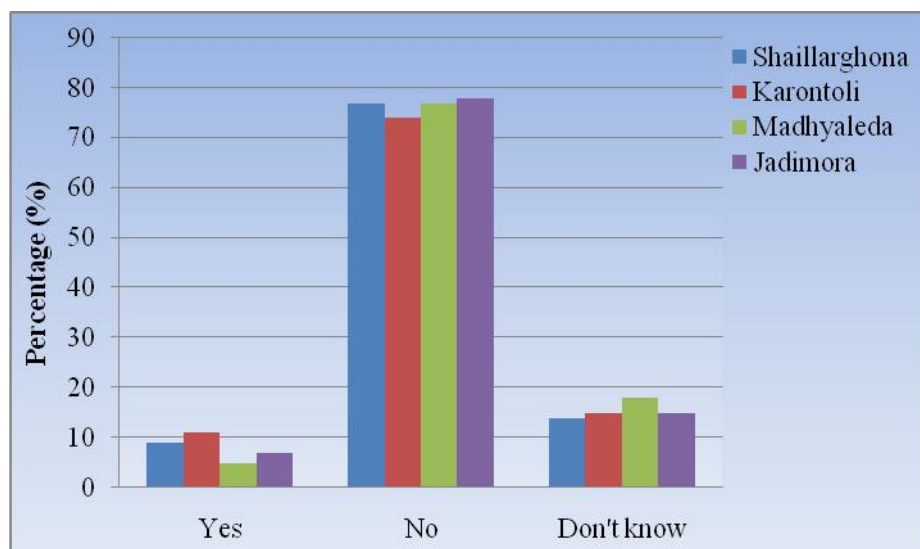


Figure 6.38 Percentage of respondents who felt that they had been disadvantaged by tourism.

6.3 Sunderbans Wildlife Sanctuary

The key informants for in-depth interviews were a village elder, Forest Department staff, NGO staff, a village doctor, a fish businessman, a local Union Parishad Chairman and a Union Parishad Member, two high level key informants representing major NGOs, and a well known environmental researcher (D-KI-1 and D-KI-2). Details of the in-depth interviews with key informants which are conducted in the case study areas are listed in Table 6.15.

Table 6.15 List of key people for in-depth interview.

Category	Gender	ID
Union Parishad Chairman, Secretary of the co-management committee	M	S-KI-1
Union Parishad Member	M	S-KI-2
Village elder	M	S-KI-3
Site facilitator (Integrated Protected Area Co-management)	M	S-KI-4
Village Doctor	M	S-KI-5
Coordinator(Integrated Protected Area Co-management)	M	S-KI-6
Village elder, Fish arottdar (fish businessman)	M	S-KI-7
Assistant conservator of forest	M	S-KI-8
CEO (IPAC)	M	D-KI-1
Researcher (IUCN)	M	D-KI-2

Eight focus group discussions were conducted, two for each village, both male and female. Details of the focus group discussions that were conducted in the case study areas are listed in Table 6.16.

Table 6.16 Summary of the focus group discussions in the case study areas.

Focus Group ID	Study village	Focus Group	
		Male	Female
S-FG-1 S-FG-2	Sarankhola	7	9
S-FG-3 S-FG-4	Bakultola	8	10
S-FG-5 S-FG-6	Baddamari	8	10
S-FG-7 S-FG-8	Hoglabunia	6	7
Total = 8 Focus Group Discussions		29	36

One hundred and fifty seven questionnaires were conducted, the list are presented in Table 6.17. The details of the implementation of questionnaire surveys were described in Chapter 3.

Table 6.17 Survey respondents.

Village	Total households	Questionnaires completed		
		Male	Female	Total
Sarankhola	550	25	28	53
Bakultola	400	19	21	40
Baddamari	64	13	18	31
Hoglabunia	70	15	18	33
		72	85	Total=157

6.3.1 Socio- economic characteristics of the respondent households

There is no human habitation inside the Sundarbans Reserve Forest except forest guard posts. There are 46 villages adjacent to the Sundarbans East Wildlife Sanctuary. Most are situated 0-2 km away from the forest boundary, and mostly depend on the Sundarbans for their livelihoods. The male villagers have to have more than one source of income due to the unpredictability of village based work and seasonal patterns (Table 6.20) for the collection of natural resources. There are various forest-based income sources (Table 6.19) such as fishing, crab, shrimp fry, golpata (*Nypa fruticans*), fuelwood, and honey collection. The village based income sources are day labor, shop and tea stall ownership, fish arottdar (fish businessman),

shrimp farm ownership, employment on shrimp farms and agriculture. Women also collect natural resources, and carry out domestic work in other villagers' homes. The respondents represent a reasonable mix of male and female, but the number of female respondents is higher than males, as males were busy fishing. The respondents also represent a good spread across the age ranges, particularly for the male respondents. The education levels of the respondents varied across villages (Table 6.18), although generally male respondents tended to be more highly educated than females and there is a statistically significant difference between them (Appendix 25). The social characteristics and livelihoods of respondents are presented in Tables 6.18 and 6.19, respectively.

Table 6.18 Social characteristics of respondents in the case study villages.

Village	Sample size	Gender (%)		Age category (%)										Education (%)									
		M	F	18-27		28-37		38-47		48-57		>57		Illit		PS		SSC		HSC		Gr	
				M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Sarankhola	53	47	53	5	4	15	25	11	19	11	6	4	0	9	23	25	30	7	0	6	0	0	0
Bakultola	40	48	52	5	5	20	22	13	20	5	5	5	0	10	25	25	25	5	3	5	0	2	0
Boiddamari	31	42	58	3	3	16	29	13	26	6	0	3	0	10	39	23	19	6	0	3	0	0	0
Hoglabunia	33	45	55	3	6	18	24	15	21	6	3	3	0	12	39	27	15	6	0	0	0	0	0

M= Male, F=Female, Illit= Illiterate, PS= Primary school, SSC=Secondary school certificate, HSC=Higher secondary certificate, Gr=Graduate

Table 6.19 Livelihoods of the respondents in the case study villages.

Economic activity (%)	Sarankhola (N=53)		Bakultola (N=40)		Boiddamari (N=31)		Hoglabunia (N=33)	
	M	F	M	F	M	F	M	F
Fishing	38	15	35	15	39	16	39	12
Fuelwood collection	17	25	18	23	16	26	18	24
Crab collection	6	9	5	10	3	10	6	9
Business	15	4	18	3	15	0	18	0
Day labor	15	6	13	5	13	6	12	6
Agriculture	13	11	15	13	0	0	0	0
Shrimp/Prawn farming	0	0	0	0	30	0	31	0
Other	15	8	20	5	16	6	12	6

Note: in some cases, there are multiple responses by the same respondent

Table 6.20 Sunderbans dependent livelihood in different seasons.

Livelihood group	Extracted resources	Harvesting season
Jele (fisher)	Fish, prawn fry, oyster, crab, snail	Round the year
Bawali (wood collector)	Timber	December to March
	Golpata (<i>Nypa fruticans</i>)	Mid December to mid March
Mawali (honey collector)	Honey, bee wax	March to June

The monthly income of respondents' varied moderately across the villages (Figure 6.39). The Boiddamari and Hoglabunia respondents tended to be somewhat less well off than the other villages. Within the communities there are also significant differences between male and female incomes (Appendix 26), where males earn more than females (Figure 6.40).

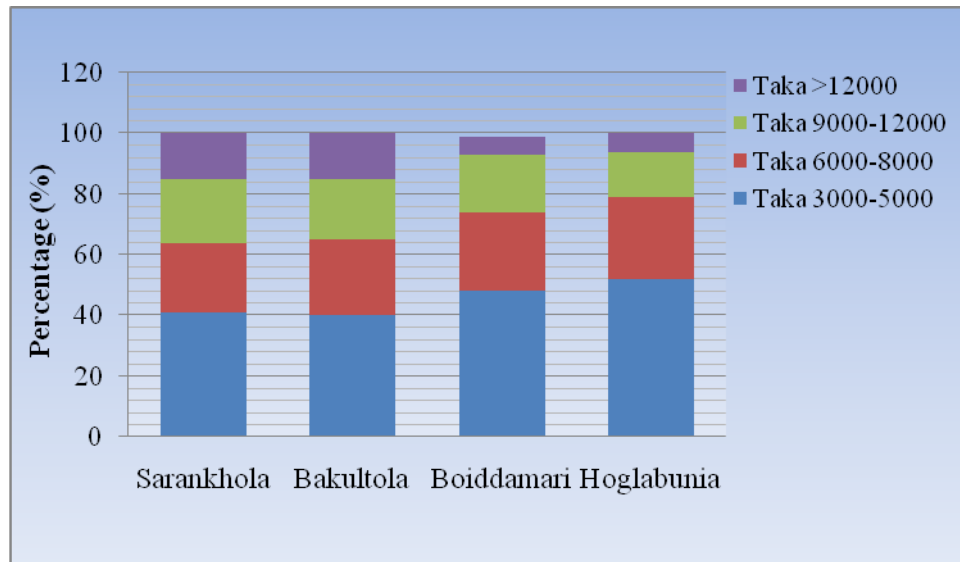


Figure 6.39 Monthly incomes of survey respondents (Bangladeshi currency 131.68 Taka=1 £).

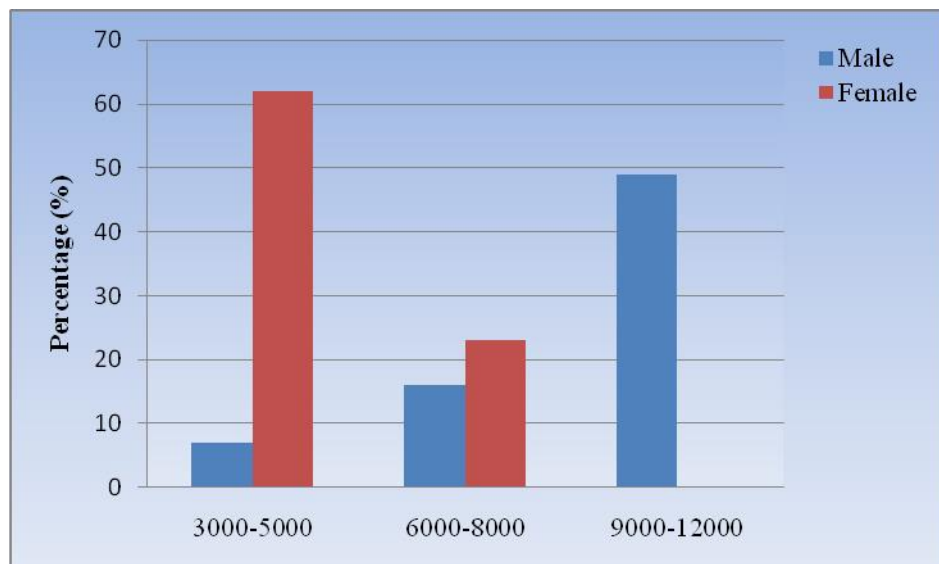


Figure 6.40 Monthly income by males and females.

6.3.2 Participation in the planning process

Participation of respondents in the management planning and attitudes towards participation in the planning process were explored through responses from interviews with key informants, comments drawn from the focus group discussions and the questionnaire survey results.

6.3.2.1 Responses from key informants

The key informants from within the Sundarbans study area (excluding the high level Dhaka based informants) were asked if they were aware of the existence of a management plan for the

protected area they lived in and if they had been involved in the management planning process. All knew about the plan; however, only 50% (4) had been involved in the management planning process.

In Sarankhola, the Union Parishad Chairman (S-KI-1) summed up the general situation when he stated:

“I know about the management plan. I am also a Chairman of the co-management committee. I was there when it was formed.”

6.3.2.2 Responses by focus group members

The focus group members were asked if they were aware of the management plan and their involvement in the management planning process. In all four villages, the respondents were neither aware of the plan nor involved in the planning process. However, some were aware of the co-management approach.

A male focus group member (S-FG-1) summed up what the majority of focus group members felt, when he stated:

“We are not aware about the management plan or its importance. But some of us are aware of the co-management approach.”

A female focus group member in another group (S-FG-4) added:

“We are not aware of the management plan and have not been involved in any planning process.”

The above statements indicate the problem within the local communities that local people do not have effective knowledge and active involvement in the management planning process.

6.3.2.3 Questionnaire survey of villagers

Overall only 13% (16) of the male respondents were aware of the management plan and 87% (105), both male and female respondents were not (Figure 6.41). Among those who stated that they were aware of the existence of the management plan, none of them were actively involved in the management planning process. Statistically there is a significant difference between male and female responses, with males showing more awareness than females (Figure 6.42) (Appendix 27).

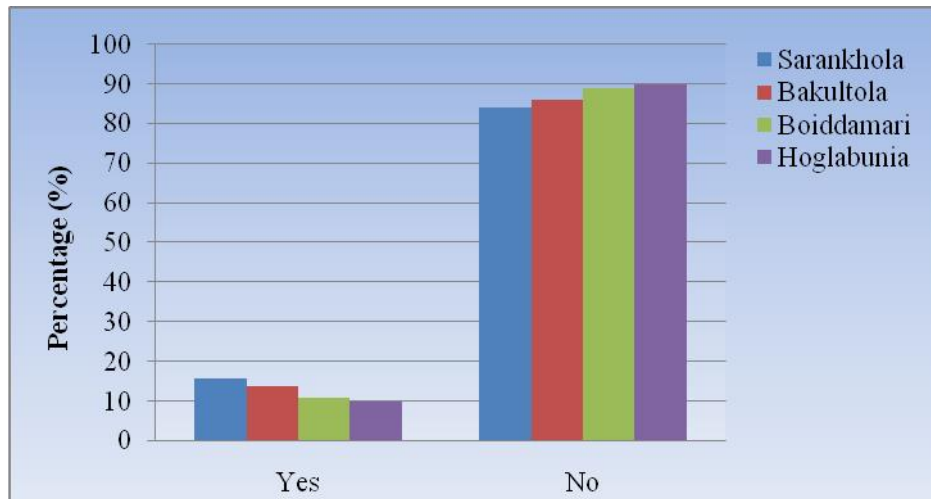


Figure 6.41 Awareness of local villagers about the management plan.

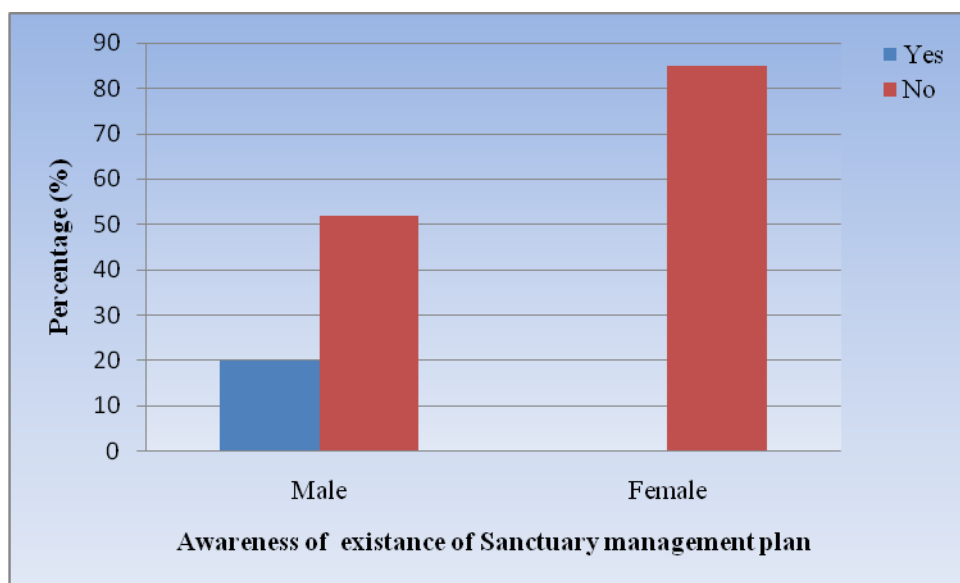


Figure 6.42 Awareness of management plan by males and females.

From the above results it is suggested that the local residents were/are not greatly involved in the management planning process, and there is a lack of integration between local communities and forest management.

6.3.3 Conservation conflicts inside the Wildlife Sanctuary

The conservation conflicts in the Wildlife Sanctuary are presented from the perspective of the interviews with the key informants, the information derived from the focus group members and the questionnaire survey results.

6.3.3.1 Interviews with key informants

A variety of conflicts were described by the key informants, i.e. illegal timber felling, fuelwood collection, fishing with poison, shrimp/prawn farming, poaching of wild animals, and a poor relationship between Forest Department and local residents; these varied across the different villages. Tiger-human conflict is also serious in the Sunderbans. In Boiddamari and Hoglabunia, shrimp/prawn farming, illegal tree felling, and fuelwood collection predominate. In Soronkhola and Bakultola villages, poaching of wild animals and fuelwood collection occur frequently. Fishing with poison and a poor relationship between Forest Department and local residents are reported in all four villages.

Fishing with poison is serious in all the case study villages, a fish arottdar (S-KI-7) summed up the general situation, when he stated:

“I have learnt that fishing with poison gives me 5 kg of fish but damages about 100 kg of fish. It destroys young fish and so endangers the future generations of fish. So, we will not find any fish later. The recent difficulties in fish availability give hints that there will soon be no fish resource. Currently, our area is among the most deprived in Bangladesh. Agriculture and fishing are the main sources of income. Due to the cyclones ‘Sidr’ and ‘Aila’, our arable lands have been rendered salty so almost no crops can grow and now the fish resource is being destroyed because of adding poison. Nearly all of us are unemployed. [.....] in desperation people go into the deep forest for fishing, and fall into the hands of bandits (e.g. kidnapped for ransom – added by author).”

The poor villagers mostly depend on the forest resources, they do not have other alternatives. The village elder (S-KI-3) stated:

*“..... the dependency on the forest resources has increased, increasing degradation [.....] tigers (*Panthera tigris*) go to the nearest village because they are short of food and fresh drinking water. There are active groups in the forest poaching wild animals, mainly deer.”*

From the above statements is clear that villagers are being pushed into fishing in the deeper forest because they have, by their own admission, damaged the fishing resources in their immediate locality; this has then left them vulnerable to attack by bandits. At the same time, damage to agricultural land from salt intrusion (as well as conversion of land for prawn farming) has encouraged the poaching of wild animals, mainly deer (*Axis axis*), which is a principle prey species for tigers; the tigers, are in turn, being pushed into entering surrounding villages in search of food.

Therefore, hunting and killing of wild life is a serious threat for wildlife conservation in the Sunderbans. The IUCN researcher (D-KI-4) added:

“Currently, the forest has two main problems, biological and socio-economic, there are no ways of combating the biological ones. The bigger issues are socio-economic. When I worked in the forest in 1969, there were 10,000 -15,000 people dependent on the forest. They collected leaves, honey and fuel wood, cut trees and hunted animals. Now, there are over 6 million people. It is not possible to satisfy the needs and demands of these from the forest. This is because Sunderbans is a mangrove forest and so is very slow growing [.....] although there are a few species which grow fast. However, the demand of the people dependent on the forest is very high and this is damaging the forest.”

The above statement indicates that ongoing increasing population pressure is causing serious damage to the forest.

6.3.3.2 The views of the focus group members on conservation conflicts

In all four villages the main conflicts were illegal tree felling, fuelwood collection, fishing with poison, shrimp and prawn farming, poaching of wild animals especially deer and tiger, a poor relationship between Forest Department staff and local residents, and fisherman have conflicts with bandits while fishing. Frequently fishermen are kidnapped by bandits and have to be released by the payment of a ransom. But it is difficult for the poor fishermen to access a large amount of ransom money; this has to be borrowed from money lenders who charge high interest rates. It has been reported that there are between 40 to 50 pirate groups operating inside the forest, illustrating the scale of the problem. Extracts from the focus group discussions usefully illustrate the range of conflicts experienced by the local residents.

In Bakultola village a focus group member (S-FG-3) illustrated the corrupt behaviour of the Forest Department staff, when he stated:

“.....the forest staff come to the homes of fishermen and give them permits. They encourage fishermen then to fish in core areas in return for money despite this being forbidden.”

The above statement is significant as it suggests that some Forest Department staff members are contributing to, rather than combating, conservation problems.

An additional problem for local fishermen is the activity of pirates in the region. A fisherman in the same group (S-FG-3) illustrated the danger faced by local fishermen:

“Currently, around 150 to 160 fishermen are locked up and will only be released if a ransom is paid. Three fishermen have been killed because payment was not made on time. Neither the police, the Rapid Action Battalion, nor even local politicians could do anything.”

Another in the same group (S-FG-3) added:

“The ransom varies with the size of the boat and the fisherman’s financial situation. If the boat is big, for example for seven men, then they demand 50,000 taka, about 7,000 per person. If the boat was for three people, then it would be about 5,000 taka for each of them.”

Others in the same group stated that sometimes the bandits demand ransom in the form of food and other items, such as mobile phones, rice, chickens, vegetables as well as money. A fisherman (S-FG-3) in the same focus group added:

“The fisherman collects ransom money from the money lenders and fish wholesalers, the wholesalers pay 30,000-40,000 taka in advance to secure supply from the fishermen, so they contribute to ransoms. If the fishermen are killed, then the wholesaler loses his early investment. But the wholesalers buy the fish direct for lower prices than in the market.”

These statements serve to emphasise the scale of the victimization of the fishermen by the pirates as those apparently helping to provide the ransom money (money lenders, fish wholesalers) are actually charging high interest on the amount supplied, thereby doubly the victimization of the fishermen.

In all the case study villages, fishing with poison is a serious issue indicating that the fishermen are engaged in environmentally irresponsible behaviour themselves. A focus group member (S-FG-1) in Soronkhola confirmed this with the indicative statement:

“Everybody knows that fishing with poison is bad and we will not get fish in the future. But we continue as everyone thinks that if they stop others will continue. So, we need a negotiation with all those involved to stop this practice.”

The fish businessman in the same group (S-FG-1) added:

“.....if I refuse to buy fish caught by using poison then other fish buyers will, so why shouldn’t I? We all need to agree that the fishermen will not use poison, and fish buyers will refuse fish caught by this method.”

From the above two statements it suggested that negotiation is required with the fisherman, fish businessmen, and the Forest Department staff to stop fish from being poisoned.

Natural disasters exacerbate the already difficult situation by contributing further damage to the forest. A focus group member (S-FG-3) stated:

“The main problem is the soil has lost its productivity. The last ‘Aila’ cyclone covered the land with salt and the salinity has not receded.”

This statement indicates that climate change induced salinity intrusion is likely to affect the productivity of the Sunderbans.

Tiger-human conflicts are also occurring in the Sunderbans. Currently the forest areas are experiencing environmental degradation and over exploitation of forest resources, squeezing of forest areas due to expansion of human habitat in and along the edge of the forests and extensive poaching of wild animal especially the deer. An important result of these problems was articulated by a focus group member (S-FG-1), who stated:

“Deer poaching is very common in the Sunderbans. [.....] so, due to shortage of food the tigers enter into the village for food.”

From the above statement it is clear that forest degradation is perceived by many to increase the likelihood of tigers moving out of the forest into the adjacent villages in search of food.

6.3.3.3 Survey responses to conservation conflicts

The issues which were identified in the questionnaire survey are presented in Table 6.21. In all four villages combined, the main issues are – restriction on park resources (60%), wildlife poaching 31%, illegal tree felling (32%), fishing with poison 52%, poor relationship between Forest Department and local residents (28%), and other 23%. Shrimp/prawn farming is also a major issue in Boiddamari and Hoglabunia. There were no significant differences between male and female responses.

Table 6.21 Conflicts identified by survey respondents.

Park-people issues (%)	Sarankhola (N=50)		Bakultola (N=38)		Boiddamari (N=29)		Hoglabunia (N=30)		Overall average %	
	M	F	M	F	M	F	M	F		
Restriction on park resources	34	28	32	29	31	28	30	27	32	28
Poaching	24	12	28	14	15	9	13	10	20	11
Shrimp/Prawn farming	0	0	0	0	23	18	25	15	12	8
Illegal tree felling	17	11	18	14	16	15	19	14	18	14
Fishing with poison	33	21	34	19	30	18	29	21	32	20
Poor relations between Forest Department staff and local residents	20	13	18	10	15	9	18	8	18	10
Other	18	10	15	8	12	7	14	8	15	8

Note: on some issues, there are multiple responses by the same respondent.

In all four villages the majority (81%) felt that before the management plan was implemented conflicts were moderate to low; only 19% felt that it was high (Figure 6.43).

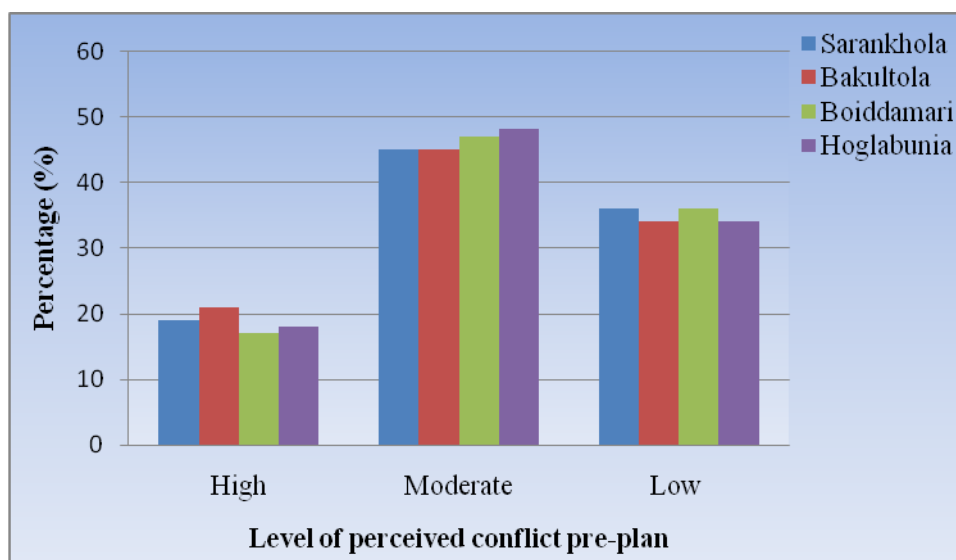


Figure 6.43 Perceived level of pre-plan conflict in case study villages.

Across all four villages, 44% respondents feel that the level of conflict has increased since the plan was implemented (Figure 6.44), 18% felt that the conflict has decreased, while 38% felt there was no change. The results suggest that there has been no change in the level of conflict,

with, perhaps, a slight increase. The management plan has not had a positive impact in reducing conflict and may, in fact, have exacerbated the problem.

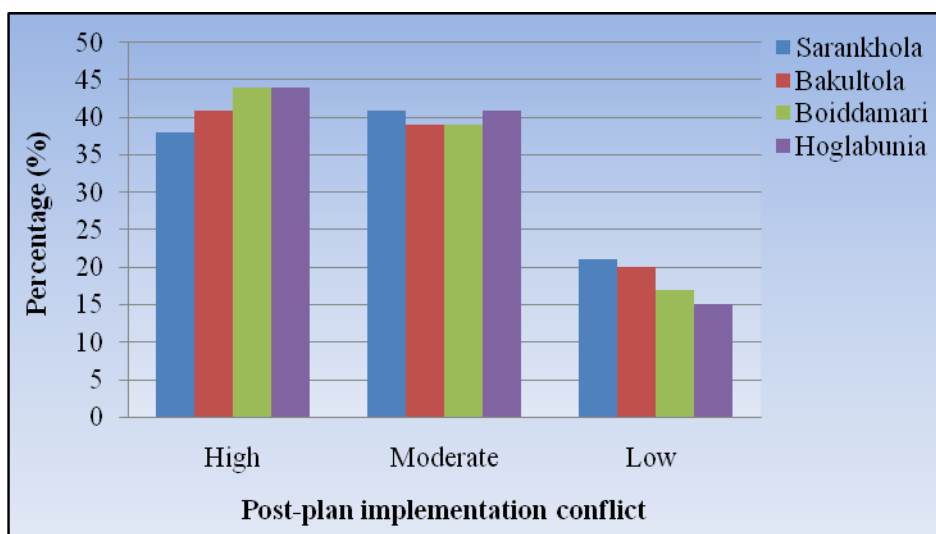


Figure 6.44 Perceived direction of change in conflict post-plan implementation.

The differences in pre and post-plan conflict reported in the questionnaire survey were statistically significant (see cross-tabulation results in Appendix 29).

The questionnaire respondents were asked to identify the types of encroachments happening in their villages, selecting from a list of options. These varied across the villages, as illustrated in Figure 6.45. The cultivation of crops emerged as the most commonly reported in Sarankhola and in Bakultola. Human settlement is also significant in all the villages. In Boiddamari and in Hoglabunia shrimp farming was seen as significant.

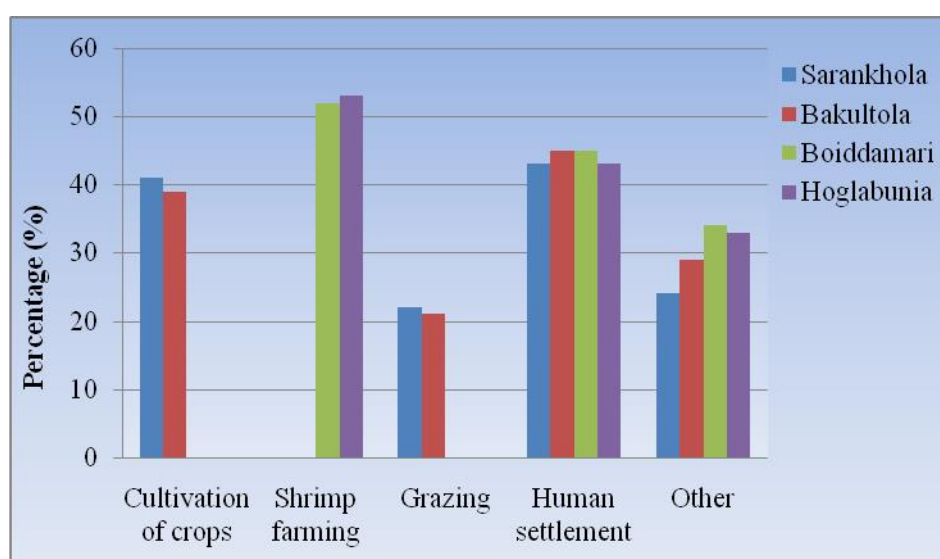


Figure 6.45 Main types of encroachment inside the Sanctuary.

Across the four villages, 18% felt that before the plan was implemented encroachment was high, 48% felt that it was moderate and 34% low (Figure 6.46). There were no significant differences between male and female responses.

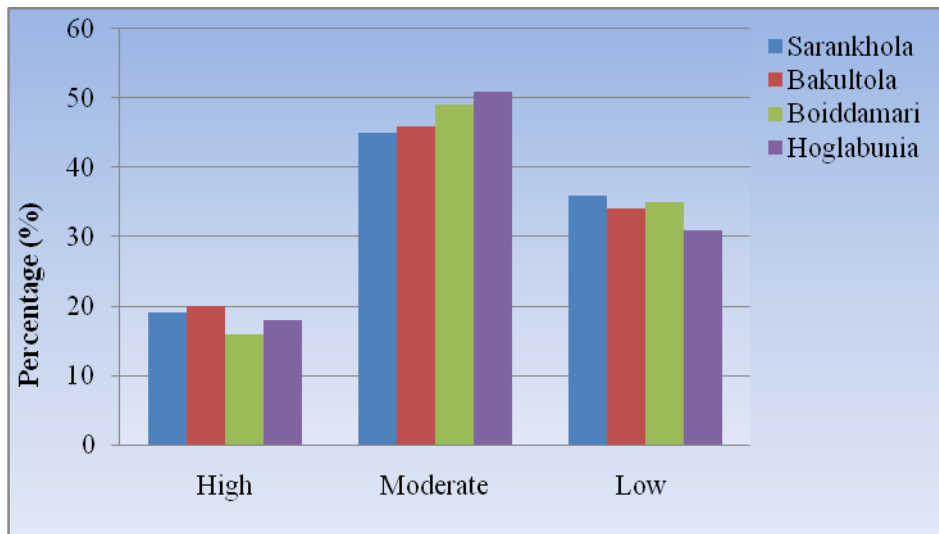


Figure 6.46 Perceived pre-plan encroachments inside the Sanctuary.

When asked if level of encroachment been affected by the plan, 43% of respondents felt that the situation had not improved, 41% felt that it had increased, and only 16% felt that it had decreased since plan implementation (Figure 6.47).

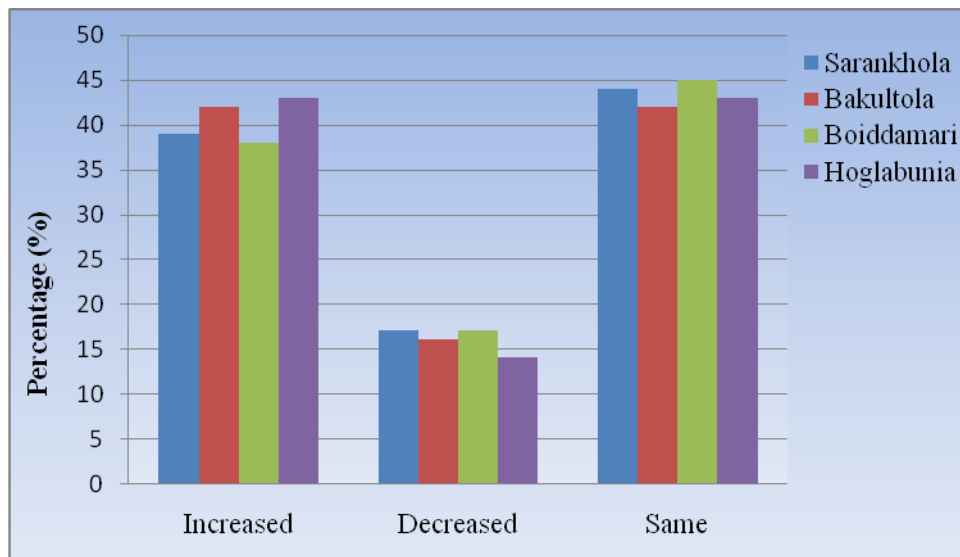


Figure 6.47 Perceived changes in encroachment post-plan implementation.

The above results suggest that encroachments were a problem before the implementation of the management plan, and remain so, casting uncertainties about the effectiveness of the management plan in controlling encroachment.

Fuelwood collection, timber felling, and encroachments into reserves for harvesting forest resources were evident during field visits (Plate 6.12).



Plate 6.12 Fuelwood collection and timber felling inside the Sunderbans.

6.3.3.4 Suggestions for addressing conflicts

The key informants suggested that conservation education programs were required to raise awareness, promote alternatives to reduce dependency on forest resources, involving local people and other stakeholders in decision making and developing a better relationship with Forest Department staff. Public awareness and education is necessary to reduce the conservation conflict, a school teacher in a focus group member (S-FG-4) stated:

“The remedy for all problems is education. There is not even a primary school in this village. If someone is educated then they will not remain dependent on the forest. One educated man will make others educated; the society will run by educated people. We cannot be proud because people from other areas think of us as fish or tree thieves. Establishing many schools, and constructing roads could be a way to save us from poverty.”

A fish businessman (S-KI-7) felt the necessity for government initiatives to re-introduce agriculture, provide loan facilities to promote alternative income facilities to the villagers, when he stated:

“The agricultural lands must be treated for salinity to make them productive. Government initiatives and aid is required. [.....] and in addition good quality seeds as none are available in the market, as well as loan facilities. The Government must stop fishing using poison by using a strong hand. The pirates must be controlled. If these steps are not taken there will be a calamity.....as there is real poverty in our area. People lack jobs and they need employment.

Despite this, they do not like to fell trees. Some support their family by collecting fuel wood to sell but this is hard work and they have to deal with fear of tigers, crocodiles, snakes, forest officers and so on. If you looked at their hands and legs, you would see they have been repeatedly cut and grazed and are permanently disfigured. I know that if there was any other source of income, they would not go into the forest. If proper arrangement for employment was made, it could improve the current situation. [.....] our innocent fishermen are either losing their money by paying ransoms or giving their lives. So, in my opinion, creating employment opportunities and restraining bandits would change the situation in a positive direction.”

The IPAC co-ordinator and co-management committee member (S-KI-6) supported the need for alternative livelihoods, and establishment of an embankment to stop salt water intrusion, when he stated:

“If we can find livelihood options, then we could reduce the forest dependency of local people. If we could stop the salt-water from the sea using a dam and return this land to agriculture then we may be able to develop this area. In the past, local people cultivated paddy, fruits and vegetables so they didn’t need to buy anything. The fields had crops, cows gave milk, and rivers had fish. But now nothing is left and people have become completely forest-dependent. Help is needed to return the land to its previous state then people would be less forest dependent.”

The IUCN researcher (D-KI-4) agreed on the need for alternative livelihood opportunities, when he stated:

“There are two ways of tackling the current problem in Sunderbans, these are either to relocate people to another area, or to ensure that the needs of local communities are met by alternative sources.”

From the above two statements it is suggested that if local people obtain any alternative sources of income then it could reduce their dependency on the forest. The establishment of a dam could reduce the salt water intrusion, re-introduce agriculture and local people could then involve themselves more in agriculture.

A focus group member (S-FG-3) implied that the corruption of local government was also responsible for the degradation of forest resources, when he stated:

“..... we do not want any Government help, but only the international help that we are entitled to, fully and completely without any corruption. We do not want to destroy the forest

which protects us from natural calamities. We want to earn an honest living through cultivation.”

From the above statement it is indicated that corruption of local government is also responsible for the poor condition of local residents.

A women focus group member (S-FG-4) added:

“If we would get some loans we would be able to do some business for our livelihood. If the road connectivity was improved we could sell our vegetables to the urban areas.”

From the above statement it is clear that access to employment opportunities is vulnerable to the incredibly poor road conditions, particularly during the monsoon season.

The villagers stated their inability to support themselves and their families by means other than collection of forest resources from the Sunderbans. A focus group member (S-FG-5) in another village stated:

“The villagers enter into the forest to collect various things but only for their livelihood. There are many fears and threats, such as they might be killed by tigers, crocodiles, pirates and a poisonous snake.”

Another focus group member (S-FG-3) added:

“.....very recently a man was killed by a crocodile while he entered the forest for livelihood purposes.”

From the above two statements it is clear that local residents go to the forest confronting the threat of the tiger, crocodiles, snakes and pirates, so that they can maintain their families.

The CEO of Arannayk Foundation (D-KI-6) illustrated the limitation of the Forest Department, when he stated:

“The Government has made several mistakes and if these were redressed, then the forest would become normal again. For example, there is not enough skilled labour to manage the forest, any good quality housing facilities for the Forest Department staff, and not enough arms or finance to combat tree thieves.”

A focus group member (S-FG-3) pointed out vulnerability:

“Natural calamities are a great threat; cyclone ‘Sidr’ (2007) and ‘Aila’ (2009) caused serious damage to our area. This increased the salinity of our agricultural land and so it lost its fertility.”

If the Government established a 10-12 feet high dam it would protect our land from further natural calamities.”

The villagers urged the building of an embankment to reintroduce agriculture, a focus group member (S-FG-5) stated:

“Now we all feel that agriculture is better. At first, we need to build an embankment along the bank of the river in order to save our lands from salt water. Only if all the large and small rivers, and canals are blocked will the agriculture be restored.”

Water salinity is increasing throughout the Sundarbans area, bringing about changes in land use practice and reducing the amount of agricultural work available in villages. A focus group member (S-FG-5) illustrated the general situation, when he stated:

“The poor villagers do not have their own land for cultivation or shrimp farm. Previously, when the lands were used for rice cultivation, the poor villagers could live on that. A shrimp farm does not need many workers; it can be run by only three to five, more are needed to produce agricultural products from the same area of land. So, the rich people are becoming richer while the poor go in to the Sunderbans in search of food and are being attacked by tigers, crocodiles, and bandits.”

Another focus group member (S-FG-7) added:

“.....there is no loss with agricultural work. We can easily get crops at home and many people can work together in the field. In contrast, shrimp hatchery only employs a few people.”

From the above four statements it is clear that employment concerns are heightened by other problems such as salt water intrusion as well as terrible weather and, in some areas, soil erosion which degrades agricultural land via inundation with saline water. Therefore, the agricultural land is now converted to shrimp farming which has had a negative impact on local residents by reducing the number and yield of local crops, including vegetables, and associated employment opportunities.

During field visits, lack of drinking water was observed; the Forest Department created artificial ponds for the villagers with the help of the USAID (Plate 6.13).



Plate 6.13 Drinking water pond in the Sunderbans.

The suggestions made by questionnaire respondents are presented in Table 6.22. Across all four villages combined, an average of 73% of respondents focused on economic benefit as a way of reducing conflicts, 33% suggested implementation of effective law enforcement, 28% felt that involvement of local people in management planning is basic to reducing conflict, 19% suggested the importance of conservation education; 28% mentioned developing relationships between local people and forest staff, and 30% wanted permission to collect forest resources in a controlled manner, 26% suggested others such as establishing an embankment, converting shrimp farm to agricultural land and compensation of people affected by tiger and crocodile attack. There were no significant differences between male and female responses.

Table 6.22 Questionnaire respondents' suggestions for reducing conflict.

Suggestions (%)	Sarankhola (N=48)		Bakultola (N=36)		Boiddamari (N=26)		Hoglabunia (N=29)		Overall average (%)	
	M	F	M	F	M	F	M	F	M	F
Economic benefit	37	34	38	33	39	34	40	36	39	34
Implement effective law enforcement	21	10	22	11	25	10	23	11	23	10
Involve local people in management planning	20	9	18	10	19	8	20	8	19	9
Give permission local people to collect forest resources in controlled basis	16	13	15	13	17	14	16	15	16	14
Develop relationship between local inhabitants and Forest Department staff	13	10	16	12	17	14	15	13	15	13
Conservation education	11	9	12	7	11	8	10	7	11	8
Other	18	10	15	8	18	6	19	7	18	8

Note: on some issues, there are multiple responses by the same respondent

6.3.4 Perceived effectiveness of the co-management approach

The awareness and participation in and attitude towards the co-management approach by key informants, focus group discussion members and local villagers are described in the following sections.

6.3.4.1 Responses from key informant interviews

All of the key informants were aware of the co-management approach, although only 50% (4) had been involved in developing this.

The Chairman of Union Parishad, also a co-management committee member (S-KI-1) said:

“.....our first duty is to build people’s awareness and this is our objective. I am not going to claim a 100% success rate, but our efforts are making positive progress. People are now more aware than the past. Up to now, we have not received any funding but hopefully we shall get some very soon. Our co-management committee is now more consolidated and well organized and with this backing I was able to stop the sale of deer meat in the bazaar and burning of wood in the brick fields with the result that four have now closed. Now it is difficult to imagine the killing of a single deer in the forest. I am proud to have achieved these things, and I would convey my deep gratitude to the co-management committee.”

The typical attitude is represented by a village elder in Sarankhola (S-KI-3):

“The co-management committee is doing some work in the forest for example repairing roads and bridges, arranging awareness raising programs for the villagers, and providing some incentives although these are negligible compared to the population.”

A co-management committee member and IPAC coordinator (S-KI-6) reported that some public awareness has increased through the activities of co-management, when he stated:

“The co-management committee has increased awareness among the local people. Previously deer meat was available for sale openly in the market, now it is not.”

He (S-KI-6) also mentioned the limitation of co-management approach.

“.....if all the activity of the co-management committee was free from political influence, the results would be 100 times better. We are trying to use political power to keep it free of political influence. But now, politics has spread to ward and village level. So it has become difficult to make forest improvement programmes free from political influence.”

The above statements suggest that the co-management committee is doing some activities such as stopping sale of deer meat in the local market, which was very frequent previously, repairing roads and bridges, arranging awareness raising programs for the local residents, and providing some incentives to reduce the forest dependency.

6.3.4.2 Responses from focus group members

In all four villages, almost all focus group members responded that they had received some benefits from the co-management, although this was inadequate compared to the large number in the population.

A focus group member (S-FG-3) from Bakultola village summed up the general situation, when he stated:

“The co-management committee have constructed some roads and provided some benefits such as they distributed fish fry to some of our villagers”.

A female focus group member (S-FG-4) confirmed:

“The co-management committee gave us fish fry for farming, and sewing machine for tailoring”.

Another (S-FG-4) in the same group stated the activities of co-management:

“The president of the co-management committee is the Union Parishad Chairman. He can do everything he wishes. Currently public awareness has increased through the activities of co-management.”

The above statements indicate that the local residents received some benefits through the activities of co-management.

6.3.4.3 Questionnaire survey responses

Respondents were asked whether they were aware of the co-management approach. In all villages combined, 62% (97) were aware of the plan and 38% (60) were not (Figure 6.48). Responses by male and female are almost same.

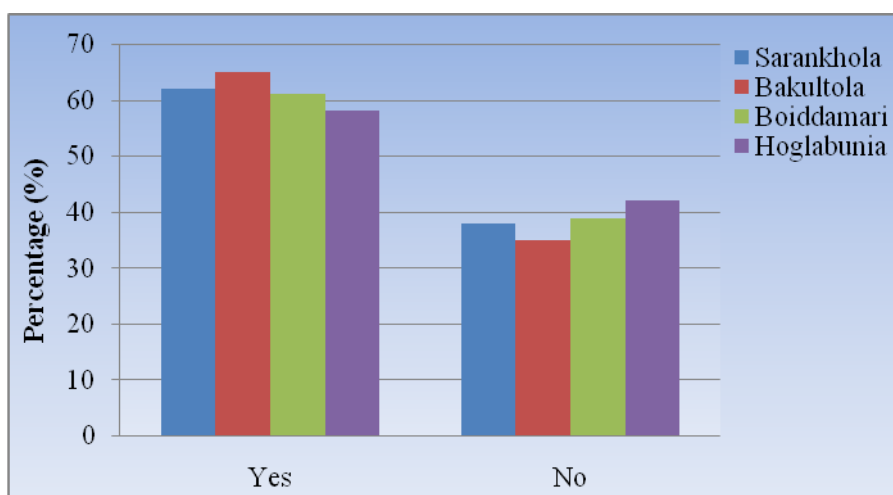


Figure 6.48 Awareness of local people about the co-management plan in the Sanctuary.

In all villages combined, of those who were aware (97) of the co-management approach, 51% (49) of the respondents had benefitted from this while 49% (48) had not (Figure 6.49).

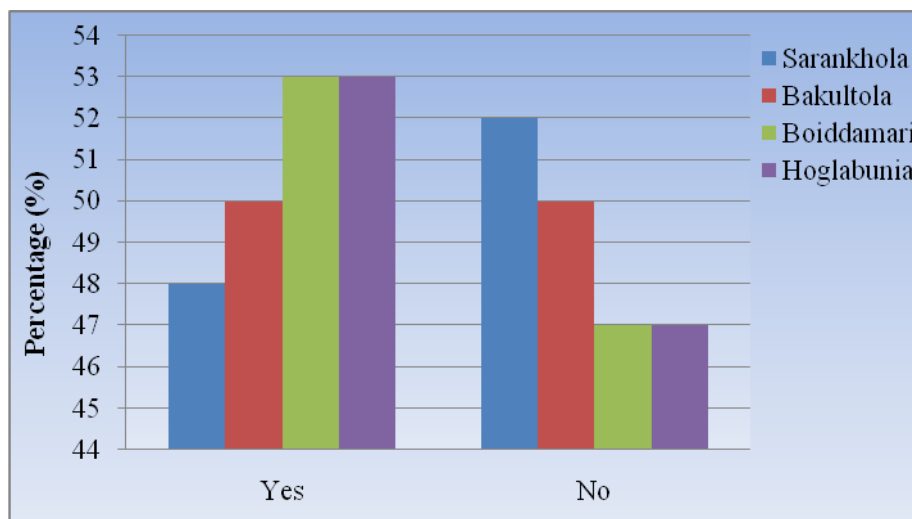


Figure 6.49 Percentage of respondents who felt benefitted as a result of co-management approach.

In all villages combined, of those who (48) were not advantaged by the co-management approach, 33% (16) were disadvantaged by it (Figure 6.50).

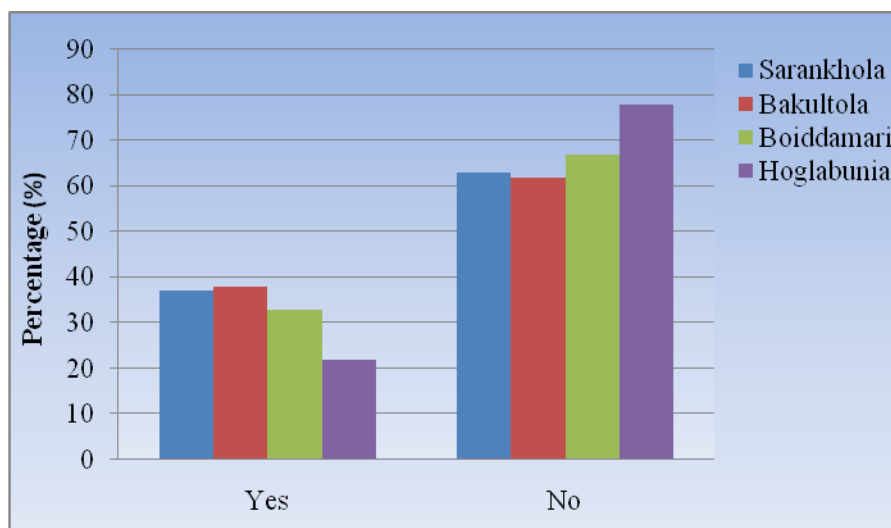


Figure 6.50 Percentage of respondents who felt disadvantaged as a result of co-management Approach.

6.3.5 Impact of the management plan

The management plan impacts are discussed in sections 6.3.5.1 to 6.3.5.4 using information derived from key informants, the focus group discussions and the questionnaire survey results.

6.3.5.1 Relationship between the Forest Department staff members and the local communities

The key informants and focus group members were asked about the relationship between local people and forest staff; diverse opinions were expressed by them on this issue, suggesting that the relationships are complex. A fish businessman (S-KI-7), for example, stated:

“.....there is no big conflict. Although some tree felling still occurs, this is assisted by the forest staff. They can stop tree felling if they want to. If the forest staff members are honest, no one can take even a single leaf from the forest. Tree felling occurs less in East Sundarbans so in this area, the local inhabitants do not have any major conflict with the forest staff and they are aware of the economical problems here so are not so strict with the fuel wood collectors. They only advise them not to cut any green shoot or saplings.”

A female focus group member (S-FG-4) illustrated the difficulty of their relationship with forest staff when it was stated that:

“We really have no relationship with the forest staff; they (forest staff) keep good relations with thieves, and those who collect fish and golpata (Nypa fruticans).”

The statement above hints at a situation, confirmed by the focus group discussions, in which the forest department staff sometimes issue licences for fishing and collection of golpata upon receipt of bribes, leaving honest villagers with a negative view of the forest department staff and unwilling to have any involvement with them.

A focus group member (S-FG-3) added:

“.....they (forest staff) do not have a good relationship with IPAC staff. This is because of the (villager) awareness developed through co-management, which has limited the corrupt practices of the forest department staff resulting in a decrease in their illicit income.”

The above three statements are indicative of a general sense that Forest Department staff are involved in corrupt activities. However, in this situation it appears that the Forestry Department staff members have grown more tolerant of the fuel wood collection activity of local villagers because of recognition of the pressures that they face. Simultaneously, it might be argued that the villagers' activity is regarded as insignificant relative to the scale of corrupt behaviour being practiced by Forest Department staff.

Of the questionnaire survey respondents overall, 48% replied that they had a good relationship with the forest staff, 32% replied it was poor, while 14% replied it was very poor, and 6% had a very good relationship with them (Figure 6.51). There were no significant differences between male and female responses.

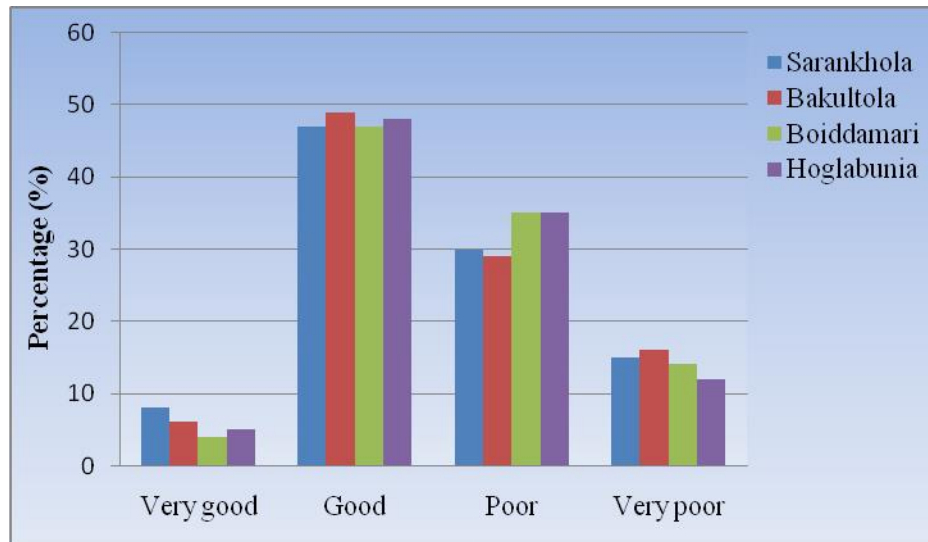


Figure 6.51 Respondents' views on the relationship with Forest staff.

6.3.5.2 Conservation education

Almost all key informants responded that the Forest Department does not provide sufficient conservation education programs, although some are available on fish poisoning. A few responded that IPAC provided some additional ones through the co-management committee.

A focus group member (S-FG-3) stated the benefits of co-management, when he stated:

“We received some training on public awareness through co-management. Now we are aware that deforestation is threat to the environment and we need to save the forest for ourselves.”

The local people were asked whether they had experienced any conservation education program provided by the Forest Department. In all villages combined, 25% responded that such a program had been provided, while 75% responded that it had not (Figure 6.52).

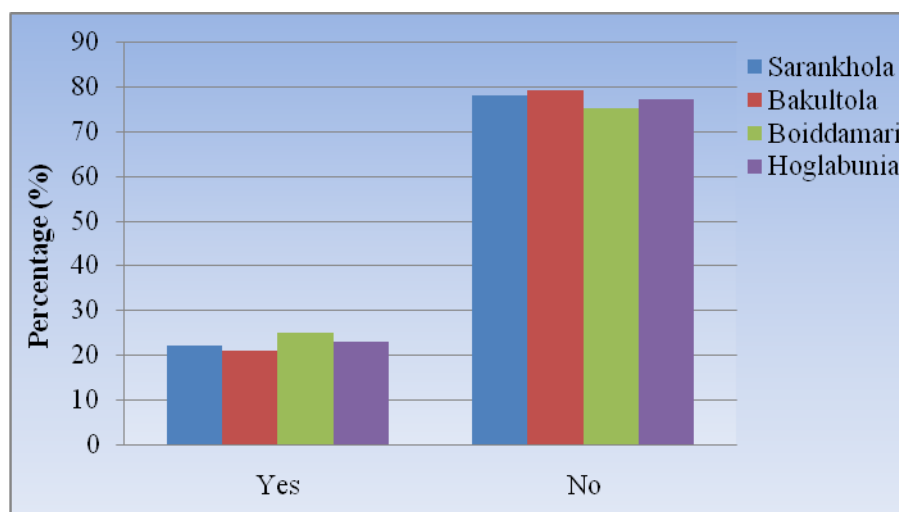


Figure 6.52 Respondents' views on their experience of conservation education programs.

6.3.5.3 Alternative income generation activities

The key informants and focus group members were asked whether the local inhabitants had received any training or other encouragement from the Forest Department to develop alternative livelihoods. Almost all responded that the Forest Department does not provide support for this, but they received some training and financial benefit from the co-management committee. The IPAC coordinator (S-KI-6) stated:

“..... providing livelihood is not IPAC’s duty but only to establish co-management systems. However, we try to increase livelihood options by giving fish, vegetable seeds and seedlings for farming, and sewing machines to people; we have also provided fertilizer making training and equipment. We are testing these methods to see which is most effective.”

The local residents illustrated their inability to support themselves and their families by means other than natural resource collection from the forest, when a focus group member (S-FG-5) stated:

“If we do not go to the forest we will die of hunger. We want work; we do not like going to the forest and wouldn’t if there was any alternative.”

From the above statement it is indicative that lack of employment opportunities in surrounding villages’ results in extensive dependency on the Sunderbans’ natural resources for income.

The respondents to the questionnaire survey were asked if they had received any alternative income support provided by the Forest Department. In all villages combined, 16% of respondents responded that they had received some benefits via the co-management, but 84% responded that they had not (Figure 6.53).

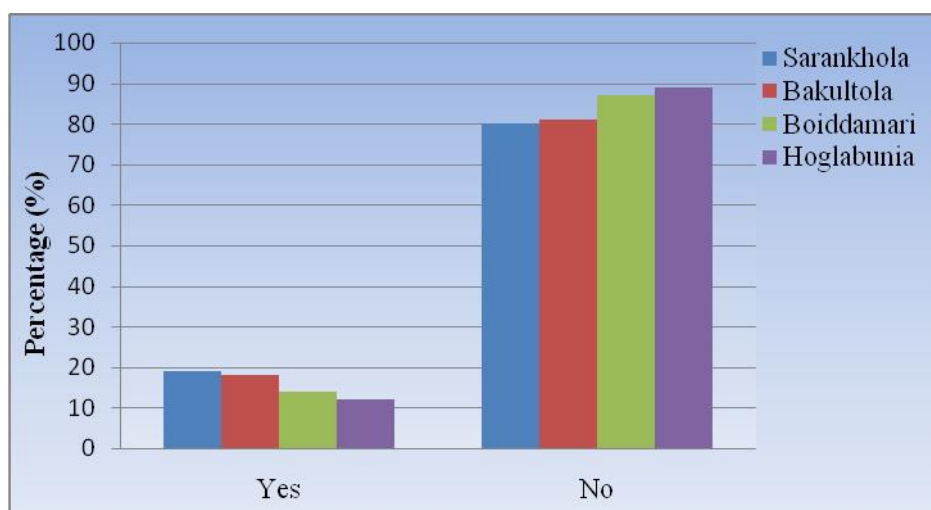


Figure 6.53 Respondents’ views on experience of alternative income generation activities.

6.3.5.4 Benefit sharing

The key informants were asked about the benefit sharing with the local communities, almost all of them responded that they are not aware about it. Awareness of this was limited as illustrated by the comment of the Union Parishad Chairman, also Secretary of the co-management committee, (S-KI-1)

“We haven’t yet received any revenue. The Government order has not been implemented.”

A focus group member (S-FG-1) stated:

“We do not get any benefit from the Forest Department but get some from co-management.”

The respondents to the questionnaire survey were asked if they agree or disagree with the statement that benefit sharing had happened for the development of communities. In all four villages combined, only 1% (2) agreed that they had received benefits, 32% (50) disagreed, and 67% (105) strongly disagreed that they had received benefits (Figure 6.54). There were no statistically significant differences between male and female responses.

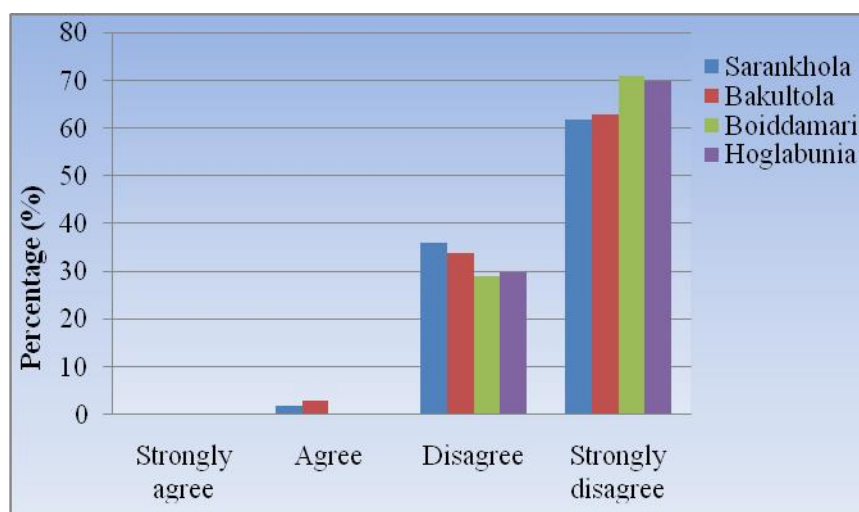


Figure 6.54 Villagers’ responses when asked to agree or disagree that benefit sharing is happening in the local communities by the Forest Department.

6.3.6 Institutional, political and local issues

The influence of institutional, local and politically influential actors on local environmental concerns is discussed from the perspective of the interviews with the key informants, the information derived from the focus group discussions and results of the questionnaire surveys in sections 6.3.6.1 to 6.3.6.3.

6.3.6.1 Responses from key informants

The key informants were asked whether they agreed or disagreed with a statement that current law enforcement is strong enough to save the forest, almost identical responses were reported about the limitations and corruption of the Forest Department, local pressure, and inadequate law enforcement. The CEO of IPAC (D-KI-1) illustrated the general situation on this issue, when he stated:

“.....but there are problems. There are tensions between the many political parties, Government supporters, and the oppositions. Each one demands the involvement of their people in our work. This is the problem of political influence.”

The IUCN researcher (D-KI-4) illustrated that current law enforcement is not sufficient to save the forest, when he stated:

“Definitely the law enforcement is insufficient. The attitude and character of the country’s ministers and secretaries are reflected in every aspect of the country. If the minister is corrupt, then how will law enforcement be adequate? Corruption has entered the lifeblood of every aspect of this country, and the law enforcement mirrors this.”

The CEO of the Arannayk Foundation (D-KI-6) added:

“Law is meant to be equal for everyone, for the normal man and the minister. But is it so in practice? [.....]But if the ‘minister sir’ does something it isn’t wrong, but if an ordinary man does the same thing, it is a terrible crime. If such discrimination exists, how likely is it that ordinary people will protect the Government’s forest? [.....] the Government thinks that the forest is being destroyed by the ordinary people but in reality, it is the influential, corrupt people, who do this with the help of the forest staff. If law was enforced then the condition of the forest would be a lot better. [.....] but I will say one thing, the police and administration seem to follow the orders of the influential corrupt people, rather than these obeying the police and the administration. Promotion, posting and money motivate them to follow the orders of the corrupted people.”

The above statements suggest that current law enforcement is not adequate to conserve the forest resources, there is a lack of transparency for the implementation of law enforcement, and it should be the same for everyone. The administration department has to be strong enough so that they can work independently without the influence of the government.

6.3.6.2 Responses from focus group members

The focus group members were asked whether they agreed or disagreed with a statement that current law enforcement is strong enough to save the forest. A focus group member (S-FG-3) summed up what the majority of focus group members felt when stating:

“Soronkhola is the smallest sub-district of Bangladesh consisting of only four unions. But due to the Sundarbans, the government tax revenue is the highest in this area so forest officers pay high bribes to get posted here. They then help people in their misdeeds in order to make this money back, illegally, by taking bribes themselves.”

From the above statement it is clear that Forest Department staff are involved in illegal activities inside the forest.

6.3.6.3 Questionnaire survey responses

The respondents were asked whether they agree or disagree with a statement on the strength and effectiveness of law enforcement. In all four villages combined, only 4% (6) responded that they agreed with the statement, 37% responded disagreed (58) and 59% (93) responded that they are strongly disagreed (Figure 6.55). Statistically there were no significant differences between male and female responses.

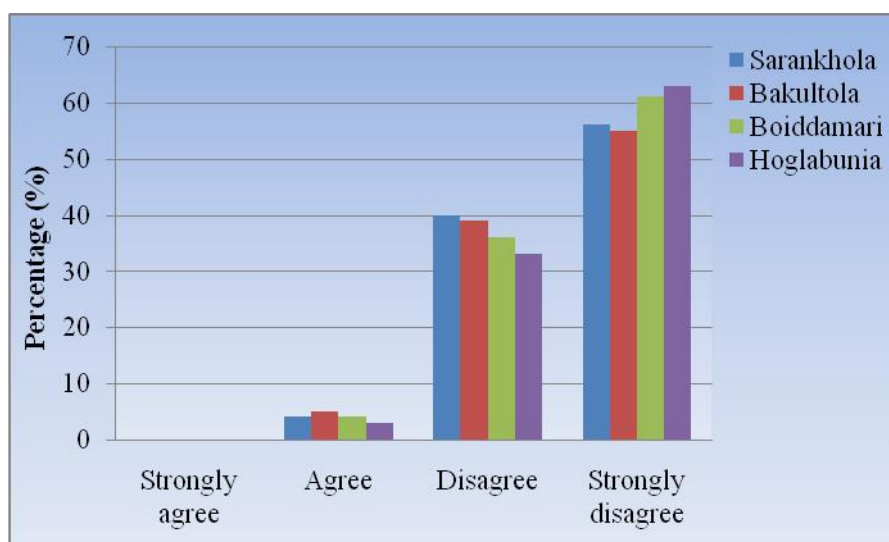


Figure 6.55 Villagers’ views on whether law enforcement is strong enough to save the forest.

6.3.7 Tourism issues

There is no site specific tourism management plan or dedicated staff for the development of tourism, although this is one of the main sources of income for the Sunderbans. There is an interpretation centre in Karamjal, a watch tower and walking trail in the Sundarbans.

6.3.7.1 Responses from key informants

The key respondents felt there are lots of opportunities, but that visitor facilities are inadequate; for example lack of safety equipment on boats, no co-ordinated system for hiring boats, and lack of trained guides. Total visitor numbers from 2005 to 2009 are presented in the Figure 6.56. Most tourists visit in March and April, with the majority of them being from Bangladesh.

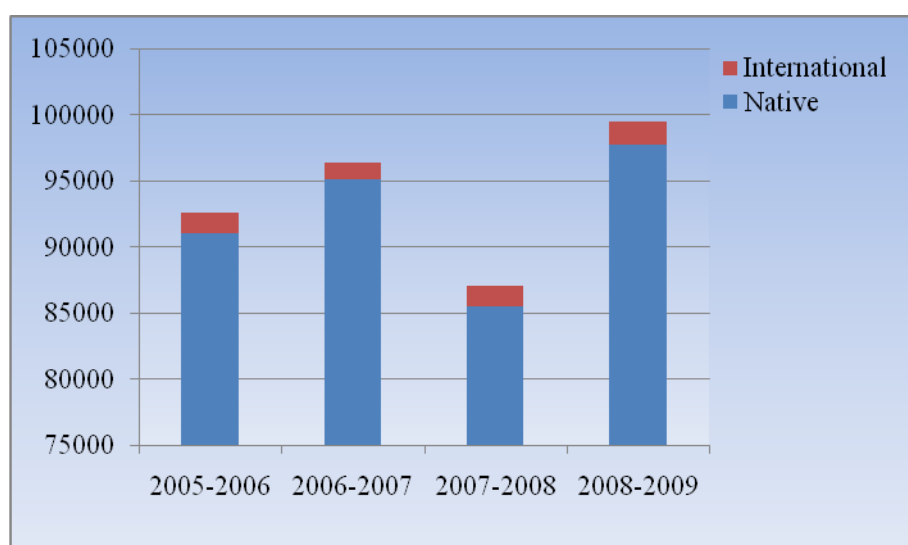


Figure 6.56 Total visitors registered in the Sunderbans Reserve Forest (Source: Forest Department of Bangladesh).

The village doctor (S-KI-5) stated the opportunity of tourism:

“Sunderbans have a great potential attraction for national and international tourists but the facilities are inadequate.”

The Union Parishad Member (S-KI-2) illustrated the advantages of tourism:

“The revenue from tourism could help to support the local communities whose livelihoods are currently entirely dependent on forest resources.”

The IUCN researcher (D-KI-4) stated the current situation of tourism:

“In our country, tourism is at a low level. There is an idea that the tourism ministry would be run on money generated from tourism, increasing Government income. But if tourists are not

being attracted this is not possible. To develop tourism, security, management, facilities, good food and lodging are needed. But tourism cannot be developed if corruption exists. Research has shown that for every tourist who enters the forest, the government spends 5000 taka. If we cannot earn more than that back from the tourists, then this is creating a loss. It is different for foreign tourists, as they bring considerable contributions in pounds and dollars and spend this on food, accommodation, travel, shopping, and communication. Attracting foreign tourists would also increase our status and recognition abroad.”

These statements suggest that there is a consensus that government could earn revenue via tourism development and that this revenue could facilitate in supporting the development of local communities.

6.3.7.2 Responses by focus group members

In Boiddamari and Hoglabunia the number of tourists is very low and therefore there were no problems of overcrowding, unwanted visits to peoples farms or houses as occurs in other regions such as Lawachara, but they were a source of extra income as illustrated by the following comments.

A focus group member (S-FG-1) stated:

“The tourism season is mainly from February-April. We earn more as guides during that time.”

A van driver in the same group (S-FG-1) added:

“My income doubles during the tourism season.”

A focus group member (S-FG-7) indicated the local view that absence of tourism represents a loss of potential economic benefit:

“No tourists come to our village if they did we would benefit economically.”

These statements are indicative of a general sense that tourism development could contribute to the development of local livelihoods, providing that the numbers of visitors are controlled to avoid the sorts of problems encountered in other regions.

6.3.7.3 Questionnaire survey responses

The survey respondents were asked if they felt they had benefitted from tourism, with 33% responding that they felt they had benefitted, but the majority did not feel they had benefitted (Figure 6.57). They were also asked if they felt they had been disadvantaged and 73% responded

that they not been disadvantaged (Figure 6.58). There was no significant difference between male and female responses.

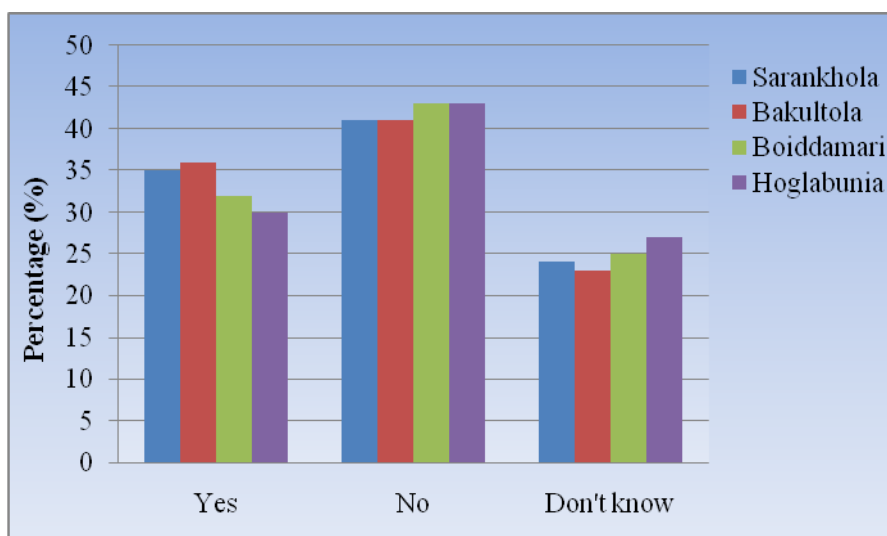


Figure 6.57 Percentage of respondents who benefitted from tourism.

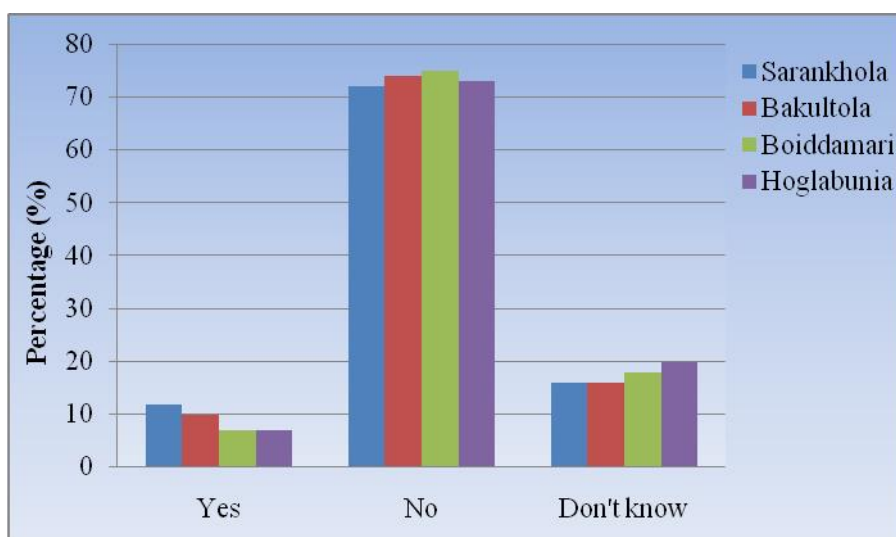


Figure 6.58 Percentage of respondents who felt disadvantaged by tourism.

6.4 Stakeholder Analysis

Five stakeholder groups were identified in the study areas: government officials/institutions; NGOs; local residents; local business community; and ‘others’. This last category comprised local journalists, researchers and tourists, although the numbers of each of these could not be determined. Most of the local residents were poor and extract forest resources for both subsistence and commercial use. For example, there are seven brickfields around the Lawachara National Park, six around the Teknaf Wildlife Sanctuary, and seventeen around the Sunderbans

East Wildlife Sanctuary, all using wood in their furnaces. Local people are frequently employed as day labourers to collect fuel wood, with an adverse impact on forest resources. In addition there are thirty furniture shops in Bhanugach bazar and twenty five in Sreemongal, both in Lawachara, There are a further eighteen in Teknaf, and twenty sawmills in the Sunderbans demonstrating the demand for timber resources. In response NGOs are attempting to develop alternative livelihood activities, combining training with increasing environmental awareness.

In this research stakeholder analysis has provided insight into, and understanding of, the people who could potentially be affected by the management plan and the relative importance of different groups for implementing it. Initial information was gathered during the desk study and first phase of field work, and further developed during the second phase of fieldwork. In each of the areas the main stakeholder groups were further sub-divided, as shown in Table 6.23.

Generally, men and women have different roles in the family and community; for example, men are mainly responsible for income generation and decision-making, women with subsistence activities and family care. They tend to have different opinions, attitudes, priorities and power over resources. They also interact differently with the environment, and have different opportunities for protecting and managing it in a sustainable manner. Generally, the women are not able to directly influence the formal management planning process although their potential for effective involvement in sustainable natural resource management is significant particularly as they are the main repositories of traditional ecological knowledge (Mwangi *et al.*, 2011; WWF-UK, 2012; Wuyep *et al.*, 2014).

Table 6.23 Importance and influence of stakeholders.

Main category	Sub division	Lawachara National park		Teknaf Wildlife Sanctuary		Sunderbans Wildlife Sanctuary	
		Importance	Influence	Importance	Influence	Importance	Influence
Government institutions	Ministry of Environment and Forest	H	H	H	H	H	H
	Ministry of Fisheries	L	L	M	M	H	H
	Ministry of Land	H	H	H	H	H	H
	Forest Department	H	H	H		H	
	Wildlife Division of Forest Department	H	M	H	M	H	M
	Local Government	H	H	H	H	H	H
	Police	H	H	H	H	H	H
	Border Guard of Bangladesh	L	L	H	H	H	H
	Coast Guard and Bangladesh Navy	L	L	H	H	H	H
Non-governmental organization	ADB	M	L	M	L	M	L
	IUCN	M	L	M	L	M	L
	ZSL	L	L	L	L	M	M
	IPAC	H	H	H	H	H	H
	AF	M	M	L	L	L	L
	ASA	L	L	L	L	L	L
	BRAC	L	L	L	L	L	L
	SHED	M	M	L	L	L	L
	Local community organization	M	M	M	M	M	M

Main category	Sub division	Lawachara National park		Teknaf Wildlife Sanctuary		Sunderbans Wildlife Sanctuary	
		Importance	Influence	Importance	Influence	Importance	Influence
Local people	Betel leaf cultivator	H	H	L	L	NA	NA
	Fuelwood collector	H	H	H	H	H	H
	Bawalies (golpata collector)	NA	NA	NA	NA	H	H
	Moualies (Honey collector)	L	L	L	L	H	H
	Fisherman	L	L	M	M	H	H
	Crab collector	NA	NA	L	L	M	M
	Lemon cultivator	M	M	NA	NA	NA	NA
	Pineapple cultivator	M	M	NA	NA	NA	NA
	Jhum cultivator	L	L	NA	NA	NA	NA
	Bamboo collector	L	L	L	L	L	L
	Fruit collector	L	L	L	L	L	L
	Vegetable collector	L	L	L	L	L	L
	Medicinal plant collector	L	L	L	L	L	L
	Sungrass collector	L	L	L	L	L	L
	Farmers living inside park	M	M	M	M	M	M
	Farmers living adjacent to the park	M	M	M	M	M	M
	Tea stall owner	L	L	L	L	L	L
	Day labor	L	L	L	L	L	L
	Rohingya refugees	NA	NA	M	M	NA	NA

Main category	Sub division	Lawachara National park		Teknaf Wildlife Sanctuary		Sunderbans Wildlife Sanctuary	
		Importance	Influence	Importance	Influence	Importance	Influence
Local business community	Brick field owners	H	H	H	H	H	H
	Furniture shop owners	H	H	H	H	H	H
	Saw mill owners	H	H	H	H	H	H
	Fish Arotdars (fish businessmen)	NA	NA	M	M	H	H
	Fish processing industry	NA	NA	L	L	H	H
	Gher Owners (prawn farming)	NA	NA	NA	NA	M	M
	Large Mohajons (Money lenders)	L	L	M	M	H	H
	Small Mohajons (money lenders)	L	L	M	M	H	H

H= High, M= Medium, L= Low, NA= Not applicable

It is possible to identify stakeholders that are unique to each of the study areas (Table 6.24). In Lawachara, these are the cultivators, focusing on betel leaf, lemon and pineapple; these farmers are demanding more land for their cultivation activities and are therefore a significant source of pressure on the forest resource (see section 6.1.3). Of the three study areas, Teknaf is the only one facing the challenge of recent refugees, with Rohingyas who came to join an existing population in 2012. The Rohingyas are reported to be clearing forest in order to build houses informally on Wildlife Sanctuary land and are also accused of illegal tree felling for commercial purposes, fuel wood collection and hunting. The largest single problem, in the view of some local people, is that the Rohingyas are considered to be undercutting the wages of other local workers and taking jobs, leading to resentment among the established population (see section 6.2.3). In the Sunderbans, there is pressure from exploitation of agricultural resources such as palm tree cutting and honey collecting, as well as prawn farming and fish poisoning (see section 6.3.3). However, the unique aspect here is piracy and kidnapping. It is reported that there are between 40 and 50 gangs operating within the remote waterways of the Sunderbans and at sea at any time (see Chapter 5, section 5.3.1.1). The fisherman have to borrow ransom money from money lenders and fish wholesalers, who charge high interests on the amounts supplied and the fisherman are doubly victimized. Easy interest free loans could be a useful way to help those affected.

The activities of different types of stakeholders require policy responses that are tailored to specific needs. For example, in Lawachara and Teknaf, loss of forest due to agricultural activity can be addressed by similar policy approaches. In Teknaf there is a wider problem of coping with a refugee population. In Sunderbans the situation is significantly different due to the activities of pirates, who are difficult to communicate with for the purposes of environmental education and awareness training. Law enforcement is not strong enough to save the forest resources due to a shortage of manpower and other logistic support such as trained staff, vehicles and modern equipment to chase the pirates. Patrols by Forest Department staff and coast guards need to increase in order to control the activities of pirates.

Table 6.24 Stakeholders unique to each of the study areas.

Study area	Name of stakeholders
Lawachara National Park	Betel leaf cultivators Lemon cultivators Pineapple cultivators
Teknaf Wildlife Sanctuary	Rohingya refugees
Sunderbans Wildlife Sanctuary	Bawalies (mainly <i>Nypa fruticans</i> cutting) Moualies (honey collector) Fishermen Gher owners (prawn farming) Piracy (robbery and kidnapping)

6.5 Summary

The Forest Department of Bangladesh is the main authority for the development and administration of the National Park and Wildlife Sanctuaries. But the Forest Department is not in a position to exert control over the forest resources due to lack of forest staff and inadequate support services, which reduce its capacity to manage effectively. Some other factors hindering the situation were identified as lack of alternative livelihoods, high demand for timber, high number of saw mills, brick fields and furniture shops in the forest locality, easy transportation networks facilitating transport of illegally felled trees, inadequate law enforcement, and political pressure.

The results of the research indicate a complex and ironic relationship between different stakeholders and the forest. The Forestry Department, which has the formal power, authority and responsibility to protect the forest often seems to be the source of illegal and corrupt practices that are damaging the forest; at the same time, villagers, who are vulnerable to accusations from the Forest Department of illegally occupying land and to demands for bribes from some Forest Department staff, appear more likely to engage in environmentally responsible behaviour in the forest. It is difficult to see how this situation will change in the absence of political will at all levels to address issues of corruption. Expanding opportunities for citizen participation in the park planning process will be of limited value if that participation is limited to receiving information, co-option onto committees without the ability to make real change happen, in other words levels of non-participation or manipulation (Arnstein, 1969).

The above results suggest that the active involvement of local communities and other stakeholders in the planning process is limited. The management plans appear to have failed to minimise the conflicts and encroachment in the National Park and Wildlife Sanctuaries. Local focus group members, questionnaire survey respondents and key informants' suggestions to mitigate conflicts and make the management plans become more effective in the future tend to focus on involvement of all key stakeholders. This would require local communities, Forest Department staff, government agencies, including local NGOs, and local policy makers, to be given the opportunity to participate. Empowerment of women's groups in the management planning process is fundamental to providing economic benefits, as is more emphasis on conservation education programs, provision of equitable benefit sharing, implementation of effective law enforcement. In addition development of relationships between local communities and Forest Department staff, and provision of compensation for depredation caused by wildlife are all important factors which need to be taken into account.

Chapters 5 and 6 presented the results of research carried out in the three case study areas. The following chapter presents a synthesis of the findings, drawing out comparisons and contrasts across the three study areas.

CHAPTER 7: SYNTHESIS OF FINDINGS ACROSS THE STUDY AREAS

This chapter presents a synthesis of findings presented previously in order to permit a more direct comparison of the three study areas.

7.1 Comparisons of the Socio-economic Characteristics of the Respondents

The questionnaire survey (Table 7.1) indicates that there is a statistically significant difference in the educational attainment of males and females in all the case study areas (Appendix 15, 20 and 25). Males are generally better educated than women, with the implication that women are less likely to be formally involved in processes of planning, management or decision making. This, however, does not taken into account the potential for women to make a meaningful contribution to environmental management through their deep traditional knowledge of forest flora and fauna (see sections 6.1.2, 6.2.2 and 6.3.2).

Table 7.1 Education levels of questionnaire survey respondents.

	Lawachara National Park (N=139)		Teknaf Wildlife Sanctuary (N=121)		Sunderbans Wildlife Sanctuary (N=157)	
	M	F	M	F	M	F
Illiterate	17 (12%)	18 (13%)	24 (20%)	36 (30%)	15 (10%)	48 (31%)
Primary School	36 (26%)	24 (17%)	38 (31%)	13 (11%)	40 (25%)	35 (22%)
Secondary school to Graduate	33 (24%)	11 (8%)	7 (6%)	3 (2%)	17 (11%)	2 (1%)

7.2 Comparison of Respondents' Views on Participation in the Management Planning Process

In all case study areas, from key informant interviews it seemed that all were aware of the management plan and the ambition of co-management. Some were actively involved in it. From focus group discussions and questionnaire survey responses it appeared a few of the men were aware of it but none of them had been involved in the management planning process. The questionnaire survey (Table 7.2) in all study areas indicates a significant difference between

male and female responses about the awareness of the management plan (Appendix 17, 22 and 27), with males more aware than females.

Table 7.2 Participation in the planning process.

Key informants	Lawachara National Park (N=12)		Teknaf Wildlife Sanctuary (N=14)		Sunderbans Wildlife Sanctuary (N=8)	
	M (N=12)	F (N=1)	M (N=13)	F (N=1)	M (N=8)	F (N=0)
Awareness of the management plan	12		13		8	
Participation in management planning	5 (42%)		7 (50%)		4 (50%)	
Focus group members	M (N=27)	F (N=14)	M (N=30)	F (N=32)	M (N=29)	F (N=36)
Awareness of the management plan	0	0	0	0	0	0
Participation in management planning	0	0	0	0	0	0
Questionnaire survey responses	M (N=86)	F (N=53)	M (N=69)	F (N=52)	M (N=72)	F (N=85)
Awareness of the management plan	17 (12%)	0	16 (13%)	0	20 (13%)	0
Participation in management planning	0	0	0	0	0	0

7.3 Comparison of Respondents' Views on the Co-management Approach

In the case study areas, one third of questionnaire respondents were aware of the co-management approach (Table 7.3). There are no significant differences between male and female responses concerning the co-management approach.

Table 7.3 Effectiveness of the co-management approach.

Key informants	Lawachara National Park (N=12)		Teknaf Wildlife Sanctuary (N=14)		Sunderbans Wildlife Sanctuary (N=8)	
	M (N=12)	F (N=1)	M (N=13)	F (N=1)	M (N=8)	F (N=0)
Awareness of co-management approach	12 (100%)		13 (93%)	1 (7%)	8 (100%)	
Percentages of respondents who felt benefitted as a result of co-management	5 (42%)		6 (46%)	0	4 (50%)	
Focus group members	M (N=27)	F (N=14)	M (N=30)	F (N=32)	M (N=29)	F (N=36)
Awareness of co-management approach	18 (44%)	10 (24%)	19 (31%)	14 (23%)	21 (32%)	19 (29%)
Percentages of respondents who felt benefitted as result of co-management	11 (27%)	5 (12%)	12 (19%)	9 (15%)	16 (25%)	12 (18%)
Questionnaire survey responses	M (N=49)	F (N=43)	M (N=38)	F (N=31)	M (N=50)	F (N=47)
Awareness of co-management approach	49 (35%)	43 (31%)	38 (31%)	31 (26%)	50 (32%)	47 (30%)
Percentages of respondents who felt benefitted as result of co-management	22 (16%)	18 (13%)	16 (13%)	15 (12%)	26 (17%)	23 (15%)

7.4 Comparison of Respondents' Views on Conservation Conflicts

Views on conservation conflicts derived from key informants, focus group members and questionnaire responses, as well as suggestions for reducing conflicts are presented in Table 7.4 and 7.5, respectively. In all case study areas, restrictions introduced by the Forest Department on the exploitation of park resources, such as illegal tree felling and fuel wood collection, and the resultant poor relationships between local people and Forest Department staff are commonly found.

For reducing conflicts, most of the respondents across the three study areas acknowledged the need for economic incentives, involvement of local people in management planning and implementation of effective law enforcement. They also noted requirements such as permitting villagers to collect forest resources in a controlled manner, providing a conservation education programme, and the need to develop the relationship between local people and Forest Department staff.

An issue unique to Lawachara involves betel leaf farmers gradually occupying more of the forest land for betel leaf cultivation; the provision of alternative income generating opportunities could be useful to deal with this problem.

In Teknaf, encroachment by both the Rohingya refugees and other local communities is a major problem; in order to address this the Forest Department could demarcate the forest boundaries and introduce community forestry in the buffer zone area. In addition, the unregistered Rohingya refugees living inside or adjacent to the Wildlife Sanctuary represent a difficult problem for the Bangladeshi authorities. One approach would be to attempt to count their numbers (take a census) and move them into refugee camps to prevent their illegal occupation of forest land. However, this is not a solution likely to be attractive to the Rohingya and could become a human rights concern. Local residents and political figures would prefer the refugees to be repatriated to Myanmar, but this would represent a human rights problem as they would be returning to a country they had fled due to religious persecution. This is an international issue that is likely only to be resolved by the involvement of the United Nations. Relations could be improved, however, if the Rohingyas were to be included in the social forestry programme, which would provide benefit to the management of the forest and would provide some income for the Rohingyas.

In the Sunderbans, multilateral negotiation between fisherman, fish traders, and the Forest Department staff is necessary to ensure that poisoning of fish does not occur. The Forest Department could provide some conservation education programmes to raise awareness in an effort to halt this environmentally irresponsible behaviour. In the Sundarbans, poaching of wild animals, mainly spotted deer (*Axis axis*), is a serious threat; to solve this problem the Forest Department could strengthen its capacity (recruiting trained forest staff with modern equipment and vehicles) and develop local intelligence networks to collect information to help uncover and prevent poaching. The research results indicated that currently there is a special task force consisting of 300 'Tiger Team' members whose focus is on saving tigers and other wild animals

from poachers in the Sunderbans. This group is, however, too small to cope with the very large geographical area involved. In fact, the Forest Department faces shortages of trained staff, a lack of vehicles, inadequate funding and other logistic support (see section 5.3.1.1).

Table 7.4 Comparison on views of questionnaire respondents on conservation conflicts in case study areas.

Questionnaire survey responses	Lawachara National Park (N=139)		Teknaf Wildlife Sanctuary (N=121)		Sunderbans Wildlife Sanctuary (N=157)	
	M (N=86)	F (N=53)	M (N=69)	F (N=52)	M (N=72)	F (N=85)
Restriction on park resources	37%	25%	46%	29%	32%	28%
Illegal tree felling	18%	10%	27%	18%	18%	14%
Poor relations between local residents and Forest Department staff	17%	12%	15%	10%	18%	10%
Betel leaf cultivation	20%	18%	0	0	0	0
Lemon and pineapple cultivation	3%	2%	0	0	0	0
Jhum cultivation	3%	2%	0	0	0	0
Rohingya refugees	0	0	44%	28%	0	0
Poaching	0	0	0	0	20%	11%
Shrimp/prawn farming	0	0	0	0	12%	8%
Fishing with poison	0	0	0	0	32%	20%
Other	15%	6%	14%	6%	15%	8%

Note: there are some multiple responses by the same respondent.

Table 7.5 Comparison of questionnaire respondents' suggestions for reducing conflicts.

Questionnaire survey responses	Lawachara National Park (N=139)		Teknaf Wildlife Sanctuary (N=121)		Sunderbans Wildlife Sanctuary (N=157)	
	M (N=86)	F (N=53)	M (N=69)	F (N=52)	M (N=72)	F (N=85)
Provide economic benefit	39%	36%	42%	40%	39%	34%
Involve local people in management planning	27%	14%	15%	7%	19%	9%
Implement effective law enforcement	23%	10%	31%	19%	23%	10%
Permission local people to collect forest resources in controlled basis	12%	13%	10%	8%	16%	14%
Conservation education program	12%	9%	24%	20%	11%	8%
Develop relationship between local people and forest staff	13%	9%	21%	16%	15%	13%
Other	15%	9%	14%	7%	18%	8%

Note: the responses do not sum to 100% as respondents could identify more than one item.

7.5 Comparison of Respondents' Views on Relationship between Local Residents and Forest Department Staff Members

More than half of the questionnaire respondents responded that the relationship between local people and Forest Department staff is good; only a few of them replied in the negative (Table 7.6). Statistically there is no significant difference between male and female responses in all study areas.

In Lawachara National Park the research result represents a complex situation where the relationships seem to vary according to the local situation between the villagers and the Forest Department staff members. The most challenging relationships seem to be in the villages that are outside the park (Baghmara and Dolubari), with innocent villagers sometimes harassed by the Forest Department and having cases filed against them for illegal tree felling. There are various possible explanations for this behaviour, including unwillingness on the part of some Forest Department staff to expose the real culprits due to their engagement in corrupt practices. In the villages inside the park (Lawachara punji and Magurchara punji) the relationships appear to be

less difficult (see section 8.5.1). While in Teknaf and the Sundarbans Wildlife Sanctuary the villagers responded that they have a good relationship with the Forest Department staff members, although some of them mentioned that they do not interact with the Forest Department staff at all and the Forest Department staff members are involved with influential people (political leaders and business operators) and thieves, who provide bribes or other illegal payments (see section 6.2.5.1).

Table 7.6 Comparison of respondents' views on relationship between local residents and Forest Department staff members.

Key informants	Lawachara National Park (N=12)		Teknaf Wildlife Sanctuary (N=14)		Sunderbans Wildlife Sanctuary (N=8)	
	M (N=12)	F (N=1)	M (N=13)	F (N=1)	M (N=8)	F (N=0)
Good	7 (58%)		7 (50%)	1 (7%)	5 (62%)	
Poor	5 (42%)		6 (43%)	0	3 (38%)	
Focus group members	M (N=27)	F (N=14)	M (N=30)	F (N=32)	M (N=29)	F (N=36)
Good	17 (41%)	9 (22%)	17 (27%)	18 (29%)	16 (25%)	20 (31%)
Poor	10 (24%)	5 (12%)	11 (18%)	12 (19%)	13 (20%)	14 (22%)
Questionnaire survey responses	M (N=86)	F (N=53)	M (N=69)	F (N=52)	M (N=72)	F (N=85)
Good	54 (39%)	36 (26%)	37 (31%)	31 (26%)	37 (24%)	47 (30%)
Poor	31 (22%)	17 (12%)	29 (24%)	20 (17%)	35 (22%)	38 (24%)

7.6 Comparison of Respondents' Views on Effective Law Enforcement

In terms of adequate law enforcement to conserve the forest the majority of respondents' responded that they disagree that the current law enforcement is strong enough to save the forest, and there is no statistical significant differences between male and female responses in all study areas (Table 7.7).

Table 7.7 Key informants, focus group members and villagers responses when asked to agree or disagree that law enforcement is strong enough to conserve the forest.

Key informants	Lawachara National Park (N=12)		Teknaf Wildlife Sanctuary (N=14)		Sunderbans Wildlife Sanctuary (N=8)	
	M (N=12)	F	M (N=13)	F (N=1)	M (N=8)	F
Agree/strongly agree	1 (8%)	0	0	1 (7%)	1 (13%)	0
Disagree/ strongly disagree	9 (75%)	0	11 (79%)	0	6 (75%)	0
Focus group members	M (N=27)	F (N=14)	M (N=30)	F (N=32)	M (N=29)	F (N=36)
Agree/ strongly agree	1 (2%)	1 (2%)	1 (2%)	2 (3%)	1 (2%)	2 (3%)
Disagree/ strongly disagree	23 (56%)	7 (17%)	26 (42%)	18 (29%)	27 (42%)	21 (32%)
Questionnaire survey responses	M (N=86)	F (N=53)	M (N=69)	F (N=52)	M (N=72)	F (N=85)
Agree/ strongly agree	0	7 (5%)	0	7 (6%)	0	9
Disagree/ strongly disagree	86 (62%)	46 (33%)	69 (57%)	45 (37%)	72 (46%)	76 (48%)

7.7 Comparison of Respondents' Views on Tourism Issues

The research results indicated the responses from Lawachara differ from those from Teknaf and the Sunderbans, as increasing tourism in Lawachara is causing damage to wildlife, particularly by noise and the spread of viruses by entering their betel leaf farms (Table 7.8). The main interest of tourists is visiting indigenous people's villages and they do not respect privacy, sometimes entering houses uninvited. In contrast, those from Teknaf and the Sundarbans thought that local people are advantaged through the increase in the number of tourists despite the lack of facilities.

Table 7.8 Respondents' views on tourism issues.

Key informants	Lawachara National Park (N=12)		Teknaf Wildlife Sanctuary (N=14)		Sunderbans Wildlife Sanctuary(N=8)	
	M(N=12)		M (N=13)	F (N=1)	M (N=8)	
Percentages of respondents who felt benefitted from tourism	5 (42%)		7 (50%)	1 (7%)	5 (63%)	
Percentages of respondents who felt disadvantaged from tourism	7 (58%)		2 (15%)	0	1 (13%)	
Focus group member	M (N=27)	F (N=14)	M (N=30)	F (N=32)	M (N=29)	F (N=36)
Percentages of respondents who felt benefitted from tourism	6 (15%)	2 (14%)	11 (17%)	8 (13%)	16 (25%)	12 (18%)
Percentages of respondents who felt disadvantaged from tourism	15 (37%)	3 (21%)	4 (7%)	4 (6%)	3 (10%)	2 (6%)
Questionnaire survey responses	M (N=86)	F (N=53)	M (N=69)	F (N=52)	M (N=72)	F (N=85)
Percentages of respondents who felt benefitted from tourism	15 (17%)	6 (11%)	10 (15%)	6 (11%)	13 (18%)	11 (15%)
Percentages of respondents who felt disadvantaged from tourism	26 (30%)	10 (18%)	2 (5%)	1 (3%)	6 (8%)	3 (4%)

7.8 Common and Location Specific Issues Identified In the Study Areas

There are some common issues identified from a combination of the questionnaire surveys, focus group discussions and key informant interviews across the case study areas, these are:

- Inadequate effective law enforcement
- Awareness about the management plan
- Awareness about the co-management approach

- Benefits of co-management
- Benefits from tourists
- Fuelwood/firewood collection
- Illegal timber felling
- Habitat destruction
- Poor relations between local people and Forest Department staff members
- Political pressure
- Benefit sharing
- Conservation education/public awareness
- Restriction on non timber forest product collection.

Three location specific issues were raised:

- Betel leaf cultivation and unplanned tourism in Lawachara National Park (see Chapter 6, sections 6.1.3 and 6.1.7)
- Rohingya Refugees in Teknaf (see Chapter 6, section 6.2.3), and
- Golpata collection, conflicts between fisherman and bandits/ransom, fishing with poison, tiger-human conflicts, salt water/climate change/sea level rise, and shrimp/prawn farming in the Sunderbans (see Chapter 6, section 6.3.3).

7.9 Summary

The findings of this research indicate that the key informants are more knowledgeable about management planning than other residents, they are aware of the management plan and some of them are involved with the planning process. However, only a small number of the wider population tends to be aware of the management plan and generally they are not involved in the planning process. Overall, across the three study areas, only one-third of the respondents were aware of the co-management approach. This suggests that the management plan is not incorporating the needs of the communities and that there is a lack of community participation in decision making. Little power appears to be granted to community institutions, leading to park-people conflict. This, in turn, is hindering the possibilities for sustainable livelihoods and improved wellbeing at the community level, and is resulting in negative consequences for wildlife.

The findings of the research indicate that female responses rates are lower than male on some issues. This is because the education attainment of women is lower in those areas, so they are

unable or are unwilling to talk about forest management issues. A number of statistically significant relationships were identified, for example: between gender and education (Appendix 15, 20 and 2), gender and monthly income (Appendix 16, 21 and 26), gender and awareness of the management plan (Appendix 17, 22 and 27), and education and monthly income (Appendix 18, 23 and 28). These results suggest that males tend to be more highly educated than females that they earn more money, and that wealthier people tend to be more educated than poor people. Overall, these results tend to be consistent with experience in the field where women were less aware, less actively involved and less likely to provide responses. The following chapter presents a more detailed discussion of this research.

CHAPTER 8: DISCUSSION

This chapter discusses the results of the study; it is organised into nine parts: first, the socio-economic characteristics of the study areas are discussed, providing important context to the development of the management plans; second, stakeholder analysis as a tool for protected area management is discussed; third, the participation of stakeholders is described; fourth, the conflicts and the implications of these for local livelihoods are discussed with suggestions for mitigation; fifth, the effectiveness of the co-management strategies is discussed; sixth, the impact of the management plans is described; seventh, institutional, political and local issues are described; eighth, tourism development is discussed; and finally a short summary of this chapter is presented.

8.1 Socio-economic Characteristics of the Study Areas

The socio-economic profiles of the study areas were constructed using a combination of secondary sources, information derived from interviews, focus group discussions and questionnaire surveys. In the published literature, several researchers have stressed the requirement to understand the underlying socio-economic conditions of local communities in areas where management plans will be implemented (Furze *et al.*, 1996; Campbell *et al.*, 2000; Aung, 2007; Hossain *et al.*, 2008). Researchers argue that the resilience of social-ecological systems is advantageous for facilitating the sustainable use of natural resources and ecosystem services and to ensure a stable environment for human life and well-being (Adger, 2006; 2007). However the resilience of social ecological systems is influenced by various factors, such as people's ability to anticipate changes and plan for the future (i.e., adaptive capacity), which is, in turn, shaped by human involvement, institutional regulations, and the level of exposure to, and the impacts of, global change on people's lives (Adger, 2007, Nelson *et al.*, 2007). Therefore, ecological and social resilience are dynamically interrelated via evolving forms of natural resource management (Ruiz-Mallen and Corbera, 2013).

According to the new paradigm of conservation, protected areas are no longer seen exclusively as a tool for biodiversity/landscape conservation but rather as a way to contribute to the social, economic, and cultural objectives of local communities as well (Mose and Weixlbaumer, 2007; Niedzialkowski *et al.*, 2012). The livelihoods of local communities adjacent to protected forest

areas are often heavily reliant on them for their subsistence needs; for example, wild foods, fuel wood, medicinal plants, and building materials (Quazi *et al.*, 2008).

This study found that the occupational status of the local communities varied across the different case study areas. The villages within Lawachara National Park depend on betel leaf cultivation, although those outside the park exhibit a more diverse occupational pattern including agriculture, small businesses (e.g., cycle repair, grocery and vegetable shops), services, and day labouring. In Dolubari village the local population mainly depends on pineapple and lemon cultivation, as well as being day labourers. The ‘Tripura’¹³ community in Dolubari has a long tradition of jhum or shifting cultivation, fuel wood collection, and harvesting of fruits and building materials from the forest.

In Teknaf Wildlife Sanctuary local people use the forest for various purposes such as livestock rearing, fuel wood collection and as a source of non timber forest products (NTFPs) to sell in the market. In the past they were totally dependent on this, but currently the economy includes fishing, day labor, and small businesses (such as shops and tea stalls) as well as agriculture.

In the Sunderbans, male villagers have several sources of income due to the unpredictability of paid work and seasonality of natural resource collection, which includes crabs, shrimp fry, golpata (*Nypa fruticans*) for thatch, grasses for matting, poles for house posts, reeds for fencing, and medicinal plants for herbal treatments, fuel wood, and honey (Plates 8.1 and 8.2); this was also observed by Zohora (2011) and Inskip *et al.*, (2013). Local people here have reported problems when collecting in the forest including attack by tigers, crocodiles, and poisonous snakes, as well as conflict with pirates, forest and coast guards. The government of Bangladesh has banned tree felling and has designated fishing zones (Sadik and Rahman, 2009) affecting access to resources. This Reserve Forest is the livelihood resource for the 3.5 million people in the surrounding area. These people are vulnerable because of their low income and unstable livelihood opportunities. The economy is at risk from climate change, intrusion of salt water, with soil salinity likely to affect the productivity of the Sundarbans (Sadik and Rahman, 2009). The incidence of top dying disease in Sundri (*Heritiera fomes*) (Plate 8.3), a fungal infection, is directly attributed to this effect (Rahman, 1998). Salinity intrusion also affects fish breeding and leads to reduced fish stocks. This will further reduce potential income and food security and this in turn will affect the ability of the residents to pay for house improvements and boats and

¹³ ‘Tripura’ is one of the main ethnic groups in Bangladesh.

fishing nets, making them more vulnerable to natural hazards such as heavy rainfall, cyclones and storms.



Plate 8.1 The villagers repairing and making boats in the Sunderbans.



Plate 8.2 The typical house made by Golpata in the Sunderbans.

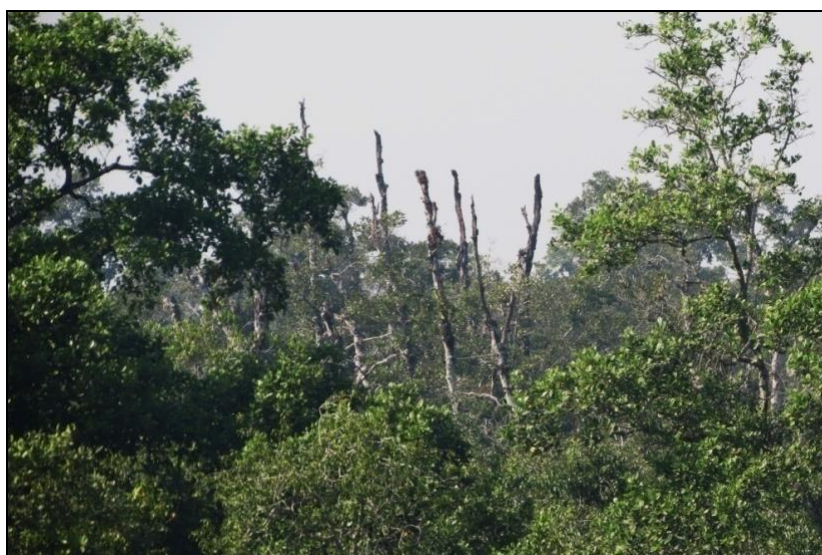


Plate 8.3 Sundri (*Heritiera fomes*) trees are affected by top dying disease in the Sunderbans.

In all the case study areas the local communities were dependent on the forests for fuel wood. Most was for their own use, although some sell it on. Fuelwood is the most valuable and important forest product globally (Roe *et al.*, 2013). The local communities in Lawachara and Teknaf also collect other NTFPs such as timber, bamboo, building materials, medicinal plants (also recognized by Uddin *et al.*, 2012), honey, cane, fruit, vegetables, and tree bark for domestic use.

In Bangladesh the average per capita income is 13,580 Taka (\$175)¹⁴. The monthly income of the villagers in the case study areas varied (sections 6.1.1, 6.2.1, and 6.3.1) but in all cases a statistically significant difference was found between the incomes of men and women, i.e. men earn more than women (Appendix 16, 21 and 26). A monthly income of between 3000-5000 Taka¹⁵ was reported by 49% of questionnaire respondents in Lawachara, 62% in Teknaf and 45% in the Sundarbans, which is much lower than the national income. In Teknaf the average monthly income is lower than that of other case study areas; this could be explained by the latest influx of Rohingya refugees. Two case study villages in the Sundarbans, namely Hoglabunia and Boiddamari, have limited alternative economic activities due to remoteness and lack of road connections to district and regional headquarters; this finding is consistent with the work conducted by Roe *et al.*, (2013). Limited livelihood options and strategies compel people to set priorities and make economic choices that may not be compatible with biodiversity conservation goals set out in the management plans for the National Parks and Wildlife Sanctuaries (Campbell *et al.*, 2000). Local communities have to be encouraged to co-operate in the marketing of their products to reduce dependence on traders and middlemen (Getzner and Islam, 2013).

Literacy is higher in Lawachara than in either Teknaf or the Sunderbans Wildlife Sanctuary, both of which have few schools and lack the transport infrastructure to take children to nearby districts (this research Chapter 6, sections 6.1.1, 6.2.1, and 6.3.1; Roe *et al.*, 2013). Concern was expressed by female focus groups in the Sunderbans about the significant dangers for young children travelling alone. Education has been well established as a key mechanism to help to reduce poverty (e.g., Islam and Mia 2007), as it facilitates adoption of technological advances, adaptation to changing environmental conditions, and to learning new skills to help manage prevailing conditions. The education system in Bangladesh is, however, compromised by a shortage of funds and staff, inadequate physical infrastructure, shortage of reading material, poor

¹⁴www.indexmundi.com/bangladesh

¹⁵Bangladeshi currency 77.6 Taka=\$1

training, lack of diversity of training, political instability, and lack of co-ordination between government and NGOs (Islam and Mia, 2007). The high illiteracy rates found in Teknaf and the Sundarbans are likely to be caused by an insufficient number of schools and teachers relative to the size of the population. The education rate of males was higher than that of females in all study areas with a statistically significant difference between gender and educational attainment (Appendix 15, 20 and 25). A statistically significant difference was also found between education and monthly income in all study areas (Appendix 18, 23 and 28). Since better education generally equates to higher earnings, promotion of women's education in these areas would be advantageous. Empowerment of women and supporting their potential role in contributing to income generation, such as establishment of small trade and handicrafts could be ways of increasing their income security (Getzner and Islam, 2013).

8.2 Stakeholder Analysis as a Tool for PA Management

Historically, not all stakeholders were taken into account in formulating conservation policies (Lewis, 2005). Over time, this has led to management and ethical issues in natural resource, and particularly PA, management. Many marginalized groups have expressed their discontent with this situation through political discourse (Saberwal, 1996; Chandra, 2004; Chhatre and Saberwal, 2005). This has created a challenge for managers who have to account for stakeholder perceptions while the policy context does not enable a high level of their involvement (Rastogi, 2010). Literature reviews produced by Brody (2003) and Reed (2008) suggest that stakeholder participation can improve the quality of environmental decision making. For human-dominated landscapes, such as in Bangladesh, it is particularly important to integrate stakeholders' views in PA management (Anand *et al.*, 2010). Engaging regularly with stakeholders and facilitating free expression of their views can identify potential opportunities for management intervention (Rastogi, 2010).

Good governance is defined as fair and effective use of governing powers in order to meet the PA objectives (Abrams *et al.*, 2003). This principle is generally accepted as a necessary prerequisite to success (Abrams *et al.*, 2003; Graham *et al.*, 2003). The different types of management organisation, land ownership, conservation of resources and availability of funding all influence the effectiveness of governance (Eagles 2008; 2009; 2013). PA management involves an array of actors who share costs and benefits, rights, roles and responsibilities; these include, among others, national governments, PA administrations (public, private or communitarian), traditional authorities, indigenous and local communities, land owners, NGOs,

entrepreneurs and large business, visitors, tourists and international organisations. For clarity and effective functioning the roles and accountability of all these participants need to be defined (Durham *et al.*, 2014). Achieving participation and partnerships between multiple actors is not easy although it is desirable for effective management. While many governments have taken steps to increase stakeholder participation evidence from PAs suggests that this is frequently tokenism with no real transfer of decision making power. Explanations for this include unwillingness of governments to share power in situations where western style democracy is not the norm. In other situations there may be a lack of institutional support, or shortages of time and resource investment. The need for urgent action may discourage the undertaking of lengthy participatory processes that require skilled facilitators. Staff and extension workers may be conditioned by a political culture of top-down leadership such that they perceive local communities as obstacles in the path of conservation; in such situations this is likely to affect adversely communication and interaction with local residents. In addition corruption, or at least the perception that officials and community leaders are corrupt, can engender mistrust and add to political strife (Stoll-Kleemann and Riordan, 2002).

Among the arguments for undertaking stakeholder engagement there is the promotion of links between science and society; gaining access to additional information or resources; and improving the relevance of the research (Durham *et al.*, 2014). The outcomes can include research outcomes that are better adapted to local contexts, increased likelihood of adoption of new approaches, more beneficial impacts and empowerment of local stakeholders (Durham *et al.*, 2014). By engaging with researchers, stakeholders may assist in the development of new knowledge, and, as a result, may be empowered to become involved in future research. Due regard for local knowledge in the research process can enable anticipation of, and improved reaction to, negative outcomes. Well managed engagement can also facilitate learning and trust between participants and so help to reduce conflict. The literature suggests that the benefits of engagement can far outweigh the risks of failure to engage (Durham *et al.*, 2014). If well planned and adequately resourced, better engagement can enrich research, deliver better knowledge and consequently permit better outcomes for biodiversity and society.

There is no one, ideal, way of integrating stakeholders in the planning process and, however well-planned, success is not always guaranteed. Each case is unique, with specific social and natural context requiring variation in the participation process (Nastran and Pirnat, 2012). Before involving stakeholders in the PA planning process the reason for participation should be considered, as the detail of the process depends on the results required or the problems to be

solved (Nastran and Pirnat, 2012). In order for conservation strategies to succeed and for programmes to be scaled up, governments and their partners must address a number of issues. The constraints include lack of effective capacity building and community empowerment, as well as reducing inequalities and disincentives for conservation at political, economic, and institutional level (Ban *et al.*, 2011). Various studies of community-based conservation have shown that the role played by key individuals and organisations is vital for this to succeed (e.g. Cinner *et al.*, 2009; Saunders 2011).

Co-management has been promoted as a means to bridge the gap between the PA and local stakeholders (Parr *et al.*, 2013). In Southeast Asia, landscape level protected area management has made advances in involving local communities through co-management (Parr *et al.*, 2013). This approach requires devolution, in contrast to the conventional approach of prohibitions and restrictions on forest resource use, limiting local incentives and support for conservation; it was developed in response to persistent conflicts with local communities over regulations and has led to community-based conservation strategies based on training and alternative income programmes. Various studies of community-based conservation have revealed that the role played by stakeholders is vital in promoting this approach (e.g. Adams and Hulme, 1998; Songorwa *et al.*, 2000; Roe *et al.*, 2009; Bertzky *et al.*, 2012; Katikiro *et al.*, 2015).

8.3 Participation of Stakeholders

In biodiversity conservation, the importance of local community participation is well established (Pimbert and Pretty, 1995; Songorwa, 1999; Brechin *et al.*, 2002, Nicholas, 2005; Gill *et al.*, 2009; Dressler *et al.*, 2010; Waylen *et al.*, 2010; Niedzialkowski *et al.*, 2012; Oli *et al.*, 2013; Stringer and Paavola, 2013). It is commonly accepted that all stakeholders should be represented in developing an effective resource management system (Borrini-Feyerabend and Brown 1997, Getzner and Islam, 2013; Mishra, 2013). Participation is a process in which different stakeholders are involved in the formulation and implementation of plans and strategies (Chowdhury, 2008). If there is genuine participation this strengthens commitment, increases user satisfaction, creates realistic expectations of outcomes, respects local people's attitudes and builds trust (Bryner, 2001; Tress and Tress, 2003). Participation is increasingly seen as a tool to promote incorporation of local stakeholders, with potential to reduce existing conflicts and negative impacts on protected areas (Mannigel, 2008). Community involvement is considered to be critical for effective forest management and in controlling illegal activities since local people have a significant stake in forests (Mukul and Quazi, 2009; Andrade and Rhodes, 2012; Aziz *et*

al., 2013). Protected area management authorities have, in the past, focused on controlling and policing the local communities rather than using their local knowledge (Fox and Mustafa, 2013).

In the context of this research, one of the management plan objectives, common to both Lawachara and Teknaf, was to conserve the biodiversity of the park by adopting a co-management approach based on building partnerships with all stakeholders and sharing benefits with local communities and key stakeholders (FDB, 2006:16). Similarly, in the Sunderbans the aim was to protect, restore, sustain and enhance the biodiversity of the SRF and its surrounding area (FDB, 2010:18), but in reality these were not being achieved. From the responses provided by key informants, focus group discussions, and the questionnaire survey it seemed that local residents were not effectively involved in the management planning process (sections 6.1.2, 6.2.2, and 6.3.2). There was little evidence that Forest Department staff and key informants were consulting and actively involving local residents, resulting in a lack of integration between the agendas of local residents and park management. The participation of local communities in the decision-making processes was very low and, where there was input, it was strongly influenced by political leaders and major landowners. These politicians and landowners are not the people reliant upon or directly accessing forest resources in any of the case study areas. Local participation in decision-making can facilitate the sharing of local knowledge, which may in turn help the formulation of achievable management and conservation plans to ensure the long-term protection of the park and sanctuaries (Aziz, 2008; Ruiz-Mallen and Corbera, 2013). In reality, the forest dependent users are often excluded from the decision-making processes. For example, the fuel wood collectors and many women, who are significant stakeholders, are not represented on any of the management committees, a finding that is consistent with Chowdhury (2008). The findings of this research suggest that community participation in the planning and decision-making process could prevent corruption by the Forest Department, improve levels of compliance with protected area policies and better ensure the integrity of protected areas. These findings are supported by work in other contexts (e.g. Roy *et al.*, 2013; Andrade and Rhodes, 2012).

8.4 Perception of Conservation Conflicts and Encroachment

Restrictions on using forest resources and restrictions in land use have been the major issue in park-people conflict around the world (Shrestha, 1996; De Boer and Baquete, 1998; Mehta and Kellert, 1998; Regmi, 2000; Gupta, 2005; Allendorf *et al.*, 2007; Karn, 2008; Stern, 2008; Dorji, 2009; Mukherjee, 2009; Ayivor *et al.*, 2013; Redpath *et al.*, 2013). Although other views have

been recognized as contributing to conflict, this is mainly attributed to the system of protected area governance (West and Brechin, 1991; Borrini-Feyerabend *et al.*, 2004). In Ghana, conflicts between protected area managers and local communities arise out of the externally enforced exclusion of the communities from the protected area and the resources they had access to before the designation of the areas. The conflicts range from disagreements over illegal entry and development of settlements, to major confrontations, arrests, prosecutions and even deaths (Ayivor *et al.*, 2013). In 2006, a border dispute in Kyabobo National Park (Ghana) resulted in the deaths of two Wildlife Officials (Ghana web, 2006). In 2007 another incident occurred in Bui National Park (Ghana), when a poacher lost his life resisting arrest and attacking a Wildlife Official (Ayivor, 2007).

According to the management plans, it is the responsibility of the Forestry Department to ensure effective protection of the forest by involving local stakeholders to help guard against illegal felling, poaching, forest fires, grazing, and forest land encroachment. It is Forestry Department policy to acknowledge good practice by local residents engaged in protecting the forest (FDB, 2006). This is an example of the intention to reduce conflicts and encroachments. From the findings in all of the case study areas this has not been achieved. Overall, a significant majority of respondents felt the level of conflict and encroachment was moderate to low before the management plans were adopted, and increased after they were introduced. In Lawachara and Teknaf, for example, the villagers living within the boundaries of the protected areas are involved in forest patrols. The Forest Department and Wildlife Trust of Bangladesh (WTB) has formed ten Village Tiger Response Teams (VTRT) to help conserve tigers that enter villages adjacent to the Sunderbans. It is a matter of local personal pride to be a member of the Village Tiger Response Team (FDB, 2006; FDB, 2010).

In all of the case study areas major conflicts arose due to restrictions on the use of forest resources (NTFPs); collection was easy before the creation of the national parks and sanctuaries but now the law prohibits this traditional activity. This effect was also experienced in the protected areas of Bhutan, Nepal and Ghana (Dorji, 2009; Ayivor *et al.*, 2013; Thapa, 2014). Illegal tree felling, fuel wood collection (Plates 8.4 and 8.5), restriction on access to park resources, and poor relationships between Forest Department staff and local people were reported in all areas covered by this research, although there was some evidence that this situation is improving, particularly in Lawachara, where it is aided by the presence of various NGOs (see sections 6.1.4.3, 6.2.4.3 and 6.3.4.3). There is a lack of suitable policies, harvesting rules and regulations for the sustainable management, harvesting and development of NTFPs,

although harvesting rules and regulations exist for some NTFPs such as bamboo and cane in Lawachara and Teknaf, and golpata (*Nypa fruticans*) in the Sunderbans, it is not implemented due to the lack of adequate funds and field supervision.



Plate 8.4 Fuelwood collection inside the Lawachara National Park.

In the Teknaf Wildlife Sanctuary (see Chapter 7, section 7.4), at least some of the conflict occurring is based on the presence of Rohingya refugees. The largest Rohingya exodus from Burma occurred in 1972, 1991-1992, and 2011-2012; these people have settled in various villages in the region. Many of the Bengalis interviewed suggested the increase in the local population resulting from the latest influx of refugees from other areas is creating additional pressure on resources. This increase in population has created competition in the job market, and is considered by other residents to have included illegal tree felling despite this being strictly prohibited. Fuelwood collection is a significant activity in Teknaf, for household consumption as well as commercial purposes. Collectors work individually but sometimes in groups and report that they pay between 5 and 10 taka as a levy to Forest Department staff to enter into the forest. Fuelwood is sold on to middleman for transport to brickfields, tea stalls, and restaurants.



Plate 8.5 Fuelwood collection by children and women in the Teknaf Wildlife Sanctuary.

There are eight brickfields in and around Teknaf Wildlife Sanctuary, three are located in Modhya-Leda (Plate 8.6); these consume a huge amount of fuel wood daily except during the monsoon and are operating in violation of the Forest Act (FDB, 2008). Brickfield owners sometimes directly hire people to collect fuel wood and this industry may constitute the main threat to the viability of the forest and forest dependent wildlife. Legal action could be taken to close the brickfields but this would be politically difficult since many of the brickfield owners are influential people. In addition, although closure would affect the livelihoods of the ordinary brickfield workers, there are other employment opportunities available. Overall, the environmental damage caused by brickfield activity is far worse than the costs to livelihoods of closing them. An alternative to the brickfields and use of fuel wood could be the development of biogas as seen in parts of Africa (Getzner and Islam, 2013).



Plate 8.6 Brickfield inside the Teknaf Wildlife Sanctuary.

Section 6.3.3 of the results reveals the conflicts encountered in the Sunderbans, including illegal tree felling, fuel wood collection, fishing with poison, poaching of wild animals (particularly deer and tiger), human-tiger conflict, bandits interfering with fishermen, climate change, sea level rise, and the poor relationship between Forest Department staff and local people. There is also a specific problem associated with the development of shrimp/prawn farming in Boiddamari and Hoglabunia villages in place of agriculture. Shrimp farming requires fewer workers than agriculture, thus reducing employment opportunities, and the population now has reduced access to milk, fresh vegetables and other produce. At the same time, the salt-water environment created for shrimp farming pollutes the land.

According to the Bangladesh Bureau of Statistics the total population in Bangladesh was last recorded at 154.7 million in 2013 up from 50.1 million in 1960¹⁶. The increase in population is leading to over exploitation of forest resources by encouraging encroachment, timber felling and fuel wood collection; a situation exacerbated by the lack of strategy for sustainable management. Fuelwood collection, illegal timber felling and harvest of non-timber forest products are prevalent in the protected areas to varying degrees (Oli *et al.*, 2013; Rahman *et al.*, 2010). Illegal logging is driven by a combination of demand and unemployment, and the need for subsistence income despite the fact that it is banned (FDB, 2010). Farmers have converted agricultural land into gher, for shrimp cultivation because of the higher economic returns. Over the last two decades this has attracted considerable attention because of its export potential (this research; Ahamed *et al.*, 2012). It requires saline water, so land used for this purpose becomes infertile for agricultural purposes and this alteration in the ecosystem has reduced fish breeding and the movement of spawn and hatchlings, thus overall fisheries production has decreased; similar findings have been reported by Akon (2013). The Sunderbans has experienced a balanced growth of flora and fauna in association with the fresh water flow from the upper stream Ganges at the north and the salty water inflow from the Bay of Bengal at the southern border. But the balance is being threatened due to decreasing freshwater flow from upstream and the salinity of the *Sundarbans* increases from east to west by tidal flooding with saline water (Haque, 2006, 2010). The increase in water salinity of these areas has created suitable habitat for shrimp cultivation and made it unsuitable for irrigation (Haque, 2006). This problem is not confined to the Sunderbans, there has been a deterioration of mangrove forests throughout Bangladesh. The shrimp farming in the gher system is responsible for the destruction of aquatic resources during post-larva shrimp collection (Biswas, 2009). In general, the shrimp business has expanded unsustainably over the years by clearing mangrove swamps. Current management by the Bangladesh Forest Department does not result in implementation of mangrove conservation practices; Roy *et al.*, (2013) also reported this problem.

Currently illegal logging is considered to be one of the major threats to forests worldwide, particularly in the tropics, where the level of deforestation and degradation is high and driven by complex socio-economic conditions and political settings. Illegal logging is frequent and one of the major challenges to the sustainability of forest resources in Bangladesh, as poverty and

¹⁶www.tradingeconomics.com

unemployment is a common phenomenon (Mukul *et al.*, 2013). According to the Bangladesh Wildlife (Preservation) (Amendment) Act, 1974, commercial harvesting is not allowed inside the core zone of protected areas in Bangladesh (FDB, 2006). It is necessary, therefore, to explore other mechanisms of benefit flow to local communities. There are several factors involved in illegal tree felling, such as the close proximity of villages, sawmills and furniture shops to the forest facilitating tree felling. The presence of good transportation infrastructure outside the villages allows the trees to be smuggled from the forest easily. Mukul *et al.*, (2013) reported that a convenient road network and lack of monitoring influence illegal logging. There are many furniture shops and saw-mills (Plate 8.7) in Bhanugach bazar in Lawachara which is close to Baghmara village. Elements of the population have been viewing tree felling as an easy source of quick income. At the same time, lack of suitable law enforcement, corruption in the police force, political conditions, and lack of manpower to guard the forest are also significant contributors. A more effective approach could be adherence to forest law, which has been long regarded as the most effective strategy to prevent illegal logging (Mukul *et al.*, 2013). The brickfields, which are in close to the Teknaf Wildlife Sanctuary also encourage tree felling by creating a market for fuel wood. The government of Bangladesh has banned the establishment of brickfields near to protected areas and the use of fuelwood in a brick kilns under the Brick Burning Act, 2013 (FDB, 2013).



Plate 8.7 A saw mill adjacent to the Lawachara National Park.

The number of people becoming unemployed, homeless and living below the poverty level is increasing day-by-day in the case study areas. Inflation and natural disasters such as cyclone 'Sidr' (2007) and 'Aila' (2009) (Plate 8.8) in the Sunderbans has caused serious, long lasting damage; this is likely to contribute to the involvement of people in tree felling as an alternative source of income.



Plate 8.8 The affect of cyclone 'Aila' in the Sunderbans.

The results of this study revealed that a major underlying source of conflict in the parks was population pressure as well as poverty and unemployment in the neighbouring communities; this, together with other issues such as lack of payment and exclusion of local communities in the management planning process has encouraged involvement in illegal activities, mainly poaching and encroachment, leading to various conflict situations. In general, conflicts between protected area managers and local communities suggest that there are significant shortfalls in the policy adopted by Forest Department to integrate local residents into the overall management framework; this finding is also consistent with work conducted by Thapa (2014) in Nepal.

8.4.1 Suggestions to increase plan effectiveness and reduce conflicts

In order to mitigate conflicts it is important that local people have a greater ability to negotiate over resource management under changing conditions. Involving affected stakeholders in a fair, credible, and respectful process and focusing on their interests is a key to the success of most conflict resolution efforts (Lewis, 1996; Mannigel, 2008). There needs to be greater recognition of the traditional rights of local communities, particularly with regard to use of natural resources (Aziz *et al.*, 2013; Chowdhury *et al.*, 2014), as well as sustainable use of forest resources consistent with a zoning plan, and co-managed through agreements between NGOs and local

communities (Gardner, 2011; Bertzky *et al.*, 2012; Gardner *et al.*, 2013). In Africa, evidence exists of improved forest conditions in community-managed forests, as compared with state-managed forests, and increased harvests in sustainably managed community forests (Blomley, 2013).

The results of this study suggest that there is a need to provide economic benefits, effective law enforcement, conservation education programs to increase public awareness, development of the relationship between the local populations and Forest Department staff members, involvement of local people in the management planning process, and permission for local people to collect forest resources on a controlled, sustainable basis. Education, political will and public relations are key elements in most conflict resolution processes; educating the local communities about the potential benefits associated with protected areas can be an important tool in avoiding and resolving protected area conflicts and increasing the scope for a more efficient use of forest resources (Lewis, 1996; Getzner and Islam, 2013). In the Sunderbans, respondents suggested establishing embankments, returning shrimp farms to agricultural land, and providing compensation to those affected by tiger and crocodile attacks. This latter aspect has now been approved in the recent revision of the Wildlife Act (FDB, 2012). In order to secure the sustainability of forest resources in Bangladesh it would be necessary to implement the following actions: providing compensation to local people for losses they have incurred as a result of their proximity to the protected area (Lewis, 1996); ensuring greater benefits to forest users with tenure rights; providing alternative income generating opportunities; offering employment opportunities; improving the socio-economic condition of local communities; and amendment of existing forest law enforcement; the foregoing concepts are consistent with the findings of Lewis (1996), Mukul *et al.* (2013), and Getzner and Islam (2013).

For sustainable management of natural resources the cumulative pressures on protected areas needs to be assessed. These have been identified as general environmental change, such as pollution, air and water quality and locally specific unsustainable harvesting of forest resources. Most of these are linked to the increase in human use (legal or illegal) inside and outside park boundaries and to the lack of substitutes for poverty alleviation (PCA, 2000). An Environmental Impact Assessment (EIA) is required to facilitate planning for sustainable development and decision-making, and to anticipate and manage the negative effects and consequences of development proposals (Sadler, 1996). Since the 1970's it has been used as a tool for decision-making regarding development proposals. It involves a more detailed handling of cumulative effects (CEs), which are defined as the impacts on the environment resulting from the

incremental impact of a given action. It can result from multiple research methods and be manifested in terms of both biophysical and socio-economic resources (Canter, 1999).

In order to address the sustainable use of resources to reduce conflicts and encroachment, research into two areas is required: the sustainable yield of each product (and the predicted impact of environmental change); and the current and future demand for forest resources have to be analysed. Thereafter, it is necessary to investigate how production can be increased and products can be substituted for demand reduction. In Nepal, efforts have been made, at the policy level, to promote the sustainable harvest of forest resources (Sharma *et al.*, 2004). Strip plantations in Bogra and Jessore Forest Divisions in Bangladesh were profitable for participants, generating an increase in annual income (Muhammed *et al.*, 2011). The Forest Department could establish roadside strip plantations of native plants, particularly those used medicinally, to provide for local use and reduce the pressure on forests. There are no wildlife research staff, research facilities, or monitoring mechanisms for assessing the biodiversity of the park and sanctuaries. There is a need for special training courses on PAs for Forest Department staff members, including legal and technical aspects of sustainable forest management, forest monitoring, forest tenure mapping, record keeping (including finances), and general skills, such as leadership, governance, communication and planning (Blomley, 2013). An adequately trained conservation professional is a key priority to effectively address declining trends in biodiversity, particularly in tropical, developing countries. Worldwide, the PA managers are increasingly faced with complex social and ecological factors that demand sound understanding of social and ecological issues (Teel *et al.*, 2013). Professional PA managers are important for strengthening the management of protected areas and the adjacent land and balancing multiple interests (Mehnen, 2013; Blomley, 2013). A wide range of threats currently challenge the sustainability of PAs for long-term biodiversity conservation (Chape *et al.*, 2008). To facilitate the sustainable management of protected areas, it is necessary to understand the park-people interactions that can be applied in designing a suitable management framework (Thapa, 2014).

Currently, formal university education does not meet the needs of field based protected area professionals. In Bangladesh, few universities have special faculties or departments for PA staff and the situation is the same in most countries (IUCN, 2014). Short courses are a potential route for PA staff to obtain the required skills and, increasingly, PA-related training is focused on building the capacity for mixed groups of stakeholders to interact with PAs on a regular basis. An example is joint seminars for PA managers, tourist companies, local communities, cultural heritage site managers and other decision makers; these are becoming the new reality and

proving to be successful (IUCN, 2014). Governance systems are increasingly required to respond to rapid environmental, cultural, social and economic changes to be effective in achieving the aims of PAs.

8.5 The Effectiveness of the Co-management Approach

Co-management approaches to natural resource management have been recognized in many areas of the world (Ostrom, 1990; Bromley, 1992; Connor *et al.*, 1996; UNDP, 1999; Borrini-Feyerabend *et al.*, 2000; Keen and Lal, 2002, Gardner *et al.*, 2013), and have been successful in many countries including Nepal, India, Australia, and Madagascar (Hughes, 1996; Castro, 1997; Castro and Nielson, 2001; Sarin, 2001; Gardner *et al.*, 2013).

In Lawachara and Teknaf the management plan objective was to develop and implement a co-management approach that will ensure long-term protection and conservation of biodiversity within the park, while permitting sustainable use in designated zones by local people as key stakeholders (FDB, 2006:16), and in the Sunderbans it was to support and improve community based co-management approaches for the activities taking place in the SRF and its surrounding landscape (FDB, 2010:18). The research suggests that in all the case study areas, the co-management committees are active but there is little information on how this is influencing the protection and conservation of PAs. Overall, nearly half of the questionnaire respondents, as well as comments from focus group members, acknowledged receiving some benefits from co-management and that this had directly and indirectly contributed to improving their livelihoods. All the key informants were aware of the co-management approach although their participation was different across the case study areas. Some acknowledged benefits such as repairing and constructing roads and bridges, arranging different types of trails inside the parks for tourists, providing some economic benefits to local people, and conservation education programs that increased public awareness.

In Lawachara and Teknaf, most of the key informants indicated that the co-management committee formed the community-patrolling group to conserve the forest, but that in practice the forest was damaged after its formation. The principal logic of the co-management committee is that the incidents of tree felling will be stopped or decreased if the tree fellers themselves are given the responsibility to protect the forest; on this basis tree fellers have been actively recruited. This intention has not succeeded in Baghmara village despite its success in other parts of the country and tree felling has continued. It was reported that owners of furniture shops, local administration and some Forest Department staff members have created a supply chain that

supports tree felling and makes it easier to carry out. Following extensive criticism by the media and the public, as well as pressure from the influential sections within the authorities, the CMC has been compelled to reform the CPG without involving the tree fellers; honest, young and active Forest Department staff members were brought in an effort to reform the situation. A number of cases were filed against the tree fellers including the former CPG members but by this time extensive felling had already occurred. It was found that although many of the villagers were involved in tree felling, some cases filed by the Forest Department had been false. It was also suggested that in the event of tree felling, the Forest Department tends to bring charges against the previously convicted tree fellers of this village without investigating whether they were actually involved or not.

In Teknaf, the co-management committee comprises a representative group of local stakeholders that organises regular meetings and co-management activities. Most of the key informants indicated that awareness has increased, and there has been some development work with local communities through the co-management committee, although it is inadequate compared to the need; however, their activities do not involve all villages. Previously the illegal tree fellers were able to take trees away openly by van, but this is now impossible due to the creation of public awareness through the activities of the co-management committee.

In the Sunderbans, most of the key informants acknowledged that awareness has increased through co-management. Previously, deer meat was available for sale in local markets, but now it is not. Four brickfields have been closed due to the activities of the co-management approach. Some key informants said that if all the activities of co-management committee were free from political influence, then the results would have been better. Moreover, there are no community patrol groups, so the activity of the co-management committee is better than in Lawachara National Park and Teknaf Wildlife Sanctuary.

It is clear that the co-management approach has delivered some benefits to these communities in terms of infrastructure development (see sections 6.1.4, 6.2.4, 6.3.4), but the co-management committee has not adequately worked with and empowered specific stakeholder groups in the communities, especially women. By empowering women, the park could directly support the families in the communities. From the literature review it was found that women took a significant role for sustainable natural resource management and solving environmental problems (see section 2.5.4.1). The women in South-east Asian countries, for example in India, Nepal and Bhutan have played a crucial role in traditional farming and joint forest management

(Kiorboe *et al.*, 2005; Wuyep *et al.*, 2014). The involvement of women has resulted in a successful reduction in deforestation. In Bangladesh, the women have rarely been part of local participation initiatives, yet it is quite impossible for such initiatives to achieve success without them. Shiva (1989) argued that the activities of women are more environmentally friendly than men. Thus, the policy makers and PA managers have to identify the needs and interests of women in PA management in order to ensure effective conservation policy (Little, 1994). Bangladeshi women are knowledgeable of the natural resources around them, therefore it could be useful to utilize their traditional ecological knowledge for sustainable natural resource management and increase their employment opportunities. Facilitating employment opportunities in communities would also benefit the families economically. The co-management approach in the case study areas indicates that the current approach, based on park revenue sharing for community development, has been successful in developing positive attitudes among local people to conserve the park and sanctuaries (see sections 6.1.5.2, 6.1.5.4, 6.2.5.2, 6.2.5.4, 6.3.5.2, 6.3.5.4). To some extent, the co-management communities also feel empowered by the co-management programmes. The findings of this research indicate the co-management programme has the potential to make tangible impacts on conservation, local livelihoods and governance. If issues such as inclusion, equity, empowerment and integration are properly incorporated in the policy and programmes of co-management, the strategy adopted in case study areas could be promoted as a viable model for the sustainable management of protected areas. In terms of classic models of participation such as Arnstein's (1969) ladder, the case study areas reveal the co-management planning experience to involve various levels of participation and even cases of manipulation rather than levels of co-production or full participation. The literature on community based co-management provides some examples that suggest that this approach has improved the implementation and enforcement of park rules through negotiation and better communications; for example, Schroter *et al.* (2014) report on the case of a PA in Brazil. This contrasts with the situation generally found in the study areas, where the discussions taking place in co-management committees are not being fed downwards to the local residents.

Although the chances of achieving biodiversity conservation objectives through the co-management programme seem quite promising, there are also challenges in altering the attitude of local people into the positive actions necessary for the long-term conservation of biodiversity and park protection. The existing co-management approach is suitable to improve the attitude and actions of local people dependent on, and affected by, the protected areas. However, they seem insufficient to address conservation threats, which are not directly linked to the subsistence

livelihood practices of the co-management communities and originating far from the park boundaries. To solve these aforementioned problems and to make the co-management more powerful, effective negotiation is required with co-management committee members, IPAC workers, local people and forest staff. This multi-faceted negotiation with various stakeholders would allow the co-management committee to play a more effective role. If everyone is sincere, and the activities of co-management committees are kept free from political influence then the committees will be more effective. In Vietnam, it was found that multi-level co-management committees can provide unified management direction to both the core and buffer zones of a PA (Parr *et al.*, 2013). This multi-level co-management framework provides institutional bridges between the conservation and community development agendas, for the long-term sustainable management of PAs and their buffer zone areas (Parr *et al.*, 2013). In the case study areas for this research, there is no multi-level co-management system, which therefore hinders the effectiveness of the co-management approach. Conservation practitioners in Bangladesh should recognise the limitations of the co-management approach as practiced there and try to introduce a multi-level approach. The government rhetoric supports the idea of a bottom up approach in which local views are effectively incorporated into planning and management, but the reality is that this is not working within the study areas. Additional instruments are needed to achieve conservation and development objectives, such as conservation education programmes and development of training opportunities that could stimulate small business development such as tailoring, gardening, poultry farming and weaving. However, incentives and benefits from the park to the local residents will not be sufficient to turn the positive feelings of local people into positive conservation practices. Ending poor practice such as fish poisoning, illegal deer hunting and the like can only be addressed through public awareness campaigns and education. This can only be ensured, however, when larger socio-economic issues are addressed. Socio-economic programmes would be necessary to achieve tangible, long-term conservation and socio-economic outcomes from the co-management programme. There seems to be a need for both protective and participatory approaches to ensure conservation and livelihood outcomes and reduce conservation threats. Community based conservation can complement enforcement but cannot replace it (Roe *et al.*, 2000), and the role of central government and the need for strictly protected areas will always remain vital to sustainable conservation (Lockwood *et al.*, 2006). The Tsimembo-Manambolomaty is a wetland and dry forest in Madagascar, co-managed by the Peregrine Fund and local communities, with a focus on empowering traditional users to manage their resources more sustainably, therefore local income from fishing is thought to have increased (Gardner *et al.*, 2013). Thus, to make the co-management sustainable and effective, the

people who have a large amount of local knowledge and experience with the PA must be recognized and incorporated into the co-management. Moreover, benefits derived from co-management must be shared with those people who critically depend on the forest.

8.6 Impact of the Management Plan

This section contains three sub-sections addressing in turn the relationships between local residents and Forest Department staff members, implementation of alternative income generation activities, and benefit sharing.

8.6.1 Relationships between local residents and the Forest Department staff members

One of the management plan objectives in Lawachara and Teknaf was to conserve the biodiversity of the park by following a landscape approach based on building partnerships with all the stakeholders (BFD, 2006:16). This research has revealed that the majority of the respondents in all case study areas viewed the relationship between the Forest Department staff members and local communities as good (see sections 6.1.5.1, 6.2.5.1. and 6.3.5.1). The relationship appears to vary, however, from community to community according to socio-economic circumstances, personal relations between the Forest Department staff and village leaders and involvement of some community members in poaching.

Lawachara National Park: In Lawachara punji, it is clear that the relationship between villagers and Forest Department is good. The Forest Department has no major complaint against the villagers and likewise the headman of the village said that they do not have any conflict with the forest officers. Generally, the local people said that they have a good relationship with the forest department staff members, however it depends on the individual officer, particularly the example set by the highest official. In Magurchara punji, it is apparent that the relationship of the villagers with the Forest Department is also satisfactory. The Forest Department itself does not also have any major complaint against the villagers. One of the villagers summed up the situation when stating that there had been no conflict with the Forest Department in the past 6 or 7 years. As the villagers do not cut down trees, no allegations have been made against them. But an official of the Forest Department alleged that these villagers are occupying land beyond their allocation, but so slowly it is not noticeable. The fact that the current ‘Montri’¹⁷ has an amicable

¹⁷ The leader of the Khasia community is called Mantri, and he is concerned about the social, traditional and religious issues within the community. A mantri is chosen by the villagers and is passed down to his son. Tenureship of a Mantri is not fixed, and he may remain Mantri as long as he wishes.

relationship with the present mainstream political leadership, human rights organisations, influential tribal forums and some international organisations are restricting the Forest Department from taking any enforcement action against the villagers for this unauthorised occupation of land, the official added. He was also concerned about the possibility of an international issue being raised as a consequence. In Dolubari, the relationship between the villagers and the Forest Department staff is good.

In Baghmara, by contrast, the relationship between the villagers and the Forest Department is at an all time low. The Forest Department has filed cases for felling trees against hundreds of people from this village, many have been arrested and new cases are being processed. A former community patrolling group member informed the researcher that the Forest Department tries to avoid their responsibilities by merely filing cases against the people of this village without any basis whenever there is a tree felling. He believes that they do this to save the real tree fellers who are bribing them and they are also pressurised by political leaders. Instead of bringing charges against the real tree fellers, the Forest Department files the cases against those previously prosecuted for tree felling even though these are no longer involved. For these reasons, the villagers have taken their position against the Forest Department.

From, the above discussion it is clear that in Lawachara the villagers living inside the protected area have a good relationship with the forest staff, whereas those outside do not. More than half of the questionnaire respondents stated that their relationship with the Forest Department staff is good (see Figure 6.11).

Teknaf Wildlife Sanctuary: The key informants in the Teknaf Wildlife Sanctuary responded that the Forest Department staff and local people blame each other for the destruction of the forest. They also mentioned that their relationship could be improved through the honest work on the part of the Forest Department staff. Almost all focus group members said that they have a good relationship with the forest staff, as they are not involved in tree felling and hill clearing¹⁸. However, 52% of the questionnaire respondents stated that their relationship with the Forest Department staff is good (see Figure 7.11).

¹⁸Hill clearing is digging out soil from hill and makes it as a plain land to make their new house. Sometimes the local influential people are engaged local people to do this for their vested interest such as real estate business, brick manufacturing, large-scale agriculture, and filling land for road construction.

The Sunderbans Wildlife Sanctuary: In the Sunderbans the key respondents indicated that there is no significant conflict between the local people and Forest Department staff. The Forest Department staff members are aware of the economic condition of this area and therefore they are not strict with the fuel wood collectors. However, some respondents said that they do not interact with the Forest Department staff at all and that the staff members are involved with the thieves. In the questionnaire survey, 45% responded that their relationship is poor with the forest staff, while 31% indicated that it is good (see Figure 8.11).

From the above discussion it would seem that villages within and close to the PA have a good relationship with the forest staff, whereas the villagers from outside the boundaries do not. The key informants from villages outside the protected area/park boundaries stated that, on some occasions, innocent locals are harassed by the Forest Department and cases are filed against them. It should be noted, however, that despite difficulties in relations, in all case study areas it was observed that relationships are better than before the management plans, while acknowledging that there is still a problem in Lawachara National Park. Overall, therefore, in this regard the management plans might be regarded as being successful, but with progress still to be made.

8.6.2 Implementation of alternative income generation activities

Conservation of biodiversity and poverty alleviation are two of the world's major challenges, therefore improving synergies between these is particularly important not only in the poorest countries but globally as a conservation priority (Brookes *et al.*, 2004; Gardner *et al.*, 2013). The forest dependent livelihoods of the local people in and around protected areas are a major cause of deforestation and forest degradation. For their livelihood such people generally rely on fuel wood collection, bamboo, and other products from the forest. But due to scarcity of these natural resources, people often destroy saplings for fuel wood and clear out trees for sun grass cultivation and other farming activities. Moreover, due to increasing demands for timber and fuel wood (particularly for brickfields) in the market, some local people also engage in illegal tree felling. Therefore, introduction of Alternative Income Generation Activities (AIGAs) for sustainable livelihood development and enhancement of skills of local stakeholders was one of the management plan objectives in all the case study areas (FDB, 2006). The objective was not achieved in any of the case study areas, due to the lack of funds and of integration between the Forest Department and NGOs.

In Lawachara, the Forest Department provides some alternative income generation training to the local communities, i.e. mushroom cultivation, apiculture, poultry, fishery, tree nursery, weaving, basket making, handicraft making, jam, jelly and juice preparation, lemon cultivation, cultivation of medicinal plants and different types of vegetable. The Arannayk foundation provides some facilities to promote alternative livelihood to aid forest conservation in Lawachara.

In Teknaf, the Forest Department staff indicated that they provide some alternative income generation activities to the local communities through the co-management approach; the activities are plant nurseries, homestead gardening, fish farming, weaving, basket making, handicraft making, lemon cultivation, poultry, cattle and goat fattening, and some horticulture. However, these types of activities are not sufficient for sustainable livelihood development; and are not able to reduce the dependence of the local communities on the forest.

In the Sunderbans, the Forest Department staff members and local people indicated that some livelihoods programs have been created through the co-management approach. Examples include the establishment of village nurseries, food storage and processing, livestock rearing and fisheries. In the Sunderbans East Wildlife Sanctuary the AIGA opportunities differ from community to community. The AIGAs recognized by the Forest Department and IPAC staff are fish culture, poultry, cow and goat rearing, tailoring, cultivation of vegetables and fruits, horticulture/tree nursery, and handicraft production.

The field study suggests that the alternative income generation activities play a limited role in reducing forest dependence among the local communities due to inadequate support and lack of consistency and co-ordination in their implementation and monitoring. The study also indicates that there is a notable lack of co-ordination among the Forest Department, IPAC, and co-management committees. No collective decisions between the groups were being made about the AIGAs; as a result, a communication gap exists among the stakeholders. Moreover, monitoring of the overall activities of the AIGAs was found to be neglected; only the IPAC officials are directly involved in the distribution of AIGAs and supervision through co-management. This research is consistent with others in the field (for example Karim, 2008) indicating an urgent need for active participation by the Forest Department.

8.6.3 Benefit sharing

Sharing park benefits for the development of local communities is one of the strategies adopted to create the social environment in which people in peripheral areas feel that they are a part of

park management. The field study suggests that recycling of park revenues to co-management programmes can help local residents understand that the park is not a liability but an important asset for local development. It can be argued that inequitable and inadequate distribution of park benefits would hinder the development of positive local attitudes towards biodiversity conservation; this emphasises the importance of efficient and sensible sharing of park benefits with local communities. Moreover, improved distribution of benefits is essential for the establishment of strong links between the park, local residents and protection of wildlife. The field study suggests that local residents have a clear understanding of the potential benefits from community forests, which outweigh the costs of managing them for biodiversity conservation. However, this study shows that, in reality, the anticipated benefits rarely trickle back to the local community. Local residents admit to receiving some benefits; however, they claim that these are inadequate.

The preceding discussion has shown that where local people obtain tangible benefits, these act as an incentive to alternative livelihood development and vice-versa. Direct or indirect economic incentives are necessary to stimulate community involvement in conservation (ICEM, 2003). The discussion clearly indicates that there is a need to expand and assure benefits of the co-management programme in order to make tangible impacts on conservation and on poverty. Better livelihoods and conservation impacts can be achieved by ensuring equitable distribution of park benefits to the local communities through the implementation of effective activities such as community forestry, wildlife damage control and compensation, as well as alternative energy sources.

8.7 Institutional, Political and Local Issues

Developing the knowledge and skills of individuals and organizations has been widely recognized as an important challenge to implementing conservation globally (Salafsky *et al.*, 2002; Bonine *et al.*, 2003; Rodriguez *et al.*, 2005, 2006; Bawa 2006; Ceballos *et al.*, 2009). Lack of infrastructure, educational resources, and professional development opportunities for educators are viewed as critical obstacles to developing the capacity needed to effectively manage biodiversity (Ceballos *et al.*, 2009). Weak institutional capacity has been identified as a threat to protected area management (Oli *et al.*, 2013). The need for enhanced interdisciplinary approaches to build management capacity for protected areas has long been discussed in the literature (Teel *et al.*, 2013) and at global conservation forums including the IUCN World Park Congress. In the context of this research, the management plan objective to refine and strengthen

operational, infrastructural and institutional capacity was not achieved due to various institutional and bureaucratic systems.

In Lawachara National Park, for example, the locally influential actors engaged poor people for illegal tree felling and to collect fuel wood to sell in the market. Political pressure is also recognized as local elites change their political views with changes in Government. From the interviews conducted it seems that local people feel that these locally influential people are involved in, and in some way responsible for, all the major misdeeds in the forest. More than half of the respondents to the questionnaire survey felt strongly that current law enforcement in the forest is inadequate to conserve the forest (see Figure 6.17). In fact, respondents believe that in some cases the illegal loggers were used by politically corrupt and greedy individuals as a day labourers to carry out these activities; a finding similar to that reported by Mukul *et al.*, (2013).

In Teknaf Wildlife Sanctuary, the Forest Department did not take any legal actions against those involved in illegal logging and, in fact, some actively misuse their power and participate directly in various destructive activities. An example of local corruption was provided by a focus group member who stated that for a payment of 1 kg fish to the Forest Department staff allowed local people to enter the forest. The questionnaire survey solicited local opinions about current law enforcement in the forest; more than half of the respondent (63%) did not feel that currently available laws were being enforced (see Figure 6.34).

This research has indicated that marginalisation of local communities, the limited capacity of the Forest Department to monitor and enforce the laws and corruption of Forest Department staff members have consistently contributed to the overall deterioration of the forest in the Sunderbans. These findings are consistent with the work of Akhter (2010). Moreover, there has been degradation specifically in the mangrove, a finding confirmed by Roy *et al.*, (2013). In the Sunderbans it was reported that the Forest Department staff members take bribes at every chance from both authorised and unauthorised forest users; during the issue of permits they demand fees several times higher than those set by the government. The authorised users obtain permission for seven days, which can be extended if further bribes are paid; in addition fines are imposed for staying for a longer time period, a finding confirmed by Roy *et al.*, (2013). To meet the cost of bribes, the local harvesters extract more forest resources than allowed by their permits. During focus group discussions it was reported that the Forest Department staff charged illegal timber fellers 250 taka per day; however this cannot be verified. These Forest Department staff members have an incentive for doing this due to their extremely low levels of pay. Government taxation is highest in the Sunderbans, therefore the forest officers pay expensive bribes to obtain

a posting in this area which encourages them to take bribes to earn this back, in turn helping local people in their illegal activities.

The above discussion has highlighted the corruption and limitations of the Forest Department staff, institutional bureaucracy, local political pressure, and inadequate law enforcement in the National Park and Wildlife Sanctuaries. However, implementation of strong law enforcement can be effective in reducing illegal logging. Across the tropics, where the law has been enforced, it has been one of the most effective ways of preventing illegal logging (Mukul *et al.*, 2013). This study suggests that inadequate law enforcement has so far had a great impact on the overall situation, but even when the law has been enforced, it can make the situation worse. For example, in Baghmara village (in Lawachara) illegal loggers actually increased their activity after previously being convicted so they could meet their court fees. In general, penalties for illegal forest acts are not high enough to cause a significant reduction in forest crime. The forest field officers have broad discretionary powers and great opportunities for corrupt behaviour (Tacconi, 2007). In developing countries such as Bangladesh, the government officers have relatively low salaries although they manage high-value forest resources, so, the incentives for corruption are significant.

The discussion has demonstrated how weaknesses in the planning system have led to increased conflicts and encroachments in the study areas. The findings of this study are broadly consistent with national and international experiences. Management planning in developing countries is confronted with many problems such as policy and development decisions that are usually taken on political and economic grounds, with inadequate survey data that is rarely updated. This means planning becomes centralized and technocratic, with little participation by local people and with weak linkage between these and district authorities, which in turn lack integration with higher level authorities.

8.8 Tourism Development

Tourism in general and eco-tourism in particular has the potential to contribute to both conservation and sustainable development of a more diversified local economy (Holden, 2013; Kirkby *et al.*, 2010, 2011). Currently, tourism is the largest and fastest growing sector of the global economy, generating a larger gross dollar output than any other single industry (Eagles *et al.*, 2001; Thapa, 2012); it is an important source of incentives and resources to strengthen the infrastructure network at local, regional or national level (Mitchell and Ashley, 2010; Zhou *et*

al., 2013). It is noted that most PAs are underfunded for the purposes of tourism development (Leverington *et al.*, 2010; Nolte *et al.*, 2010). If well planned and managed, tourism can provide a significant source of revenue for local people and/or PA administrators, and increase visitor education and environmental awareness (Christ, 2003; Chape *et al.*, 2008; Zhou *et al.*, 2013). However, research in this area is still limited, particularly in developing countries such as Bangladesh where tourism is still in the early stages of development (Alam *et al.*, 2010).

In all the case study areas, relatively small percentages of respondents recognized the benefits of tourism (see section 7.7). The majority expressed no opinion due to lack of knowledge, particularly the female group members. However, effective management of tourism will enable protected areas and adjacent communities to achieve positive impacts and reduce the negative impacts of tourism (Eagles *et al.*, 2001). In Africa, it has been shown that sharing modest sums of tourism revenue with local communities, combined with community development, can help improve relationships between park authorities and local communities in PAs (Holmes, 2003; Blomley *et al.*, 2010). The ecotourism potential of the wildlife sanctuaries and national parks adjacent to forests has been well recognised by local people as an important additional income source. For sustainable conservation of the resources and biodiversity, forest based tourism is regarded as an effective tool; it can pay for both conservation as well as revenue collection (Alam *et al.*, 2010). To achieve this involvement and the feelings of local community members should be taken into consideration. They should be given access and rights to operate and deliver ecotourism activities in the forest areas (Alam *et al.*, 2010). To make ecotourism an option for attracting funds for local communities, the PA managers should be competent in visitor management, public relations and marketing, sales, infrastructure management, and tour operating (Kopylova and Danilina, 2011).

Lawachara National Park is an appealing tourist destination due to its natural beauty, landscape and local culture. It has potential for both domestic and international tourists. Nowadays a large numbers of tourists visit, illustrating its importance as a tourist destination. The study revealed that before introducing the Nishorgo Support Project in 2004 there were very few visitors at Lawachara and they made very little contribution to the local people or even to the park itself. A considerable number of domestic visitors have been coming to this park to enjoy the natural site and its surroundings for the last 4 years (Plate 8.9). The majority of questionnaire respondents perceived the impacts of ecotourism and its effect on the local communities living in and adjacent to the Park as positive. The respondents articulated the benefits of ecotourism on well-being and community development in various impact statements.



Plate 8.9 Tourist facilities in the Lawachara National Park.

Due to its natural beauty, Teknaf is famous for tourism in Bangladesh. It has immense scope to develop eco-tourism in the long series of hills along the Naf River. There are some tourist attractions such as elephant riding, the Naf river bank, sea beach, wetlands, guest houses, ethnic villages, the Kudum Cave trail which is famous for bats, the Toingya Hill which is about 400 feet above sea level. The Teknaf Wildlife Sanctuary has a tourist shop and ticket counter, as well as an interpretation centre with signboard facilities. The student dormitory is active; students are undertaking their research while staying there (Plate 8.10). Ecotourism could be a development tool for the region that could not only provide benefits for nature conservation, but also create the way for revenue collection and create job opportunities. Local communities need additional technical assistance to manage the impacts of tourism on their areas, and the opportunity, where possible, to manage tourism by special consideration from the Forest Department.



Plate 8.10 Student dormitory in the Teknaf Wildlife Sanctuary.

The Sundarbans Reserve Forest is a World Heritage site recognized by UNESCO, found in both India and Bangladesh, with over 23,000 square miles of mangrove ecosystem found within Bangladesh. Hundreds of endangered Bengal tigers (*Panthera tigris*) live in the reserve, but are rarely observed by visitors or scientists. Other charismatic species more likely to be seen are the huge estuarine crocodiles (*Crocodylus porosus*), abundant spotted deer (*Axis axis*), and otter (*Enhydra lutris*). Bird watching is a key attraction with 250 species among which are many wading birds that populate the banks of the mangroves. The Sundarbans is well known for Irrawaddy dolphins (*Orcaella brevirostris*) and the Ganges River dolphin (*Platanista gangetica*) within the Reserve's waters. This will undoubtedly bring more foreign visitors in the future (FDB, 2010). The tourism industry is frequently referenced as a highly important stakeholder/user group with the potential to provide extensive benefits to the Sundarbans Reserve Forest. All community members interviewed agreed that tourism income, together with other sources of local livelihoods, could be excellent for improving their lives. However, there is no consistent analysis of the impact of tourism on the ecosystem or neighbouring communities. And there is no existing tourism plan in effect to help measure how tourism management is functioning at present, nor is there any management authority within the reserve that has tourism management as part of its mandate. Threats to the Sundarbans Reserve Forest are largely not caused by tourism although some specific sites, particularly Karamjal, are under extreme pressure. Nonetheless, the lack of infrastructure is acute in existing tourist sites, leading to threats of accidents, pollution, erosion, and negative impacts on aquatic and terrestrial flora and fauna (Plate 8.11). The existing interpretation centre at Khulna and Mongla needs to be improved, and the visitor centre at Karamjal needs to be overhauled (this research; FDB, 2010).



Plate 8.11 Tourist launch in the Sunderbans.

Both the local communities and the key informants in all case study areas expressed their opinion that the co-management approach has helped to initiate ecotourism through the active participation of local people. Most of them addressed the co-management approach as a way to help the local people as well as the forest staff to develop ecotourism. Co-management has encouraged some local young men and women to come forward to be involved in ecotourism and adopt it as a profession. The local communities are obtaining benefits that run across the four dimensions of sustainability (socio-cultural, economical, environmental and institutional) through ecotourism practice. The local communities are encouraged to see the visitors and are being asked by the visitors about their local culture and traditions. Thus the local communities become more interested in preserving their culture and also become keen to educate their family members. The visits by outsiders and movement of eco-guides and other people inside the park play a role in reducing forest offences and criminal activities. Some ethnic women have been employed through ecotourism by manufacturing handicrafts, cloth and engaging themselves in different cultural activities. It also encourages other women, playing a role in empowering them. Moreover, ecotourism has created some opportunities for earning money with less capital (guiding, small-scale local business, renting bicycles and home-stay), thereby spreading the opportunity to earn. The tourists can come to the point of production for consumption of goods and services, offering the local communities the chance to sell their products directly to the tourists. So eco-tourism is generating employment opportunities and providing a new market where the local population can invest their money to earn more. Previously the local communities were very ignorant about their rights and claims on the forest resources, but through ecotourism (working with NGOs and other organizations) they are becoming aware of their rights and obligations. Examples of successful community development through tourism, from which Bangladesh can derive lessons, are the Annapurna Conservation Area in Nepal, and community based tourism project in Kerala, India (Holden, 2013).

Encouragement of eco-tourism in suitable zones and developing visitor amenities was a management plan objective in Lawachara and Teknaf (FDB, 2006: 16), while in the Sundarbans the aim was to provide for and enhance eco-tourism and visitor recreation opportunities (FDB, 2006: 20). Unregulated and unbalanced tourism growth has posed a major challenge to park management; the authorities seem not to be able to reduce the impact of unplanned tourism while realising the tourism potential of the park for the benefit of the local communities and biodiversity conservation. On this point, the park and wildlife sanctuaries lack tourism management plans and dedicated staff for tourism management even though tourism is the main

source of park income. Considering the objective of the management plan to conserve biodiversity, ecotourism was identified as an alternative income generation strategy by which the local people were supposed to be able to earn money, as well as become aware of the environment, which, in turn, would contribute to protection of the Park and Wildlife Sanctuaries and conservation of their biodiversity. This study indicates that although eco-tourism has the potential to contribute to creation of alternative income generation opportunities, protection of the Park and Wildlife Sanctuaries, increased environmental awareness among the local communities and visitors, and empowerment of the local people, visitor facilities have not yet been improved, nor have the park service and facility fees been revised for many years. The park could enhance national support for biodiversity conservation by providing quality conservation education and a unique wilderness experience to the visitors. Efficient distribution of ecotourism benefits, both from national and international visitors, are fundamental to ensure alternative land use and justify strict protection of the area (Aryal, 2008). The income generated from visitors to the park could be used for the development and management of protected areas and local communities; it could also help to reduce the dependency on the central government for a regular budget for protected area management (Thapa, 2012). Moreover, compared to other economic sectors, tourism has the potential to directly benefit women, which is significant for their empowerment and capability to play a full participatory role in society (Holden, 2013).

8.9 Summary

The research findings suggest that there are numerous challenges and limitations that must be addressed to make the management plans really effective in addressing complex issues affecting park protection and sustainable biodiversity conservation. Scholars believe that sustainable natural resource use can generate positive incentives for conservation among local communities (Rosser and Leader-Williams, 2010). Strong coordinated efforts are indispensable together with all concerned groups (development/administration/law enforcement/civil society) for wildlife conservation in and around National Park and Wildlife Sanctuaries. The inadequate capacity of the government at both park and departmental levels has been hindering the effective implementation of the management programme. However, no effective co-ordination mechanism exists between park managers, other governmental agencies and local political bodies to bring collaboration to conservation activities. These all lead to the argument that there are inconsistencies between the vision of the management programme and its policies and practices. This study suggests that a pragmatic policy is not sufficient to make the management programme

successful, proactive mechanism, devoted institutions with trained staff are required to achieve this. The 5th World Park Congress (September 2003) declared that:

“Effective management of protected areas in the context of global changes, local communities and other stakeholders have the knowledge, attitudes, skills, capabilities and tools to plan, manage and monitor protected areas. Managers and stakeholders also need the skills to be able to establish and maintain the complex relationships and networks that are essential for sustainable and effective management of protected areas”.

(Kopylova and Danilina, 2011: 1)

Increasing external pressures such as human settlement, infrastructure development, and extractive resource use in and around PAs repeatedly test the abilities of today’s managers to apply the principles of sound stewardship and adaptive management. In recent decades, the social and political arena in which PA management takes place has also seen exaggerated changes (Teel *et al.*, 2013). The settlement of indigenous rights, application of community-based governance structures that involve a variety of local stakeholders, and the development of landscape-level connectivity networks demonstrate the growing complexity facing today’s PA decision-makers (Lockwood, 2010). After all, the global forces of change including climate change, incursion of invasive species, and degradation of soil, water and air, add further difficulties to such circumstances (Teel *et al.*, 2013).

Whereas growing external pressures and a variety of community demands represent key challenges to efficient PA management and global conservation in the 21st Century, internal shortcomings in administrative competency and ability have long been identified as equally important (Teel *et al.*, 2013). An international review organized for the 1992 World Congress on National Parks and PAs (McNeely *et al.*, 1994) indicated that three of the five most commonly reported threats to PAs were related to management and policy rather than external impacts (Teel *et al.*, 2013). These threats were inadequate legislation, poor administrative practices, and shortages of funding and staff (Hockings, 2003). The PA professionals frequently lack the diverse set of skills necessary to deal with the difficulties that characterizes contemporary management. For instance, a recent management effectiveness evaluation of Tiger Reserves in India concluded that lack of trained staff had the lowest performance rating among a set of efficiency indicators (Mathur *et al.*, 2011). In various areas, ability is often lacking among PA staff, such as natural resource management and planning principles, research, monitoring and evaluation techniques, leadership and decision-making, visitor management, conflict resolution

and involvement of stakeholders, fundraising, outreach and partnership development, and the ability to account for the attitudes of local communities in management decisions (Hockings *et al.*, 2006). In the literature, the need to monitor and improve management effectiveness for PAs in light of these concerns has been widely recognized (e.g. Ervin, 2003; Hockings *et al.*, 2006; Leverington *et al.*, 2010). This was also one of the significant messages emerging from dialogue at the 5th IUCN World Parks Congress in Durban, South Africa in 2003 (Sheppard, 2004). A Workshop Stream at this event was focused on *Developing the Capacity to Manage Protected Areas*. Participants recommended that the IUCN and the World Commission on PAs (WCPA) should:

“Promote and support national and international collaborative capacity-development activities through which stakeholders at all levels can acquire and share best practices, develop appropriate responses to change, and thereby enable and empower themselves to play their full role in protected area management...”

(IUCN, 2005:142)

The need for innovative mechanisms to build capacity for inter-disciplinary, systems thinking approaches to PA management will be a key point of discussion leading up to the next IUCN World Parks Congress in 2014 (Teel *et al.*, 2013). Developing innovative mechanisms to promote the resilience of threatened species and ecosystems in the face of global change will characterize future efforts in PA management (Teel *et al.*, 2013). Worldwide, various issues such as habitat fragmentation, climate change, and the need to balance protection of natural resources with the livelihoods of local communities will continue to complicate the management process and check the abilities of PA managers. Challenges are often exaggerated in developing countries such as Bangladesh. The need to build capacity among PA managers in these areas has been well recognized for decades (Child, 1994; Appleton *et al.*, 2003; Bonine, 2003; Mathur *et al.*, 2011). Multi-institutional partnerships provide a means by which capacity-building programs can be strengthened through the sharing of institutional knowledge and experience. Furthermore, the international cooperation for PA management effectiveness can promote professional development toward internationally united thinking and action that allows PA managers to more clearly observe their broader responsibility in biodiversity conservation (Teel *et al.*, 2013).

The findings of this research indicate that the co-management programme has been well accepted by both local residents and Forest staff as the best available strategy to reduce park-people conflicts and to achieve the multidimensional objectives of park management. There is an increased awareness among local people that the co-management programme has created

opportunities for sharing park benefits as well as improving access to buffer zone forest resources through social forestry. The local people felt that the co-management programme helped empower them and increase their social status. Scholars suggest establishing substantial buffer zones around PAs, to maintain substantial connectivity, and promote lower-impact land uses by involving and benefiting local communities (Laurance *et al.*, 2012). In essence, the co-management programme can make promising impacts on the livelihoods of the local communities and biodiversity conservation of the park. However, co-management benefits are not yet sufficient to influence behavioural change among the local residents. Most of the co-management funds are used in rural infrastructure development and have limited impact on park-people issues.

Expansion of conservation constituencies and empowering local communities are crucial to ensure the success of conservation programmes. Thus, the future of conservation in Bangladesh in the changing socio-political context of the country depends on how quickly and easily the institutional and policy reforms will take place to make conservation more comprehensive and empowering, how effectively the conservation objectives will be integrated into broader development plans and programmes, and how much protected areas could contribute to poverty alleviation. Integrated conservation and development programmes, such as the co-management programme, can only achieve integrated conservation objectives when they are also supported by appropriate integrated conservation and development policies and institutional initiatives (Barber *et al.*, 2004). In terms of its management and governance arrangements the international PA network is diversifying rapidly. Accessible information suggests that nearly half the world's PAs are within sustainable-use areas and protected landscapes/seascapes, and nearly a quarter are managed by non-governmental actors or under co-management arrangements, often with indigenous peoples or local communities (Bertzky *et al.*, 2012).

Strong law enforcement and wider co-operation will be required to control the poaching of endangered animals like deer and tigers. These activities are largely driven by greed rather than subsistence needs and are, often, under the influence of outsiders. Generally, it is believed that the short run anti-poaching activities are more effective in protecting wild animals than community development activities (Martin, 1998), as community infrastructure projects do not deliver the incentives necessary for biodiversity conservation (Shyamsundar *et al.*, 2005). A study in Uganda also proposed that usually the people prefer to obey rather than violate the laws when these are strictly enforced (Mugisha, 2002). Law enforcement is vital to achieve long-term improvement of forest conditions whether it is by communities or government agencies.

However, the essential feature of any changes in conservation governance should be the empowerment of local communities by developing conservation authority to local levels and making local communities more accountable for their rights and responsibilities. The rights, roles, responsibilities and resources (4Rs) should be bundled together with empowerment of the local communities. It has been evident that true partnership between park and park-adjointing communities for biodiversity cannot be achieved without having strong social organization.

This discussion has been based on the key themes that emerged from the results of the field research. It is necessary in the following chapter to consider the conclusions that can be reached on the basis of the research analysis and discussion.

CHAPTER 9: CONCLUSIONS AND SUGGESTIONS FOR FURTHER WORK

This chapter presents the overall conclusions reached as a result of the research. Final comments on the research aim and research questions are presented first, followed by an evaluation of the overall approach and methods used to collect, analyse and interpret the data. Key policy implications for planning and management of national park and wildlife sanctuaries are presented and recommendations are made for further research.

9.1 Research Questions

The framework for this section is set by the five research questions that were presented in Chapter 1, section 1.3.

Research Question 1. What are the major issues in PA management in the study areas?

The research revealed that these PAs face a range of issues, some in common but others that are location specific (Chapter 7, section 7.8). Overall, the most significant issues across all the study sites were identified as (in no particular order) population pressure, poverty, illegal logging, habitat destruction, fuelwood collection, as well as a poor relationship between local residents and the Forest Department. Additional significant challenges include hunting and poaching, flood and erosion, grassland degradation, land disputes, establishment of industries, traffic movement on roads and rail tracks, demarcation of protected area boundaries, inadequate law enforcement, political pressure, institutional influence, corruption, lack of funds and skilled professionals, as well as insufficient staff.

There were some concerns specific to individual protected areas such as betel leaf cultivation (Lawachara), the presence of Rohingya refugees (Teknaf Wildlife Sanctuary), and fishing with poisonous chemicals (such as DDT), increasing salinity, tiger-human conflict, and shrimp and prawn farming (the Sunderbans).

Research Question 2. What strategies are available for the long-term conservation and management of the National Parks and the Wildlife Sanctuaries in the study areas?

Although the management plans clearly identify co-management as a central theme for long-term management, this research has suggested that the implementation of this approach and its effect are limited. The outreach programme that lies at the core of co-management only

operates at the lowest level of community engagement and, although local communities receive some benefit such as infrastructure development (repairing and constructing roads and bridges), providing some economic benefits and conservation education programs but they are not empowered to make any real contribution to the planning and decision making process (sections 6.1.4, 6.2.4 and 6.3.4). This study has indicated that active participation would, if present, create a more empowered community that would enable greater links to be made between local development and wildlife conservation inside the protected areas. At present the local residents are focused on their need to protect the forest, as it protects them from cyclones, and storms, and provides livelihood opportunities in a situation where alternatives are very limited (sections 6.1.5.2, 6.2.5.2 and 6.3.5.2).

Research Question 3. Have the relationships between local communities and the Forest Department staff improved in PA planning and management in the study areas?

The history of conflict between local people and Forest Department staff is well documented (Chapter 6; sections 6.1.3, 6.2.3 and 6.3.3). In the past, local communities were dependent on the forest for their livelihood, but they were excluded when the areas were ‘protected’ by designation, losing their access to traditional resources and, significantly, the principal livelihood resource. It is hardly surprising that conflict was the result or that the local population continued to exploit resources. This goes against the wildlife conservation objectives of the management plans which are based on ‘no take’ resource management although, as there is no detailed survey data, the actual impact is difficult to determine. Baseline ecological surveys and ongoing monitoring are necessary to evaluate the effects of management plans on biodiversity conservation but this was not the focus of this research project.

Information derived from the interviews, focus group discussions and questionnaire surveys suggests significant difficulties continue in the relationships between local communities and the Forest Department. The ongoing difficulties spring from the common perception that Forest Department staff are engaged in corrupt or prejudiced behaviour towards villagers in conjunction with other locally powerful figures. However, almost all local residents felt that their relationship with the Forestry Department staff has started to improve and is better now than when the management plans were first introduced. The villagers stated that the Forest Department staff now acknowledge the pressure faced by the local residents and are more willing to help them with their difficulties. There appears to be a process of mutual learning taking place in which the local populations have come to understand the aims of the protected area and the emphasis on ‘valued’ wildlife resources which are not found in other areas. At the same time, the Forest

Department staff seem more willing to respect the religious and cultural significance of the forests to local inhabitants. Such improvements appear to have reduced confrontations, decreased illegal activities, improved forest protection and co-operation in anti-poaching activities in most areas. As an example, the tiger conservation special task force, comprising 300 local people is helping to save the Royal Bengal Tigers (*Panthera tigris*) and other wild animals from poachers in the Sundarbans (see section 5.3.1.2).

Research Question 4. Have local communities developed alternative income generation activities through the management plans in the study areas?

The Forest Department is required to provide alternative income generation activities to compensate local people for the loss of livelihood opportunities that has resulted from the designation of protected areas (see Chapter 6; sections 6.1.5.3, 6.2.5.3 and 6.3.5.3). Examples found across the case study areas were food processing, nurseries, poultry, plantations and fish farming; specific examples include cloth weaving and market development in Lawachara. This study found that these alternative livelihood opportunities are perceived as having a minor role by the recipients due to inadequate support and training, lack of consistency and co-ordination of monitoring of these activities. There seems to be little communication between the Forest Department, and the co-management committee regarding what is required by local people to support their livelihoods. Formal training needs assessment (TNA) could be used to overcome this problem (Kopylova *et al.*, 2011).

Research Question 5. Have tourism opportunities been harnessed more effectively in the study areas as a result of the co-management approach to PA management?

The tourism potential of the Parks and Sanctuaries has been well recognised by local communities as an important source of additional income (see sections 6.1.7, 6.2.7, and 6.3.7). It was found that the co-management approach had led to some local young men and women being trained as eco-tour guides and adopting this as a career. Some tourist facilities such as walking trails, interpretation signs and visitor centres were found, to varying degrees, in all the case study areas. Seating and litter bins were seen in Lawachara, and there is an active dormitory in Teknaf, although it is not clear how effectively these attract tourists. In the Sunderbans the data on tourists (FDB, 2010) indicates that numbers are increasing, but no equivalent information is available for the other areas, although there are anecdotal reports of increases in unplanned tourism in Lawachara.

As a result of this research it is suggested that site-specific tourism development plans should be prepared. This is essential if any real benefit is to be realized for local people. The preparation of site specific tourism development plans will require technical input to model and predict the impacts of tourism, the carrying capacity of the sites and the infrastructure required to support a viable industry. An opportunity was identified (FDB, 2010) for this to be managed by tour companies in association with the Forest Department but this needs to involve a strategic overview rather than the current ad hoc approach. The involvement of the local populations is of paramount importance; it is they who understand the forest, and who can help tourists be accommodated locally and enable them to benefit from a wider cultural experience.

9.2 Evaluation of the Methodology and Techniques Adopted

Three different methods were selected to carry out this research in order to investigate the extent to which the management plans had met their aims and objectives; each of these is evaluated in turn. The questionnaire surveys, particularly the responses to the open ended questions, provided valuable information. However, the researcher's ability to interpret the responses to the surveys was greatly enhanced by the rich data derived from the interviews with key informants, particularly those with the elders and headmen in the villages.

The focus group discussions provided an essential dimension by giving a voice to ordinary villagers, including women. By placing the villagers in control of the discussions, various topics that might not otherwise have been raised were revealed and responded to by those present. As is always the case, more time in the field would have added more depth and detail to the research and enabled a wider range of stakeholders to be involved. Nonetheless, the researcher's ability as a female, and a Bangladeshi national to gain access to the communities and to engage with them through the combination of interviews, focus group discussions and surveys provided insights that would otherwise have been difficult to obtain.

In light of the fact that many villagers in the study areas spoke only their local dialects (for example the Khasia community in Lawachara, and Madhyaleda in Teknaf), it was felt necessary to employ local male and female field assistants to ensure effective engagement and to minimize potential misunderstandings. Moreover, it was often the case that female villagers were shy and reluctant to speak with strangers, even a female Bangladeshi researcher, who was from outside the area. The use of field assistants enabled more effective entry to the study areas and the collection of information that otherwise would not have been possible to obtain.

9.3 Policy Implications, and Recommendations for Future Research

The results of this investigation have indicated that only a limited number of community members have been involved in decision making on major issues affecting livelihoods, or in policy/legislation development. This is a factor in the failure of the Forest Department to implement the management plans effectively. Policies are required that encourage development of local administrative institutions and which take into account the specific socio-cultural characteristics of the villages concerned. The current system of village administration is bureaucratic and appears to be driven by the personal interests of those with influence. To rectify this, strategies to empower local communities at the grass roots level are crucial. Such reform, however, would require genuine political will from higher levels of government in order to counter entrenched local political interests. The representation of women through full participation in decision-making is crucial, but in all the case study areas it was virtually absent. As such, the study areas are not effectively addressing the Agenda 21 recommendations on representation of women, young people and indigenous groups (UNSD, 1992).

The limited incentives and benefits that the National Park and Wildlife Sanctuaries were observed to provide to the local communities are apparently not sufficient to change the behaviour of the communities, although this is crucial for long-term biodiversity conservation (the stated aim of the management plans). The success of the co-management programme thus largely depends on the capacity of the PA administrations to influence the actions of both other development agencies and local communities, for example to increase development funding and real benefits to the villagers to adjust their livelihoods. The results of this study indicate that the co-management plans need to go hand-in-hand with provisions for alternative income generation activities to aid the development of local communities that depend mostly on forest resources. But there is no evidence of research on existing livelihood activities, their impact on forest resources and sustainable use of forest resources. Therefore, it is difficult to develop a viable alternative livelihood strategy, which would require real investment from outside and independent research by consultants.

9.4 Research Contribution

This is the first time that social research methods and stakeholder analysis has been applied in the context of management plan evaluation in Bangladesh. The findings will contribute to the

development of more effective PA management plans in Bangladesh and to the argument for greater participation of stakeholders in future plans. Moreover, it provides a basis for further research, planning, and action to improve the current protected area management planning and policy in the country.

9.5 Recommendations

Based on the research findings and conclusions, the following sections provide a series of proposed recommendations for achieving the aims of the management plan.

9.5.1 Participation of stakeholders

A co-management planning approach should be devised that takes into account the need for wider stakeholder participation and should cover enhanced health care and education, the rights of women, the role of youth and of indigenous people and local communities and a democratic process of participation in connection with enhanced governance to achieve sustainable livelihoods. This could be achieved if a wider range of stakeholders were involved on an equal footing with government departments and appropriate international, non-governmental and local community organizations. Empowerment of women is essential and can only be assured through education, training and policies and improving their access to assets, human and civil rights, job opportunities and participation in decision-making. For a comprehensive and successful conservation process, the participation of women is a significant component (Allendorf and Allendorf, 2013; Wuyep *et al.*, 2014). Other requirements for effective management planning, including: respecting the cultural integrity and the rights of indigenous people; establishing grass-roots mechanisms to promote the sharing of experience and knowledge between communities; working constructively with local communities to incorporate traditional ecological knowledge into developing plans for sustainable use of the forest resources. Since the first Rio 'Earth Summit' in 1992 the United Nations has promoted the global recognition of traditional knowledge systems in achieving various environmental goals. There is an emergent appreciation that traditional knowledge and sustainable use of natural resources strengthen indigenous people and the resilience of local communities to climate change, and directly contribute to biological and cultural diversity, as well as global sustainable development¹⁹.

¹⁹www.un.org/.../IASG_Thematic%20paper_Traditional%20knowledge.pdf, accessed on 7.6.2014

In all the case study areas the participation of women in management planning is apparently absent. According to the Agenda 21 accord (UNSD, 1992) and Nagoya principles the participation of women is essential, this could be achieved by generating employment and education for the local women, through the provision, development and maintenance of urban infrastructure, services, and the support of economic activities in informal sectors, such as harvesting of medicinal plants, services and small businesses. Medicinal plant cultivation provides a means of integrating the use of indigenous knowledge into management plans to integrate the needs of the local communities to obtain direct benefits from conservation with universal concerns about the environment (Howe, 2005). Women should be acknowledged as significant participants at the local, regional, national and international level on environmental issues, as they are engaged in significant activities relating to natural resources management, environment rehabilitation and conservation (Wuyep *et al.*, 2014). In India, when the women realized that degradation of productive land led to the erosion of top soil they jointly leased degraded land and revived it through traditional farming (Wuyep *et al.*, 2014).

9.5.2 Social and economic incentives

Population pressure and poverty are serious problems in all the case study areas. No universal solution is likely to be effective, but rather location specific effective research is required in order to develop programmes that meet the needs of local people. According to the Durban treaty (UNFCCC, 2011), good relations with local communities is crucial to effective conservation. The easiest way to encourage a positive attitude among the local people is to ensure they receive tangible economic benefits from the existence of the PA (Kopylova *et al.*, 2011). This will require significant support from national, and probably international, organisations to identify realistic long term sustainable resource use, with effective monitoring in place, and to quantify the additional requirement for creating livelihood opportunities. It could also be undertaken by providing compensation for loss of access to forest resources. This has to be done fairly, with benefit to all within a target community or there is likely to be long term resentment between those who have and have not benefited.

A range of complementary strategies would be useful to integrate more resilient and robust protected area governance. Introduction of micro credit programs with low interest rates could stimulate the development of new businesses, perhaps in conjunction with tourism initiatives, and reduce dependence on money lenders charging high interest rates. Moreover, the government could take the steps necessary to provide medical facilities for the harvesters in the

Sundarbans, and improve security from the pirates by increasing patrols by guards and police within the forest (Islam, 2012).

9.5.3 Sustainable forest resource management

Establishment of sustainable levels of harvesting, development of strong marketing infrastructure and building strong networks among and between producers, traders and companies are all essential elements of a more productive silviculture. An environmental policy that focuses mainly on the conservation and protection of resources, but which does not take into account those who have historically depended on forest resources is likely to increase both poverty and illegal harvesting. Development based on indigenous knowledge supports appreciation of the role of traditional livelihoods within sustainable development and the links between environmental management, science and well-being. The Convention on Biodiversity provides the clearest recognition of the link by the following Articles that states: “...*respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge innovations and practices*” (Article 8 (j)), and “*protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements*” (Article 10 (c))²⁰. All over the world’s oceans, there is growing evidence that marine conservation works best when local communities are responsible for the management of fisheries. In Fiji and Costa Rica, locally managed marine areas (LMMAS) have proved highly effective in reducing local conflict over fisheries, conserving marine biodiversity and improving catches. The LMMA approach to coastal management is gaining momentum and popularity among communities, government authorities and conservation organisations throughout Madagascar, the broader western Indian Ocean region, Kenya, Tanzania, and Mozambique, with local fishing communities building their marine resource management skills and often gaining greater management authority from the state²¹. The Forest Department could run an awareness raising campaigns among the harvesters concerning the sustainable level of use of forest resources. Monitoring and supervision by the Forest Department staff would need to be

²⁰www.cbd.int/traditional/what.shtml, accessed on 18.11.2013.

²¹www.blueventures.org/conservation/locally-managed-marine-areas.html, accessed on 14.07.2014.

increased to ensure that the harvesters followed the harvesting rules and regulations. In the Sunderbans, it is evident that the maximum numbers of harvesters do not follow the harvesting rules of the Forest Department as they try to collect the maximum amount of products within a short period of time, which has a serious impact on production and sustainable management of forest resources (Islam, 2012).

The rural development policies and involvement of private organizations in forest areas that address the developmental issues and provide cheaper alternatives to fuelwood would reduce the dependency of local residents on the forest. Some technological initiatives including the fuel efficient improved stove, solar energy, and biogas could be promoted in these areas. In Lawachara and Teknaf the Grameen technology has provided some fuel efficient stoves to local communities, although the number available is inadequate (FDB, 2006). In the Sundarbans, the Forest Department has installed solar energy pumps to supply drinking water to local communities (Chaki, 2014).

The existing social forestry programmes (Choudhury and Hossain, 2011) could be extended to reserved and protected forest areas by diversifying the mix of species from mainly teak (*Tectona grandis*) to fuelwood species such as *Acacia sp.* These could be supplemented with shrubs and bushes to yield fuelwood and fodder, and satisfy the needs of the local residents. Plantations outside the forests such as in community yards, marginal farmlands, and other vacant lands would also increase the supply as well as providing additional benefits such as shade and wildlife habitat. In Kenya, the Green Belt Movement (GBM) empowered local communities particularly women to conserve the environment, and encouraged them to grow seedlings and plant trees to reduce forest dependency for fuelwood, and improve their livelihoods (Wuyep *et al.*, 2014).

9.5.4 Effectiveness of the co-management approach

A detailed assessment is required to understand the specific underlying problems and requirements for each case study area. Moreover, the co-management initiatives need adequate and enduring financial support and strategies to improve their capacity to represent and empower local communities and deal with the vested interests of locally influential people. Sufficient and consistent funding is a basic component of effective management and good governance in protected areas; these allow for actions that strengthen governance, for instance administrative and technical capacity building among protected area personnel and community organizations, and long-term planning that highlights transparent decision-making.

The co-management approach has not been effective in educating local villagers about the value of wildlife conservation. If the co-management approach is to be successful, the local governments, socio-economic elite, sawmill operators, brickfield owners, charcoal producers, and furniture shop owners also need effective environmental education. Otherwise it will be difficult to convince them to support the concept of forest protection and sustainable natural resource management. Timber is important to a wide variety of livelihoods, so supply chain analysis is needed to understand the scale of use, as well as how much can be imported from alternative locations or substituted by other materials. A strong monitoring system needs to be developed with the involvement of representatives from the Forest Department, co-management committee and all groups concerned with conservation of forest resources.

9.5.5 Development of tourism

The potential for tourism expansion is significant and could effectively bring higher incomes to the local communities while satisfying ecological imperatives. Management plans should, therefore, be produced that integrate local communities into ecotourism development, and incorporate policies for diversification into this area. However, without in-depth understanding of firstly the requirements of both domestic and international tourists as well as the potential impact on local communities and, secondly, how tourism can be used to enhance livelihood opportunities, the benefits are unlikely to be realized. At present, calculation of limits of acceptable change (LAC) is a particularly important issue for sustainable tourism in PAs (Kopylova *et al.*, 2011). The negative impact of tourism on ecosystems has become a major problem for PA staff. Therefore visitor management and monitoring of impact and adaptive measures to make tourism sustainable are necessary.

There is a danger of the benefits of tourism going to external organisations and companies set up by foreign tour operators. Great care is required if local people are to benefit and, if the intention is 'eco-tourism', then there must be a demonstrable benefit to the conservation and maintenance of natural resources. This is challenging but not impossible; successful examples are the Periyar and the Parambikulam Tiger Reserves, India, where ecotourism is recognized as a community development tool. The local communities have been involved in ecotourism from the start, and it provides alternative sources of income, therefore decreasing their dependence on forest resources and increasing their commitment to conserve the forests (Thampi, 2005; Vinodan and Manalel, 2011; Leung *et al.*, 2014).

Externally imposed policy solutions are failing because of a lack of awareness of local culture. Moreover, good governance, characterised by participation, transparency and accountability, is fundamental to ensuring the effective and equitable use of tourism for the development of local communities (Holden, 2013). Such governance could be achieved by establishing a network of inclusive and empowered community institutions and local communities. As part of this approach, site specific tourism development plans, political will and productive partnerships between the private sector, government, NGOs and the local communities would have to be involved in elaborating effective ways to provide more benefits to the local communities.

9.5.6 Institutional restructuring and political will

In order to implement the management plans effectively, devolution and decentralization of authority within and between different layers of government institutions are crucial. The existing management process involves highly bureaucratic and centralized decision-making, with power lying at the higher level of government ministries. Institutional restructuring and policy reform are essential to ensure the inclusiveness and empowerment of local communities in the co-management approach and equity in benefit sharing. This is likely to be the greatest challenge to effective co-management planning for national parks and wildlife sanctuaries. It will be necessary to enlist higher level political support in order to ensure that the necessary reforms at the local level are enacted; otherwise there is a danger that the power of entrenched local interests will hamper implementation of a genuine co-management approach and more effective National Park and Wildlife Sanctuary management.

9.6 Suggestions for Further Research

- Ecological survey work is required to permit evaluation of the impacts of management plans on biodiversity. Innovative methods such as use of remote sensing and GIS for purposes of establishing wider regional data accumulation and processing for ongoing evaluation of impacts on biodiversity would be useful (Kopylova *et al.*, 2011). If conservation planning is fundamentally about protecting and enhancing the biodiversity of an area, it is necessary for there to be clear and comprehensive baseline data that will permit, over time, an evaluation of the effectiveness of plan policies in achieving that protection. Ecological survey work would improve awareness of the ecological constraints at specific sites at an early stage in the development resulting from the presence of important habitats or species, to inform the planning process and to help

identify opportunities to enhance the biodiversity of the site. This is also a pre-requisite to developing an inventory of forest resources, analyse sustainable yield and assess how much is required to meet the current needs of local people, and determine how this can be met or substituted in an alternative way.

- Simply banning the timber trade and excluding local communities from using forest resources has been shown not to be an effective way to maintain the forest. In order to protect it, the underlying social, economic, and political reasons for deforestation must be recognized, understood, and addressed. Social assessment of protected areas is a new approach to measure and analyse social impacts and issues is aimed at protected area managers to improve both policy and practice (Frank, 2014).
- More research is required to integrate traditional ecological knowledge (TEK) held by the indigenous communities into conservation strategies. It is now acknowledged globally that more investment is needed to enable this to contribute effectively to sustainable development policy and science, and for the TEK holders to participate fully in this process²². Accessing traditional ecological knowledge is an important strategy into conservation management plans, particularly in the developing world (Golden *et al.*, 2014).
- More research is required to identify the interaction between local communities and tourism development, as tourism could be a viable economic option for local community development (Muganda *et al.*, 2013).
- In Lawachara and in Teknaf, supply chain research is required to make a list of forest products both marketed and for subsistence use, including the potential of NTFPs for licensing systems.
- A long term, funded, research programme is required for the development of sustainable use of forest resources. This is key to both raising the standard of living for people in and around the forests and protected areas and for conserving their long term ecological integrity. The forest resources should be used more effectively to maximize productivity and minimize the impact on the environment.

²²www.un.org/.../IASG_Thematic%20paper_Traditional%20knowledge.pdf, accessed on 14.07.2014

REFERENCES

- Abrams, P., Borrini-Feyerabend, G., Gardner, J., Heylings, P. (2003) *Evaluating governance: A handbook to accompany a participatory process for a protected area*, Joint publication of Parks Canada, Ottawa and TILCEPA – Theme on indigenous and local communities, equity and protected areas of the International union for conservation of nature IUCN, Commission on Environmental, Economic and Social Policy and World Commission on Protected Areas, Gland.
- Adams, W., Hulme, D. (1998) *Conservation and Communities: Changing Narratives, Policies and Practices in African Conservation*. Manchester, Institute of Development Policy and Management, University of Manchester, England: 30.
- Adams, M. J. (2001) *Green Development: Environment and Sustainability in the Third World*, 2nd edn, London: Routledge.
- Adams, W. M., Aveling, R., Brockington, D., Dickson, B., Elliott, J., Roe, D., Bhaskar, V., Wolmer, W. (2004) Biodiversity conservation and the eradication of poverty. *Science*, 306 (5699), pp.1146-1149.
- Adams, M. J. (2005) *Beyond Yellowstone? Conservation and indigenous rights in Australia and Sweden*. Faculty of science-papers. Wollongong NSW: University of Wollongong.
- Adger, W.N. (2006) Vulnerability. *Global Environmental Change*, 16 (3), pp. 268–281.
- Adger, W. N. (2007) Ecological and social resilience in G. Atkinson, S. Dietz, and E. Neumayer, editors. *Handbook of sustainable development*. Elgar, Cheltenham, UK.
- Agarwal, B. (1997) Environmental action, gender equity and women's participation. *Development and Change*, 28 (1), pp. 1-44.
- Agarwal, B. (2001) Participatory exclusions, community forestry and gender: an analysis and conceptual framework. *World Development*, 29 (10), pp.1623–1648.
- Agarwal, B. (2007) Inequality, cooperation, and environmental sustainability. In: Baland, J.M., Bardhan, P.K. and Bowles, S. (eds.) *Inequality, cooperation, and environmental sustainability*. New York: Russell Sage Foundation; Princeton: Princeton University Press.
- Agrawal, A., Gibson, C.C. (1999) Enchantment and disenchantment: The role of community in natural resource conservation. *World Development*, 27(4), pp. 619-649.
- Agrawal, A., Gibson, C.C. (2001) *Communities and the environment: ethnicity, gender, and the state in community-based conservation*. Rutgers University Press, New Brunswick, NJ.
- Ahmad, I. U., Greenwood, C. J., Barlow, A. C. D., Islam, M. A., Hossain, A. N. M., Khan, M. M. H., Smith, J. L. D. (2009) *Bangladesh Tiger Action Plan 2009-2017*. Bangladesh Forest Department, Ministry of Environment and Forests, Government of the People's Republic of Bangladesh, Dhaka, Bangladesh.

Ahsan, M.M. (2007) Perceptions of tourisms by indigenous communities living in and adjoining Lawachara National Park. In Fox, J., Bushley, B.R., Dutt, S. and Quazi, S.A. (eds.), *Making conservation work: linking rural livelihood and protected area management in Bangladesh*, Honolulu: East-West Centre.

Akhter, S. (2010) Shrimp farming, mangrove depletion and environmental governance: A case study on the coastal region of Bangladesh. Proc. of International Conference on Environmental Aspects of Bangladesh.

Akon, A. S. M. J. U. (2013) Reducing dependency on fishers in the ecologically critical area bordering the Sundarbans reserve forest, in Fox, J., Mustafa, M.G., Bushley, B.R., Brennan, S.M. and Durand, L. (eds.), *Connecting communities and conservation: co-management initiatives implemented by IPAC in wetlands and forests of Bangladesh*. Dhaka: USAID; Integrated Protected Area Co-Management Project, pp. 131-142.

Alam, M. K. (1998) Annotated checklist of woody flora of Sylhet forests. Bulletin 5, *Plant Taxonomy Series*, Bangladesh Forest Research Institute, Bangladesh.

Alam, M. (2009) Evolution of forest policies in Bangladesh: A critical analysis. *International Journal of Social Forestry*, 2(2), pp. 149-166.

Alam, M., Furukawa, Y., Akter, S. (2010) Forest-based tourism in Bangladesh: status, problems, and prospects. *Tourism: An International Multidisciplinary Journal of Tourism*, 5(1), pp.163-172.

Ali, M.O., Ahmed, M. (2001) 'Biodiversity conservation: Vision for Bangladesh', in Chowdhury, Q.I. (eds.) *Bangladesh: state of biodiversity*. Forum of Environmental Journalists of Bangladesh, Dhaka, pp. 33-39.

Allendorf, T. D., Smith, J. L. D., Anderson, D. H. (2007) Residents' perceptions of Royal Bardia National Park, Nepal. *Landscape and Urban Planning*, 82, pp. 33-40.

Allendorf, T. D., Allendorf, K. (2013) Gender and Attitudes toward Protected Areas in Myanmar. *Society and Natural Resources*, 26(8), pp. 962-976.

Alpert, P. (1996) Integrated conservation and development project: examples from Africa. *Journal of Bioscience*, 46(11), pp. 845-855.

Anand, M. O., Krishnaswamy, J., Kumar, A., Bali, A. (2010) Sustaining biodiversity conservation in human-modified landscapes in the Western Ghats: remnant forests matter. *Biological Conservation*, 143(10), pp. 2363-2374.

Andrade, G. S. M., Rhodes, J. R. (2012) Protected areas and local communities: an inevitable partnership toward successful conservation strategies. *Ecology and Society*, 17 (4), 14p.

Anoko, J. N. (2007) Gender and equity in the Protected Areas of West Africa. UICN – PAPACO, www.papaco.org

ANZECC Working Group on National Parks and Protected Areas Management Benchmarking and Best Practice Program. (2000) Best Practice in Protected Area Management Planning. Lead Agency Parks and Wildlife Service Tasmania.

Appleton, M. R., Texon, G. I., Uriarte, M.T. (2003) *Competence Standards for Protected Area Jobs in South East Asia*. Los Banos, Philippines: ASEAN Regional Centre for Biodiversity Conservation, 104p.

Arnstein, S. (1969) A ladder of participation. *Journal of the American Planning Association*, 35(4), pp. 216–224.

Aryal, J. P. (2008) *Impacts of Poverty on Land Conservation Investment: A Case of Mardi Watershed Nepal*. Third International Student Conference Proceeding “Empirical Models in Social Sciences”, 269p.

Aswani, S., Weiant, P. (2004) Scientific evaluation in women’s participatory management: monitoring marine invertebrate refugia in the Solomon Islands. *Human Organization*, 63(3), pp.301–319.

Aung, U. M. (2007) Policy and practice in Myanmar's protected area system. *Journal of Environmental Management*, 84 (2), pp. 188-203.

Australian Government (2011) Indigenous Protected Areas. Online: <http://www.environment.gov.au/indigenous/ipa/index.html> (accessed on 09/12/ 2012).

Ayivor J. S. (2007) *An Exploration of Policy Implementation in Protected Watershed Areas: Case Study of Digya National Park in the Volta Lake Margins in Ghana*: Master Thesis Presented to the College of Arts and Sciences. Athens, USA: Ohio University.

Ayivor, J. S., Gordon, C., Ntiama-Baidu, Y. (2013) Protected area management and livelihood conflicts in Ghana: a case study of digya national park, *Parks*, 19 (1), pp. 37-50.

Aziz, M. A. (2008) ‘Co-management of protected areas without knowledge and participation: A case study of Lawachara National Park’, in Fox, J., Bushley, B.R., Dutt, S. and Quazi, S.A. (eds.), *Making conservation work: linking rural livelihood and protected area management in Bangladesh*. East-west centre and Nishorgo program of Bangladesh Forest Department, Dhaka, pp. 161-189.

Aziz, S. A., Clements, G. R., Rayan, D.M., Sankar, P. (2013) Why conservationist should be concerned about natural resource legislation affecting indigenous people’s rights: lessons from Penninsular Malaysia. *Biodiversity Conservation*, 22, pp. 639-656.

Babbie, E. R. (1990). *Survey Research Methods*, 2nd edn. Wadsworth Publishing.

Babbie, E. R. (1997). *Survey Methods*, 2nd edn. Wadsworth Publishing.

Bajracharya, S. B., Furley, P. Newton, A. (2005) Effectiveness of community involvement in delivering conservation benefits to the Annapurna Conservation Area, Nepal. *Environmental Conservation*, 32(3), pp. 239-247.

- Balloffet, N.M., Martin, A.S. (2007) Governance Trends in Protected Areas: Experiences from the Parks in Peril Program in Latin America and the Caribbean. Parks in Peril Innovations in Conservation Series. Arlington, Virginia, USA: The Nature Conservancy.
- Ban, N., Picard, C., Vincent, A. (2008) Moving toward spatial solutions in marine conservation with indigenous communities. *Ecology and Society*, 13(1):32 [online]
URL:<http://www.ecologyandsociety.org/vol13/iss1/art32/>, accessed on 7.08.2012
- Bangladesh Wildlife (Amendment) (Preservation) Act. (1974) Ministry of Environment and Forests, Government of Bangladesh: Dhaka, Bangladesh.
- Bangladesh Bureau of Statistics (BBS) (2009) Statistical pocketbook of Bangladesh 2008: Bangladesh Bureau of Statistics, Dhaka.
- Bangladesh Bureau of Statistics (BBS) (2010a) Millenium development goals: Bangladesh Progress at a glance. Bangladesh Bureau of Statistics, Dhaka.
- Ban, N., Adams, V., Pressey, R., Hicks, J., (2011) Promise and problems for estimating management costs of marine protected areas. *Conservation Letters*. 4, pp. 241-252.
- Barber, C. V., Miller, K. R., Boness, M. (2004) Securing protected areas in the face of global change: Issues and strategies. Gland and Cambridge: IUCN.
- Bari, A., Dutta, U. (2004) Co-management of tropical forest resources in Bangladesh. Secondary data collection for pilot protected area: Teknaf game reserve. USAID-Bangladesh, Ministry of Environment and Forest.
- Barlow, A. C. D. (2009) The Sundarbans tiger: adaptation, population status, and conflict management. PhD thesis, University of Minnesota, USA.
- Barlow, A. C. D., Chakma, S., Hossain, A. N. M., Rahman, M., Howlader, A., Greenwood, C. J., Islam, M. A., Ahmed, I. U., Smith, J. L. D. (2009) Bangladesh Sundarbans relative tiger abundance survey. Technical report. Wildlife Trust of Bangladesh.
- Barrio, D. C., Gutierrez, H., Hoyos, O., Barrios, A., Meulen, K.V.D. (1999) The use of semi-structured interviews and qualitative methods for the study of peer bullying, a report of the working party in nature and prevention of bullying. *Infancia y Aprendizaje*, 26 (1), pp. 63-78.
- Barr, L. M., Pressey, R. L., Fuller, R. A., Segan, D. B., McDonald-Madden, E., Possingham, H. P. (2011) A new way to measure the world's protected area coverage. *PLoS ONE*, 6(9): e24707. doi:10.1371/journal.pone.0024707.
- Bawa, K. S. (2006) Globally dispersed local challenges in conservation biology. *Conservation Biology*, 20, pp. 696–699.
- Belal, M. A. H. (2013) Effectiveness of co-management committees in Teknaf Wildlife Sanctuary, in Fox, J., Mustafa, M.G., Bushley, B.R., Brennan, S.M. and Durand, L. (eds), *Connecting communities and conservation: co-management initiatives implemented by IPAC in wetlands and forests of Bangladesh*.

- Bellamy, J. A., McDonald, G. T., Syme, G. J., Butterworth, J. E. (1999) Evaluating integrated resource management. *Society and Natural Resources*, 12, pp. 337-353.
- Bennett, G., Wit, P. (2001) The Development and Application of Ecological Networks: a review of proposals, plans and programmes. AID Environment and IUCN.
- Berks, F., George, P., Preston, R. (1991) Co-management: The evolution of the theory and practice of joint administration of living resources. *Alternatives*, 18(2), pp. 12-18.
- Berkes, F., Colding, J., Folke, C. (2003) *Navigating social-ecological systems: building resilience for complexity and change*. Cambridge University Press, Cambridge, United Kingdom.
- Berkes, F. (2004) Rethinking community-based conservation. *Conservation Biology*, 18(3), pp. 621-630.
- Bertzky, M., Stoll-Kleemann, S. (2009) Multi-level discrepancies with sharing data on protected areas: What we have and what we need for the global village. *Journal of Environmental Management*, 90, pp. 8-24.
- Bertzky, B.; Corrigan, C.; Kemsey, J.; Kenney, S.; Ravilious, C.; Besancon, C., Burgess, N. (2012). Protected planet report: Tracking progress towards global targets for protected areas. IUCN, Gland, Switzerland and UNEP-WCMC, Cambridge, UK.
- Besancon, C. (2011). Protecting the best places. UNEP, World Conservation Monitoring Centre.
- Beukering, P. V., Brander, L., Tompkins, E., McKenzie, E. (2007) Valuing the environment in small islands. An Environmental Economics Toolkit.
- Bhatt, S., Bavikatte, K.S., Subramanian, S.M. (2012) Community based experiences on access and benefit sharing: Case studies. Hi-Tech Offset (P) Limited, Chennai, India.
- Billgren C, Holmen H. (2008) Approaching reality: Comparing stakeholder analysis and cultural theory in the context of natural resource management. *Land Use Policy*, 25, pp.550–562.
- Bishop K., N. Dudley, Phillips, A., Stolton, S. (2004) Speaking a Common Language – the uses and performance of the IUCN System of Management Categories of Protected Areas, Cardiff University, IUCN and UNEP/WCMC.
- Biswas, S., Chowdhury, J.K. (2007) Forests and forest management practices in Bangladesh: the question of sustainability. *International Forestry Review*, 9 (2), pp. 627-640.
- Blair, H. W. (1990) Local government and rural development in the Bengal Sundarbans: An inquiry in managing common property resources. *Agriculture and Human Values*, 7, pp. 40-51.
- Blanco, E., Razzaque, J. (2008) Ecosystem services and human well-being in a globalized world: assessing the role of law. *Human Rights Quarterly*, 31(3), pp.698–720.
- Blomley, T., Namara, A., McNeilage, A., Franks, P., Rainer, H., Donaldson, A., Malpas, R., Olupot, W., Baker, J., Sandbrook, C., Bitariho, R., Infield, M. (2010) Development and gorillas?

- Assessing fifteen years of integrated conservation and development in south-western Uganda. *Natural Resource Issues*, 23, London: IIED.
- Blomley, T. (2013) Lessons Learned from Community Forestry in Africa and Their Relevance for REDD+. The Forest Carbon, Markets, and Communities (FCMC) Program. Arlington, VA, USA.
- Bonine, K., Reid, J., Dalzen, R. (2003) Training and education for tropical conservation. *Conservation Biology*, 17, pp.1209–1218.
- Borrini-Feyerabend, G. (1996) Collaborative management of protected areas: Tailoring the approach to the context. Gland, Switzerland: IUCN.
- Borrini-Feyerabend, O., Brown, M. (1997). *Beyond Fences: Seeking Social Sustainability in Conservation*, IUCN, Gland, Switzerland.
- Borrini-Feyerabend, G. (2000) *Co-management of Natural Resources: Organising, Negotiating and Learning by Doing*. IUCN, Gland, Switzerland.
- Borrini-Feyerabend, G. (2003) *Governance of Protected Areas Innovation in the Air*. IUCN, Gland, Switzerland.
- Borrini-Feyerabend, G., Kothari, A., Oviedo, G. (2004) *Indigenous and local communities and protected areas*. IUCN, Gland, Switzerland.
- Borrini-Feyerabend, G., Johnston, J., Pansky, D. (2006). Governance of Protected Areas, in Lockwood, Worboys and Kothari (eds.) *Managing Protected Areas: A Global Guide*, Earthscan UK and USA, pp. 116-145.
- Borrini-Feyerabend, G. (2007) The IUCN Protected Area Matrix – a Tool Towards Effective Protected Areas Systems. Gland, Switzerland.
- Borrini-Feyerabend, G., Dudley, N., Jaeger, T., Lassen, B., Broome, N. P., Phillips, A., Sandwith, T. (2013) Governance of protected areas: from understanding to action. Best Practice Protected Area Guidelines Series N°. 20, Gland Switzerland: IUCN, 124p.
- Boyce, C. (2006) Conducting In-depth interviews: A guide for designing and conducting in-depth for evaluation input.
- Boyd, C. (2004) Biodiversity issues for consideration in the planning, establishment and management of protected area sites and networks. Montreal, SCBD, CBD Technical Series N°. 15.
- Braimah, I., Tudzi, E. P., Baah-Ennumh, T. Y. (2009) Land tenure as a challenge to the sustainability of the amokwao community reserve management area in Ghana. *Journal of Sustainable Development in Africa*, 11(1), pp. 128-148.
- Brandon, K., Redford, K.H., Sanderson, S. E. (1998) *Parks in Peril: People Politics And Protected Areas*, Washington, DC: Island Press.

- Bray, D. B., Velazquez, A. (2009) From displacement based conservation to place based conservation. *Conservation and Society*, 7(1), pp. 11-14.
- Brechin, S. R., Wilshusen, P. R., Fortwangler, C. L., West, P. C. (2002) Beyond the square wheel: toward a more comprehensive understanding of biodiversity conservation as social and political process. *Society and Natural Resources*, 15 (1), pp. 41–64.
- Brody, S. D. (2003) Measuring the effects of stakeholder participation on the quality of local plans based on the principles of collaborative ecosystem management. *Journal of Planning Education and Research*, 22, pp. 407–419.
- Brody, A. (2009) Gender and Governance: Overview Report. Institute of Development Studies: University of Sussex, Brighton.
- Bromley, D. W. (1992) Property Rights as Authority Systems: The Role of Rules in Resource Management. In P.N. Nemetz, ed. *Emerging Issues in Forest Policy*. Vancouver: University of British Columbia Press, pp. 443-471.
- Bryner, G. (2001) Cooperative instruments and policy making: Assessing public participation in US environmental regulation. *European Environment*, 11, pp. 49-60.
- Brokington, D., Igoe, J., Schmidt-Soltau, K. (2006) Conservation, human rights and poverty reduction. *Conservation Biology*, 20(1), pp. 250-252.
- Brooks, T. M., Bakarr, M. I., Boucher, T., Da Fonseca, G. A., Hilton-Taylor, C., Hoekstra, J.M., Moritz, T., Olivieri, S., Parrish, J., Pressey, R. L., Rodrigues, A., Sechrest, W., Stattersfield, A., Strahm, W., Stuart, S. N. (2004) Coverage provided by the global protected area system: is it enough? *BioScience*, 54, pp. 1081–1091.
- Bryman, A. (2004) *Social Research Methods*, 2nd edn, New York: Oxford University Press.
- Buanes, A., Jentoft, S., Karlsen, G. R., Maurstad, A., Soreng, S. (2004) In whose interest? An exploratory analysis of stakeholders in Norwegian coastal zone planning. *Ocean and Coastal Management*, 47, pp. 207–223.
- Budhathoki, P. (2012) Developing conservation governance strategies: holistic management of protected areas in Nepal. PhD thesis, University of Greenwich.
- Burns, R. B. (2000) *Introduction to Research Methods*, 4th edn, Sage Publications, London.
- Campbell, H., Ellis, H., Gladwell, C., Henneberry, J. (2000) Planning obligations, planning practice, and land-use outcomes. *Environment and Planning H*, 27(5), pp. 759-776.
- Canonizado, J. A., Hossain, A. (1998) Integrated forest management plan. Forest Department, Dhaka, Bangladesh.
- Canter, L. (1999) Cumulative Effects Assessment. In: *Handbook of Environmental Impact Assessment*. Edited by J. Petts. Blackwell Science, Ltd., Oxford, UK. pp. 405-440.
- Castro, A. P. (1997) Social and anti-social forestry in Bangladesh. *Development Anthropologist*, 15 (1-2), pp. 3-12.

- Castro, A. P., Nielsen, E. (2001) Indigenous people and co-management: implications for conflict management. *Environmental Science and Policy*, 4 (4-5), pp. 229-239.
- Campbell, K. S., Day, J. C., Gunton, T. I. (2000) Planning obligations, planning practice, and land-use outcomes. *Environment and Planning B*, 27(5), pp. 759-776.
- Ceballos, G., Vale, M. M., Bonacic, C., Calvo-Alvarado, J., List, B., Bynum, N., Medellin, R. A., Simonetti, J. A., Rodriguez, J. P. (2009) Conservation challenges for the austral and Neotropical America section. *Conservation Biology*, 23, pp. 811-817.
- Chaki, S. (2014) Saline water turn into drinking water by solar power in Bangladesh. Available at www.youtube.com/watch?v=HK9gAv5F6wA, accessed on 18.05.2014.
- Chakrabarti, K. (1987a) Sundarbans honey and the mangrove swamp. *Journal of the Bombay Natural History Society*, 84, pp. 133-137.
- Chakrabarti, K. (1987b) Sundarbans mangroves; biomass productivity and resources utilization: an in-depth study. *Indian Forester*, 113, pp. 622-628.
- Chandra, K. (2004) *Why Ethnic Parties Succeed: Patronage and Ethnic Head Counts in India*. Cambridge, Cambridge University Press, Cambridge and New York.
- Chape, S., Spalding, M., Jenkins, M. D. (2008) *The worlds protected areas: status, values and prospects in the 21st century*. Berkeley: University of California Press.
- Chemonics (2002) Biodiversity sustainable forestry IQC strengthening. The arannayak foundation. Site selection inventory and monitoring report. USAID–Bangladesh, Dhaka.
- Chevalier, J. (2001) *Stakeholder analysis and natural resources management*. Carlton University, Ottawa.
- Chhatre, A., Saberwal, V. (2005) Political incentives for biodiversity conservation. *Conservation Biology*, 19 (2), pp. 310–317.
- Child, G. (1994) Strengthening protected-area management: A focus for the 1990s, a platform for the future. *Biodiversity and Conservation*, 3(5), pp. 459–463.
- Chopra, K., Leemans, R., Kumar, P., Simons, H. (2005) *Ecosystems and Human Well-Being: Policy Responses*, 3. Island Press, Washington, D.C., USA.
- Choudhury (2010) National forest policy review-Bangladesh. Available at www.scribd.com/doc/.../national-forest-policy-review-Bangladesh, accessed on 18.11.2012.
- Choudhury, J. K., Hossain, A. A. (2011) Bangladesh forestry outlook study. Food and agriculture organization of the United Nations regional office for Asia and the pacific, working paper no. apfsos ii/ wp/ 2011/ 33.
- Chowdhury, D. K. (2003) The process of policy and strategy formulation. Working Paper No. 20. Program Development Office for Integrated Coastal Zone Management Plan (PDO-ICZMP), Dhaka, Bangladesh.

- Chowdhury, J. K. (2005) Forests and forestry in Bangladesh. Paper presented at BELA. 39 pp.
- Chowdhury, R. M. (2008). Governance through protected area conservation co-management committees: a case study at Lawachara national park. In S. A. Quazi, B. R. Bushley, & W. B. Miles, *Connecting Communities and Conservation: Collaborative Management of Protected Areas in Bangladesh*, pp. 49-72.
- Chowdhury, M. S. H., Nazia, N., Izumiyama, S., Muhammad, N., Koike, M. (2014) Patterns and extent of threats to the protected areas of Bangladesh: the need for a relook at conservation strategies. *Parks*, 20 (1), pp. 91-104.
- Chowdhury, M. S. H., Gudmundsson, C., Izumiyama, S., Koike, M., Nazia, N., Rana, M. P., Mukul, S. A., Muhammed, N., Redwan, M. (2014) Community attitude toward forest conservation programs through collaborative protected area management in Bangladesh. *Environment, Development and Sustainability*, 16(6), pp. 1135-1252.
- Christ, C., Hillel, O., Matus, S., Sweeting, J. (2003) Tourism and Biodiversity: Mapping Tourism's Global Footprint. Conservation International, Washington, DC.
- Cinner, J. E., Wamukota, A., Randriamahazo, H., Rabearisoa, A. (2009) Toward institutions for community-based management of inshore marine resources in the Western Indian Ocean. *Marine Policy*, 33, pp. 489-496.
- Clark, T. W., Amato, E. D., Whittemore, D.G. Harvey, A. H. (1991) Policy and programs for ecosystem management in the Greater Yellowstone Ecosystem: An analysis. *Conservation Biology*, 5(3), pp. 412-422.
- Clark, S. Bolt. K., Campbell, A. (2008) Protected areas: an effective tool to reduce emissions from deforestation and forest degradation in developing countries. Working paper, UNEP World Conservation Monitoring Centre, Cambridge, UK.
- Clarke, P., Jupiter, S. (2010) Principles and practice of Ecosystem-Based Management: A guide for Conservation Practitioners in the Tropical Western Pacific. Wildlife Conservation Society, Suva, Fiji.
- Clarkson, M. B. E. (1995) A stakeholder framework for analyzing and evaluating corporate social performance. *Academy of Management Review*, 20, pp. 65–91.
- Coad, L., Leverington, F., Burgess, N.D., Cuadros, I.C., Geldmann, J., Marthews, T.R., Mee, J., Nolte, C., Stoll-Kleemann, S., Vansteelant, N., Zamora, C., Zimsky, M., Hockings, M. (2013) Progress towards the cbd protected area management effectiveness targets, *Parks*, 19 (1), pp. 13-24.
- Collins, N. M. Sayer, J.A., Whitmore, T. C. (1991) The Conservation Atlas of Tropical Forests: Asia and the Pacific, IUCN, Chapters 1-10.
- Connor, R., Houlbrook, R. Tarihao, F. (1996) Local Conservation Area Ownership Traditional Management, in Wallace, H. (eds.), *Developing Alternatives: Community Development Strategies and Environmental Issues in the Pacific*, Victoria University, Melbourne.

- Cordell, H. K., Bergstrom, J. C. (1999) *Integrating social sciences with ecosystem management: Human dimensions in assessment, policy and management*, Champaign, IL: Sagamore.
- Cortner, H. J., Moote, M. A. (1999) *The politics of ecosystem management*, Washington, DC: Island Press.
- Creswell, J. W. (2009) *Research design: Qualitative, quantitative and mixed methods approaches*, 3rd edn, Thousand Oaks, CA: Sage Publications.
- Crewe, E., Harrison, E. (1998) *Whose Development: An Ethnography of Aid*. London: Zed.
- Crofts, R. (2009) Protected Areas: An Overview. IEEM in Practice, available at rogercrofts.net/files/protectedareas/IEEMinpracticeDec2009.pdf , accessed on 7.08.2010.
- Crosby, L. B. (1991) Stakeholder Analysis: A Vital tool for Strategic managers, publication of USAID's Implementing Policy Change Project, No.2.
- Curtis, S. J. (1933) Working Plan for the Forests of the Sundarbans Division for the period from 1933 to 1951. Bengal Government Press, Calcutta.
- Danby, R. K., Slocombe, D. S. (2002). Protected areas and intergovernmental cooperation in the St. Elias Region. *Natural Resources Journal*, 4, pp. 247-282.
- Danby, R. K., Slocombe, D. S. (2005). Regional ecology, ecosystem geography and transboundary protected areas in the St. Elias mountains parks. *Ecological Applications*, 15(2), pp. 405-22.
- Denzin, N. K., Lincoln, Y. S. (2003) *Collecting and interpreting qualitative materials*, 2nd edn, Sage publications. Thousand Oaks, California, U.S.A.
- Denzin, N. K., Lincoln, Y. S. (2008) Introduction: The discipline and practice of qualitative research. In N. K. Denzin, and Y. S. Lincoln (eds.), *Strategies of qualitative inquiry* (pp.1-44). Sage Publications, Thousand Oaks.
- Daymon, C., Holloway, I. (2011) *Qualitative Research Methods in Public Relations and Marketing Communications*, 2nd edn. Routledge.
- De Boer, W. F., Baquette, D. S. (1998) Natural resource use, crop damage and attitudes of rural people in the vicinity of the Maputo Elephant Reserve, Mozambique. *Environmental Conservation*, 25, pp. 208-218.
- Dearden, P., Bennet, M., Johnston, J. (2005) Trends in global protected area governance, 1992-2002. *Environmental Management*, 36 (1), pp. 89-100.
- DeCosse, P. J. (2006) The role of alternative income generation (AIG) activities in Nishorgo's strategy for conservation of protected areas. USAID, Nishorgo Support Project, p. 16.
- Di Ciommo, R. C., Schiavetti, A. (2012) Women participation in the management of a marine protected area in Brazil. *Ocean and Coastal Management*, 62, pp.15-23.

Di Minin, E., Hunter, L.T.B., Balme, G.A., Smith, R.J., Goodman, P.S. (2013) Creating larger and better connected protected areas enhances the persistence of big game species in the Maputaland- Pondoland-Albany biodiversity hotspot. *PLoS ONE* 8(8): e71788. doi:10.1371/journal.pone.0071788, accessed on 07.11.2013.

Distefano, E. (2005) Human wildlife conflict worldwide: collection of case studies, analysis of management strategies and global practices. SARD Initiative Report, FAO, Rome.

Dorji, R. (2009) Interactions between protected areas and local communities- A Case study from Jigme Dorji National Park, Bhutan. MSc. Thesis, University of Natural Resources and Applied Life Sciences, Vienna.

Doss, C. R. (2001) Designing agricultural technology for African women farmers: lessons from 25 years of experience. *World Development*, 29, pp. 2075-2092.

Dressler, W.; Buscher, B.; Schoon, M.; Brockington, D.; Hayes, Y.; Kull, C.A. McCarthy, J., Shrestha, K. (2010) From hope to crisis and back again? A critical history of the global CBNRM narrative. *Environmental Conservation*, 37, pp. 5-15.

Dudley N, Hockings M, Stolton S. (1999) Measuring the effectiveness of protected area management. In Stolton S, Dudley N, eds. *Partnerships for Protection*. London: Earthscan.

Dudley, N., Parish, J. (2006) Closing the gap: Creating ecologically representative protected area systems. Secretariat of the Convention on Biological Diversity.

Dudley, N., Belokurov, A., Higgins-Zogib, L., Hockings, M., Stolton, S., Burgess, N. (2007) Tracking progress in managing protected areas around the world. An analysis of two applications of the management effectiveness tracking tool developed by WWF and the World Bank. Gland: WWF International.

Dudley, N. (2008) Guidelines for applying Protected Area Management Categories. IUCN, Gland, Switzerland.

Dudley, N., Stolton, S., Belokurov, A., Krueger, L., Lopoukhine, N., MacKinnon, K., Sandwith, T., Sekhran, N. (2010). *Natural Solutions. Protected areas helping people cope with climate change*. IUCN-WCPA, TNC, UNDP, WCS, The World Bank and WWF. Gland, Switzerland, Washington DC and New York, USA.

Durham E., Baker H., Smith M., Moore E., Morgan V. (2014) *The BiodivERsA Stakeholder Engagement Handbook*. BiodivERsA, Paris, 108 pp.

Eagles, P. F. J., Bowman, M. E., Tao, T. C. (2001) Guidelines for tourism in parks and protected areas of East Asia. IUCN, Gland, Switzerland and Cambridge, UK in collaboration with University of Waterloo, Waterloo, ON, Canada.

Eagles, P. F. J., McCool, S. F., Haynes, C. D. (2002) *Sustainable Tourism in Protected Areas: Guidelines for Planning and Management*. IUCN Gland, Switzerland and Cambridge, UK. 183pp.

- Eagles, P. F. J., 2008, 'Governance models for parks, recreation and tourism', in K. S. Hanna, D. A. Clark and D. S. Slocombe (eds.), *Transforming parks and protected areas: Management and Governance in a changing world*, pp. 39–61. Routledge, London.
- Eagles, P. F. J. (2009) 'Governance of recreation and tourism partnerships in parks and protected areas', *Journal of Sustainable Tourism*, 17(2), pp. 231–248.
- Eagles, P. F. J., Romagosa, F., Buteau-Duitschaever, W. C., Havitz, M., Glover, T. D., McCutcheon, B. (2013) 'Good governance in protected areas: An evaluation of stakeholders' perceptions in British Columbia and Ontario Provincial Parks', *Journal of Sustainable Tourism*, 21(1), pp. 60–79.
- Eaton, R. M. (1990) Human settlement and colonization in the Sundarbans, 1200–1750. *Agriculture and Human Values*, 7 (2), pp. 6-16.
- Emmerton, L., Mfunda, I. (1999) Making Wildlife Economically Viable for Communities Living around the Western Serengeti, Tanzania, Evaluating Eden Series Working Paper No.1.
- Ervin, J. (2003) Rapid Assessment and Prioritization of Protected Area Management (RAPPAM). Gland (Switzerland): World Wide Fund for Nature.
- Ervin, J. (2003a) Protected area assessments in perspective. *BioScience*, 53(9), pp. 819-822.
- Ervin, J. (2007) Protected Area System Master Planning: A Quick Guide for Protected Area Practitioners. Arlington, DC: The Nature Conservancy, 36 pp.
- Ervin, J., Mulongoy, K. J., Lawrence, K., Game, E., Sheppard, D., Bridgewater, P., Bennett, G., Gidda, S.B., Bos, P. (2010). Making Protected Areas Relevant: A guide to integrating protected areas into wider landscapes, seascapes and sectoral plans and strategies. CBD Technical Series No. 44. Montreal, Canada: Convention on Biological Diversity, 94pp.
- Espey, J. (2011) Women exiting chronic poverty: empowerment through equitable control of households' natural resources. Working paper 74, chronic poverty research centre, overseas development institute, Manchester, U.K.
- Ezebile, E. E., Mattsson, L. (2010) Socio-economic benefits of protected areas as perceived by local people around Cross River National Park, Nigeria. *Forest Policy and Economics*, 12 (3), pp. 189-193.
- Feldman, M. S., Bell, J., Berger, M. T. (2003) *Gaining access: A practical and theoretical guide for qualitative researchers*. Walnut Creek, CA: AltaMira.
- Firoz, R., Mobasher, S.M., Waliuzzaman, M., Alam, M.K. (2004) Proceedings of the Regional Workshops on National Biodiversity Strategy and Action Plan. IUCN Bangladesh Country Office, Dhaka, 167pp.
- Fisher, R. J., Jackson, W. J. (1998) Action Research for Collaborative management of Protected Areas. Paper presented at the workshop on collaborative management of protected areas in the Asian Region. Suaraha, Nepal.

- Food and Agricultural Organization (FAO) (2000) FRA-2000: Forest resources of Bangladesh: Country Report 141, working paper 15, Forest Resources Assessment Program, Rome.
- Food and Agricultural Organization (FAO) (2005a) Global forest resources assessment 2005: Bangladesh Country Report 141, Rome. Available at <http://www.org/forestry/site/32245/en>, accessed on 7.12.2010.
- Fisher, R. (2000) Experiences, challenges and prospects for collaborative management of protected areas: An international perspective. Paper prepared for the symposium, “Adaptive Collaborative Management of Protected Areas: Advancing the Potential”. Cornell University 16-19 September 1998.
- Fontana, A., Frey, J. H. (2003) The interview: from structured questions to negotiated text. In K.N. Denzin and Y.S. Lincoln (eds.), *Collecting and interpreting qualitative materials*. 2nd edn, Sage Publications, Thousand Oaks, California, USA.
- Forest Department of Bangladesh (FDB) (2006) Management Plan for Lawachara National Park. Nishorgo Support Project, Bangladesh.
- Forest Department of Bangladesh (FDB) (2006) Management Plan for Teknaf Game Reserve, Nishorgo Support Project, Bangladesh.
- Forest Department of Bangladesh (FDB) (1998) The conservation management plan of the protected areas other than those in the Sunderban forest of Bangladesh.
- Forest Department of Bangladesh (FDB) (2010) Strategic management plan for Sunderbans reserve forest. Ministry of Environment and Forests, Bangladesh.
- Forestry Commission (2011) Public engagement in forestry: a toolbox for public engagement in forest and woodland planning. Forestry Commission, Edinburgh.
- Fox, J., Mustafa, M.G. (2013) Co-management initiatives implemented by IPAC in wetlands and forests of Bangladesh. In: Fox, J.; Mustafa, M.G.; Bushley, B.R.; Brennan, S.R. and Durand, L. (eds.), *Connecting communities and conservation: co-management initiatives implemented by IPAC in wetlands and forests of Bangladesh*.
- Frank, P. (2014) Time for new look at social impacts of protected areas. www.iiied.org/time-for-new-look-social-impacts-protected-areas, accessed on 15.04.2014.
- Freeman, R. E. (1984) *Strategic Management: A Stakeholder Approach*. Cambridge University Press
- Frost, P., Campbell, B., Medina, G., Usongo, L. (2006) Landscape-scale approaches for integrated natural resource management in tropical forest landscapes. *Ecology and Society* 11(2): 30. [Online] URL: <http://www.ecologyandsociety.org/vol11/iss2/art30/>, accessed on 25.10.2011.
- Furze, De Lacy, T., Birckhead, J. (1996) *Culture Conservation and Biodiversity-The Social Dimension of Linking Local Level Development and Conservation through Protected Areas*. England: John Wiley and Sons.

- Gain, P. (2002) *The last forest of Bangladesh*. Dhaka: Society of Environment and Human Development.
- Gallina, A. (2010) *Gender aware approaches in agricultural programmes – international literature review*, Swedish international development cooperation agency/UTV working paper (3), Stockholm: Sida.
- Gandiwa, E., Zisadza-Gandiwa, P., Mango, L., Jakarasi, J. (2014) Law enforcement staff perceptions of illegal hunting and wildlife conservation in Gonarezhou National Park, southeastern Zimbabwe. *Tropical Ecology*, 55(1), pp. 119-127.
- Gardner, C. J. (2011) IUCN management categories fail to represent new, multiple use protected areas in Madagascar. *Oryx*, 45, pp. 336-346.
- Garbarino, S., Holland, J. (2009) Quantitative and qualitative methods in impact evaluation and measuring results: Issues paper. Governance and Social Development Resource Centre.
- Gardner, C. J., Nicoll, M. E., Mbohoahy, T., Oleson, K. L. L., Ratsifandrihamanana, A. N., Ratsirarson, J., Roland, I. R., Virah-Sawmy, M., Zafindrasilivonona, B., Davies, Z.G. (2013) Protected areas for conservation and poverty alleviation: experience from Madagascar. *Journal of Applied Ecology*, 50 (6), pp.1289–1294
- German, L., Mazengia, W., Ayele, S., Tirwomwe, W., Tanui, J., Taye, H., Begashaw, L., Nyangas, S., Chemangeni, A., Cheptegei, W., Tsegaye, M., Admassu, Z., Alinyo, F., Mekonnen, A., Abera, K., Tolera, T., Jotte, Z., Bedane, K. (2008) *Enabling equitable collective action and policy change for poverty reduction and improved natural resource management in the eastern African highlands*. Collective Action and Property Rights (CAPRI) Working Paper 86. International Food Policy Research Institute, Washington, D.C. USA.
- Getzner, M., Jungmeier, M., Lange, S. (2012) *People, parks and money, stakeholder involvement and regional development: A manual for Protected Areas*, Verlag Johannes Heyn, Klagenfurt, ISBN 978-3-7084-0413-4.
- Getzner, M., Islam, M. S. (2013) Natural resources, livelihoods, and reserve management: a case study from Sundarbans mangrove forests, Bangladesh. *International Journal Sustainable Development Planning*, 8(1), pp. 75-87.
- Ghana web, (2006) Assaults of Kyabobo Park Guards would face justice-DC assures. Regional News of 2006-07-12. Hohoe, Ghana.
- Ghimire, K. B., Pimbert, M.P., (1997) Social change and conservation: An overview of issues and concepts, in Ghimire, K.B., and Pimbert, M.P.(eds.) *Social change and conservation-environmental politics and impacts of national parks and protected areas*, London: Earthscan Publication, 1-45.
- Gill, S. K., Ross, W.H., Panya, O. (2009) Moving beyond rhetoric: the need for participatory forest management with the Jakun and South-East Pahang, Malaysia. *Journal of Tropical Forest Science*, 21, pp. 241-249.
- Gilmour, J., Beilin, R. (2007) *Stakeholder mapping for effective risk assessment and communication*. ACERA Project 06/09. 53p.

- Golden A. S., Naisilsisili W., Ligairi I., Drew J. A. (2014) Combining natural history collections with fisher knowledge for community-based conservation in Fiji. *PLoS ONE* 9(5): e98036. doi:10.1371/journal.pone.0098036, accessed on 12.07.2013.
- Government of the Peoples Republic of Bangladesh (GoB) (1984) Bangladesh Wildlife (Preservation) (Amendment) Act, 1974. Forest Directorate, Government of Bangladesh.
- Government of the Peoples Republic of Bangladesh (GoB) (2009) Moving ahead national strategy for accelerated poverty reduction II (FY2009-11). General Economic Division Planning Commission, Dhaka.
- Graham, J., Amos, B., Plumptre, T. (2003) Governance principles for protected areas in the 21st century. Ottawa, ON: Institute on Governance and Parks Canada.
- Grimble, R. (1998) Stakeholder methodologies in natural resource management. Socio-economic methodologies. Best practice guidelines.
- Grimble, R., Wellard, K. (1997) Stakeholder methodologies in natural resource management: a review of concepts, contexts, experiences and opportunities. *Agricultural Systems*, 55, pp. 173–193.
- Grumbine, R. E. (1994) What is ecosystem management? *Conservation Biology*, 8(1), pp.27-28.
- Grumbine, R. E. (1997) Reflections on “What is ecosystem management?” *Conservation Biology*, 11, pp. 41-47.
- Gupta, R. (2005) Human wildlife conflicts in Khata Corridor under Terai Arc Landscape (TAL), Nepal. B.Sc. thesis, School of Environmental Science and Management, Pokhara Univeristy, Kathmandu.
- Gutzwiller, K. J. (2002) *Applying Landscape Ecology in Biological Conservation*. New York: Springer.
- Haque, C. H., Deb, A. K., Medeiros, D. (2009) Integrating conservation with livelihood improvement for sustainable development. The experiment of an oyster producers’ cooperative in Southeast Brazil. *Society and Nature Resources*, 22(6), pp. 554-570.
- Haque, S. A. (2006) Salinity problems and crop production in coastal regions of Bangladesh. *Pak Journal of Botany*, 38(5), pp. 1359-1365.
- Haque, S. A. (2010) Impact of climate change on “Sundarbans”, the largest mangrove forest: ways forward. 18th Commonwealth Forestry Conference, Scotland, UK.
- Hayes T. M. (2006) Parks, people, and forest protection: an institutional assessment of the effectiveness of protected areas. *World Development*, 34(12), pp. 2026–2075.
- Hendrichs, H. (1975) The status of the tiger *Panthera tigris* in the Sundarbans mangrove forest (Bay of Bengal). *Saugetierkundliche Mitteilungen*, 23, pp.161-199.
- Holden, A. (2013) *Tourism, Poverty and Development*. Routledge.

- Holmes, C. (2003) The influence of protected area outreach on conservation attitudes and resource use patterns: A case study from western Tanzania. *Oryx*, 37, pp. 305–315.
- Hossain, M. K. (2001) Overview of the forest biodiversity in Bangladesh. In: *Assessment, conservation and sustainable use of forest biodiversity* (CBD Technical Series N^o. 3). SCBD, Montreal, Canada, 33-35.
- Hossain, A., Karim, R. (2005) Community participation – key to success in co-management of Protected Areas in Bangladesh. umdcipe.org/conferences/epckdi/abstracts/10.pdf, accessed on 18.03.2012.
- Hossain, M. S. 2007. Report on socio-economic field surveys at Nishorgo pilot sites. Nishorgo Support Project, p. 74.
- Hossain, D., Eley, R., Coutts, J., Gorman, D. (2008) The mental health of landholders in Southern Queensland- issues and support. *Australian Journal of Rural Health*, 16(6), pp. 343-348.
- Hockings, M., Phillips, A. (1999) How well are we doing? – Some thoughts on the effectiveness of protected areas. *Parks*, 9(2), pp. 5-14.
- Hockings, M., Stolton, S., Dudley, N. (2000) Evaluating Effectiveness: A Framework for Assessing the Management of Protected Areas. IUCN, Gland, Switzerland and Cambridge, UK.
- Hockings, M. (2003) Systems for Assessing the Effectiveness of Management in Protected Areas. *Bioscience*, 53(9), pp. 823-832.
- Hockings, M., Stolton, S., Leverington, F., Dudley, N., Courrau, J. (2006) Evaluating Effectiveness: A framework for assessing management effectiveness of protected areas. 2nd edition. Gland, Switzerland: IUCN.
- Hooper, B. P. (1997) *Improving watershed management using an innovative integrated resources management approach in Australia*. *Journal of Professional Issues in Engineering Education and Practice*, 123(2), pp. 57-61.
- Hooper, B. P., McDonald, G. T., Mitchell, B. (1999) Facilitating integrated resource and environmental management: Australian and Canadian perspectives. *Journal of Environmental Planning and Management*, 42(5), pp. 747-766.
- Hughes, D.M. (1996) When parks encroach upon people. *Cultural Survival Quarterly*, 20(1), pp. 36-40.
- Hutton, J., Adams, W. M., Murombedzi, C. (2005) Back to the barriers? Changing narratives in biodiversity conservation. *Forum of Development Studies*, 32(2), pp. 341-370.
- Iftekhar, M. S., Islam, M. R. (2004) Managing mangroves in Bangladesh: A strategy analysis. *Journal of Coastal Conservation*, 10, pp. 139-146.

- ICEM (2003) *Lessons Learned From Global Experience*. Review of Protected Areas and Development in the Lower Mekong River Region, Indooroopilly, Queensland, Australia. 166 pp.
- Inskip, C., Ridout, M., Fahad, Z., Tully, R., Barlow, A., Barlow, C.G., Islam, M.A., Roberts, T., MacMillan, D. (2013) Human –tiger conflict in context: risks to lives and livelihoods in the Sundarbans. *Human Ecology*, 41, pp. 169-186.
- Islam, M. M., Amin, A. S. M. R., Sarker, S. K. (2003) National Report on Alien Invasive Species of ‘Bangladesh’. In: Pallewatta, N., Reaser, J.K. and Gutierrez, A.T. (eds.), *Invasive Alien Species in South-Southeast Asia: National Reports and Directory of Resources*. Global Invasive Species Programme, Cape Town, South Africa, 7-24.
- Islam, M. S., Haque, M. (2004) The mangrove-based coastal and near shore fisheries of Bangladesh: ecology, exploitation and management. *Reviews in Fish Biology and Fisheries*, 14, pp. 153-180.
- Islam, M. S., Wahab, M. A. (2005) A review on the present status and management of mangrove wetland habitat resources in Bangladesh with emphasis on mangrove fisheries and aquaculture. *Hydrobiologia*, 542, pp. 165-190.
- International Resource Group (IRG) (2010).
- Islam, M. R., Mia, A. (2007) The role of education for rural population transformation in Bangladesh. www.apjce.org/files/APJCE_08_1_1_21.pdf, accessed on 20.11.2013.
- Islam, T. (2012) Impacts of non-timber forest products (NTFPs) collection by local people on the environment of the Sundarbans reserve forest. MSc. thesis, University of Greenwich.
- IUCN (1994) *Guidelines for Protected Area Management Categories*. IUCN, Gland, Switzerland and Cambridge, UK.
- IUCN (1999) *Threats to forest protected areas*. A research report from IUCN the World Conservation Union for the World Bank/ WWF alliance for conservation and sustainable use.
- IUCN (2000) *Red list of threatened animals of Bangladesh*. The World Conservation Union (IUCN), Bangladesh, 54 pp.
- IUCN (2005) *Benefits beyond boundaries*. Proceeding of the Vth IUCN World Park Congress. Gland and Cambridge: IUCN.
- Jagrata Juba Shangha (2003) *Human-wildlife interactions in relation to the Sundarbans reserved forest of Bangladesh*. Sundarbans Biodiversity Project Report.
- Jahan, I. (2012) *Cyclone Aila and the South-Western coastal zone of Bangladesh: in the context of vulnerability*. MSc thesis, Lund University.
- Jalais, A. (2008) Unmasking the cosmopolitan tiger. *Nature and Culture*, 3, pp. 25-40.
- Johl, S. K., Renganathan, S. (2010) Strategies for gaining access in doing fieldwork: reflection of two researchers. *Electronic Journal of Business Research Methods*, 8(1), pp. 42-50.

- Jones, M.T., Fleming, P. (2003) Unpacking complexity through critical stakeholder analysis: the case of globalization. *Business and Society*, 42(3), pp. 430–454.
- Joppa, L.N., Pfaff, A. (2011) Global protected area impacts. *Proceedings of the Royal Society B*, 278, pp. 1633–1638.
- Joseph, C. T. R. B. (2004) Evaluation of British Columbia strategic land-use plan implementation framework. MSc. Dissertation, Simon Fraser University, Canada.
- Kabir, D. M. H., Hossain, J. (2008) Resuscitating the Sundarbans: Customary use of biodiversity and traditional cultural practices in Bangladesh. Unnayan Onneshan.
- Kapoor, I. (2001) Towards participatory environmental management? *Journal of Environmental Management*, 63 (3), pp. 269-279.
- Karn, P. (2008) Making payment for environmental services (PES) work: A Case study of Shivapuri National Park, Nepal. In Bajracharya, S.B., Dahal, N. *Shifting Paradigms in Protected Area Management*, NTNC, Kathmandu.
- Katikiro, R. E., Macusi, E. D., Ashoka, K. H. M. (2015) Challenges facing local communities in Tanzania in realising locally-managed marine areas. *Marine Policy*, 51, pp. 220-229.
- Keen, M., Lal, P. (2002) Creating supportive frameworks for community based resource management. *Development Bulletin* 58, pp. 46-51.
- Kellert, S. R., Mehta, J. N., Ebbin, S. A., Lichtenfeld, L. L. (2000) Community natural resource management: Promise, rhetoric, and reality. *Society and Natural Resources*, 13 (8), pp. 705-715.
- Kettunen, M., Brink, P. (2013) *Social and Economic Benefits of Protected Areas: An Assessment Guide*. Adbingdon: Routledge.
- Khan, N.A. (2001) Social forestry versus social reality: patronage and community based forestry in Bangladesh. Gatekeeper Series No. 99. International Institute for Environment and Development (IIED): London.
- Kiorboe, D., Vinding, M., Salazar, V., Tuxen, H., Munk, H. (2005) Integrating indigenous and gender aspects in natural resource management. Gland (Switzerland): World Wide Fund for Nature.
- Kirkby, C. A., Giudice-Granados, R., Day, B., Turner, K., Velarde-Andrade, L.M., Dueñas-Dueñas, A., Lara-Rivas, J.C., Yu, D.W. (2010) The market triumph of ecotourism: an economic investigation of the private and social benefits of competing land uses in the Peruvian Amazon. *PLoS ONE*, 5(9): e13015. doi:10.1371/journal.pone.0013015.
- Kirkby, C. A., Giudice, R., Day, B., Turner, K., Soares-Filho, B.S., Oliveira-Rodrigues, H., Yu, D.W. (2011) Closing the ecotourism-conservation loop in the Peruvian Amazon. *Environmental Conservation*. 38, pp.6–17.
- Kolahi, M., Sakai, T.1, Moriya, K., Yoshikawa, M., Esmaili, R. (2014) From paper parks to real conservations: case study of social capital in Iran's biodiversity conservation. *International Journal Environmental Resources*, 8(1), pp. 101-114.

- Kopylova, S. I., Danilina, N. R. (2011) Protected area staff training: Guidelines for planning and management. Gland Switzerland: IUCN, 102pp.
- Kothari, A., Pathak, N., Vania, F. (2000) Where Communities Care: community based wildlife and ecosystem management in South Asia. Kalpavriksh, Pune and IIED, London, UK, pp. 17-23.
- Kubo, H., Supriyanto, B. (2010) From fence and fines to participatory conservation: mechanisms of transformation in conservation governance at the Gunung haliman-Salak National Park, Indonesia. *Biodiversity Conservation*, 19 (6), pp. 1785-1803.
- Lal, P., Lim-Applegate, H., Scoccimarro, M. (2001) The adaptive decision-making process as a tool for integrated natural resource management: Focus, attitudes, and approach. *Conservation Ecology*, 5(2), 11.
- Lawrence, W. (2012) Averting biodiversity collapse in tropical forest protected areas. *Nature*, 489 (7415), pp. 290-294.
- Lawton, J. (2011) Making Space for Nature: A review of England's Wildlife Sites and Ecological Network. Department of Environment, Food and Rural Affairs.
- Leach, M., Mearns, R., Scoons, I. (1999) Environmental entitlements: dynamics and institutions in community based natural resource management. *World Development*, 27(2), pp. 225-247.
- Lee, T., and Jetz, W. (2008) Future battleground for conservation under global change. *Proceedings Biological Science*, 275, pp. 1261-1270.
- Leung, Y.-F., Spenceley, A., Hvenegaard, G., Buckley, R. (2015) *Tourism and Visitor Management in Protected Areas: Guidelines towards sustainability*. Best Practice Protected Area Guidelines, Gland, Switzerland: IUCN.
- Leverington, F., Hockings, M., Paves, H., Costa, K.L., Courrau, J. (2008) Management Effectiveness Evaluation in Protected Area- A global study overview of approaches and methodologies. Supplementary reports no. 1. The University of Queensland, Gatton, TNC, WWF, IUCN-WCPA, Australia.
- Leverington, F., Lemos, K., Courrau, J., Pavese, H., Nolte, C., Marr, M., Coad, L., Burgess, N., Bomhard, B., Hockings, M. (2010) *Management Effectiveness Evaluation in Protected Areas – A Global Study*, 2nd edn. The University of Queensland, Brisbane, Australia.
- Lewis, C. (1996) *Managing Conflicts in Protected Areas*. IUCN, Gland, Switzerland, and Cambridge, UK. 100 pp.
- Lewis, M. (2005) Indian science for Indian tigers? Conservation biology and the question of cultural values. *Journal of the History of Biology*, 38 (2), pp. 185–207.
- Little, J. (1994) *Gender, Planning and the Policy Process*. Butterworth-Heinemann Ltd
- Lockwood, M., Worboys, G.L., Kothari, A. (2006) *Managing Protected Areas. A Global Guide*. Routledge.

- Lockwood, M. (2010) Good governance for terrestrial protected areas: A framework, principles and performance outcomes. *Journal of Environmental Management*, 91(3), pp. 754-766.
- Mack, N., Woodsong, C., Macqueen, K. M., Guest, G., Namey, E. (2005) *Qualitative Research Methods: A Data Collector's Field Guide*. Family Health International, North Carolina, USA.
- Macura, B., Secco, L., Pullin, A. S. (2013) Does the effectiveness of the forest protected areas differ conditionally on their type of governance? *Environmental Evidence*, 2(14), pp. 2-14.
- Maiorano, L., Falcucci, A., and Boitani, L. (2008) Size dependant resistance of protected areas to land-use change. *Proceedings of the Royal Society B*, 275, pp. 1297-1304.
- M., Bell, J., Berger, M. (2003) *Gaining Access: A Practical and Theoretical Guide for Qualitative Researchers*, California: Alta Mira Press.
- Mannigel, E. (2008) Integrating parks and people: How does participation work in protected area management? *Society and Natural Resources*, 21, pp. 498-511.
- Margerum, R. D. (1997) Integrated approaches to environmental planning and management. *Journal of Planning Literature*, 11(4), pp. 459-475.
- Margerum, R. D., Born, S. M. (2000) A co-ordination diagnostic for improving integrated environmental management. *Journal of Environmental Planning and Management*, 43(1), pp. 5-21.
- Margoluis, R., Salafsky, N. (1998) *Measure of success; Designing, managing and monitoring conservation and development projects*. Washington DC, Island Press.
- Martin, E. B. (1998) Will new community development projects help Rhino conservation in Nepal? In Martin, E. B. (eds.), *from the jungle to Kathmandu: Horn and tusk trade*. Kathmandu: Wildlife Watch Group (WWG), pp. 88-101.
- Mathur, V. B., Gopal, R., Yadav, S. P., Sinha, P. R. (2011) *Management effectiveness evaluation (MEE) of Tiger Reserves in India: Process and Outcomes*. New Delhi: National Tiger Conservation Authority, Government of India.
- McGibbon, M. J. (1990) *The Effects of Neighbourhood Plans in Edmonton. A Case Study of Grate Estate, Riverdale, Oliver, and Garneau*. PhD Thesis. University of Alberta, Canada.
- McLean, J., Straede, S. (2003) Conservation, relocation, and the paradigms of park and people management. A case study of Padampur Villages and the Royal Chitwan National Park, Nepal. *Society and Natural Resources*, 16(6), pp. 509–526.
- McNeely, J. A., Harrison, J., Dingwall, P. (1994) *Protecting Nature: Regional Reviews of Protected Areas*. Gland (Switzerland), Cambridge (United Kingdom): IUCN.
- McNeely, J. A., Mainka, S. A. (2009) *Conservation for a New Era*. Gland: IUCN.
- Mehnen, N. (2013) *Protected landscapes – the great hope of European area protection policies?* PhD thesis, Netherlands.

- Millennium Ecosystem Assessment (MEA), (2005a). Ecosystem and human well-being: synthesis. Washington, D.C.: World Resource Institute.
- Meffe, G. K., Carroll, C. R. (1997) *Principles of Conservation Biology*, 3rd edn. Sinauer Associates.
- Mehta, J. N., Kellert, S. R. (1998) Local attitudes toward community-based conservation policy and programmes in Nepal: a case study in the Makalu Barun conservation area. *Environmental Conservation*, 25, pp. 320-333.
- Miah, M. G., Bari, M. N., Rahman, M. A. (2003) Agricultural activities and their impacts on the ecology and biodiversity of the Sundarbans of Bangladesh. *Journal of the National Science Foundation of Sri Lanka*, 31, pp. 175-199.
- Miles, M. B., Huberman, A. M. (1994) *Qualitative Data Analysis: an Expanded Source Book*, 2nd edn. Sage Publications, London 338p.
- Millat-e-Mustafa, M. (2002) A Review of Forest Policy Trends in Bangladesh. Bangladesh Forest Policy Trends. Policy Trend Report.
- Millennium Ecosystem Assessment. (2005) *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC.
- Mishra, B. (2013) An exploratory study of the protected area management policies in odisha. *Indian Forester*, 139 (6), pp. 507-517.
- Mitchell, N., Slaiby, B., Buggery, S., Benedict, M. (2002) Local community leadership: Building partnerships for conservation in North America. *Parks*, 12(2), pp. 55-66.
- Mitchell, J., Ashley, C. (2010) *Tourism and Poverty Reduction: Pathways to Prosperity*, Earthscan, London.
- Mittermeier, R. A., Myers, N., Thomsen, J. B., Da Fonseca, G. A., Olivieri, S. (1998) Biodiversity hotspots and major tropical wilderness areas: approaches to setting conservation priorities. *Conservation Biology*, 12, pp. 516-520.
- Monoj, K. R. (2004) Designing a co-management model for protected areas in Bangladesh. International seminar on protected area management, University of Montana, U.S.A.
- Mose, I., Weixlbaumer, N. (2007) A new paradigm for protected areas in Europe? Pages 3–20 in I. Mose and N. Weixlbaumer, editors. *Protected areas and regional development in Europe: Towards a new model for the 21st century*. Ashgate, Aldershot, UK.
- Muhammed, N., Koike, M. and Haque, F. (2008) Forest Policy and Sustainable Forest Management in Bangladesh: An Analysis from National and International Perspectives, *New Forests*, DOI, 10.1007/s11056-008-9093-8.
- Muganda, M., Sirima, A., Ezra, P.M. (2013) The role of local communities in tourism development: grassroots perspectives from Tanzania. *Journal of Human Ecology*, 41(1), pp. 53-66.

- Mugisha, A. R. (2002) Evaluation of community based conservation approaches: management of protected areas in Uganda. PhD thesis, University of Florida.
- Muhammed, N., Koike, K., Haque, F. (2008) Forest policy and sustainable forest management in Bangladesh: an analysis from national and international perspectives. *New Forests*, 36(2), pp. 201-216.
- Mukherjee, A. (2009) Conflict and coexistence in a national park. *Economic and Political Weekly*, 23, pp. 52-59.
- Mukul, S. A., Uddin, M. B., Uddin, M. S., Khan, M., Marzan, B. (2008) Protected areas of Bangladesh: current status and efficacy for biodiversity conservation. *Proceedings of the Pakistan academy of Sciences*, 4(2), pp. 59-68.
- Mukul S. A., Quazi S. A. (2009) Communities in conservation: Changing protected area management and enhanced conservation in Bangladesh. In: Leslie RN (eds.), Proceedings of the international conference; 'The Future of Forests in Asia and the Pacific: Outlook for 2020' held in October 16-18, 2007 at Chiang Mai, Thailand, pp. 143–159.
- Mukul, S. A., Uddin, M. B., Rashid, A. Z. M. M., Fox, J. (2010) Integrating livelihoods and conservation in protected areas: understanding the role and stakeholder views on prospects for non-timber forest products, a Bangladesh case study. *International Journal of Sustainable Development and World Ecology*, 17(2), pp. 180-188.
- Mukul, S. A., Rashid, A. Z. M. M., Uddin, M. B., Herborn, J. (2013) Efficacy of forest law enforcement and incentive based conservation to prevent illegal logging in developing countries: experience from Bangladesh. *Earth system governance: complex architectures, multiple agents*.
- Muhammed, N., Koike, M., Chowdhury, M. S. H., Haque, F. (2011) The profitability of strip plantations: a case study on two social forest divisions in Bangladesh. *Journal of Sustainable Forestry*, 30, pp. 1-23.
- Murphree, M. W. (2002) Protected areas and the commons. *Common Property Resource Digest*, 60, pp.1-3.
- Mushove, P., Vogel, C. (2005) Heads or tails? Stakeholder analysis as a tool for conservation area management. *Global Environmental Change*, 15, pp. 184-188.
- Mwangi, E., Meinzen-Dick, R., Sun, Y. (2011) Gender and sustainable forest management in East Africa and Latin America. *Ecology and Society*, 16(1), 17p.
- Myers, N. (1999) Saving biodiversity and saving biosphere, in Cracraft, J. and Grifo, F.T. (eds.) *The living planet-biodiversity science and policy in crisis*. New York: Columbia University Press, pp. 237-254.
- NACOM (Nature Conservation Management) (2003) Secondary Data Collection for Pilot Protected Areas: Lawachara National Park. Co-Management of Tropical Forest Resources of Bangladesh, USAID-Bangladesh and Ministry of Environment and Forest, GoB, 57p.
- Nardi, P.M. (2006) *Doing Survey Research: A Guide to Quantitative Methods*. Pearson Education Inc.

- Nastran, M., Pirnat, J. (2012) Stakeholder participation in planning of the protected natural areas: Slovenia. *Sociologija I Prostor*, 193 (2), pp. 141-164.
- Naughton-Treves, L., Holland, M.B., Brandon, K. (2005) The role of protected areas in conserving biodiversity and sustaining local livelihoods. *Annual Review of Environment Resources*. 30, pp. 219-252.
- Nelson, J. G., Sportza, L. M. (2001) Evolving protected area thought and practice. *George Wright Forum*, 17(2), pp. 5-6.
- Nelson, J. G., Day, J. C., Sportza, L., Loucky, J., Vasquez, C. (2003) *Protected Areas and the Regional Planning Imperative in North America*. Calgary: University of Calgary Press.
- Nelson, D. R., Adger, W. N., Brown, K. (2007) Adaptation to environmental change: contributions of a resilience framework. *Annual Review of Environment Resources*, 32, pp. 395-419.
- Neuman, W.L. (2006) *Social Research Methods: Qualitative and Quantitative Approaches*. Sage Publications.
- Newing, H. (2011) *Conducting Research in Conservation. A Social Science Perspective*. Routledge, London and New York.
- Nicholas, C. (2005) Who can protect the forest better? Pitching Orang Asli against professionals in protected area management in Penninsular Malaysia. International symposium on Eco-human interactions in tropical forests, Japan Society of Tropical Ecology, Kyoto University.
- Niedzialkowski, K., Paavola, J., Jedrzejewska, B. (2012) Participation and protected area governance: the impact of changing influence of local authorities on the conservation of the bialowieza primeval forest, Poland. *Ecology and society*, 17(1): 2. Available at <http://dx.doi.org/10.5751/ES-04461-170102>, accessed on 12.09.2013.
- Nishat, A., Huq, S. M. I., Barua. S. P., Reza. A. H. M. A., Khan, A. S. M. (2002) Bio-ecological Zones of Bangladesh. IUCN-The World Conservation Union, Bangladesh Country Office, 141 pp.
- Nolte, C., Leverington, F., Kettner, A., Marr, M., Nielsen, G., Bomhard, B., Stolton, S., Stoll-Kleeman, S., Hockings, M. (2010) Protected Area Management Effectiveness Assessments in Europe: A review of applications, methods and results. Federal Agency for Nature Conservation, Germany.
- Oliver, P. (2003) *The Students Guide to Research Ethics*. Open University Press.
- Oli, K. P., Chaudhary, S., Sharma, U.R. (2013) Are governance and management effective within protected areas of the Kanchenjunga landscape (Bhutan, India and Nepal)? *Parks*, 19 (1), pp. 25-36.
- O'Rourke, E. (2005) Landscape planning and community participation: local lessons from mullaghmore, the burren national park, Ireland. *Landscape Research*, 30 (4), pp. 483-500.

- Ostrom, E. (1990) *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press.
- Oviedo, G. Brown, J. (1999) Building Alliances with Indigenous Peoples to Establish and Manage Protected Areas, in Stolton, S. and N. Dudley (eds.), *Partnerships for Protection*. WWF-International and the World Conservation Union, Earthscan Publications.
- Ozesmi, U., Ozesmi, S. (2003) A participatory approach to ecosystem conservation: fuzzy cognitive maps and stakeholder group analysis in Uluabat lake, Turkey. *Environmental Management*, 31, pp.518–531.
- Parr, J. W. K., Insua-Cao, P., Lam, H. V., Hoang Van, H. V., Ha, N. B., Nguyen Van Lam, N. V., Quang, N. N., Cuong, N., Crudge, B. (2013) Multi-level co-management in government-designated protected areas – opportunities to learn from models in mainland Southeast Asia. *Parks*, 19(2), pp. 59-74.
- Patton, M. Q. (1990) *Qualitative Evaluation and Research Methods*, 2nd edn. Sage publications.
- Patton, M. Q. (2002) *Qualitative Research and Evaluation Methods*, 4th edn. Sage publications.
- PCA (Parks Canada Agency) (2000) "Unimpaired for future generations" protecting ecological integrity with Canada's National Parks. Report of the panel on the ecological integrity of Canada's national parks. Minister of public works and government services. Ottawa, Ontario, Canada.
- Phillips, A. (1998) Management Guidelines for IUCN Category V Protected Areas – Protected Landscapes/Seascapes, IUCN Cambridge, UK.
- Phillips, A. (2003a) Turning ideas on their heads: a new paradigm for protected areas. *George Wright Forum*. 20, pp. 8–32.
- Phillips, A. (2003b) A modern paradigm. *World Conservation Bulletin*, 2, pp. 6–7.
- Phillips, A. (2004) The history of the international system of protected area management categories. *Parks, Protected Areas Programme*, 14(3), pp. 4-14.
- Pimbet, M. P., Pretty, J. N. (1995) Parks, People and Professionals: Putting 'Participation' into Protected Area Management, Discussion Paper No 57, Geneva, UN Research Institute for Social Development, WWF.
- Pimbet, M. P., Pretty, J. N. (1997). Parks people and professionals: Putting participation into protected area management, in Ghimire, K.B., and Pimbert, M. P. (eds.), *Social change and conservation-environmental politics and impacts of national parks and protected areas*. London: Earthscan Publication, pp. 297-330.
- Pole, C. J., Lampard, R. (2002) *Practical Social Investigation: Qualitative and Quantitative Methods in Social Research*. Harlow: Prentice Hall.
- Popper, K. R. (1945) *The Open Society and its Enemies*. London, Routledge.

Porter-Bolland, L., Ellis, E. A., Guariguata, M. R., Ruiz-Mallen, I., Negrete-Yankelevich, S., Reyes-Garcia, V. (2012) Community managed forests and forest protected areas: An assessment of their conservation effectiveness across the tropics. *Forest Ecology and Management*, 268, pp. 6-17.

Prell, C., Hubacek, K., Quinn, C. H., Reed, M. S. (2008) Who's in the network?' When stakeholders influence data analysis. *Systemic Practice and Action Research*, 21, pp. 443–458.

Pretty, J., Adams, B., Berkes, F., Ferreira de Athayde, S., Dudley, N., Hunn, E., Maffi, L., Milton, K., Rapport, D., Robbins, P., Samson, C., Sterling, E., Stolton, S., Takeuchi, K., Tsing, A., Vintinner, E., Pilgrim, S. (2008). How do biodiversity and culture intersect? Planery paper for sustaining cultural and biological diversity in a rapidly changing world. Lessons for global policy conference, 2-5 April, [http://www.greenexercise.org/pdf/How biodiversity and culture intersect.pdf](http://www.greenexercise.org/pdf/How_biodiversity_and_culture_intersect.pdf), accessed on 25.11.2012.

Pretty, J., Smith, D. (2004) Social capital in biodiversity conservation and management. *Conservation Biology*, 18(3), pp. 631–638.

Primack, R. B. (1993) *Essentials of Conservation Biology*. Sinauer Associates, Inc.

Punch, K. F. (2000) *Introduction to social research: Quantitative and Qualitative Approaches*, Sage publications, London.

Quazi, S. A., Bushley, B. R., Miles, W. B. (2008). Introduction: Participation and the collaborative management of protected areas in Bangladesh, in Fox, J., Bushley, B.R., Dutt, S. and Quazi, S.A. (eds.), *Making conservation work: linking rural livelihood and protected area management in Bangladesh*. East-west centre and Nishorgo program of Bangladesh Forest Department, Dhaka, 1-24.

Rahman, M. A. (1995) Mangrove Plant Pathology of the Sundarbans Reserved Forest in Bangladesh. Field Document No.3 of FAO/UNDP Project BGD/84/056 -Integrated Resource Development of the Sundarbans Reserved Forest, Khulna, Bangladesh, 83pp.

Rahman, M. A. (1998) Diseases and disorders tree species with particular reference to top dying of surdri and the magnitude of its damage in the Sundarbans in Bangladesh. In, the Proceedings of the National seminar on Integrated Management of Ganges Flood Plains and Sundarbans Ecosystem, held on 16-18 July, 1994. At Khulna University, Khulna, pp. 50-76.

Rahman, L. M. (2000) The Sundarbans: A Unique Wilderness of the World. *USDA Forest Service Proceedings*, 15 (2), pp. 143-148.

Rahman, M. M., Rahman, M. M., Islam, K. S. (2010) The causes of deforestation of Sundarban mangrove forest ecosystem of Bangladesh: conservation and sustainable management issues. *AAFL Bioflux*, 3(2), pp. 77-90.

Rands, M. R. W., Adams, W. M., Bennun, L., Butchart, S. H. M., Clements, A., Coomes, D., Entwistle, A. et al., (2010). Biodiversity Conservation: Challenges Beyond 2010. *Science*, 329, pp. 1298-1303.

- Rao, M., Johnson, A., Spence, K., Sypasong, A., Bynum, N., Sterling, E., Phimminth, T., Praxaysombath, B. (2014) Building capacity for protected area management in Lao PDR. *Environmental Management*, 53, pp. 715-727.
- Rashid, A. Z. M. M., Craig, D., Mukul, S. A., Khan, N. A. (2013) A journey towards shared governance: status and prospects for collaborative management in the protected areas of Bangladesh. *Journal of Forestry Research*, 24(3), pp. 599–605.
- Rastogi A., Badola R. S., Hussain A., Hickey G. M. (2010) Assessing the utility of stakeholder analysis to Protected Areas management: The case of Corbett National Park, India. *Journal of Biological Conservation*, 143, pp. 2956–2964.
- Reade, E. J. (1983) Monitoring in planning. In: I. Masser (eds.), evaluating urban planning efforts, pp. 224-242. Aldershot: Gower.
- Redford, K. H., Coppolillo, P., Sanderson, E. W., Da Fonseca, G. A. B., Dinerstein, E., Groves, C., Mace, G., Maginnis, S., Mittermeier, R.A., Noss, R., Olson, D., Robinson, J.G., Vedder, A., Wright, M., (2003) Mapping the conservation landscape. *Conservation Biology*, 17(1), pp. 116-131.
- Redford, K. H., Levy, M. A., Sanderson, E. W., de Sherbinin, A. (2008) What is the role of conservation organisations in poverty alleviation in the world's wild places? *Oryx*, 42(3), pp. 1–14.
- Redpath, S. M., Young, J., Evely, A., Adams, W. M., Sutherland, W. J., Whitehouse, A., Amar, A., Lambert, R. A., Linnell, J. D. C., Watt, A., Gutiérrez, R. J. (2013) Understanding and managing conservation conflicts. *Trends in Ecology and Evolution*, 28(2):100-9. Available at doi: 10.1016/j.tree.2012.08.021, accessed on 11.03.2014.
- Reed, M. S. (2008) Stakeholder participation for environmental management: a literature review. *Biological Conservation*, 141 (10), pp. 2417–2431.
- Reed, M. S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., Prell, C., Quinn, C. H., Stringer, L. C. (2009) Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of Environmental Management*, 90, pp. 1933–1949.
- Regmi, K. R. (2000) Park and people conflict in the Royal Bardia National Park: A Case study of Thakurdwara VDC, Bardia District, Nepal. MA thesis, Central Department of Geography, Tribhuvan University, Kathmandu.
- Remenyi, D. (2011). *Field methods for academic research: Interviews, focus groups and questionnaires*. Academic publishing International ltd, Reading, UK.
- Ritchie, J., Lewis, J. (2003) *Qualitative Research Practice: A Guide for Social Science Students and Researchers*. Sage Publications.
- Robson, C. (2002) *Real World Research*, 2nd edn, Oxford: Blackwell.
- Rockloff, S. F., Lockie, S. (2004) Participatory tools for coastal zone management: use of stakeholder analysis and social mapping in Australia. *Journal of Coastal Conservation*, (10), pp. 81-92.

Rodrigues, A. S. L., Andelman, S. J., Bakarr, M. I., Boitani, L., Brooks, T. M., Cowling, R. M., Fishpool, L. D. C., Fonseca, G. A. B., Gaston, K. J., Hoffmann, M., Long, J., Marquet, P. A., Pilgrim, J. D., Pressey, R. L., Schipper, J., Sechrest, W., Stuart, S. N., Underhill, L. G., Waller, Roe, D. (2003) The Millennium Development Goals and natural resources management: reconciling sustainable livelihoods and resource conservation or fuelling a divide? in Satterthwaite, D. (eds.), *The Millennium Development Goals and local processes: hitting the target or missing the point*, IIED, London.

Rodriguez, J. P., Simonetti, J. A., Premoli, A., Marini, M. A. (2005) Conservation in Austral and Neotropical America: building scientific capacity equal to the challenges. *Conservation Biology*, 19, pp. 969–972.

Rodriguez, J. P., Rodriguez-Clark, K. M., Oliveira-Miranda, M. A., Good, T., Grajal, A. (2006) Professional capacity building: the missing agenda in conservation priority setting. *Conservation Biology*, 20, 1340p.

R. W., Watts, M. E. J., Xie Y. (2003) Global gap analysis: Towards a representative network of protected areas. *Advances in Applied Biodiversity Science* 5. Washington DC: Conservation International.

Roe, D., Nelson, F., Sandbrook, C. (2009) Community management of natural resources in Africa: Impacts, experiences and future directions, *Natural Resource Issues* No. 18, International Institute for Environment and Development, London, UK.

Roe, D., Mayers, D., Grieg-Gran, M., Kothari, A., Fabricius, C., Hughes, R. (2000) Evaluating Eden: Exploring the myths and realities of community-based wildlife management evaluating Eden series no. 8, IIED, London.

Roe, D., Sandbrook, C., Fancourt, M., Schulte, B., Munroe, R., Sibanda, M. (2013) A systematic map protocol: which components or attributes of biodiversity affect which dimensions of poverty? *Environmental Evidence*, 2(8), pp. 1-8.

Rosser, A. M., Leader-Williams, N. (2010) Protection or use: a case of nuanced trade-offs? *Trade-offs in Conservation: Deciding What to Save* (eds.) N. Leader-Williams, W.M. Adams and R.J. Smith), pp. 135–156. Blackwell Publishing, Oxford, UK.

Roy, M. K., DeCosse, P. (2006) Managing demand for protected areas in Bangladesh: poverty alleviation, illegal commercial use and nature recreation. *Policy Matters*, 14, pp. 94-102.

Roy, A. K. D.; Alam, K., Gow, J. (2013) Community participations of state forest ownership and management: A case study of the Sundarbans mangrove forest in Bangladesh. *Journal of Environmental Management*, 117, pp. 141-149.

Ruiz-Mallén, I., Corbera, E. (2013) Community-based conservation and traditional ecological knowledge: implications for social-ecological resilience. *Ecology and Society*, 18(4):12. Available at <http://dx.doi.org/10.5751/ES-05867-180412>, accessed on 12.02.2014.

Saberwal, V. K. (1996) Pastoral politics: gaddi grazing, degradation and biodiversity conservation in Himachal Pradesh, India. *Conservation Biology*, 10 (3), pp. 741–749.

Sadik, R., Rahman, R. (2009) Indicator framework for assessing livelihood resilience to climate change for vulnerable communities dependent on Sundarban mangrove system. 4th South Asia water resource conference on interfacing poverty, livelihood and climate change in water resources development: lessons in South Asia. Available at www.academia.edu/.../IndicatorFrameworkforAssessingLivelihoodResiliencetoClimateChangeforVulnerableCommunities, accessed on 4.10.2010.

Sadler, B. (1996) Environmental assessment in a changing world: evaluating practice to improve performance. International study of the effectiveness of environmental assessment. Final Report. International Association for Impact Assessment/Canadian Environmental Assessment Agency. Minister of Supply and Services, Canada.

Salafsky, N., Margoluis, R., Redford, K.H., Robinson, J.G. (2002) Improving the practice of conservation: a conceptual framework and research agenda for conservation science. *Conservation Biology*, pp. 1469–1479.

Sarin, M. (2001) Disempowerment in the name of ‘participatory’ forestry? Village forests joint management in Uttarkhand. *Forests, Trees and People*, 44p.

Sarkar, S. K., Bhattacharya, A. K. (2003) Conservation of biodiversity of the coastal resources of Sundarbans, Northeast India: an integrated approach through environmental education. *Marine Pollution Bulletin*, 47, pp. 260-264.

Saterson, K., Christensen, N., Jackson, R., Kramer, R., Pimm, S., Smith, M., Wiener, J. (2004) Disconnects in evaluating the relative effectiveness of conservation strategies. *Conservation Biology*, 18, pp. 597–599.

Saunders, F. (2011) It’s like herding monkeys into a conservation enclosure: The formation and establishment of the Jozani-Chwaka Bay National Park, Zanzibar. *Conservation and Society*, 9(3), pp. 261–273.

Sayer, J. A., Campbell, B. M. (2004) *The Science of Sustainable Development. Local Livelihoods and the Global Environment*. Cambridge University Press, Cambridge, UK.

Schmidt-Soltau, K., Brockington, D. (2007) Protected areas and resettlement: What scope for Voluntary Relocation? *World Development*, 35 (912), pp. 2182-2202.

Schmeer, K. (2000) Stakeholder analysis guidelines. Section 2 policy toolkit for strengthening health sector reform, LAC HSR health sector initiative, pp. 2-43.

Schroter, M., van der Zanden, E. H., van Oudenhoven, A. P. E., Remme, R. P., Serna-Chavez, H. M., de Groot, R. S., Opdam, P. (2014) Ecosystem services as a contested concept: a synthesis of critique and counter-arguments. *Conservation Letters*, 7(6), pp. 514-523.

Seidensticker, J. Hai, M. A. (1983) The Sundarbans Wildlife Management Plan: conservation in the Bangladesh Coastal Zone. International Union for Conservation of Nature and Natural Resources.

Sharma, U. R., Malla, K. J., Uprety, R. (2004) Conservation and management efforts of medicinal and aromatic plants in Nepal. *Banko Janakari*, 14(2), pp. 3-11.

- Sharma, R., DeCosse, P., Roy, M., Khan, M., Mazumder, A. (2005) Co-Management of Protected Areas in South Asia with special reference to Bangladesh. Nishorgo Support Project, Dhaka, Bangladesh.
- Sharma, B.D., Bhatta, I.D., Poudyal, N.C. (2011) Impact of relocation of forest communities- a case from Chitwan National Park, Nepal. *Journal of Biodiversity and Ecological Sciences*, 1(2), pp. 1-8.
- Sheppard, D. (2004) The Vth IUCN world parks congress (WPC). *Parks*, 14 (2), pp. 1-5.
- Shiva, V. (1989) *Staying Alive: Women, Ecology and Development*. Zed Books Ltd.
- Shrestha, B. (1996) Park people conflict around the Royal Chitwan National Park. *Journal of Natural History Museum*, 15, Natural History Museum, Kathmandu.
- Shyamsundar, P., Araral, E., Weeraratne, S. (2005) Devolution of resource rights, poverty, and natural resource management –A Review. Washington DC: The World Bank.
- Siddiqi, N. A. (1995) Role of crabs in the natural regeneration of mangroves in the Sundarbans forest of Bangladesh. *Austral Ecology*, 20, pp. 340-343.
- Silliance, J. C. (1986) *A Theory of Planning*. Aldershot: Gower.
- Silvermen, D. (2010) *Doing Qualitative Research*, 3rd edn, Sage Publication.
- Slocombe, D. S. (1993) Implementing ecosystem-based management. *Bioscience*, 43(9), pp. 612-622.
- Slocombe, D. S. (1998a) Defining goals and criteria for ecosystem-based management. *Environmental Management*, 22, pp. 483-493.
- Slocombe, D. S. (1998b) Lessons from experience with ecosystem-based management. *Landscape and Urban Planning*, 40, pp. 31-39.
- Slocombe, D. S., Dearden, P. (2002) *Protected areas and ecosystem-based management. Parks and protected areas in Canada: Planning and management*, 2nd edn, Oxford University Press.
- Slocombe, D. S., Hanna, K. S. (2007) Integration in resource and environmental management, in Hanna, K. S. and Slocombe, D. S. (eds.), *Integrated resource and environmental management: Concepts and practice*. Oxford University Press.
- Songorwa, A. N. 1999. Community based wildlife management (CWM) Tanzania: Are the communities interested? *World Development*, 27(12), pp. 2061-2079.
- Songorwa, A. N., Buhrs, K., Hughey, K. (2000) Community-Based Wildlife Management in Africa: A Critical Assessment of the Literature. *Natural Resources Journal*, 40(2), pp. 603- 643.
- Sovacool, K. E. (2008) A Stakeholder Analysis of the Creation of High Seas Marine Protected Areas within the Antarctic Treaty System. MSc. thesis at the Virginia Polytechnic Institute and State University.

- Springer, J. (2009) Addressing the social impacts of conservation. *Conservation and Society*, 17(1), pp. 26-29.
- Stake, R. E. (2008) Qualitative case studies. In N. K. Denzin, and Lincoln, Y. S. (eds.), *Strategies of qualitative inquiry*, pp. 119-149. Sage Publications.
- Stern, M. J. (2008) The power of trust: Toward a theory of local opposition to neighboring protected areas. *Society and Natural Resources: An International Journal*, 21(10), pp. 859-875.
- Stoll-Kleemann, S., O’Riordan, T. (2002) From participation to partnership in biodiversity protection: experience from Germany and South Africa. *Society and Natural Resources*, 15(2), pp. 157–173.
- Strasus, A., Corbin, J. (1998) *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, Sage Publications.
- Stringer, L. C., Paavola, J. (2013) Participation in environmental conservation and protected area management in Romania: A review of three case studies. *Environmental Conservation*, 40 (2), pp.138–146.
- Stolton, S. (2009) Communicating values and benefits of protected areas in Europe. Federal Agency for Nature Conservation, Bonn, Germany.
- Tacconi, L. (2007) *Illegal Logging: Law enforcement, livelihoods and the timber trade*. Earthscan, London, UK.
- Tamang, K. M. (1993) Wildlife management plan for the Sundarbans reserved forest. FAO/UNDP Project, Integrated Resource Development of the Sundarbans Reserved Forest.
- Teel, T. L., Carlos, A.W.D., Manfredo, M.J., Mathur, V.B. (2013) A mult-institutional partnership to build capacity for effective protected area management in India. *Journal of park and recreation administration*, 31(2), pp. 132-146.
- Terborgh, J. (1999). *Requiem for Nature*, Island Press, Washington, DC, USA.
- Thampi, S. P. (2005) Ecotourism in Kerala, India: Lessons from the eco- development project in Periyar Tiger Reserve.<http://www.ecoclub.com/library/epapers/13.pdf>, accessed on 14/4/2014.
- Thapa, K. (2012). Ecotourism for nature conservation and development. *Tiger Paper*, 39 (3), pp. 4-7.
- Thapa, K. (2014) Conflict, conservation and resource use in Protected Areas: Case study from Annapurna Conservation Area and Parsa Wildlife Reserve, Nepal. The Rufford Foundation, United Kingdom
- Thomas, L., Middleton, J., Phillips, A. (2003) Guidelines for Management Planning of Protected Areas. World Commission on Protected Areas (WCPA). Best Practice Protected Area Guidelines Series No. 10. IUCN – The World Conservation Union.

Toropova, C., Meliane, I., Laffoley, D., Matthews, E., Spalding, M. (2010) *Global Ocean Protection: Present Status and Future Possibilities*. Gland, Switzerland, Washington, DC and New York, USA: IUCN WCPA, Cambridge, UK: UNEP-WCMC, Arlington, USA: TNC, Tokyo, Japan: UNU, New York, USA: WCS. 96pp.

Torri, M. C. (2010) Power, structure, gender relations and community-based conservation: the case study of the Sariska region, Rajasthan, India. *Journal of International Women's Studies* 11(4), pp.1-18.

Tress, B., Tress, G. (2003) Scenario visualization for participatory landscape planning: A study from Denmark. *Landscape and Urban Planning*, 64, pp. 161-178.

Naughton-Treves, L., Holland, M., Brandon, K. (2005) The role of protected areas in conserving biodiversity and sustaining local livelihoods. *Annual Review of Environmental Resources*, 30, pp. 219-252.

Uddin, M. Z., Hassan, M. A., Rahman, M., Arefin, K. (2012) Ethno-medico-botanical study in Lawachara national park, Bangladesh. *Bangladesh Journal of Botany*, 41(1), pp. 97-104.

UNDP (1999) Decentralization: A sampling of definitions. Joint UNDP-Government of Germany Working Paper.

UNFCCC (2011) United Nations Framework Convention on Climate Change. unfccc.int/meetings/durban_nov_2011/meeting/6245.php, accessed on 18.12.2013.

UNEP/WCMC. (2008) Protected areas: an effective tool to reduce emissions from deforestation and forest degradation in developing countries. Working paper, UNEP-WCMC.

UNEP-WCMC (2012) World Database on Protected Areas (WDPA). Available at www.bipindicators.net/pacoverage, accessed on 18.11.2012.

UNSD (1992) United Nations Conference on Environment & Development, Rio de Janeiro, Brazil. sustainabledevelopment.un.org/content/documents/Agenda21.pdf, accessed on 15.10.2012.

Vinodan, A., Manalel, J. (2011) Local economic benefits of ecotourism: a case study on Parambikulam tiger reserve in Kerala, India. *South Asian Journal of Tourism and Heritage*, 4(2), pp. 93-109.

Walliman, N. (2011). *Your Research Project*. Sage Publications.

Waylen, K.A.; Fisher, A.; McGowan, P.J.K.; Thirgood, S.J.; Milner-Gulland, E.J. (2010). Effect on local cultural context on the success of community based conservation interventions. *Conservation Biology*, 24, pp. 1119-1129.

Weible, C. (2006) An advocacy coalition framework approach to stakeholder analysis: understanding the political context of California marine protected area policy. *Journal of Public Administration Research and Theory*, 17, pp. 95-117.

Weladji, B., Tchamba, M.N. (2003) Conflict between people and protected areas. Within the Benoue wildlife conservation area, North Cameroon. *Oryx*, 37 (1), pp. 72-79.

- Wells, M., Brandon, K. (1992) *People and parks: Linking protected area management with local communities*, Washington, DC: International Bank for Reconstruction.
- West, P. C., Brechin, S. R. (1991) *Resident Peoples and National Parks: Social Dilemmas and Strategies in International Conservation*. University of Tucson, USA: Arizona Press.
- Western, D., Wright, R. M. (1994) *Natural Connections: Perspectives in Community-Based Conservation*. Washington, DC: Island Press.
- WDPA (2012) Biodiversity indicator partnerships: Coverage of Protected Areas [http://www.wdpa.org/resources/statistics/2010BIP Factsheet Coverage of Protected Areas.pdf](http://www.wdpa.org/resources/statistics/2010BIP_Factsheet_Coverage_of_Protected_Areas.pdf), accessed on 28.12.2012.
- Wiens, J. A., Moss, M. R. (2005) *Issues and Perspectives in Landscape Ecology*. Cambridge, England: Cambridge University Press.
- Wilshusen, P. R., Brechin, S.R., Fortwangler, C.L., West, P.C. (2002) Contested nature: conservation and development in the turn of the twenty first century, in Brechin, S.R. (eds.), *Contested nature-promoting international biodiversity with social justice in the twenty first century*, pp. 1-22. New York: State University of New York Press,.
- Williams, L. N., Harrison, J., Green, M. J. B. (1990) Designing protected areas to conserve natural-resources. *Science Progress*, 74, pp. 189-204.
- Wilson, E. O. (2006) *The Future of Life*. London: Abacus.
- Wildlife Trust of Bangladesh (WTB) (2009) Community conserved areas in Bangladesh. Wildlife trust of Bangladesh.
- World Bank (1998) Health and population-program project. Available at worldbank.org/.../1998/.../Bangladesh-health-population-programproject, accessed on 15.08.2011.
- World Wildlife Fund (WWF) (2004) Are protected areas working? WWF International, Gland Switzerland.
- WWF-UK (2012) Gender: Natural resource management and the importance of gender. *Social Development*: WWF-UK.
- Wuyep, S. Z., Dung, V. C., Buhari, A. H., Madaki, D. H., Bitrus, B. A. (2014) Women Participation in Environmental Protection and Management: Lessons from Plateau State, Nigeria. *American Journal of Environmental Protection*, 2 (2), pp. 32-36.
- Yaffee, S. L. (1999) Three faces of ecosystem management. *Conservation Biology*, 13(4), pp. 713-725.
- Yin, R. K. (1994) *Case Study Research: Design and Methods*, 3rd edn, Sage Publications.
- Yin, R. K. (2009) *Case Study Research Design and Methods*, 4th edn, Sage Publications.

Zashimuddin, M. (2004) Community forestry for poverty reduction in Bangladesh, in Sim, H. C.; Appanah, S. and Lu, W. M. (eds.), Proceedings of the workshop forest for poverty reduction: can community forestry make money? 1-2 September 2003, FAO, Beijing, China.

Zhou, Y., Buesching, C.D., Newman, C., Kaneko, Y., Xie, Z., Macdonald, D. W. (2013) Balancing the benefits of ecotourism and development: The effects of visitor trail-use on mammals in a Protected Area in rapidly developing China. *Biological Conservation*, 165, pp. 18-24.

Zohora, F. T. (2011) Non-timber forest products and livelihoods in the Sundarbans, in Fox, J., Mustafa, M. G., Quazi, S. A., Miles, W. B., Cunningham, E. J. and Chassels, M. (eds.), *Rural livelihoods and protected landscapes: Co-management in the wetlands and forests of Bangladesh*, pp. 99-117. AUSAID-Bangladesh.

APPENDICES

Appendix 1. Three different types of protected areas defined under Bangladesh Wildlife Preservation Act, 1974.

<p>A. National Park: a comparatively large area of natural beauty to which the members of the public have access for recreation, education and research, and which the wildlife is protected</p> <p>B. Wildlife Sanctuary: an area maintained as an undisturbed breeding ground for wild fauna and where the habitat is protected for the continued well-being of the resident or migratory fauna.</p> <p>C. Game Reserve: normally comprises a relatively isolated area meant for protection of wildlife in general and to increase the population of specified species.</p>
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Appendix 2. Protected Areas of Bangladesh (Forest Department of Bangladesh, 2010).

A) National Parks				
Sl. No.	National Parks	Location	Area (ha.)	Established
1	Bhawal National Park	Gazipur	5022.00	11-5-1982
2	Modhupur National Park	Tangail/ Mymensingh	8436.00	24-2-1982
3	Ramsagar National Park	Dinajpur	27.75	30-4-2001
4	Himchari National Park	Cox's Bazar	1729.00	15-2-1980
5	Lawachara National Park	Moulavibazar	1250.00	7-7-1996
6	Kaptai National Park	Chittagong Hill Tracts	5464.00	9-9-1999
7	Nijhum Dweep National Park	Noakhali	16352.23	8-4-2001
8	Medha Kachhapia National Park	Cox's Bazar	395.92	8-8-2008
9	Satchari National Park	Habigonj	242.91	15-10-2005
10	Khadim Nagar National Park	Sylhet	678.80	13-04-2006
11	Baraiyadhala National Park	Chittagong	2933.61	06-04-2010
12	Kuakata National Park	Patuakhali	1613.00	24-10-2010

13	Nababgonj National Park	Dinajpur	517.61	24-10-2010
14	Shingra National Park	Dinajpur	305.69	24-10-2010
15	Kadigarh National Park	Mymensingh	344.13	24-10-2010
B)Wildlife Sanctuaries				
Sl. No.	Wildlife Sanctuaries	Location	Area (ha.)	Established
16	Rema-Kalenga Wildlife Sanctuary	Hobigonj	1795.54	7-7-1996
17	Char Kukri-Mukri Wildlife Sanctuary	Bhola	40.00	19-12-1981
18	Sunderbans (East) Wildlife Sanctuary	Bagerhat	31226.94	6-4-1996
19	Sunderbans (West) Wildlife Sanctuary	Satkhira	71502.10	6-4-1996
20	Sunderbans (South) Wildlife Sanctuary	Khulna	36970.45	6-4-1996
21	Pablakhali Wildlife Sanctuary	Chittagong Hill Tracts	42087.00	20-9-1983
22	Chunati Wildlife Sanctuary	Chittagong	7763.97	18-3-1986
23	Fashiakhali Wildlife Sanctuary	Cox's Bazar	1302.43	11-4-2007
24	Dudh Pukuria-Dhopachari Wildlife Sanctuary	Chittagong	4716.57	6-4-2010
25	Hazarikhil Wildlife Sanctuary	Chittagong	1177.53	6-4-2010
26	Sangu Wildlife Sanctuary	Bandarban	2331.98	6-4-2010
27	Teknaf Wildlife Sanctuary	Cox's Bazar	11615.00	24-03-2010
28	Tengragiri Wildlife Sanctuary	Barguna	4048.58	24-10-2010

Appendix 3. Participatory Benefit Sharing Agreements (PBSA) under Social Forestry Rules 2004 (BFD, 2011).

Type	Stakeholder	Share of benefit (%)
Woodlot and Agroforestry in areas	Forest Department	45
	Beneficiaries	45
	Tree Farming Fund	10
Sal forest conservation and development	Forest Department	65
	Beneficiaries	25
	Tree Farming Fund	10
Strip plantation in the private or public lands other than Forest Department owned land	Forest Department	10
	Land owning agency	20
	Beneficiaries	55
	Local Union Parishod	5
	Tree Farming Fund	10
Char land and foreshore plantation	Forest Department	25
	Beneficiaries	45
	Land owner or tenant	20
	Tree Farming Fund	10
Khari (natural canal or ditch) and pond bank rehabilitation and plantation	Forest Department	25
	Beneficiaries	45
	Land owner or tenant	20
	Tree Farming Fund	10
Plantation and natural forest except sal forests	Forest Department	50
	Beneficiaries	40
	Tree Farming Fund	10
Social forestry in the Forest Department owned lands initiated by local people	Forest Department	25
	Beneficiaries	75
Social forestry in the government or autonomous organization lands initiated by the local people	Forest Department	10
	Beneficiaries	75
	Land owning agency	15

Appendix 4. Designated number of representatives from each stakeholder group in the co-management council and co-management committee.

Stakeholder group	Designated number of council members	Designated number of committee members
Local government	12	4
Local elites	7	2-3
Resource owning groups	5	2
Forest users groups and federations	9	2
Local youth	2	1
Indigenous communities	3	2
Law enforcing authorities	2	1
Forest Department (ACF/RO)	2	1
Local NGOs/ CBOs	5	1
Other government agencies/departments	4	2
Total members	51	18-19

Appendix 5. Questionnaire for Households

Village:

Date:...../...../2012

1. Are you aware that there is a National Park/Wildlife Sanctuary management plan for your area? (আপনি কি জানেন যে আপনার এলাকায় ন্যাশনালপার্ক / অভয়াড়ণ্য ব্যবস্থাপনা প্রকল্প আছে?)

YES (হ্যাঁ) NO(না)

2. Have you been involved in the National Park/Wildlife Sanctuary management planning process? (আপনি কি ন্যাশনালপার্ক / অভয়াড়ণ্য ব্যবস্থাপনা প্রকল্প প্রসেসিং এর সময় জড়িত ছিলেন ?)

YES (হ্যাঁ) NO (না)

PLEASE EXPLAIN YOUR ANSWER (IF YES)দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন (যদি হ্যাঁ হয়):-----

3. In your opinion what are the major issues of park-people conflict in the National Park/Wildlife Sanctuary? (আপনার মতে ন্যাশনালপার্ক/অভয়াড়ণ্য এবং এলাকার জনগণের মধ্যে দণ্ডের মূল কারণগুলো কি কি ?)

PLEASE EXPLAIN YOUR ANSWER(দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন):-----

4. Please compare the park-people conflicts before and after the management plan (ব্যবস্থাপনা প্রকল্প বাস্তবায়নের পূর্বে ও পরে পার্কের স্টাফ ও এলাকার জনগণের মধ্যে দণ্ডের তুলনামূলক পার্থক্য করুন)

Before plan (ব্যবস্থাপনা প্রকল্প বাস্তবায়নের পূর্বে): High (উচ্চ) Moderate (মধ্যম) Low (কম)

After plan (ব্যবস্থাপনা প্রকল্প বাস্তবায়নের পরে): High (উচ্চ) Moderate (মধ্যম) Low (কম)

5. In your opinion, what forms of human encroachment on the park/sanctuary are occurring?

(YOU MAY SELECT MORE THAN ONE CATEGORY) (আপনার মতে ন্যাশনালপার্ক / অভয়াড়ণ্য এলাকার জনগণের দ্বারা কিভাবে ক্ষতিগ্রস্ত হচ্ছে ?)

CULTIVATION OF CROPS GRAZING OF ANIMALS

HUMAN SETTLEMENT OTHER

(PLEASE EXPLAIN) (দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন)-----

6. Please compare the human encroachment before and after the management plan (ব্যবস্থাপনা প্রকল্প বাস্তবায়নের পূর্বে ও পরে পার্কের স্টাফ ও এলাকার জনগণের মধ্যে ক্ষতিগ্রস্তের তুলনামূলক পার্থক্য করুন)

Before plan (ব্যবস্থাপনা প্রকল্প বাস্তবায়নের পূর্বে): High (উচ্চ) Moderate (মধ্যম) Low (কম)

After plan (ব্যবস্থাপনা প্রকল্প বাস্তবায়নের পরে): High (উচ্চ) Moderate (মধ্যম) Low (কম)

7. What suggestion can you make to help the management plan become more effective in reducing park-people conflicts and encroachments?(জনগণের দ্বারা পার্ক / অভয়াড়ণ্য ঞ্চতিগ্রস্ততা নিরসনের জন্য এই ব্যবস্থাপনা প্রকল্প কিভাবে অধিকতর কার্যকরী ভূমিকা পালন করতে পারে বলে আপনি মনে করেন ?)

PLEASE EXPLAIN YOUR ANSWER (দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন)-----

8. To what extent do you agree or disagree with the following statement

(নিম্নোলিখিত বক্তব্যের কোনটির সাথে আপনি একমত বা দ্বিমত পোষণ করেন):

“The enforcement of the law is strong enough to save the National Park/Wildlife Sanctuary”

STRONGLY DISAGREE DISAGREE STRONGLY AGREE AGREE

PLEASE EXPLAIN YOUR ANSWER (দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন)-----

9. Does your community benefit from tourism activities in the National Park/Wildlife

Sanctuary? (আপনার এলাকার জনগন পর্যটন বিষয়ক কার্যকলাপ দারা লাভবান হয়েছে কি ?)

YES NO

PLEASE EXPLAIN YOUR ANSWER(দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন)-----

10. Is your community disadvantaged as a result of tourism activities at the National

Park/Wildlife Sanctuary? (আপনার এলাকার জনগন পর্যটন বিষয়ক কার্যকলাপ দারা ঞ্চতিগ্রস্ত হয়েছে কি ?)

YES (হ্যাঁ) NO (না)

PLEASE EXPLAIN YOUR ANSWER (দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন)-----

11. In your opinion, does your community benefit from the co-management approach to

management and planning at the National Park/Wildlife Sanctuary? (আপনার এলাকার জনগন সহ-ব্যবস্থাপনা প্রকল্প দারা লাভবান হয়েছে কি ?)

YES NO

PLEASE EXPLAIN YOUR ANSWER (দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন)-----

12. In your opinion, is your community disadvantaged as a result of co-management at the

National Park/Wildlife Sanctuary? (আপনার এলাকার জনগন সহ-ব্যবস্থাপনা প্রকল্প দারা ঞ্চতিগ্রস্ত হয়েছে কি ?)

YES (হ্যাঁ) NO (না)

PLEASE EXPLAIN YOUR ANSWER(দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন)-----

13. What suggestion can you make to improve the quality of co-management approach at the

National Park/Wildlife Sanctuary? (আপনার এলাকায় সহ-ব্যবস্থাপনা প্রকল্পের কার্যকলাপ উন্নত করতে

আপনার পরামর্শ কি ?)

14. How would you rate the level of relationship between your community and the Forest Department staff? (পার্কের স্টাফ এবং এলাকার জনগনের মধ্যে পারস্পরিক সম্পর্কের পর্যায় কি?)

VERY GOOD (অনেক ভাল) GOOD (ভাল) POOR (খারাপ) VERY POOR (অনেক খারাপ)

PLEASE EXPLAIN (দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন)-----

15. To what extent do you agree or disagree with the following statement (নিম্নোলিখিত বক্তব্যের কোনটির সাথে আপনি একমত বা দ্বিমত পোষণ করেন):

“The management plan at the National Park/Wildlife Sanctuary provides benefit sharing among the local residents” (“ব্যবস্থাপনা প্রকল্প এলাকার জনগনের মধ্যে সুযোগ সুবিধা বন্টন করেন”)

STRONGLY AGREE (জোরাল সমর্থন করি) AGREE (সমর্থন করি)

DISAGREE (দ্বিমত পোষণ করি) STRONGLY DISAGREE (জোরাল দ্বিমত পোষণ করি)

PLEASE EXPLAIN (দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন)-----

16. Does the forest Department provide any conservation education programme to the local communities? (এলাকার জনগনের জন্য বনবিভাগ কি পরিবেশ বিষয়ক গনসচেতনতামূলক কোন শিক্ষার ব্যবস্থা করেছে?)

YES (হ্যাঁ) NO (না)

PLEASE EXPLAIN YOUR ANSWER (দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন)-----

17. Does the forest Department provide alternative income generation activities for the local communities? (এলাকার জনগনের জন্য বনবিভাগ কি কোন বিকল্প আয়ের ব্যবস্থা করেছে?)

YES (হ্যাঁ) NO (না)

PLEASE EXPLAIN YOUR ANSWER (দয়া করে আপনার বক্তব্যের ব্যাখ্যা দিন)-----

18. Sex (লিঙ্গ): Male (পুরুষ) Female (মহিলা)

19. Age (বয়স): 18-27 28-37 38-47 48-57 over 57 years

20. What is your highest level of education attainment? (আপনার শিক্ষাগত যোগ্যতা অর্জন এর পর্যায় কি)

PRIMARY SCHOOL (প্রা. ইমারি স্কুল)

SECONDARY SCHOOL CERTIFICATE (মাধ্যমিক স্কুল সার্টিফিকেট)

HIGHER SECONDARY CERTIFICATE (উচ্চমাধ্যমিক স্কুল সার্টিফিকেট)

GRADUATE (গ্রা. জুয়েট)

OTHER (অন্যান্য) (PLEASE SPECIFY)-----

21. How long have you been living in this area?

<10 year 10-20 year by born others

22. What is your main source of income? (আপনার প্রধান আয়ের উৎস কি ?)

BUSINESS AGRICULTURE SERVICE TOURISM

OTHERS (PLEASE SPECIFY)-----

23. Monthly income (মাসিক আয়)

3000-5000 Taka (৩০০০-৫০০০ টাকা) 6000-8000 Taka (৬০০০-৮০০০ টাকা)

9000-11000 Taka (৯০০০-১১০০০ টাকা) >12000 Taka (>১২০০০ টাকা)

Thank you for your time and kind cooperation

(আপনার সময় ও সদয় সহযোগিতার জন্য অনেক ধন্যবাদ)

Appendix 6. Participation information sheet in Bengali

প্রিয় সাক্ষাতে অংশগ্রহণকারীগণ,

আমি সালমা আহমেদ যুক্তরাজ্যের গ্রীনউইচ বিশ্ববিদ্যালয়ের পি.এইচ.ডি-তে অধ্যয়নরত একজন ছাত্রী। বর্তমানে আমি বাংলাদেশে সংরক্ষিত এলাকা ব্যবস্থাপনা পরিকল্পনা ও নীতির মূল্যায়নের উপর গবেষণা করছি। ডঃ মাইক ম্যাকগীবন, প্রধান প্রডামক, ডুগোল (ফোন : ০০৪৪-০২০-৮৩৩১ ৯৭২৯, ই-মেইল : mm07@gre.ac.uk এবং ডেবি বার্টলেট প্রবীণ প্রডামক, পরিবেশ সংরক্ষণ (ফোন : ০০৪৪ ০২০ ৮৩৩১ ৮৪৭৮) ই-মেইল : d.bartlett@gre.ac.uk. এই গবেষণার মূল লক্ষ্য হলো বাংলাদেশের সংরক্ষিত এলাকার প্রয়োজনীয় ব্যবস্থাপনা ও বাস্তবায়নের মূল্যায়ন করা। বাংলাদেশের সংরক্ষিত এলাকার বর্তমান পরিস্থিতিতে উনড়বয়নের উপযুক্ত চাবিকাঠি গুলো চিহ্নিত করে জ্ঞানদান ও দক্ষতা অর্জনে গুরুত্বপূর্ণ অবদান রাখবে, যার দ্বারা সংরক্ষিত এলাকার ব্যবস্থাপক, বিভিন্ন পেশাজীবী এবং এলাকাবাসী সকলেই উপকৃত হবে।

প্রশ্নের উত্তর প্রদানে সহযোগীতার জন্য আমি আপনাদের বিনীত অনুরোধ করছি। আপনার পরিচিতি, বয়স, শিক্ষা ও আয় সম্বন্ধে কিছু সাধারণ প্রশ্নের জন্য যাহা মাত্র ৩০ মিনিটেরও কম সময় লাগবে। এই গবেষণায় আপনার অংশগ্রহণ হবে স্বেচ্ছাসেবী (ঐচ্ছিক) হিসেবে এবং যে কোন মুহুর্তে আপনি অব্যাহতি গ্রহণ করতে পারবেন। আপনার এই গুরুত্বপূর্ণ তথ্যসমূহ আমি আমার গবেষণা ছাড়া অন্য কোন কাজে ব্যবহার করব না। এতে যদি আপনি এই গবেষণায় অংশগ্রহণ করতে সম্মতি থাকেন তাহলে এই সম্মতি পত্রে স্বাক্ষর করন এবং উহা আমাকে ফেরৎ দিন। আপনার দেয়া সকল তথ্য গোপন রাখা হবে। তথ্য সংরক্ষণ কার্যবিধি ১৯৯৮ নিয়মানুসারে সমস্ত তথ্য সংগ্রহ, সংরক্ষণ ও বিন্যাস করা হবে এবং এই গবেষণা ও পর্যালোচনার দ্বারা কোন ব্যক্তি বা ব্যক্তিবর্গের পরিচিতি প্রকাশ পাবে না। দৃঢ় প্রতিজ্ঞ যে যখন প্রয়োজন শেষ হবে সাক্ষাতের রেকর্ড এবং অন্যান্য উপকরণ সতর্কতার সাথে বিনষ্ট করা হবে। এই গবেষণা গ্রীনউইচ বিশ্ববিদ্যালয়ের গবেষণা নৈতিক কমিটি দ্বারা অনুমোদিত ও পুনর্বিবেচিত।

এই গবেষণা সম্পর্কে আপনার যদি কান প্রশ্ন থাকে অথবা আপনি যদি এই তথ্য সমূহের ফলাফল বছরের শেষে রাখতে চান তাহলে আপনি আমাকে এখানে ই-মেইল করতে পারবেন : as05@gre.ac.uk

সাহায্য ও সময় প্রদানের জন্য আপনাকে অগ্রীম ধন্যবাদ।

শুভেচ্ছান্তে

সালমা আহমেদ

গবেষণার ছাত্রী

পরিবেশ সংরক্ষণ, গ্রীনউইচ বিশ্ববিদ্যালয়, যুক্তরাজ্য

অফিস : জি ৩১০ (গ্রীনউইচ ভবন), মিডওয়ে ক্যাম্পাস, চেথাম,

ক্যান্ট এমই৪ ৪টিবি, যুক্তরাজ্য,

টেলিফোন : ০০৪৪ ০২০ ৮৩৩১ ৮৩৪২ (অফিস),

০০৪৪ ০১৬৩৪ ৮৩০ ৬৬৫ (বাসা)

০০৪৪ ০৭৯৫ ১৭০ ৪৬৪২ (মোবাইল)

০০৮৮ ০২ ৯০০৪২১০ (বাংলাদেশে)

ই-মেইল : as05@gre.ac.uk,

salma6139@yahoo.com

Appendix 7. In-depth interview schedule

Area/Village:

Date:...../...../2012

Respondent Name:

Respondent position:

1. Are you aware that there is a National Park/Wildlife Sanctuary management plan for your area?
2. Have you been involved in the National Park/Wildlife Sanctuary management planning process?
3. Are you aware that a co-management approach, involving residents and other groups, is used in management and planning in the National Park/Wildlife Sanctuary management (please explain)?

If you have attended co-management committee meeting(s):

4. Does everyone get an adequate opportunity to express their views in the co-management committee meeting?
5. Can you explain the advantages and disadvantages of the co-management approach?
6. Do you have any suggestions to improve the quality of the co-management approach in the National Park/Wildlife Sanctuary?
7. Can you tell me about tourism in the National Park and Wildlife Sanctuary?
8. What is your opinion on benefit sharing with local communities?
9. What do you think about law enforcement inside National Park/Wildlife Sanctuary?
10. Does the Park Authority provide conservation education programs for local people?
11. Do you know anything about capacity building? Does the Park Authority provide any training programs for local people?
12. Can you tell me about the relationship between local residents and Forest Department staff?
13. Is there anything happening that you feel might be damaging the National Park/Wildlife Sanctuary?

If encroachment is acknowledged:

14. Can you make any suggestions about reducing these?
15. Are there any issues of conflict locally?

If conflicts are reported:

16. Is there any way that the management plan could help this situation?

Section A

Introduction (Who I am, Aim of the discussion, Confidentiality, Okay with recoding)

Name (with permission only):

Date:

Location:

Section B

Management Plan and co-management approach

1. Are you aware of a National Park/Wildlife Sanctuary management plan for your area?
2. Were you been involved in the management planning process?
3. Are you aware of the co-management approach?
4. Can you explain what this is?

If you have attended co-management committee meeting(s):

5. Does everyone get adequate opportunity to express their views in the meeting?
6. Can you explain the advantages and disadvantages of the co-management approach?
7. Do you have any suggestions that might improve the co-management approach

Livelihoods

8. What do most people in this area do?
9. What is their main sources of income?
10. What influences choice of income activities?
11. How could livelihoods be improved?

Tourism development

12. Do you or your community benefit from tourism activities in the National Park/Wildlife Sanctuary?
13. Do you/they experience any disadvantages from tourism?
14. How can tourism contribute to community development?

Institutional commitment

15. Does the Forest Department provide any conservation education programmes?
16. Does the Forest Department provide any alternative income generation activities?
17. Are benefits from the management plan shared with local people?
18. If so how?

19. Is the current level of law enforcement strong enough?
20. Has the relationship between local people and Forest Department staff changed in the last five years?

Encroachments and conflicts

21. Are there any potentially damaging activities taking part in the National Park/Wildlife Sanctuary?
22. If so what are these?
23. Has the level of these changes since the management plan?
24. Have you any suggestions for reducing these?
25. What are the major conflicts in the National Park/Wildlife Sanctuary?
26. Have these altered since the introduction of the management plan?
27. Can you make any suggestions as to how the management plan can be more effective at reducing conflict?

Appendix 9. Sampling allocation of questionnaire surveyed in the case study areas

Study area	Village	Total households	Questionnaire surveyed			
			Male	Female	Total	Percentage
Lawachara National Park	Lawachara punji	26	9	5	14	53.8
	Magurchara punji	48	14	9	23	47.9
	Dolubari	90	25	19	44	48.8
	Baghmara	300	38	20	58	19.33
Teknaf Wildlife Sanctuary	Shaillarghona	55	13	10	23	41.8
	Karontoli	180	17	12	29	16.11
	Modhayaleda	49	14	10	24	48.9
	Jadimora	450	25	20	45	10
Sundarbans Wildlife Sanctuary	Sarankhola	550	25	28	53	9.6
	Bakultola	400	19	21	40	10
	Baddamari	64	13	18	31	48.4
	Hoglabunia	70	15	18	33	47.1
			Total = 417			

Appendix 10. Analysis of key informant interview notes in Lawachara National park

ID	Key point	Code
L-KI-1	<i>I know about the management plan and I am also a member of the co-management committee.</i>	Management plan Co-management committee
L-KI-3	<i>Yes, I know about the management plan inside the Lawachara National Park and I am also a member of the co-management committee. I was there when it was formed and I remain there as the representative of our tribes. I can see that some of their concepts and projects are good although I don't agree with all of their policies.</i>	Management plan Involvement of management plan Co-management committee
L-KI-6	<i>Villagers are gradually occupying more of the forest area using the land for betel leaf cultivation and lemon gardens.</i>	Encroachment
L-KI-3	<i>The Forest Department looks at us as an opponent. We live here on lands that have passed to us our ancestral lineage. Over the last 80 or 90 years, the number in our families has increased although we are still trying to survive on the same area of land. For this reason, we have expanded the land we cultivate by 5 or 10 acres. I do not think this has caused any damage to the forest but; rather this management makes a positive contribution to it. Our small expansion is the only subject of conflict with the Forest Department. In all other ways, our relationship to the Forest Department is quite good and we always cooperate with them when they need our help. The Kashia's are Christian, although they previously believed in Naturalism and so continue to adore trees and include these in their worship. The Kashia's worship of nature means they can never do anything to harm and, when the forest was developed under the British Empire it was the Khasia people</i>	Human settlement Land encroachment Relationship between local people and Forest Department staff

	<i>who were employed to plant the trees. Because of this history, our people asks why the Forest Department oppose them collecting fuel wood? It is only there due to their previous commitment. Our tribes have no connection to the illegal tree-fellers; why would we fell trees when these are necessary for betel-leaf farms. We want to save trees for the sake of our own interest, for our survival and, rather than felling trees, we plant them in empty spaces.</i>	Fuelwood collection
L-KI-5	<i>We cannot survive a single day without fuel wood as the women would not be able to cook. But we never sell it in the market. Our ancestors would not teach us that. This is our forest; I personally planted many of the trees. Cutting the tree you planted yourself makes you feel bad. How can someone hijack their own plantation?</i>	Fuelwood collection
L-KI-9	<i>The Forest Department has filed cases randomly to both good and bad people, so the villagers are very annoyed with them and with IPAC. No one is held accountable for this and it is resulting in the harassment of innocent people by police. The situation could become serious at any time.</i>	Relationship between local people and forest department staff
L-KI-6	<i>The relationship between Khasia people and the Forest Department is good. The main problem is that the Khasia are occupying and building houses on large area of land which belongs to the Forest Department. They are claiming that the land was their ancestor's. There is a benefit as timber thieves are not able to cut down any trees in the areas they are living as they become dangerous when confronted. However, if we continue to allow them to extend their holdings to accommodate their growing families over time, the forest will cease to exist.</i>	Relationship between local people and forest department staff
L-KI-7	<i>There is no conflict with the local people but only with the thieves. It is a matter for regret that NGOs, political leaders and others support the illegal activities. If I as a forestry official, catch thieves, and then high officials free them I cannot</i>	Local and political influence

	<i>do anything.</i>	
L-KI-8	<i>The people from Baghmara were mostly illegal tree fellers. When any tree felling happened, the Forest Department tries to find the culprit but if they cannot then they just accuse people from Baghmara who have previously been convicted (or accused) of tree felling.</i>	Illegal tree felling
D-KI-4	<i>The forest management of Lawachara has failed due to the involvement of local people in the community patrolling group (CPG) and co-management committee. At the beginning each patrolling group member was paid 150 taka per night; but this stopped. This was resented and as they all knew by then the location of trees that could be stolen easily this is exactly what happened, the thieves were the CPG members. The main reason for the destruction of the forest is responsibility; if no one is accountable then the task will never be successful. This is exactly what's happening in Lawachara. Neither co-management committee nor Forest Department wants to take responsibility for the tree thefts although both IPAC and Forest Department claim it is the result of their work if any success in the forest; when there is any problem, then they blame each other.</i>	Community patrolling group Co-management committee
D-KI-6	<i>I think we need to increase the awareness of local people regarding the forest. In the past they were paid to cut trees, but in the future they will be paid to protect the forest. Some poor people collect fuel wood or cut 1-2 trees from the forest, to sell in the market, in order to survive. We are trying to provide them with a livelihood in order to prevent this, if there is financial stability, then the forest will be safeguarded. So funds are allocated for them and the money is repayed as the community feels it is their own money. Thirty to forty people have formed a council to organize how this money is lent out with the poorest getting loans first. There are some conditions, for example whoever takes out 10,000 taka must plant 20 trees in their garden, at their own expense. This will reduce</i>	Awareness of local people Fuelwood collection Alternative income generating activities

	<i>dependence on the forest as their fuel and food needs can be satisfied from these trees. Nowadays, remote sensing is used to collect images of the forest and highlight change to the local people and to formulate future steps and plans.</i>	
L-KI-1	<i>The co-management Committee is doing some work in the forest such as repairing roads and bridges, arranging trails for half hour, one hour, three hours.....and they have formed a community patrolling group to save the forest. However there has been serious damage since formation of the community patrolling group.</i>	Co-management committee Foot trail Community patrolling group
L-KI-3	<i>I remain in the co-management committee representing our tribes. But I do not find it good that the tree-fellers have been made members of the community patrolling group. What an irony that those with lifelong involvement in tree-felling are in the group! I was shocked to see it was effectively permission to the tree-fellers to enter the forest.</i>	Co-management committee Community patrolling group
L-KI-8	<i>The co-management committee recruits community patrolling group members who were illegal tree fellers. This gives them a chance to guard the forest without any training. So what happened? They destroy the forest as now they have official permission to enter the forest and do illegal activities.</i>	Co-management committee Community patrolling group
L-KI-6	<i>The co-management committee is not a problem. The problem is our thinking and greed. Anyway, now the situation is under our control. Before, if we caught a tree-thief, we were put under pressure. But now there are no such pressures. Basically, the co-management committee, and the Forest Department work together to keep the situation under control.</i>	Co-management committee Community patrolling group
D-KI-1	<i>Not all the community patrolling group members are good. Some do not like to work. In many places they were dependent on the forest, felling trees, and taking fuel wood. But, by our activities, most have come to the right way, even though some</i>	Community patrolling group

	<i>are still felling trees. In social work 100% success is hard to achieve, 60% or 70% might be said to be progress. There are many complaints about the community patrolling group despite the fact that it is working. There was high occurrence of tree felling in Lawachara, but now this has reduced. I have a statistics regarding this matter. Previously 1800 trees were felled per year, now this is only 400 so it is still occurring.</i>	Tree felling
L-KI-6	<i>To make the co-management committee more powerful and effective, negotiation is needed with the IPAC workers, local people, and Forest Department staff. This would enable the co-management committee to play a more effective role.</i>	Suggestions for effective co-management committee
D-KI-4	<i>The co-management has committee given the 'certification of theft' to the local people; and tree thieves have been given the responsibility to protect the forest. I would say that if resources of the forest have increased as the result of co-management committee, then CMC is a good thing, if it has decreased, then CMC is a bad thing. Do you feel it has increased? Not at all! All these projects are part of the conspiracy to destroy our forest resources; and our ministers are directly involved in this conspiracy.</i>	Co-management committee Community patrolling group Corruption
L-KI-1	<i>We do not have any conflict with the forest officers, but this depends on the mentality of the individual officers. Now the officers are good, they always support us and help us with difficulties we have. Before, although we did not have any clash with previous forest officers, relations were not friendly.</i>	Relationship between local people and Forest Department staff
L-KI-3	<i>We expanded our lands inside the forest up to 5 or 10 acres. I do not think this expansion damaged the forest rather it has saved the place. The Forest Department staff members think that if the area under the control of villagers is expanded, that they (the Forest Department staff) will suffer because they will then not be able to benefit from illegal and corrupt tree felling. This is the only conflict with the Forest Department. In all other</i>	Land encroachment Corruption by the Forest Department

	<i>directions, our relations with the Forest Department are quite good. We always cooperate with them when they stand in need.</i>	
L-KI-5	<i>We are the descendants of the Tipra Maharaja and have lived here for more than 70 years but now we are a marginal community. We are surviving on the pity and mercy of others. Our wishes and views are not honored. This reserve forest is our wealth. How can we steal it? when our poor people collect fuel wood from the forest they accused us.</i>	Fuelwood collection
L-KI-1	<i>The Forest Department had not arranged any alternative livelihood training for us. Some people of our village got some money from Arannayak Foundation.</i>	Alternative income Arannayak foundation
L-KI-3	<i>To my knowledge, the co-management committee gets one half of the Government revenue, and the Government gets the other half. This goes to the Government fund, but I do not know where the co-management committee's share goes. I know that a yearly plan is made for the purpose, and the money is spent according to this but it is not clear how the money is spent for the development of local people.</i>	Co-management committee Government revenue Benefit sharing
L-KI-6	<i>50% of the revenue is meant to go to the people. But we need to do a lot of development work within the park. I have said that a hotel should be built in the village so that tourists can stay there. They can also buy utensils, and dishes which are needed for weddings. The village conservation forum could hire these utensils in exchange for money. Some litter bins and seats have been placed in the park area.</i>	Government revenue Village conservation forum
L-KI-1	<i>If Government laws are implemented, then everything would be fine. If we inform the beat or range officers about tree thefts, then they ask for a written statement to be filed but if I do this with my name, then the thieves would find and kill me. So, people cannot complain even if they see tree-thefts. If this cannot be changed how will the forest improve? Basically, the protector is the predator. The forest department staff needs to stop their business.....When plantation started my father</i>	Law enforcement Institutional, political and local influence

	<i>and grandfather planted various types of trees. We also used to cultivate various trees here. None of those are existing now. The only ones to be seen are on the road-sides, inside the forest is empty. We all are thieves. Nishorgo and IPAC may have positive intentions, but our theft is ruining everything. If the father is a thief, then the son would be a thief too.</i>	
L-KI-10	<i>The local influential people will take the trees away by using lorries while the local people are not allowed a single piece of fuel wood from the forest; this cannot be a lawful, law should be equal for everyone. Either all or none should be allowed in the forest. What kind of law is it which permits you to lease out forest lands to one person while at the same time sending another to jail for collecting some fuelwood?</i>	Local influence Law enforcement
L-KI-4	<i>During patrolling we caught the illegal tree fellers and handed them over to the forest staff. It is their (Forest Department) duty to take them to court. Among the group of 20, 5 said that they were tree fellers but the remaining 15 said they were not, so were let go. Sometimes I fight with the tree fellers, see my hands and legs are broken. The law and enforcement is not strong enough to save the forest.</i>	Limitation of Forest Department Law enforcement
L-KI-8	<i>Currently there are many problems inside the park, such as the shortage of Forest Department staff, the park is large but the forest guards are few in number. So it is not possible for them to patrol the forest. And these people are not skilled. Recently tree felling is increasing. The existing law and its enforcement is not enough to save the forest. Political pressure is strong with local leaders changing their political view according to the current Government.....There are about one thousand furniture shops in Sreemongal and Komolgong district and these claim they get trees legally from the Forest Department by auction. So the question arises how many auctions occurred in a year.</i>	Limitation of the Forest Department Law enforcement Local and political pressure

L-KI-10	<i>The honest will of the Government and the honesty and efficiency of the administration can save the forest. To save the bio-diversity, honesty is the only remedy.</i>	Honest will of the Government Efficiency of the administration
L-KI-2	<i>During the peak season you would not be able to stand in my yard. The tourists become a heavy crowd in the forest. With so many people roaming around, then what is the condition of the forest! There are different trails given for walking but they are not followed. If the tourists want to go to the deep forest then they should be with local guides; this should be mandatory. Tourism has to be systematic and they must follow the way to walk, because small trees are dying under their feet and the animals are hiding and moving to the deep forest. Sometimes tourists get robbed.but not only the forest is affected but we also are affected. We are betel leaf cultivators and when we go to the betel leaf gardens, we clean ourselves, and wear different clothes than those we wear at home because there is a virus which can spread very quickly. But tourists do not understand this and damage the plants by ripping the betel leaf. In the past, the roaring of the gibbons could be heard but now you need to go to deep forest early in the morning.</i>	Increase tourists Disadvantages by tourists Lack of tourists facilities Virus spread by in the betel leaf farm
L-KI-1	<i>Tourists normally come to our village. They are a burden. Sometimes they enter into our houses, even to the bed room and destroy our privacy. If there was a gate to enter our village then it would be easier for us to control them.</i>	Disadvantages by tourists
L-KI-3	<i>It is our hope that many tourists come here, but there are no guidelines to enable them to enjoy Lawachara National Park, as it is a wildlife area. I have seen in India how beautifully they handle this and control it successfully. Only the genuine tourists should be permitted to enter the forest and no one should be allowed to picnic in the wildlife area. I have put this forward several times in our meeting. They said there are some</i>	Damaged from tourists

	<i>picnic spots. So, in my opinion, it is good that the number of tourists increases, but we should pay attention to how this can be planned better. We suffer some damage from tourists because they are curious about the life of tribes.</i>	
L-KI-8	<i>Currently the number of tourists is increasing but it is not planned, so it creates lots of problems. It should be controlled from the entry gate of the park.</i>	Tourists increase Entry gate
L-KI-1	<i>The revenue is split, 50% goes to the Government and 50% to the co-management committee for local development and infrastructure. The co-management committee provides some facilities such as ticket counter, litter bins and sitting bench inside the park.</i>	Tourists revenue Co- management committee
L-KI-3	<i>The co-management committee gets half, and the other half goes into the Government funds, but I do not know more about the co-management committee's share although, I know there is an annual plan for this purpose. But I do not know how the money is spent.</i>	Co- management committee

Concepts

Aware of management plan	L-KI-1, L-KI-3
Involvement of management plan	L-KI-1, L-KI-3
Co-management committee	L-KI-1, L-KI-3, D-KI-4, L-KI-6
Involvement of co-management approach	L-KI-1, L-KI-3
Community patrol group	D-KI-1, D-KI-4, L-KI-3,
Illegal tree felling	L-KI-8, D-KI-1
Betel leaf cultivation	L-KI-1, L-KI-2, L-KI-3, L-KI-6
Fuelwood collection	L-KI-3, L-KI-5, D-KI-6,
Human settlement	L-KI-3
Encroachment	L-KI-3, L-KI-6
Corruption by the Forest Department	L-KI-3
Limitation of the Forest Department	L-KI-4, L-KI-8,
Relationship between local people and forest department staff	L-KI-1, L-KI-3, L-KI-6, L-KI-9

Governance revenue	L-KI-3, L-KI-6,
Awareness of local people	D-KI-6
Benefit sharing	L-KI-3
Alternative income generation activities	L-KI-1, D-KI-6
Law enforcement	L-KI-1, L-KI-4, L-KI-8, L-KI-10
Local and political influence	L-KI-1, L-KI-7, L-KI-8, L-KI-10
Increasing tourists	L-KI-2, L-KI-8,
Benefits of tourism	L-KI-1,
Disadvantages from tourism	L-KI-1, L-KI-2,
Local guide	L-KI-2
Entry gate	L-KI-8

Themes

Participation in the planning process	L-KI-1, L-KI-3
Conservation conflicts	L-KI-8, D-KI-1, L-KI-2, L-KI-3, L-KI-6, L-KI-5, D-KI-6
Effectiveness of the co-management approach	L-KI-1, L-KI-3, D-KI-4, L-KI-6
Impact of the management plan	L-KI-1, L-KI-3, L-KI-6, L-KI-9, D-KI-6
Institutional, political and local issues	L-KI-1, L-KI-4, L-KI-7, L-KI-8, L-KI-10
Tourism issues	L-KI-1, L-KI-2, L-KI-8,

Appendix 11. General information on case study areas in Bangladesh

	Lawachara National Park	Teknaf Wildlife Sanctuary	Sunderbans Wildlife Sanctuary
Area (hectares)	1,250	11 615	31227
Established	1996	2009	1996
Land Tenure	State owned	State owned	State owned
Location	Latitude 24° 30' – 24° 32' N and longitude 91° 37' – 91° 47' E	21°00'N latitude and 92°20'E longitude	21°30' – 22°30' N latitude and 89°00' –89°55' E longitude
Management Plan	Present	Present	Present
Site Status	National Park	Wildlife Sanctuary	Wildlife Sanctuary
Forest type	Mixed tropical evergreen and semi-evergreen forests.	Tropical wet evergreen and semi-evergreen forests	Natural Mangrove.
Number of habitat present	Five	Eight	Five
Habitat types	High forests, grasslands bamboos, wetlands, tea estates, cultivated fields.	High forests, grasslands, bamboos, wetlands, tidal mudflats mangrove vegetation, sandy beaches, cliffs/steep slopes, cultivated fields	Shore, Low/high mangrove forest, openland/grassland, estuarine riverine cultivated fields
Climate	Warm and humid cool and pleasant in winter.	Warm and humid	Moist, sub-tropical, and tempered by the sea
Flora and Fauna species	Noted for Hoolock Gibbon (<i>Bunipithecus hoolock</i>), Capped Langur (<i>Trachypithecus pileatus</i>), Phayres Langur (<i>Trachypithecus phayrei</i>), Pig tailed Macaque (<i>Macaca nemestrina</i>), and Masked Civet (<i>Pegumalarvata</i>)	Noted for Elephant (<i>Elephas maximus</i>)	Noted for Sundri tree (<i>Heritiera fomes</i>), Royal Bengal Tiger (<i>Panthera tigris</i>) and Dolphin
Settlements	28	115	46

Staff	DFO= 1, ACF= 1, Range Officer=1, Beat Officer=1, Assistant Beat Officer= 3, Forest Guards=3 (field and office source)	DFO= 1 ACF= 1 Range Officer=6 Beat Officer= 8 Forest Guard=14 (field and office source)	DFO=2, ACF=6, Forester=3, Forest Guard=12, Boatman= 15-18 (field and office source)
Wildlife monitoring	Currently absent, although some monitoring was done about <i>Hoolock gibbons</i> .	Currently indicator bird monitoring was completed by IPAC (2011).	Currently Tiger and Dolphin have been monitored
Management effectiveness evaluation	Absent	Absent	Absent
Co-management Council	Present	Present	Present
Co-management Committee	Present	Present	Present
Guest houseno.	01	01	02
Eco-cottage	x	02	x
Ecoguide	09	17	20
Interpretation Centre	Not active	Active	Not Active

Appendix 12. Stakeolders in Lawachara National Park

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Local people	Fuelwood collector	Fuelwood collection, basic needs for survival.	Local poor people, tea garden labour (mainly women and children)
	Betel leaf cultivator	Forest villagers and outsider people. Encroach land for betel leaf cultivation, they burn the under growth for preparing the field and cutting bamboos for making fences.	Forest villagers and local people
	Lemon cultivator	Lemon cultivation	Local people and tribal
	Pineapple cultivator	Pineapple cultivation	Local people and tribal
	Jhum cultivator	They clean specific hills, burning the bush and then cultivate	Local people and tribal
	Bamboo collector	Cut both naturally occurring bamboo and planted bamboo	Forest villagers, local poor people
	Fruit collector	Collect lemon, pineapple, nut, berry and others.	Local people, mostly forest villagers
	Vegetable collector	Collect vegetables such as kachu, palong, bamboo shoot and others	Local people, mostly forest villagers
	Medicinal plant collector	Collect medicinal plants	Local people, mostly forest villagers
	Sungrass collector	Collect sungrasses as house building material	Forest villagers, local poor people

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Local people	House building material collector	Collect house building material	Local people, mostly forest villagers
	Illegal logger	Obtain money to sell timber	Potential supporters
	Hunter/trapper	Wildlife for meat and sale. Kill, trap jungle fowl, pigs, occasionally small deer and monkeys for household consumption	Some local people, forest villagers
	Farmers living inside park	Arable land, shifting cultivation, betel leaf cultivation , basic needs for survival, cultural value of the forest	Local people, encroacher, forest villager
	Farmers living adjacent to the park	Collect construction material from the park, cultivate land around the park	Local people, encroacher, forest villager
	Tea stall owner	They purchase fuel wood from the children or people, and use it as fuel; it encourages the fuelwood collector	Forest villagers and local people
	Day labor	Cutting down valuable timber plants, cut tree branches and fuelwood on daily basis	Local people, forest villagers
	Honey collector	When comb encountered collect honey and wax	Local people
	Land encroacher	Encroached land, converted to homestead, agriculture land and others.	Local people
	Fodder collector	Collect grasses of different grass species for feeding livestock	Mostly cowboys and local people

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Local people	Bark collector	Extract bark from certain trees for use and sell it	Local people
	Poacher	They catch wild animals such as deer, pig, wild cock by trapping and sometimes shooting.	Influential persons, local people, and tribal
	Cane collector	Basket binder	Local users
	Fisherman	Fishing	Local people
	Boat maker	Timber collection	Local people
	Boat owner	Timber collection	Local people
	Snake Charmer	Catch different types of snakes	Local or outsider
	Local hotels	Purchase fuel wood from the local people	Local people
	Local restaurants	Purchase fuel wood from the local people	Local people and tribal
Local business community	Saw mill owners	Timber for sale	Influential, but outside of the area. There are 9 sawmills in Bhanugach-Kamalgonj and 12 in Sreemongal, owned by very influential people. It is alleged that sawmills receive illegally felled trees at a cheap rate.
	Brick field owners	Fuelwood for burn coal	Influential, but outside of the area. There are about 7 brickfields located near Kamalgonj and Sreemongal.

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Local business community	Furniture shop owner	Involved poor people to collect timber	There are about 30 furniture shops in and around Bhanugach Bazaar and about 20-25 in Sreemongal town.
	Fuelwood trader	Involved poor people to collect fuelwood from the forest	14 fuelwood traders in Bhanugach and Sreemongal
	Timber trader	Buy timber from illegal feller and mix with legal timber and make arrangement for its transportation	Influential, but outside the park area. There are about 10-12 persons in Sreemongal and 15-20 persons at Bhanugach Bazar who are involved with timber trading
	Political leaders	Encourage and provide support to collect forest resources illegally	Political leaders of local and adjacent areas
Government institutions	Forest Department	Conservation, programme implementation, revenue	Government organization
	Local Government	Can play a role in conservation of the park through forest and environment protection committees	Government organization
	Police	Promote human and ecosystem well being	Government organization
	Bangladesh Rifles	Promote human and ecosystem well being	Government organization
	Wildlife Division of FD	Wildlife conservation, park management	Government institution

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Non-governmental Organization	IPAC	Field personnel and consultants, achieve targets, build the capacity of staff	Non -governmental organization
	Arannayk Foundation	Conserve the country's biological diversity	Non - governmental organization
	Local Community Organization	Execute policies, promote human and ecosystem well being and capacity for self-help.	Non-governmental organization
	ADB	Conserve the country's biological diversity	International organization
	IUCN	Conserve the country's biological diversity	International organization
	ASA	Conserve the country's biological diversity	Non - governmental organization
Others	Bangladeshi tourist	Walking across the forest, litter throwing, causing disturbances to wildlife	People from different parts of the country
	Foreign tourist	Walking across the forest, litter throwing, causing disturbances to wildlife	People from different parts of the world
	Tea estate	Unemployed inhabitants enter into the forest and exploit forest resources	Six tea estates surrounding the park, of which 4 border the park (i.e. Fulbari, Khaichara, Jakchara, Gilachara tea estates) and the other two (Bharaura tea garden and Noorjahan tea estate) are located nearby
	Researcher	Conserve the country's biological diversity, research and monitoring	Local and outsiders to the area
	Journalist	Conserve the country's biological diversity, news stories	Local and outsiders to the area

Appendix 13. Stakeholders in Teknaf Wildlife Sanctuary

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Local people	Fuelwood collector	Fuelwood collection, basic needs for survival	Local people, forest villagers
	Illegal logger	Cutting down valuable timber plants. Obtain money to sell timber	Local people, daylabour, and tribal
	Hunter/trapper	Wildlife for meat and sale. Kill, trap jungle fowl, pigs, occasionally small deer and monkeys for household consumption	Some local people, forest villagers
	Bamboo collector	Cut both naturally occurring bamboo and planted bamboo	Forest villagers, local people
	Fruit collector	Collect nuts, berry and others.	Local people, mostly forest villagers
	Vegetable collector	Collect vegetables such as kachu, palong, bamboo shoot and others	Local people, mostly forest villagers
	Medicinal plant collector	Collect medicinal plants	Local people, mostly forest villagers
	Sungrass collector	Collect sungrasses as house building material	Forest villagers, local people
	House building material collector	Collect various materials as per needs for house building	Forest villagers

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Local people	Farmers living inside park	Arable land, shifting cultivation, betel leaf cultivation, basic needs for survival	Local people, forest villagers
	Farmers living adjacent to the park	Collect construction material from the park, cultivate land around the park	Local people, forest villagers
	Local restaurants	Purchase fuel wood from the local people	Local people and tribal
	Tea stall owner	They purchase fuel wood from the local people, and use it as a fuel	Forest villagers and local people
	Day labor	Cutting down valuable timber plants, cut tree branches and fuelwood on daily basis.	Local people, forest villagers
	Honey collector	When comb encountered collect honey and wax	Local people
	Land encroacher	Encroached land, converted to homestead, agriculture land and others.	Local people
	Fodder collector	Collect grasses of different grass species for feeding livestock	Mostly cowboys and local people
	Bark collector	Extract bark from certain trees for use and sell it	Local people
	Jhum cultivator	They clear specific hills, burning the bush and then cultivate	Local people and tribal
	Cane collector	They collect cane and use it for handicrafts or sell	Local users
	Fisherman	Fishing	Local poor

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Local people	Boat maker	Purchase timber and sometimes motivated people to cutting down valuable trees	Local people
	Boat owner	They transport timber and help the tree poacher	Local people
	Chander Gari(Zeep owner)	They transport timber and help the tree poacher	Local people
	Snake Charmer	Catch different snakes	Local or outsider
	Poacher	They catch wild animals such as deer, pig, and wild cock by trap and sometimes by shooting	Influential persons, local people, and tribal
Local business community	Saw mill owners	Purchase timber from the local people and also appoint labor to cut trees on daily basis	Influential, but outside of the area. Currently 2 saw mills are active
	Brick field owners	Purchase fuel wood from the local people for burning charcoal. They also appoint labor to cut tree branches for fuel wood on daily basis	Influential, but outside of the area
	Political leaders	Encourage and provide support to collect forest source illegally	Political leaders of local and adjacent areas
	Furniture shop owner	Involved poor people to collect timber	There are about 18 furniture shops in the nearby markets

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Local business community	Fuelwood dealer	Fuelwood from the forest	Influential people. There are about 4-5 fuelwood traders in Shamlapur bazaar, about 10-12 in Teknaf bazar and 4-5 in Hnilla and Mouluvibazar.
	Timber trader	Buy timber from illegal tree fellers and mix with legal timber and make arrangement for its transportation	Influential, but outside of the area
Government organization	Ministry of environment and Forest	Conserve the country's biological diversity	Government organization
	Ministry of fisheries	Conserve the country's biological diversity	Government organization
	Ministry of land	Conserve the country's biological diversity	Government organization
	Forest Department	Conservation, programme implementation, and revenue	Government organization
	Wildlife Division of FD	Wildlife conservation, Sanctuary management	Government organization
	Local Government	Have no direct role in park issues. Rural development, protection of environment and forest, control law and order.	Government organization
	Police	Promote human and ecosystem well- being	Government organization
	Bangladesh Rifles	Promote human and ecosystem well- being	Government organization

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Non-governmental Organization	IPAC	Field personnel and consultants, achieve targets, build capacity of the staff	Non- governmental organization
	Local Community Organization	Execute policies, promote human and ecosystem well-being and capacity for self-help.	Non- governmental organization
	BRAC	Conserve the country's biological diversity	Non- governmental organization
	SHED	Conserve the country's biological diversity	Non- governmental organization
	AF	Conserve the country's biological diversity	Non- governmental organization
	ASA	Conserve the country's biological diversity	Non- governmental organization
	ADB	Conserve the country's biological diversity	International organization
	IUCN	Conserve the country's biological diversity	International organization

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Others	Bangladeshi tourist	Walking across the forest, causing disturbances to wildlife	People from different parts of the country
	Foreign tourist	Walking across the forest, causing disturbances to wildlife	People from different parts of the world
	Researcher	Conserve the country's biological diversity, research and monitoring	Local and outsider of the area
	Journalist	Conserve the country's biological diversity, news stories	Local and outsider of the area

Appendix 14. Stakeholders in the Sunderbans Wildlife Sanctuary

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Local people	Bawalies (NTFP collector)	Collection of NTFP, specially golpata, goran, hantal, catkin, reeds and other minor plant based products	Local people mainly male; sometimes female and children
	Moualies (Honey collector)	Collection of honey and wax	Local people mainly male
	Fuelwood collector	Fuelwood collection, basic needs for survival	Local people
	Hilsha Fisherman	Hilsha fishing inside and on adjacent water bodies of Sunderbans Reserve Forest (SRF)	Local people mainly male
	Other Fisherman	Fishing and fish drying in dry season	Local people male, female and children
	Crab collector	Crab collection, also catch fish in season	Local people
	Shrimp collectors	Collect shrimp PL (post larva) from water bodies from inside and edges of SRF	Local people
	Day labor	Cutting down valuable timber plants, cut tree branches and fuelwood on daily basis.	Local poor people, forest villagers
	Farmers living inside the park	Arable land, basic needs for survival, cultural value of the forest	Local people, forest villager
	Medicinal plant collector	Collect medicinal plants	Local people, mostly forest villagers

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Local people	House building material collector	Collect various materials as per needs for house building	Forest villagers and surrounding people
	Farmers living adjacent to the park	Collect construction material from the forest, cultivate land around the forest.	Local people, encroacher, Forest villager
	Fruit collector	Collect fruits such as nut, berry and others.	Local poor people, mostly forest villagers
	Vegetable collector	Collect vegetables such as kachu, palong, bamboo shoot and other	Local people, mostly forest villagers
	Land encroacher	Encroached land, converted to homestead, agricultural land and others.	Local poor people
	Fodder collector	Collect grasses down different grass species for feeding livestock	Local poor people
	Boat maker	Purchase timber and sometimes also motivated people for cutting down valuable tree.	Local people
	Snake charmer	Catch different snakes	Local or outsider
	Local hotels	Purchase fuel wood from the local people	Local people
	Local restaurants	Purchase fuel wood from the local people	Local poor people and tribal
	Boat owner	They transport timber and help the tree poacher	Local people
	Illegal logger	Cutting down valuable timber plants, obtain money to sell timber	Local poor, daylabour, and tribal, terror
	Hunter/trapper	Wildlife for meat and sale	Some local people, forest villagers

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Local business community	Political leaders	Encourage and provide supports to collect forest resources illegally	Political leaders of local and adjacent areas
	Saw mill owners	Purchase timber from the local people and also appoint labor to cut tree in daily basis	Influential people from local or outside
	Brick field owners	Purchase fuel wood for brick kiln from wood collectors as well as employ labor to collect it from forest	Influential people from local or outside
	Charcoal producer	Purchase wood for charcoal production	Local business man, local people, and forest villager
	Fish Arottdars (fish businessmen)	Make business out of managing/investing in fishing in the forest and adjoining rivers and canals	Large traders, investors, and influential
	Fish processing industry	Fish collection	Influential persons, local people
	Gher Owners	Purchase shrimp PL (post larva) from PL collectors and invest money to collect the same from SRF and adjoining water bodies	Influential and powerful persons either local or outside
	Large Mohajons (Money lenders)	Commercial collection of SRF resources, invest either in full or part from his own	Local influential people
	Small Mohajons (money lenders)	Collect forest products commercially, tend to make profits, invest either in full or part from his own	Local influential people

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Local business community	Timber trader	Buy timber from illegal feller and mix with legal timber and make arrangement for its transportation	Large traders and investors, influential people.
	Furniture shop owner	Involved poor people to collect timber	Local influential people
	Fuelwood trader	Fuelwood from the forest	Influential persons, poor local people
	Fish processing industry	Fish collection	Influential persons, local people
Government organization	Ministry of environment and Forest	Conserve the country's biological diversity	Government organization
	Ministry of land	Conserve the country's biological diversity	Government organization
	Ministry of fisheries	Conserve the country's biological diversity	Government organization
	Forest Department	Conservation, programme implementation, revenue	Government organization
	Local Government	Rural development, protection of environment and forest other than SRF, control law and order	Government institution
	Coast Guard and Bangladesh Navy	Have power to control law and order	Government institutions have free access in and around Sundarbans forest
	Police	Promote human and ecosystem well-being, and control law enforcent	Government organization

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Government organization	Border Guard of Bangladesh	Promote human and ecosystem well being, and control law enforcent	Government organization
	Wildlife Division of FD	Wildlife conservation, Sanctuary management	Government institution
Non - governmental organization	ADB	Conserve the country's biological diversity	International organization
	IUCN	Conserve the country's biological diversity	International organization
	ZSL	Conserve the country's biological diversity	International organization
	IPAC	Field personnel and consultants, achieve targets, build the capacity of staff	Non- governmental organization
	AF	Conserve the country's biological diversity	Non -governmental organization
	SHED	Conserve the country's biological diversity	Non- governmental organization
	BRAC	Conserve the country's biological diversity	Non -governmental organization

Category	Name of Stakeholder	Main interest	Description of Stakeholder
Others	Robbers	Make money by robbery, taking hostages who collect Sunderbans Reserve Forest resources	Group of derailed armed people, organized, powerful in Sunderbans Reserve Forest area
	Bangladeshi tourist	Walking across the forest, causing disturbances to the wildlife	People from different parts of the country
	Foreign tourist	Walking across the forest, causing disturbances to the wildlife	People from different parts of the world
	Private tour operators	Make business through organizing guided tours inside the Sunderbans Reserve Forest	Business concern. Have potential to generate awareness among wider communities
	Poacher	They catch wild animals such as tiger, deer, pig, etc by trap and sometimes shoot them	Influential persons poor local people, and terror
	Journalist	Conserve the country's biological diversity and news stories	Local and outsider of the area
	Researcher	Conserve the country's biological diversity, research and monitoring	Local and outsider of the area

Appendix 15. Cross-tabulation of gender and education in Lawachara National Park

Gender * Education Crosstabulation

		Education			Total		
		Illiterate	Primary School	Secondary school and higher education			
Gender	Male	Count	16	36	34	86	
		Expected Count	21.0	37.1	27.8	86.0	
		% within Gender	18.6%	41.9%	39.5%	100.0%	
		% within Education	47.1%	60.0%	75.6%	61.9%	
		Female	Count	18	24	11	53
			Expected Count	13.0	22.9	17.2	53.0
Total		% within Gender	34.0%	45.3%	20.8%	100.0%	
		% within Education	52.9%	40.0%	24.4%	38.1%	
		Count	34	60	45	139	
		Expected Count	34.0	60.0	45.0	139.0	
		% within Gender	24.5%	43.2%	32.4%	100.0%	
		% within Education	100.0%	100.0%	100.0%	100.0%	

Chi-square= 6.82; D.F. = 2; P<0.05

Appendix 16. Cross-tabulation of gender and monthly income in Lawachara National Park

Gender * M.Income Crosstabulation

		M.Income			Total		
		3000-5000	6000-8000	9000-12000			
Gender	Male	Count	30	28	28	86	
		Expected Count	43.3	24.1	18.6	86.0	
		% within Gender	34.9%	32.6%	32.6%	100.0%	
		% within M.Income	42.9%	71.8%	93.3%	61.9%	
		Female	Count	40	11	2	53
			Expected Count	26.7	14.9	11.4	53.0
Total		% within Gender	75.5%	20.8%	3.8%	100.0%	
		% within M.Income	57.1%	28.2%	6.7%	38.1%	
		Count	70	39	30	139	
		Expected Count	70.0	39.0	30.0	139.0	
		% within Gender	50.4%	28.1%	21.6%	100.0%	
		% within M.Income	100.0%	100.0%	100.0%	100.0%	

Chi-square= 24.94; D.F. = 2; P<0.05

Appendix 17. Cross-tabulation of gender and awareness of management plan in LNP

Gender * A.MP Crosstabulation

		A.MP		Total	
		Yes	No		
Gender	Male	Count	16	32	48
		Expected Count	10.7	37.3	48.0
		% within Gender	33.3%	66.7%	100.0%
	Female	Count	2	31	33
		Expected Count	7.3	25.7	33.0
		% within Gender	6.1%	93.9%	100.0%
Total	Count	18	63	81	
	Expected Count	18.0	63.0	81.0	
	% within Gender	22.2%	77.8%	100.0%	

Chi-square= 8.41; D.F. = 1; P<0.05

Appendix 18. Cross-tabulation of education and monthly income in Lawachara National Park

Education * M.Income Crosstabulation

		M.Income			Total	
		3000-5000	6000-8000	9000-12000		
Education	Illiterate	Count	30	4	0	34
		Expected Count	17.1	9.5	7.3	34.0
		% within Education	88.2%	11.8%	0.0%	100.0%
	Primary School	Count	34	22	4	60
		Expected Count	30.2	16.8	12.9	60.0
		% within Education	56.7%	36.7%	6.7%	100.0%
	Secondary school and higher education	Count	6	13	26	45
		Expected Count	22.7	12.6	9.7	45.0
		% within Education	13.3%	28.9%	57.8%	100.0%
Total	Count	70	39	30	139	
	Expected Count	70.0	39.0	30.0	139.0	
	% within Education	50.4%	28.1%	21.6%	100.0%	

Chi-square= 68.06; D.F. = 4; P<0.05

Appendix 19. Cross-tabulation of conflict before and after implementtion of management plan in Lawachara National Park

C.BMP * C.AMP Crosstabulation

			CONFLICT.AMP		
			High	Moderate	Low
CONFLICT.BMP	High	Count	17	0	0
		Expected Count	7.3	7.3	2.3
	Moderate	Count	43	22	0
		Expected Count	28.1	28.1	8.9
	Low	Count	0	38	19
		Expected Count	24.6	24.6	7.8
		Expected Count	60.0	60.0	19.0

Chi-square = 88.55; D.F. = 4; P<0.05

Appendix 20. Cross-tabulation of gender and education in Teknaf Wildlife Sanctuary

Gender * Education Cross tabulation

			Education			Total
			Illiterate	Primary School	Secondary and higher education	
Gender	Male	Count	25	38	6	69
		Expected Count	34.8	29.1	5.1	69.0
		% within Gender	36.2%	55.1%	8.7%	100.0%
	Female	Count	36	13	3	52
		Expected Count	26.2	21.9	3.9	52.0
		% within Gender	69.2%	25.0%	5.8%	100.0%
Total	Count	61	51	9	121	
	Expected Count	61.0	51.0	9.0	121.0	
	% within Gender	50.4%	42.1%	7.4%	100.0%	

Chi-square= 13.10; D.F. = 2; P<0.05

Appendix 21. Cross-tabulation of gender and monthly income in Teknaf Wildlife Sanctuary

Gender * M.Income Cross tabulation

		M.Income			Total		
		3000-5000	6000-8000	9000-12000			
Gender	Male	Count	29	23	17	69	
		Expected Count	44.5	14.8	9.7	69.0	
		% within Gender	42.0%	33.3%	24.6%	100.0%	
	Female	Count	49	3	0	52	
			Expected Count	33.5	11.2	7.3	52.0
			% within Gender	94.2%	5.8%	0.0%	100.0%
Total	Count	78	26	17	121		
		Expected Count	78.0	26.0	17.0	121.0	
		% within Gender	64.5%	21.5%	14.0%	100.0%	

Chi-square= 35.83; D.F. = 2; P<0.05

Appendix 22. Cross-tabulation of gender and awareness of management plan in Teknaf Wildlife Sanctuary

Gender * A.MP Cross tabulation

		A.MP		Total		
		Yes	No			
Gender	Male	Count	16	53	69	
		Expected Count	9.1	59.9	69.0	
		% within Gender	23.2%	76.8%	100.0%	
	Female	Count	0	52	52	
			Expected Count	6.9	45.1	52.0
			% within Gender	0.0%	100.0%	100.0%
Total	Count	16	105	121		
		Expected Count	16.0	105.0	121.0	
		% within Gender	13.2%	86.8%	100.0%	

Chi-square= 13.89; D.F. = 1; P<0.05

Appendix 23. Cross-tabulation of education and monthly income in Teknaf Wildlife Sanctuary

Education * M.Income Cross tabulation

		M.Income			Total	
		3000-5000	6000-8000	9000-12000		
Education	Illiterate	Count	57	3	1	61
		Expected Count	39.3	13.1	8.6	61.0
		% within Education	93.4%	4.9%	1.6%	100.0%
	Primary School	Count	19	22	10	51
		Expected Count	32.9	11.0	7.2	51.0
		% within Education	37.3%	43.1%	19.6%	100.0%
	Secondary and higher education	Count	2	1	6	9
		Expected Count	5.8	1.9	1.3	9.0
		% within Education	22.2%	11.1%	66.7%	100.0%
Total		Count	78	26	17	121
		Expected Count	78.0	26.0	17.0	121.0
		% within Education	64.5%	21.5%	14.0%	100.0%

Chi-square= 61.20; D.F. = 4; P<0.05

Appendix 24. Cross-tabulation of conflict before and after implementtion of management plan in Teknaf Wildlife Sanctuary

C.BMP * C.AMP Crosstabulation

			C.AMP		
			High	Moderate	Low
C.BMP	High	Count	17	0	0
		Expected Count	7.6	6.0	3.4
	Moderate	Count	37	22	0
		Expected Count	26.3	21.0	11.7
	Low	Count	0	21	24
		Expected Count	20.1	16.0	8.9
	Expected Count	54.0	43.0	24.0	

Chi-square= 84.27; D.F. = 4; P<0.05

Appendix 25. Cross-tabulation of gender and education in Sunderbans Wildlife Sanctuary

Gender * Education Cross tabulation

			Education			Total
			Illiterate	Primary School	Secondary and higher education	
Gender	Male	Count	15	40	17	72
		Expected Count	28.9	34.4	8.7	72.0
		% within Gender	20.8%	55.6%	23.6%	100.0%
	Female	Count	48	35	2	85
		Expected Count	34.1	40.6	10.3	85.0
		% within Gender	56.5%	41.2%	2.4%	100.0%
Total	Count	63	75	19	157	
	Expected Count	63.0	75.0	19.0	157.0	
	% within Gender	40.1%	47.8%	12.1%	100.0%	

Chi-square= 28.58; D.F. = 2; P<0.05

Appendix 26. Cross-tabulation of gender and monthly income in Sunderbans Wildlife Sanctuary

Gender * M.Income Cross tabulation

			M.Income			Total
			3000-5000	6000-8000	9000-12000	
Gender	Male	Count	7	16	49	72
		Expected Count	31.6	17.9	22.5	72.0
		% within Gender	9.7%	22.2%	68.1%	100.0%
	Female	Count	62	23	0	85
		Expected Count	37.4	21.1	26.5	85.0
		% within Gender	72.9%	27.1%	0.0%	100.0%
Total	Count	69	39	49	157	
	Expected Count	69.0	39.0	49.0	157.0	
	% within Gender	43.9%	24.8%	31.2%	100.0%	

Chi-square= 93.66; D.F. = 2; P<0.05

Appendix 27. Cross-tabulation of gender and awareness of management plan in Sunderbans Wildlife Sanctuary

Gender * A.MP Cross tabulation

		A.MP		Total	
		Yes	No		
Gender	Male	Count	20	52	72
		Expected Count	9.2	62.8	72.0
	Female	Count	0	85	85
		Expected Count	10.8	74.2	85.0
Total	Count	20	137	157	
	Expected Count	20.0	137.0	157.0	

Chi-square= 27.05; D.F. = 1; P<0.05

Appendix 28. Cross-tabulation of education and monthly income in Sunderbans Wildlife Sanctuary

Education * M.Income Cross tabulation

		M.Income			Total	
		3000-5000	6000-8000	9000-12000		
Education	Illiterate	Count	50	12	1	63
		Expected Count	27.7	15.6	19.7	63.0
		% within Education	79.4%	19.0%	1.6%	100.0%
	Primary School	Count	19	25	31	75
		Expected Count	33.0	18.6	23.4	75.0
		% within Education	25.3%	33.3%	41.3%	100.0%
	Secondary and higher education	Count	0	2	17	19
		Expected Count	8.4	4.7	5.9	19.0
		% within Education	0.0%	10.5%	89.5%	100.0%
Total	Count	69	39	49	157	
	Expected Count	69.0	39.0	49.0	157.0	
	% within Education	43.9%	24.8%	31.2%	100.0%	

Chi-square= 77.68; D.F. = 4; P<0.05

Appendix 29. Cross-tabulation of conflict before and after implementation of management plan in Sunderbans Wildlife Sanctuary

C.BMP * C.AMP Crosstabulation

			C.AMP		
			High	Moderate	Low
C.BMP High	Count	29	0	0	
	Expected Count	12.0	11.6	5.4	
Moderate	Count	36	37	0	
	Expected Count	30.2	29.3	13.5	
Low	Count	0	26	29	
	Expected Count	22.8	22.1	10.2	
Expected Count		65.0	63.0	29.0	

Chi-square= 116.07; D.F. = 4; P<0.05