

**BIODIVERSITY CONSERVATION THROUGH COLLABORATIVE FOREST  
MANGEMENT IN BARA DISTRICT, NEPAL**

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A research study submitted in partial fulfillment of the requirements for the degree of  
Bachelor of Science in Environmental Management

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## Certification

This is to certify that the thesis entitled " **Biodiversity Conservation Through The Collaborative Forest Management In Bara District, Nepal** " submitted by Mr. Ram Lama towards partial fulfilment of Degree of bachelor of Science in Environmental Management is based on the original research and study under the guidance of **Dr. Ananda Raj Joshi** The thesis in part or full is the property of **School of Environmental Management and Sustainable Development (SchEMS)** and thereof should not be used for the purpose of awarding any academic degree in any other institution.

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## Abstract

The study entitled **“Biodiversity Conservation through Collaborative Forest Management in Bara district, Nepal”** is an endeavour to contribute to the newly launched collaborative forest management (CFM) program in the Terai region of Nepal. The study was carried out in Parsaunai VDC of Bara district of central Nepal to review the effectiveness of the CFM for biodiversity conservation by documenting the people’s participation, analysing the approaches and programs conducted for Biodiversity Conservation and by identifying the benefits of CFM to the people in terms of Biodiversity conservation.

Primary data for the study were collected mainly by field observations, household surveys, in depth personal interviews with household heads and key informants, interviews with stakeholders, local leaders and forestry officers and professionals of the study area. The field level information were also probed with discussion with district forestry co-ordination committee members, local NGOs/social workers and with information derived from the secondary sources which include review of the previous literature, books and journals published so far.

It was found that, within the scope of this study, CFM is favoured by almost 2/3 of the people because of the failure of the previous forest management approaches, and its broad based stakeholder’s participation scheme, which solely considers the people from the distant user area too. It is also generating a significant amount of revenue to the government which was not legally possible during the process approaches of Terai forest management like community forestry. People’s participation in the first phase of the program was also found satisfactory. Due to the government intervention and peoples handing in several Biodiversity conservation activities were being carried out e.g. study tour, NTFP farming etc. awareness towards the conservation of wildlife is found to be increased. In some cases people have started banning poaching and controlled encroachment in their area hence maintaining good regeneration and growing stock in the forest. Some promising NTFP/MAPs cultivation were found to be effective for the household income enhancement, hence reducing peoples pressure in the forest.

The study concludes that the CFM is a very good vehicle to drive the participatory Biodiversity Conservation throughout the Terai and Chure area of Nepal. Being a case study it is recommended that the study result should be tested in other similar areas for the generalisation.

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## Abbreviations

AFO	Assistant Forest Officer
BISEP-ST	Biodiversity Sector Program for Siwaliks and Terai
CBO	Community Based Organization
CFM	Collaborative Forest Management
CFMG	Collaborative Forest Management Group
DDC	District Development Committee
DFO	District Forest Office
DoF	Department of Forest
FORSPA	Forestry Research Support Programme for Asia and the Pacific
FUG	Forest User Group
HMG	His Majesty Government
IDEA	Innovative Development Asia
IGA	Income Generating Activities
NBS	Nepal Biodiversity Strategy
NGO	Non-Government Organization
NTFP	Non-Timber Forest Product
MFSC	Ministry Of Forest and Soil Conservation
OFMP	Operational Forest Management Plan
PRA	Participatory Rural Appraisal
SchEMS	School of Environmental Management and Sustainable Development
VDC	Village Development Committee

## Chapter I

### INTRODUCTION

Biodiversity or Biological Diversity is sum of all the different species of animals, plants, fungi, and microbial organisms living on Earth and the variety of habitats in which they live (Microsoft Encarta, 2003). Biological diversity or biodiversity is the total variety of life on Earth. It encompasses the total number, variety, and variability of life forms, levels, and combinations existing within the living world. As such, biodiversity means the richness and variety of living beings from all sources including, *inter alia*, terrestrial, marine and freshwater ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (MFSC, 2002). The term implies not only to terrestrial but to marine and other aquatic biodiversity as well and refers to richness and variety of living organisms in the world as a whole or any location within it (Singh, 2000).

Today, Plant and animal species are disappearing from the earth at an alarming rate and the threat to biodiversity conservation is initiated by the human activities, habitat destruction, over exploitations. This is accompanied by introduction exotics in afforestation leading to habitat change, soil degradation, malnutrition, disease and uncertainty of food and shelter. Biodiversity—the biological variety that thrives in a healthy ecosystem—became the focus of intense international concern and also in local level. Some of the threats for the biodiversity in Nepalese context are listed in Box 1 below.

#### **Box 1.1: Threats to Biodiversity in Nepalese Context**

- Low levels of public awareness and participation;
- High population pressures and prevailing poverty;
- Weak institutional, administrative, planning and management capacity;
- Lack of integrated land and water use planning;
- Inadequate data and information management; and
- Inadequate policies and strategies for biodiversity conservation.

*Source: MFSC, 2002*

In Nepal loss of biodiversity is due to habitat destruction which is due to forest destruction and degradation associated with clearing of forests. Within a period of 1964-1979 about 400,000s ha of forest was cleared and converted in agriculture land. In between 1978-1991, about 99,000 ha of tropical Sal Forest was cleared (Singh, 2000). Therefore to reduce the alarming rate of degrading forest situation, HMG has introduced new approach for the conservation of biodiversity through Collaborative Forest Management (CFM), especially for the conservation of forest and biodiversity in Terai region of the country i.e. An approach of sustainable management in collaboration with the local people to achieve multiple benefits maintaining ecological balance, generating economic returns and improving livelihood form the government managed forests (Parajuli, 2004). CFM concept provides a new basis for forming equitable alliances between government and local communities to achieve horizon of

conservation and continuing enhance of productivity of forest resources. The overall goal of the CFM concept is listed in the Box 2.

***Box 1.2: Goal of Collaborative Forest Management in Nepalese Context***

- To achieve more sustainable and equitable management system of forest resources
- To create a multi-stakeholders forum through the development and identification of a set of models, institutional arrangements, methods, tools and strategies to empower the local communities.
- To establish the horizontal and vertical coordination among the stakeholders
- To explore the opportunity on livelihood of the people
- To suggest a CFM mechanism to resolve the complex problems of multiple interest groups through continuing Social Learning Process.

*Source: Bandari, 2003*

## **1.1 Background**

In Nepalese context, biodiversity conservation is an emerging issue today. Different approaches and programs are conducted for the conservation of the biodiversity. Nepal, with an area of 1,47,181 km<sup>2</sup>, i.e. with a very small territory, it comprised of complex climate and varied habitat types. Because of wide variation of climate, physiography and edaphic condition, the ecosystem and habitat changes abruptly and all most all-climatic zones except marine are represented with different vegetation types.

Out of total land area (14.72 million ha), forest covers about 4.27 million ha (29%) and shrub covers 1.56 million ha (10.6%). Both forest and shrub together cover 39.6% of total land area of the country (Singh, 2000). For the conservation of the forest different forest legislations, policy are developed and adopted.

In the earlier days, forest was being managed by traditional systems through defined groups. The forest was nationalized following the Private Forest Nationalization Act 1957. Most people took the concept of the Act negatively. Moreover, the act of 1957 introduced a strong 'protection of territory' or custodial element into all government forestry activities. The introduction of this Act brought major change in the perception and attitude of people. People did not manage their forests as it used to be. On the contrary, they started reckless felling of trees and land were brought as far ad possible for agriculture use.

In order to stop the deterioration of the forest and to develop forest, government brought National Forest Plan 1976 which aimed enlisting people's participation in the protection and development of forest. This resulted in the enforcement of Panchyat Forest and Panchyat protected Forest Regulations 1978. These regulations authorized to handover government forest land to village Panchyats, the local elected body for management and development. This regulation so considered as the evolution of community forestry as it gave formal recognition and the right of managing forest resources to the local people. This regulation implemented for 10 years which did not yield encouraging results in the management and development of forest resources in the country which ultimately put forward the new forestry

legislation, Forestry Act 1993 and Forestry Bylaws 1995 which is supportive and conducive for community forestry development in the country.

The community forestry policy focuses in handing over any part of accessible forests to the communities. The current policy document is the Master Plan for the Forestry Sector approved by the government in 1989 which lays out the plan, policies and resource needs for investments to develop forestry sector. The community forestry model has become an accepted approach for managing mid hill forests of Nepal. This has tremendously conserved the forest and became one of the success programs in hilly region. In community forestry, local people manage the forests and the government supports, facilitates and monitors this process. In such circumstances, it is difficult to incorporate government objectives or a national agenda in forest management (Shrestha, 2002). The community forestry originated in the middle hills where forests are small and villages are intermingled with them. But in the Terai where the forest is very big and consists of a very valuable species with scatter users, there is a problem in managing and the forest is being degraded. The situation of degrading the forest in Terai forest remains same. The Terai forest is very rich in biodiversity and also consists a number of valuable species. There is a beautiful, intimate and intricate relationship between Terai, Chure and Inner Terai. Therefore, the significance of forest management and land use is crucial in these areas. If the resources here are not managed well, it is not going to have a tremendous impact not only on the beautiful life of the people residing here, but also on the overall development activities of the country. This requires a comprehensive, active and influential involvement of the local people.

Social mobilization is in fact a dynamic and participatory process for the active inclusion of the poor and socially excluded as well as all stakeholders and it pervasively acknowledges the equal importance of both the social aspects and technical aspects of forestry.

Forest Sector Policy, 2057 BS has put forward the concept of CFM to engender the active participation of stakeholders in efficient forest management. This concept bears the objective of enhancing the well being of the stakeholders through CFM integrating the decentralization approaches and local self-governance principles. As per the major elements of the CFM are biodiversity conservation, sustainable utilization of the wildlife resources, proportionate distribution of the forest resources and equitable economic development, to name a few, all of these aims and goals of CFM are therefore going to contribute significantly to the poverty reduction programs.

## **1.2 Collaborative Forest Management Concept**

CFM originated in Nepal as a compromise between the two approaches to forest management-community forestry and conventional forestry (Shrestha, 2002). As such CFM is defined as management of forestland with sharing of responsibilities or investments among government, close and distant users local government (such as protection, land development, silvicultural operations, etc.) and sharing of rights of benefits. The major elements of CFM are, Clear responsibilities (who will do what?), Clear right (who will receive what, and how much?) and Checks and balances among stakeholders.

CFM is the new concept in the management of forest through the mutual relationship between government and local people with concerned stakeholders to achieve the common horizon of conservation and continuing enhance of productivity of forest resource.

CFM is a sustainable forest management system of the government-managed national forest agreed upon by the Government and stakeholders based on forest management plan with the ultimate aim of keeping the forest ecologically sustainable, improving the livelihood of the stakeholders and increasing the economic and multiple uses of the forest. It is also going to make an increasing and encouraging contribution to the biodiversity conservation in the areas of implementation of CFM.

Since both the central government and local governmental bodies are involved together, there is a sense of ownership of the forest resources, both the vegetation and the wildlife. People have the increased commitment to stop illegal activities in the forest and also reduce overgrazing. This has the trickling effect of reduced forest fire due to the lessened activities in the forest. This also reduces the forest encroachment and consequently contributes to the effective forest management making the favourable conditions for the managed growing stock.

Involvement of the local people and all stakeholders increases the overall economic status of the people. This also leads to the increased commitment to the forest property organization and reduced dependency of the forest. Regeneration of the forest species and development of the NTFP also contribute to the biodiversity conservation.

### **1.3 Rationale of the Study**

The Terai forest of Nepal is significantly recognize as the richest in terms of economical as well as very rich in biodiversity. But due to the lack of management, the forest is degrading. As mentioned earlier the forest is degrading at the rate of 1.3 % annually. Some initiatives have taken to manage the forest and forest resources introducing various programs. Community forest in Nepal is a very successful program for the management of forest, but it only covers the small patches, so in the forest of Terai where there is a big chunk of dense forest, it is quite impracticable for the management of the forest. Similarly others programs and plans e.g. Operational Forest Management Plan (OFMP) also fail to contribute in the management of the Terai forests.

So in order to manage and conserve the Terai forest as well as to fulfill the needs of forest products of local people and also for the poverty alleviation, government introduced the new concept of CFM.

The present study was carried out because the system of managing the forest is new concept, i.e. there is very few studies carried out in this management system. It is hope that this study will analyzed CFM system of managing the forest and conserving the biodiversity effectively and its effectiveness for biodiversity conservation. Secondary data on policy and program of CFM are thoroughly analyzed to study the effectiveness of CFM in terms of Biodiversity conservation of the study area.

The study has also attempted to focus on the trends of encroachment and illegal hunting; theft that effect in the conservation of forest and also suggests minimizing these activities in order to maintain the forest conditions good.

## Chapter II

### LITERATURE REVIEW

The community forestry approach developed in Nepal has become one of the best models for managing the forests in the mid hill region. However in relation to management of forests in Terai, there are some deficiencies. For example, community forests are managed according to local objectives. In addition, there is no revenue-sharing mechanism. Since professionals' foresters are not managing the community forests, incorporation of complex management techniques such as multi-storey management is difficult. As a result, forests in the Terai are not managed optimally. This situation is degrading the resource base, which could benefit local people and the entire nation. Therefore, CFM-a partnership between the Department of Forests, local government and local people is an alternative option for managing Terai forests. In this approach, responsibilities and rights i.e. investments and benefits of all stakeholders must be clear and mutually agreed (Shrestha, 2002).

The overall assumption CFM is to create the sense of ownership among stakeholders to the program that would result in the sustainable conservation practices at local level. The key assumptions are:

- Involvement of local communities will promote better conservation
- Devolution of property right and authority will lead to better conservation

Efforts to manage Terai forests have passed several decades without having significant output. Many scientific forest management plans were prepared but very few of them were implemented partly due to lack of broad stakeholders' participation. Lack of clear approach and long-term vision to address the complex situation of Terai is equally responsible for non-management. The forest resources of Terai have immense potential in terms of economic and social development. In addition and local government and communities have demonstrated high level of commitment to collaborate in managing the forest for ecological restoration, economic benefits and the livelihood opportunity (Bhandari<sup>1</sup>, 2003).

After initiation of the Collaborative Forest, more women and poor people may get employment through the provision of the NTFP farming in the collaborative sites. NTFP cultivation like *Asparagus racemosus* (Kurilo), Medicinal plants, *Dendrocalamus sp.* (Bans) etc is significantly increased in the area (BISEP-ST, 2003). This has the help in the conservation of local biodiversity.

The forest destruction has not been retarded in most part of the country and the means used to manage the forest have not able to become cost effective and truly sustainable. Technical management of the forests and transformation of the resources in the benefit of people is always lacking. Revolutionary change in working strategy and sensitizing the people's needs and aspirations is still to come (Bhandari<sup>2</sup>, 2003).

The community forests approach is one of the most cite success for managing common property resources. It has been argued that the approach is successful in improving the supply

of forests products, improving the environmental situations in the hills, rehabilitating degraded hills and also increasing biodiversity. It is claimed that the approach offers an attainable means to indicate increasing threats to the conservation of biodiversity. The prevalent forest management approach in community forestry recognizes biodiversity conservation as secondary issue and there is evidence that biodiversity has either declined or has altered in community managed forest (Acharya, 2004).

Shrestha, (2002), the production forests of the Terai are not managed either communally or conventionally due to which Nepal could have lost several million rupees a year. The World Bank estimated a loss of NRs 5,390 per hectare per year from the non-scientific management of Terai forests (Hill, 1999); this does not include benefits from the under storey.

Terai forests need a decentralized management approach; it requires a participatory approach different from hill model, which needs to focus on living in the proximity of the forests. It is critical to embrace multitudes of stakeholders extending up to miles away to the south of the Terai despite the complexities involved in the intervention (Baral, 2004). As in the hills, community forestry programs have also been initiated in the Terai. A program similar to that in the hills has not been found appropriate in the Terai because socio-economic and resource use conditions are different. Therefore a revision of community forestry policy for the Terai is recommended (Shrestha and Budhathoki, 1993), (Bhandari<sup>2</sup>, 2003).

The government shall introduce appropriate but affordable tools and sustainable technologies especially in the rural area so as to processed means and to export abroad with a very high value on it. In addition, proper management plan should be introduced for the development of NTFPs resources and to maintain the sustainability of the yield regulation (Acharya, 2003).

The Terai (below 300m) and Siwalik (300-1500m) regions encompass 2.1 million and 1.4 million hectares, respectively, of the tropical, moist and deciduous type of forests. Forests of the Terai and Siwalik possess astonishing bio-characteristics. The forest throughout these regions support or preserve the soil, water, terrestrial flora, fauna and whole ecosystem and all of these are worth some form the productive, regulative and protective point of views (Kathiwada, 2003).

A wide range of assessment techniques and harvesting practices has to be considered for NTFP to address the enormous variation in terms of plant form, life cycle and product type. Methods of assessment and sustainable harvesting of NTFP have to be site and product specific to address both ecological and social considerations. Understanding ecological regularities of species as well as ecosystems can facilitate speedy inventory of NTFP. Community's interest, capacity and need must be considered in designing management and use plan (Ojha, Subedi and Dangal, 2003).

Participatory forest management and development activities have been existing in the Terai region of Nepal in different forms as user group forestry, leasehold forestry, agro-forestry, religious forestry, and private forestry. User group forestry is found to be one of the effective activities in the region due to readily available high value timber for income generation and for providing jobs to local people/ a joint approach between Department of Forest and local people is necessary for managing forests effectively and sustainably, which requires the different model of FUG, particularly in benefit sharing mechanism in the Terai (Pokharel,

1999). Many plans/schemes were prepared in the past but they were not implemented effectively (BISEP-ST, 2003), (Bhandari<sup>1</sup>, 2003).

Community forestry in the Terai in its present form seems problematic from social and the humanitarian viewpoint. Loss of use rights due to the land grabbing by more influential group; the lack of transparency within the groups, etc. are amongst the most sentimental problems existing at present. While these situation may apply everywhere in the country, it is more serious in the Terai where the hill migrants have normally settled near the rich patches of forest, and tend to manipulate the situation for their benefit (Baral and Subedi, 2004). Community forestry is equally feasible and has an equally important role in the Terai as in the Hills. However, in the Terai conditions are different due to population density and composition, rapid population growth, and the presence of natural forests of high value, so a 'blanket approach' and a 'carbon copy' approach of programs from the hills will not produce the results envisaged (Shrestha and Budhathoki, 1993).

It is often criticized that community forestry in Terai has encouraged those latecomers at the cost of indigenous community who are now miles away for forest. In order to accommodate the needs of distant users and to address various issues associated with Terai forests, government introduced the concept of CFM in forest sector policy, 2000. This concept provides opportunity of setting up a new management mode for sustainable and productive management of Terai forest through sharing of tasks and revenues among all the stakeholders including traditional users (Bhandari<sup>1</sup>, 2003).

The collaborative approach for the Terai forest management of Nepal is the most suitable model. In the past, the challenge of accommodating distant user, managing large forest, creating income generation, and providing benefit to different level from household to nation had not been addressed so systematically. The CFM explains about the benefit sharing mechanism among different stakeholders like distant and close users, local (VDC and DDC) and central government (BISEP-ST, 2003).

## **Chapter III**

### **OBJECTIVES AND SCOPE**

#### **3.1 Objectives**

The general objective of the study is to review the effectiveness of the CFM for biodiversity conservation in Bara district.

The specific objectives of the study are as follows:

1. To document the people's participation in CFM in terms of biodiversity conservation.

In order to meet this objective, information was sought for the people attitude and the perception through questionnaire survey and also identified whether people are satisfied or not.

Consideration was also given to explain why other methods of forest management are not bearing fruits and how CFM can be used as a system of management for the same.

2. To analyze the approaches and programs conducted for the biodiversity conservation

In order to achieve this objective, different policy and program levels of activities were studied. In addition, a detail study on those programs and their efficiency was made. Information was also sought of the major vegetation types or tree species protected through CFM and of major wildlife species found in the study area.

3. To identify the benefits of CFM in terms of biodiversity conservation

In order to meet this objective, information were sought on

- i. Control of illegal hunting, poaching and encroachment in the forests,
- ii. Maintenance of the growing stock,
- iii. Regeneration capacity of the forest,
- iv. Promotion of NTFP/MAPs, etc.

#### **3.2 Scope of the Study**

##### **3.2.1 Description of the site**

Bara District is located in the south-central lowland Terai of Nepal. Out of the total area of 129,564 hectares of Bara district, forest covers 27,182 hectares. The forests in this study area mainly are composed of tropical and sub tropical species.

The Sal species is the main species of the area. The area is very rich in biodiversity but because of the habitat alternation, overgrazing, use of the chemical fertilizers, and similar activities, it is decreasing day by day. It is reason behind the area is selected for study.

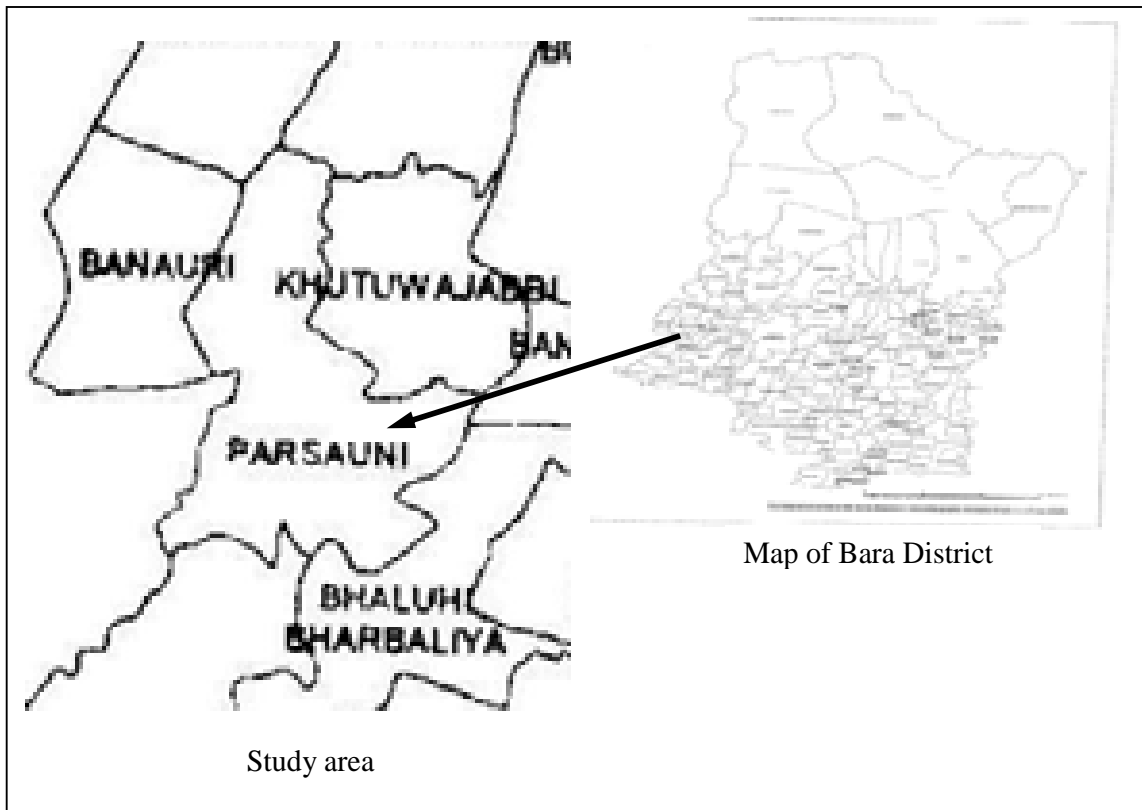


Fig. 3.1 Showing Study area

### 3.2.2 Extent of The Work

The study tries to present the effectiveness of the CFM regarding biodiversity conservation in the Madhuvan, Bara district. It enlists the factors for the conservation of biodiversity and discusses them. It analyses the population concept of the CFM user and changes on growing stock as well as dependency on forest. Since the issues of biodiversity conservations are vast, the research study focuses mainly on the major CFM programs, public attitude in the conservation of biodiversity through CFM, NTFPs programs. These explanations are based on the primary data and secondary data obtained through different sources.

### 3.2.3 Limitation of The Study

The study was limited to the area where there is an implication of CFM in Bara district only, i.e. Sahajnath CFM, Parsauna. The results obtained will be basically suitable to the study site and precaution must be given in the generalizations of the outcome from this study.

Time was the greatest limiting factor for the study of detail process of inventory of the forest. Hence secondary data are used to predict the growing stock and regeneration arability of the forest.

The other limitations of the study are that only few places were visited in the Bara district for collecting information. The study has focused only on Parsauna VDC. Moreover, the reference materials like books, journals and reports consulted as apart of data collection for the analysis.

The inherent difficulties in the study are lack of data to carry out the research because the CFM approach is very new concept in the forestry field, and yet there is no clear delineation of specific working scheme.

## Chapter IV

### METHODOLOGY

The research will follow participatory model based on the participatory tools, field visits, interview, questionnaire survey, and expert's comments. Other essential tools will also be used as and when required.

#### 4.1 Source of Information

The required information for the study were collected from different organizations and departments as below:

- BISEP-ST, Central Support Unit, Kathmandu,
- District Forest Office, Simira
- Range post, Pasaha
- ForestAction
- Ranger Association of Nepal
- BISEP-ST, Regional Support Unit Hetauda
- Library of Department of Forest Research and Survey
- Library of SchEMS

##### 4.1.1 Sources of Primary Information

The primary information was collected through various methods:

- *Household Survey Followed by Semi-Structured Questionnaire*

In order to collect primary data regarding people participation in CFM, people's attitude towards CFM in terms of biodiversities conservation and the overall efficiency of the program, household survey was carried out. The household survey was carried out in Parsauna VDC, users of Sahajnath CFM. The household survey was concerned particularly on the data required for the specific objectives of the study i.e. peoples participation in CFM, approaches and program of CFM and benefits of CFM. A semi-structured question was selected for interviewing stakeholders. This method was helpful to collect information to support identified objectives of the research. Different question was prepared for interviewing local people and officers. Set of question was given in Annex A and B.

- *Discussion with Bara District Forestry Co-ordination Committee*

Discussion with Committee was performed to identify the programs and activities performed by them for the conservation of biodiversity.

- *Informal Discussion With Key Informants*

This technique was conducted to collect primary data. Key informants were selected from among the user groups. The working committee in the collaborative forest, different jobholders such as forest guards, rangers, DFO, AFO, etc are selected as key informants.

- *Local NGOs/ Social Workers/Government Bodies*

Information was also obtained through different projects, organizations and government bodies such as District forest office, Range post, BISEP-ST, ministry running over there for different purposes.

#### **4.1.2 Source of Secondary Information**

- *Review of Various Documents*

Different related books and documents was gone reviewed in detail to identify the problem under study, to make the research worth full and describe the study area. They were used to compare and find the data information to help the fresh findings and to make the more realistic options.

#### **4.2 Data Analysis**

The information obtained from the field was collected and stored in the computer. Information were categorized according to the objectives and it was ordered, compiled and summarized.

## Chapter V

### RESULT AND DISCUSSION

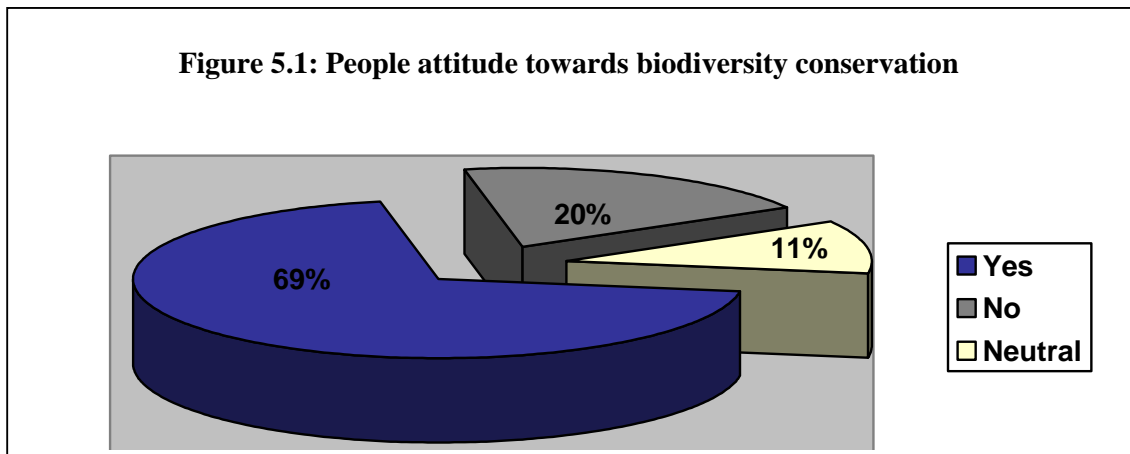
The impact and concept of collaborative forest in the conservation of biodiversity was assessed through the direct (Formal discussions/questionnaire) and indirect (personal judgment, informal discussion, key informants survey, PRA) means. Different impacts in the conservation are assessed which are described below and the public attitude in the conservation of biodiversity indirectly through the collaborative forest was assessed.

#### 5.1 People Participation in CFM in Terms of Biodiversity Conservation

People participation in CFM usually shown by viewing on people's attitude on biodiversity conservation, level of participation in CFM, which are discussed below.

##### 5.1.1` People's Attitude towards Biodiversity Conservation

No will deny that different people have different attitude in specific subjects. Different people see same thing differently. So a consensus should develop in the program. But while putting arguments on biodiversity conservation, there is a very positive attitude of people regarding the biodiversity conservation in the study area, which is shown in the table below.



*Field Survey, 2004*

People have considerable positive attitudes towards biodiversity conservation through Collaborative forestry concept, cause, this management practices emphasis on the fulfillment of basic requirements (fuel wood, fodder, grass) of local people with free of cost i.e. unless and until fulfillment of the basic needs of people, there is no any biodiversity conservation. 69% of the people are positive for the approach of CFM regarding the conservation of the biodiversity, 20% are negative and 11% are neutral. They wish to have diversified and well stocked forest in the future. They advised to have plantation, forest management practices like thinning and pruning. They also suggested carrying out the NTFP plantation, training and field visit. They are in a strong view to keep some area undisturbed so as to have different habitat improvement to conserve the biodiversity for the future generation.

### **5.1.2 People's Participation in Collaborative Forest Management**

Most of the users' group members were aware about the forest. Since the main occupation of the people is fishery and agriculture, they felt the need of the forest resource. Hence the proposed forest is not handed over yet but the people are managing forest as collaborative forest named as Sahajnath Collaborative forest. The community with the help of District forest office conserves and protect as the collaboratively. They have formed the committee for the conservation and protection of the forest in collaborative way.

The forest was decreasing greatly before the formation of the committee, but after the formation of CFMG there is stop in decrement. The situation of the forest is same before and after the formation of the CFMG, but there is no decreased. After the formation of the committee, people were concerned about the forest and have begun to protect.

As compared to the past the destruction of the forest and encroachment of the forest by the human intervention has been significantly decreased. They caught the thief and stop the encroachment on forest and give punishment by themselves.

Nevertheless, the people are hopeful that after the legal handover of the forest, the future will be secured than the present.

Despite all above-mentioned positive attributes, there are some technical and social challenges.

There is a major debate in terms of management practices, benefit sharing and decisions making by committee between the hill migrant people and indigenous Terai People.

### **5.1.3 Effectiveness of CFM over Other Management Practices in Terms of Biodiversity**

There are numerous problems in implementing community forestry development activities which are complex, multidimensional and interrelated. It is also found that in most cases policies are not clear and programs are not well formulated. CFM approach tries to address the problems concerning the other forestry development programs so it is more effective than other management approaches. Some other problems concerning the community forestry development programs in Terai region are, there are acute land-use conflicts, strong market forces and high commercial value of forest products, fairly young settlements and acute ethnic diversity, wide gap of trust between the local people and forestry gap, difficulty in identification of real users, discontinuity of program, tendency of user groups to demand forest areas simply for harvesting and not for long-term management, poor communication between the centre and field etc.

So the main objective of introducing the CFM in Terai region is to address the problems concerning the community forestry development programs and other management plans like OFMP.

This approach is also very much effective due to its important aspect like it covers the user right of the distant users, it adds some of the benefit as government revenue and also it covers most of all the stakeholders, which other practices fails to cover and include it.

- Issues of Distant User

Generally the forest of the Terai forest cover the big area with big patch forest stretches up to the boarder side. There are also forest users in the south towards the Indian boarder who are traditionally using the forest. They have also equal right to use the forest, so the main beauty of CFM over other practices is that it also considers the rights of the distant users which make to stop the encroachment and theft of the forest area and products from the distant users and everybody at the distant users also feel the ownership in the forest.

- Government Revenue

Another important aspect of the CFM approach is that it increases the government revenue. Since government also get the profit from the forest management, so it is also responsible for the sustainable management of the forest, so government help in formulating appropriate Plans and programs for the sustainable management of the forest, and hence promote the conservation of the biodiversity.

- The Entire Stakeholder

Different bodies like forest product users group, local government bodies, government line agencies, political institutes, forest based industries, NGO's and CBO's are the stakeholders who are totally involve in the platforms need to be developed in the district level to plan and implement for scientific and sustainable management of Terai and Siwalik forest (Schoubroeck and Karna 2003). There is different responsibility for all stakeholders for the conservation and utilization of the forest, not only community is responsible for the management and in also decision making, but there is also stake holders, so if the forest is degraded, all the stakeholders is responsible, so all of them keep effort for the sustainable management of the forest.

## **5.2 Analysis of Approaches and Programs in Terms of Biodiversity Conservation**

Different approaches and programs are under implementation for the conservation of the forest in the site to fulfill the basic needs of the local users. Major CFM program and analysis of this program and activities are discussed below.

### **5.2.1 Major CFM Programs**

Since the formation of CFMG just took place one year, there is less CFM program introduced in the area like the field visit related to the NTFPs, formation of committee and sub committee, protection of forest from encroachment and theft where as government emphasis to put forward the activities like fire line construction and maintenance, seedling production for government forests and plantation including NTFPs workshop and extension activities are carried out to support local people and socio-economic improvement program through BISEP-ST program. District forest of Bara has recently prepared a five-year Working Scheme 2003. Main objectives of the schemes are based on the 10<sup>th</sup> five-year plan of: (i) CFM system involving local users in the mainstream of development (ii) Priority on the poverty reduction of the local people through employment generation and involvement in income generation activities, and (iii) Sustainable management of forest resources and biodiversity conservation (BISEP-ST, 2004).

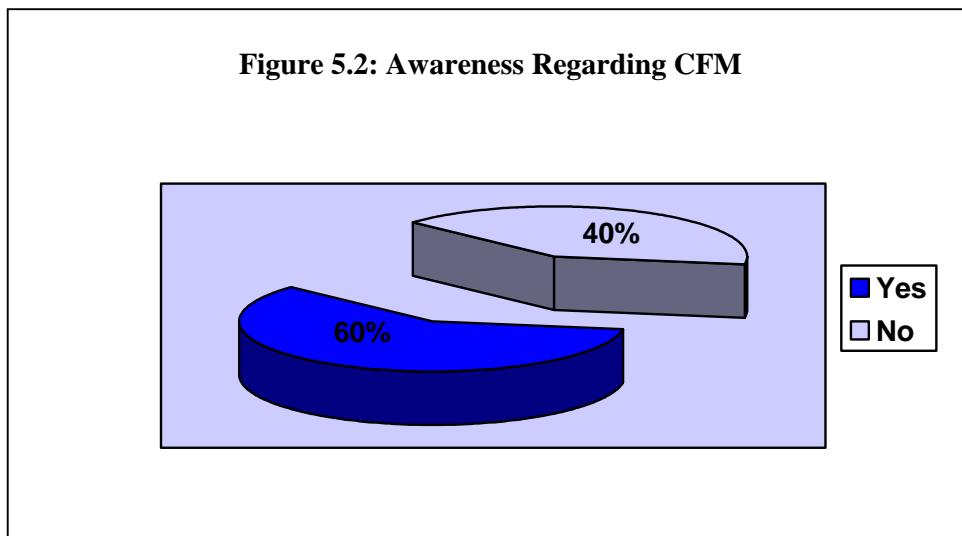
**Box 5.1: Objectives of CFMG**

- Sustainable management of forest through involvement of different level stakeholders and self-sufficiency in forest products
- Involvement of women, poor and economically backward people for economic development
- In order to keep environmental balance and assist biodiversity conservation
- Proper management of local resources and employment generation through different skill development
- Revenue generation through commercial utilization of forest products

Source: IDEA, 2004

The above-mentioned program of CFM is concerned for the conservation of the forest with the Fulfillment of the basic needs of the people. Since forest is the main source of the biodiversity, i.e. if the forests is conserved and manage, then it is sure that there is the conservation of the biodiversity, i.e. with the conservation and management of forest, there is the manipulating of the different habitat, and also it is clearly mentioned in the objectives of CFMG in box 3 which also promote the conservation of biodiversity.

**5.2.2 Efficiencies of the program**



Source: Field survey 2004

Hence, the approach of CFM in Terai passes one year, and during this one-year, out of 47 people interviewed, 40 people came to know about CFM approach, and remaining still to know i.e. 60 % of the people are aware and familiar about the CFM approach. Different programs include in the CFM as mentioned in 5.4 is quite effective for the conservation of biodiversity, but practically people are not utilizing in their field, so it must be effectively applied.

**5.2.3 Major Vegetation Types**

*Shorea robusta* is the dominant species of the area. The other associates species of the area are Karma, Jamun, etc.

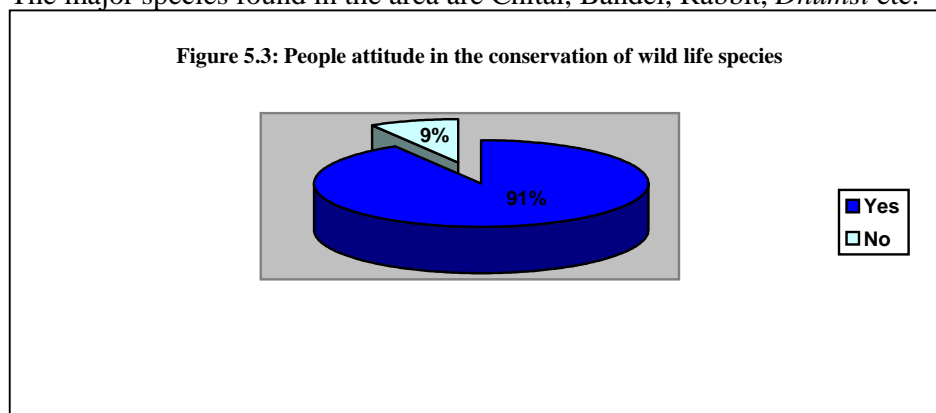
**Table 5.1: List of the vegetation**

S.N.	Scientific Name	Species	Coverage %
1	<i>Shorea robusta</i>	Sal	53.15
2	<i>Dalbergia sissoo</i>	Sissoo	14.39
3	<i>Tectona grandis</i>	Teak	10.65
4	<i>Dillenia pantagyna</i>	Tatari	3.67
5	<i>Eugenia jambolana</i>	Jamun	3.19
6	<i>Adina cordifolia</i>	Karma	2.47
7	<i>Lagerstromia parviflora</i>	Botdhayaro	2.46
8	<i>Careya arborea</i>	Kumbhi	2.23
9	<i>Mallotus Philippinesis</i>	Sindhure	1.55
10	<i>Hymenodictyon exelsum</i>	Bhurkut	1.32
11	<i>Mysine semiserrata</i>	Kalikath	1.31
12	<i>Gurga pinnata</i>	Dabdabe	0.24
13	<i>Duabanga gradiflora</i>	Lampate	0.92
14	<i>Semecarpus ancardium</i>	Bhalayo	0.45
15	<i>Eugenia operculata</i>	Kyamuna	0.07
16	<i>Phyllanthus emblica</i>	Amala	0.03
17	NA (Not Available)	Badcaule	0.03
18	NA	others	1.87
Total			100

Source: IDEA, 2004

### 5.2.4 Major Wild life Species

The major species found in the area are Chital, Bandel, Rabbit, *Dhumsi* etc.



Source: Field Survey 2004

There is no such especial program for the conservation of wild life but the people feel need and importance of wild life for the beauty of the forest, so as they are aware in the conservation of wild life species and the forest. Out of 47 people interviewed 43 people are positive in the conservation of the wildlife so as they showed interested in the conservation of it whereas remaining are neutral and are against of it.

### 5.3 Benefits of CFM

To solve the problem of the Terai forest, this CFM approach was introduced for the proper sustainable management of the forest by solving the conflicts. Different benefits for different stakeholders according to the input to the forest are given below in table 4.

**Table 5.2: Investments and Benefits for Major Stakeholders**

Stakeholders	Investments	Benefits
DoF	<ul style="list-style-type: none"> <li>• Identify forest blocks and their boundaries for CFM</li> <li>• Divide forest into CFM units</li> <li>• Prepare basic management plan for managing trees</li> <li>• Formalize CFM users groups</li> <li>• Arrange resources form implementing CMF plans</li> <li>• Implement tree management plans</li> <li>• Provide technical assistance to CFM user groups</li> <li>• Conduct secondary protection measures</li> </ul>	<ul style="list-style-type: none"> <li>• Majority share income from sale of tree products</li> <li>• Minority share of income form sale of user-managed NTFPs</li> <li>• Environmental benefits</li> </ul>
Local Government	<ul style="list-style-type: none"> <li>• Form CFM user groups according to set criteria</li> <li>• Monitor NTFPs management plans</li> <li>• Resolve conflict generated at local level</li> <li>• Coordinate management plan implementation</li> <li>• Support CFM user groups, according to capability</li> </ul>	<ul style="list-style-type: none"> <li>• Share of income from sale of tree products</li> <li>• Gains for local economy through the creation of jobs in forestry sector</li> </ul>
CFM user groups	<ul style="list-style-type: none"> <li>• Protect forest from animals, theft, encroachment and fire</li> <li>• Support implementation of the management plans</li> <li>• Implement NTFP management plans and harvest NTFPs</li> </ul>	<ul style="list-style-type: none"> <li>• Majority share of income form sale of NTFPs</li> <li>• Share of income form sale of tree products</li> <li>• All lops and tops free of cost</li> </ul>

*Source: Shrestha, 2002*

#### 5.3.1 Illegal Hunting, Poaching and Encroachment

Illegal hinting, poaching and encroachment are the major problem in the area. These activities are not completely stopped. However, the existing committee tries to do so. The committee caught the thief whenever they find and gave punishment by themselves.

**Box 5. 4. A case of Kakadi: Some appreciative work of Committee**

This is a beautiful story that comes from Mr Trilok Chaudary chairman of CFM, where illegal hunting, poaching, and encroachment have been beautifully addressed. Accordingly, there was a huge encroachment of the land of area about 25 biga in the northern part of Kakadi VDC. The beautiful forest was about to change to agriculture land. But the situation could not turn into this phase because of the efforts put up by the collaborative committee of CFM. The committee stopped the encroachment and now the situation is going to be out and about.

The committee has decided there to do some agro forestry activities and plantation so that there will be benefits from the encroached land. Besides this, committee members are also protecting the forest form theft. They even have caught the thief and have punished him. They have captured the logs, timber and have stored it. They have utilized these logs and timber for development activities such as making bridges, supporting schools, etc.

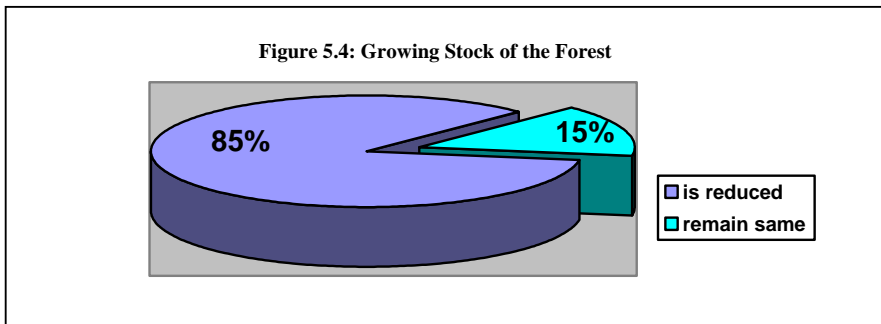
**5.3.2 Maintenance of Growing Stock**

Growing stock per hectare is 115.14 m<sup>3</sup>, which is 24% less than 1994. In 1994, the average growing stock was 150.44 m<sup>3</sup> per hectare.

*Table 5.3: Comparison of Growing Stock between 1994 & 2003*

Year of Inventory	Growing Stock m <sup>3</sup> per hectare
1994	150.44 m <sup>3</sup>
2003	115.14 m <sup>3</sup>
Gap in growing stock between 1994 and 2003	35.3 m <sup>3</sup> (24 % less in 10 year period)

*Source: IDEA, 2004*



*Field Survey, 2004*

Growing stock of the forest is reduced sharply, but after the formation of the committee, it remains same. Out of 47 interviewed, 40 argue that the growing stock of the forest is reduced and remaining state that the growing forest is same, before and after the formation of the CFM committee.

### 5.3.3 Regeneration Availability

The total 36 sample plots were taken for regeneration estimates in plot-I. An average of 7910 numbers of seedlings was found per hectare.

Table 5.4: Regeneration Status

Regeneration	Number
< 4cm diameter	6888
4-9.9 cm diameter	1022
<b>Total</b>	<b>7910</b>

Source: IDEA, 2004

Direct observation of the forest shows that the regeneration status of the forest is average. The forest is threatened from fire grazing and illegal theft of timber, fuel wood and other forest products. There is lack of management and conservation activities.

### 5.3.4 Promotion of NTFP

NTFP is one of the alternative sources of income. Bara district is very potential for development and production of NTFP especially Sahajnath forest because of its unique topography. Numerous varieties of NTFPs are found abundantly in the forests area. But due to lack of proper management, technology and collection tools, the situation of NTFPs resources have been degrading and depleting gradually. Another significant cause for depleting and degrading cause is due to lack of knowledge. People didn't identify the NTFPs. Field visit for the promotion of NTFPs is given there to the selected local people, but this is insufficient. Due to improper implementation, it becomes worthless.

Table 5.5: List of NTFP

S.N.	Scientific Name	English Name	Local Name
1	<i>Asparagus spp.</i>	Asparagus	Kurilo
2	<i>Emblica officianalis</i>	Embelic Myorobolan	Amala
3	<i>Mentha spicata</i>	Spearmint, Garden mint, Lamb mint	Pudina, Bawari
4	<i>Ocimum sancyum</i>	Basil	Tulsipatra
5	NA*	NA*	Palmarosa
6	<i>Andropogon citratus</i>	Lemon grass	Pirheghans

Field Survey 2004

\* Not Identified

## Chapter VI

### Conclusion and Recommendation

#### 6.1 Conclusion

The finding of the present study shows that the approach of CFM is effective for the conservation of biodiversity if it is applied properly. CFM approach is the new concept in the forestry filed for the conservation of the Terai forest i.e. conservation of the forest by the mutual relationship between all the stakeholders in all step of the forest management work, even in decision making also, so every stakeholders are responsible for the forest management.

The CFM approach is effective than other management approaches in terms of three different aspect for example, it consider the right of the distant user, i.e. also it also includes the distant users in the benefit sharing and forestry activities. Second it includes entire stakeholders in the management of the forest and the third beauty of CFM approach is that it also includes the government in benefit sharing i.e. it increase government revenue.

Since the working scheme of CFM is in the process of formulation, the frequent CFM programs conducted till date are study tour and regular interaction meeting.

People are aware about the forest and wild life. They felt the need of it. 60% people are familiar with the CFM approach whereas remaining are at the sea. They even didn't know what CFM is.

Growing stock of the forest is reduced by 10 % in one-decade form 1993 to 2003, but after the formation of the CFMG, they tried to maintain the growing stock of the forest. Total regeneration of the forest is found 7910 per hectare, by the direct field observation of the forest, regeneration of the forest is good, but it is threatened form open grazing and also CFM is not handed over legally, it is also threatened form the people also.

While the benefits of the CFM approach in terms of biodiversity are it promotes the MAPs, reduction of illegal hunting and encroachment of the forest. There is formation of the committee and sub committee for the protection and conservation of the forest. Study tour related to NTFP for its promotion is done. Especially, Committee personnels are responsible to reduce the encroachment and illegal hunting which promote the conservation of the forest and hence biodiversity is conserved.

#### 6.2 Recommendations

Since the concept of CFM approach is new in the forestry sector for the management of Terai forest, there is still to develop the working schemes and programs. At present, this approach is using as trial basis, so first it should be handed over, which ultimately solve many problems.

Awareness regarding CFM is less therefore priority should be given awareness program. After the complementation of developing working scheme and program, it is necessary to develop also management strategy to run the program smoothly.

There is still a conflict between the users and committee and also between the people between Hill migrant and indigenous people which result the degradation on natural resources so consideration should also given in solving the conflict and misunderstanding between them.

Regular monitoring and regularity of the program is needed so that the programs and the approaches the program becomes sustainable and hence enhance the conservation of the forests so as to conserve the biodiversity.

The specific working scheme in the CFM is not yet prepared so far. So working scheme of CFM should be formulated and also implement.

Many IGA activities are demanding by the people so such programs should be developed so that the pressure on the forest is reduced in order to enhance the protection and conservation of the biodiversity.

Since the concept of CFM for the management of Terai region is new, and there is very few studies carried out in this field, so further studied should be carried out.

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## Annex A: Questionnaire for Household Survey

Name of the respondent:

VDC:

Sex :

Occupation :

1. What sort of domestic animals do you keep?

Oxen	Buffalo	Cow	Goat	Others

2. For what purpose do you keep them?

Meat	Milk	Ploughing	Others

3. What are the major crops you grow in your field?

Paddy	Wheat	Maize	Sugarcane	others

4. Do you go to the nearby forest for any products? Please specify.

5. Do you know the concept of CFM

Yes	No

6. If yes, how long has it been?

From the beginning	Later

7. What are the major plant species in this area?

8. How do you think these plant species are conserved?

Community forestry	CFM	Private Forestry	Others specify

9. How do you value CFM?

Excellent	Very good	Good	Poor

10. What about wild animal species? What types of wild animals can you see here? Please specify.

11. Do you have any evidences to show the role of CFM in biodiversity conservation?

12. How were these forests conserved before? Please specify.

13. How are these forests conserved then? Please specify any programs you have here

14. What roles is DFO playing in conserving these forests? Please specify.

- 15. Do you think present system of CFM is enough for biodiversity conservation?
- 16. Precisely, may you please tell me if hunting, encroachment has decreased over time?
- 17. Is the growing stock maintained?
- 18. Are there any species that are threatened?
- 19. Are there notable species that have been safe with CFM?

20. Has CFM promoted NTFP?

Yes	No

- 21. Is yes, which species? Please specify.
- 22. What are the major problems that you are facing with CFM? Please specify.
- 23. Do you see any role of supporting organization in promoting biodiversity through CFM? Please specify.

## **Annex B: Questionnaire for Officers and Rangers**

Name:

Office:

Position:

1. What are the objectives of CFM approaches?
2. Are people positive towards the CFM approach?
3. What are the major programs in CFM till now?
4. Is CFM could be one options for the biodiversity conservation?
5. If yes, how?
6. What are the programs in CFM for the conservation of biodiversity?
7. Are there any species that are threatened?
8. If yes, how could you conservation that species and is there any program for that?
9. Did CFM promote the NTFP?
10. What are the major problems that you are facing with CFM? Please specify.
11. How do you solve the problems or do you apply any alternative options for solving the problems?
12. Is CFM really effective than other approaches?
13. If yes, how?

**Annex C: Map of Study Area**



**Annex: D Photos of Study Area**



*Plate no.1 Showing Regeneration Status of Forest of Study Area*



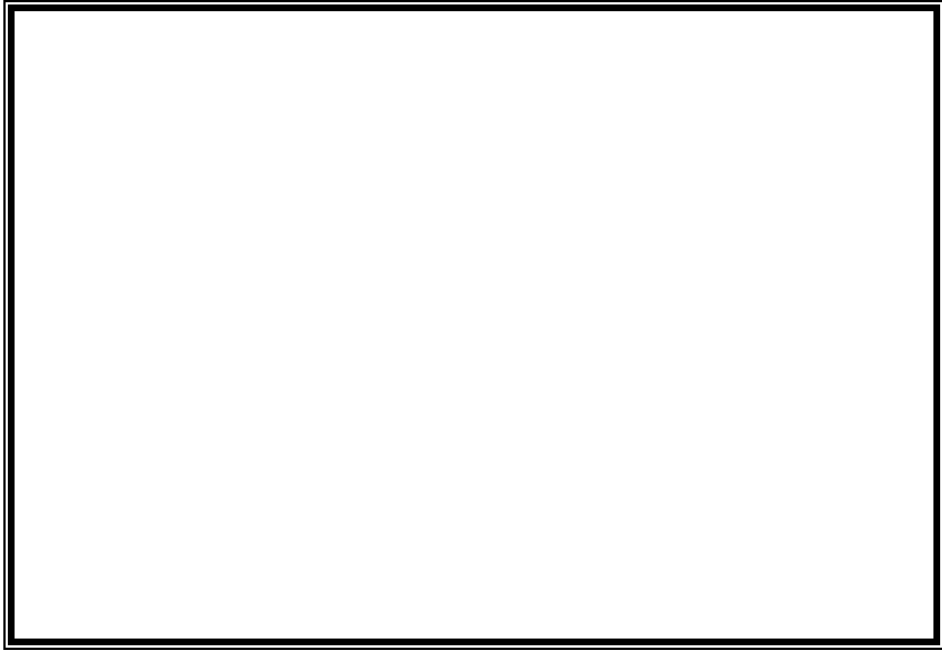
*Plate 2: Discussion with Mr. Surendra Shrestha, AFO, Simara*



*Plate no 3: Farm land of Study Area*



*Plate 4: Interviewing Chairman of CFM, Mr. Trilok Chaudhary*



*Plate no 5: Encroached Land*



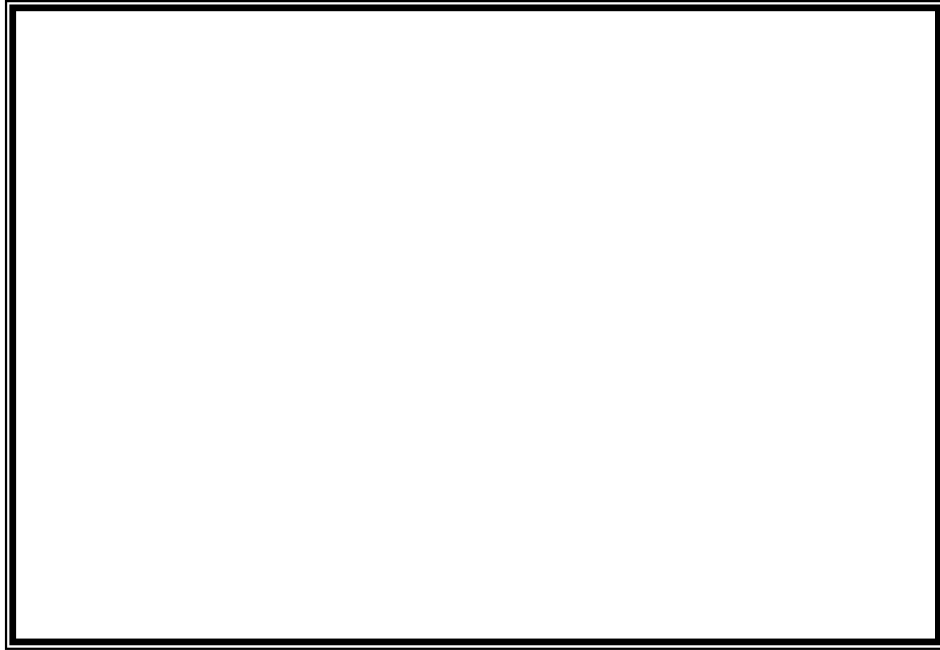
*Plate 6: House holds Survey*



*Plate no 7: Field Visit with Mr. Ram Sagar Mandal, Ranger*



*Plate 8: Discussion with lady member*



*Plate no 9: House holds Survey*



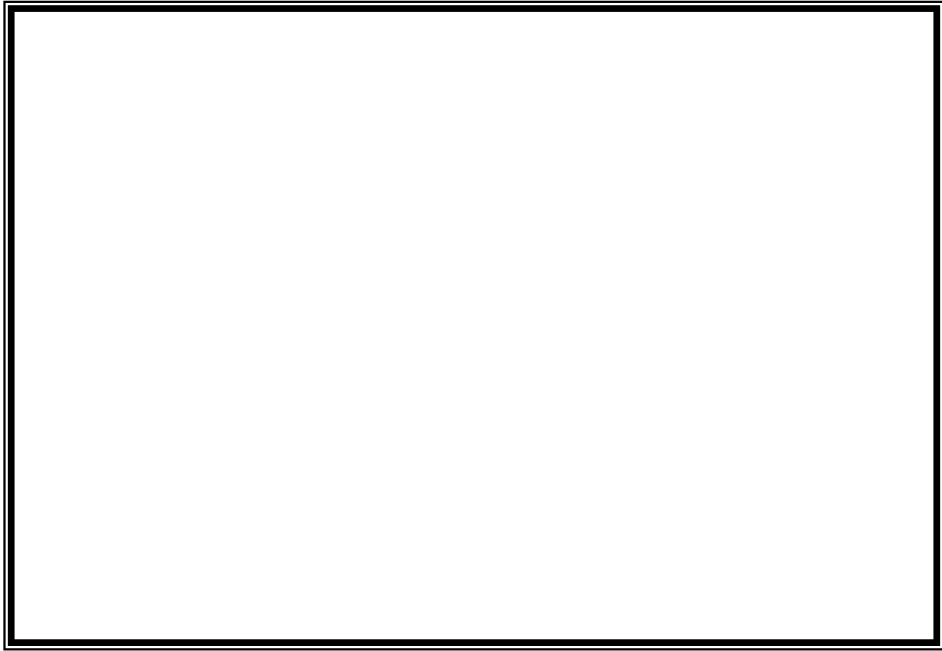
*Plate 10: Discussion with Foresters*



*Plate no 11: Small Group Discussion*



*Plate 12: Interviewing Local People*



*Plate no 12: Interveiwing Local People*