TRIBHUVAN UNIVERSITY

NATURAL RESOURCES MANAGEMENT: A PARTICIPATORY PERSPECTIVE

(A case of Singiya VDC, Sunsari)

A Dissertation

Submitted to the Central Department of Geography, Faculty of Humanities and Social Sciences, for the Partial Fulfillment of Requirement for Master's Degree in Geography

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CHAPTER I

TRIBHUVAN UNIVERSITY
FACULTY OF HUMANITIES AND SOCIAL SCIENCES
CENTRAL DEPARTMENT OF GEOGRAPHY

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Dissertation Committee

ACKNOWLEDGENT

Offering this dissertation to my parent and family, who contributed me this courage and effort slicing their meal and clothes and living homelessly as the refugee

Natural Resources Management: A Participatory Perspective (A Case of Singiya VDC, Sunsari) is a dissertation prepared to submit to the Central Department of Geography, Faculty of Humanities and Social Sciences, for the Partial Fulfillment of Requirement for Master's Degree in Geography. At this moment, I would like to state that it is a joint effort of various individuals and institutions from various sectors.

I would like to acknowledge all those, who contributed their important effort to provide the final shape of the dissertation. First, I would like to express my sincere gratitude to the department head, Prof. Dr. Bhim P. Subedi and his Department – Central Department of Geography, T.U. – who provided me this glorious and challenging opportunity to carryout the research on the them of NRM. Second, I would like to thanks my respected supervisor, Mr. Umesh Kumar Mandal, for his important guidance. Similarly, I would like to thanks my respected teacher Mr. Motilal Ghimire, who supervised me at the initial phase.

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Abbreviations

AO:	Area Officer
CDO:	Chief District Officer
CFP:	Community Forestry Program
Cft:	Cubic Feet
CFUG:	Community Forestry Users,
CM:	Conflict management
DFO:	District Forest Officer
FECOFUN:	Federation of Community Forestry Users-Nepal
FGD:	Focuseds Group Discussion
GIS:	Geographic Information System
ICM:	Interactive Conflict Management
LSGA:	Local Self Government Act
MG:	Monitoring Group
MoU:	Memorandum of Understanding
NPC:	National Planning Commission
NR:	Natural Resource
NRM:	Natural Resources Management
NTFP:	None Timber Forest Product
SDC:	Sunsari District Court
VC:	Valve Chamber
VDC:	Village Development Committee
WUC:	Water Users Committees
WUG:	Water Users Group

Glossary

Abbal:	Very high category of land on the basis of fertility.
Bari Land:	Upland
Bhari:	A bundle of immeasurable goods with the weight that a person can lift at once
Bigha:	0.67 hector equals to 1 *Bigha*
Charkose Jhadi:	Dense forest of Nepal, extends form East to West along the north from Tarai and south from the hill.
Dalits:	Socially considered 'low caste' members
Dhalapada:	Wood, lay down on the ground/ wood with low quality
Dhalpa:	A post of employee in the Chatara Cannel Sub-Branch. The main duties of Dhalpa is to distribute water according to the approved schedule and maintain the cannel.
Dharmik Ban:	*R*eligious forest
Dhuni:	A fire center
Doyem:	Second category of land
Guthi-land:	A trust of land
Halo:	Plough made of wood
Haris:	A piece of wood used for preparing Halo
Khar:	A kind of grass that is used on roofing house
Khola:	Stream
Kitta:	Plot size of Land
Man:	40 kg equal to 1 *Man*
paddy land:	Irrigated land
Quintal:	100 kg.
Sim:	Tertiary category of land

1. INTRODUCTION

1.1 Background

Natural resource refers to any property of the physical environment, such as minerals, vegetation, water, land, forest etc, which human can use to satisfy their needs, (Myhew 1997: 297). Every property of the environment is not natural resource. It only becomes a resource, when human exploit it. Generally, soil, minerals, water, forest products, and air are accepted as natural resources.

There are mainly two types of natural resources (Lekhak and Lekhak 2003:1-2): tangible resources (Material Resources) are measurable in quantities. Some tangible resources that are being used frequently by users today are fresh air, clean water, fertile soil, and forest products, and intangible resources (Non-Material Resources) cannot be measured in quantity but only can be felt in our sense. Solitude, tranquility, joy, security, beauty etc., are the examples of intangible resources.

The land, which is an invaluable resource, not only for livelihood but also for social prestige, provides food and settlement to the human being. Forest provides fuel, fodder, and construction materials. Furthermore, sufficiency of water provides productivity of land and health, and forest is the means of environmental balance.

Resource like minerals has been proved as the way of civilization. The inventions of petroleum and natural gas have pushed the world civilization countless times ahead. These new resources, which are being invented as new techniques, are successfully able to establish a balance with population growth and able to afford the heavy world population. People always exploit resources and fulfill his needs. The amount and type of resources vary from place to place.

In most cases, resources are limited with respect to the user or people. Generally, the available resource is limited what human being wants to use it.

Natural Resources Management (NRM) refers a balance between local people as user and their exploitation as activities over the natural resource. It is quite similar to a popular Nepali proverb *Sarpa pani marne, Lathi pani nabhachine"* or killing of a snake without any hurt and loss. It refers consumption of resources in proper way.

Upreti (2002) defines that NRM means appropriation, distribution, utilizatio n, and conservation of natural resources and the legitimate way of controlling them. Actually, NRM has an important responsibility of enhancing the resources to the next generation with contemporary use, by which local people (users) can get maximum benefits and resources can also be quite protected and reproduced with various technologies that are available in local level.

On the other hand, NRM requires user's participation. Local people, who know resources very closely, are the real master of resources. Their participation will be more important for eco-balance. There are major two aspects in NRM – users aspect and resources aspect. A balance, which is defined as NRM, between these two aspect is the way of environmental justice by which every elements of ecosystem can get a proper chance to be protected and developed itself.

Nowadays, NRM is popularly being used as the means of poverty reduction with the proper use and management of resources, and poor people of developing countries like Nepal are benefit ing well. Because of it, we can say that poverty is the result of unequal distribution and unsystematic management of resources.

It is obviously seemed that only those people, who exploit it, can preserve the natural resources themselves. It is argued that the participation of local people in

the development of natural resource is considered as the best way to preserve, use, and management of it. People always want to exploit locally available resources to a maximum possible through using various technologies and that is defined as development. While local people involved not only in exploitation but also in management, then the development gets sustainability.

Under these condition, this study is going to be carried out on natural resource management in Singiya Village Development Committee (VDC) of Sunsari District. This study mainly focuses on land, water and forest resource management on the perspective of local participation.

1.2 Statement of the Problem

Basically, the concept of Natural Resource Management is accepted as balance between population and natural resources of a particular region. Because of its limited characteristics, natural resources and its balance with growing population are also being appeared obviously as a burning issue. After the elimination of malaria in 1956, the restoration of democracy in 1990, and furthermore illustration of Maoist insurgency, Tarai Region of Nepal has got an explosion of population growth that it was never experienced. "With a surge of hill migrants to the Tarai, the population grew from 2.5 million in 1971 to 6.7 million in 2001. The tremendous pressure on natural resource, resulted in forest conservation, deforestation, habitat degradation, fragmentation, and socioeconomic complexities."[1] As a result some problems on resource management are being caused.

Because of increasing population, the access of people over natural resources is further pooring. Increasing population and reducing natural resources are merely producing conflict in society or among the users. Tarai region is facing

[1] //http//www.wwfnepal.org/wwfs presence in Tarai/Tarai Landscape Program.

more such kinds of problem than the other region. Because of over exploitation, natural resources are degrading day by day. For the name of development, resources are being affected negatively, which cannot be defined as development. Sustainable development of resources is essential, because the users able to use and recycle it to handover the future generation.

Singiya VDC, thus the study areas, is also the area of eastern Tarai. Population of the study area is rapidly increasing with the growth rate of 3.06%, which is 0.81% greater than the national growth rate (2.25%). 37 ethnic groups, including Hill and Tarai, use to live in Singiya , which is larger ethnic complexity for a tiny area. Ethnically and culturally complex society use to more conflictable than the homogenous society (Upreti 2004: 281-282). Natural resource consumption ratio is increased as increased in population and as in resource-related conflict.

On the other hand, *Sunsari, Sera, and Duttkitcha Khola* (stream) – the major drainage systems of the study area – are eroding the soil damaging hundred *bighah*[2] of arable land and forest. Little relief works that have been carried out by the local government, VDC, are not sufficient to manage the hazards. Local technologies, which are being adopted by the local people in natural hazard management, are not under the concern of local government. Very little, only tow, scholar had carried out research in Singiya VDC, but are not on natural resource management. Probable technologies and customary systems are to be studied necessarily that helps to draw a future plan or strategy on NRM.

In this outset, what views do the users take about the relationship between natural resources and society? What kinds of technologies are being adopted in management system? What is the condition of landuse pattern of the study area? What are the challenges and difficulties that user are facing today especially in

[2] 0.67 hector equals to 1 Bigha.

tarai region in terms in NRM? What are the current managing systems and are they suitable or not? How are the user resoluting resource-related conflicts and whether the resoluting systems are promoting the natural resource development? These are the provocative questions that should be answered by the contemporary researcher.

The study area also is seeking the answer of these questions and those answer may lead to further development of natural resources management system.

1.3 Objectives of the Study

The overall objective of this study is to study the management systems of Land and Forest resources that existing in Singiya VDC of Sunsari district. Specific objectives are as follows

1. To assess the population pressure on land, water and forest resources
2. To analyze the management system of land, water, and forest resource
3. To examine the conflict management relating land, water, and forest resource.

1.4 Conceptual Frame

"Concrete condition do not validate, it is the concept which makes possible and validates and analysis of the concrete (Hindress et al 1977: 180)."

Conceptual frame is a glass of view by which the real situation of the study area can be observed really. Bhattarai (2003:5) stated about the conceptual frame in his book, that conceptual frame assumes paramount significance before

venturing in to empirical investigation of a concrete phenomenon in a concrete situation.

To make the study very systematic and scientific following concepts are applied in study.

1.4.1 Relation between Population and Natural Resources

Through the previous world's civilization history, the importance of natural resource is reflecting on population. 'What determine the standard of living of a community was the ratio between its productive capacity and the size of its population, its productivity per head (Wrigley, 1996: 7). It means the living standard of a man or a community depends on the existence of resources. Kathmandu, the capital city of Nepal, which is now more advanced than other cities of Nepal, was more richer of the natural resources once than other places.

A model that was developed in early seventies by Paul Ehrlich and John Holden (1970), can enlighten the relation between population-growth and natural resources. They formulated a model as Impact (I) = Population (P) × Affluence (A) × Technology (T). These three factors, which can play vital role in environmental degradation, are: i. number of People (Population Size) = P, ii. the average number of units of resource each person use (consumption per capita/affluence) = A, and iii. The amount of environmental degradation and population produced for each unit of resource used (the environmental destructiveness of the technologies use to provide and use resources) = T.

The model, $I = P \times A \times T$, compares well the relation between natural resources and population growth and its technological development.

To enlighten more about the importance of natural resources and the relationship between population and resources, presenting the degradational pathways of Michael Martimore, will be more fruitful. According to the pathways, for various causes, population increases resulting the incensement of

food demand. Demand for food leads obviously the more cultivated area reducing the length of fallows, which results to decline the soil fertility. Because of declination of soil fertility, the yields of land per hector, man-our also will decline. Ultimately the falling output results food scarcity.

On the other hand, declining of the soil fertility results soil degradation, erosion and ultimately, environmental destruction (Sarre and John, 1995: 97).

This pathway, which is developed according to Malthusian Population Theory, can quite answer to the question that why is the natural resource being the emphasizing issue.

In a Malthusian outcome, shortening follows leads to loss of fertility of cultivated soils, declining crops yields, falling output per man-hour, and in the system as a whole. The main theme of this pathway is population growth ultimately leads to the food scarcity and environmental destruction. It does not deal that the problem, which is created by the population growth, may create new effort that invents new technology and leads to the balance.

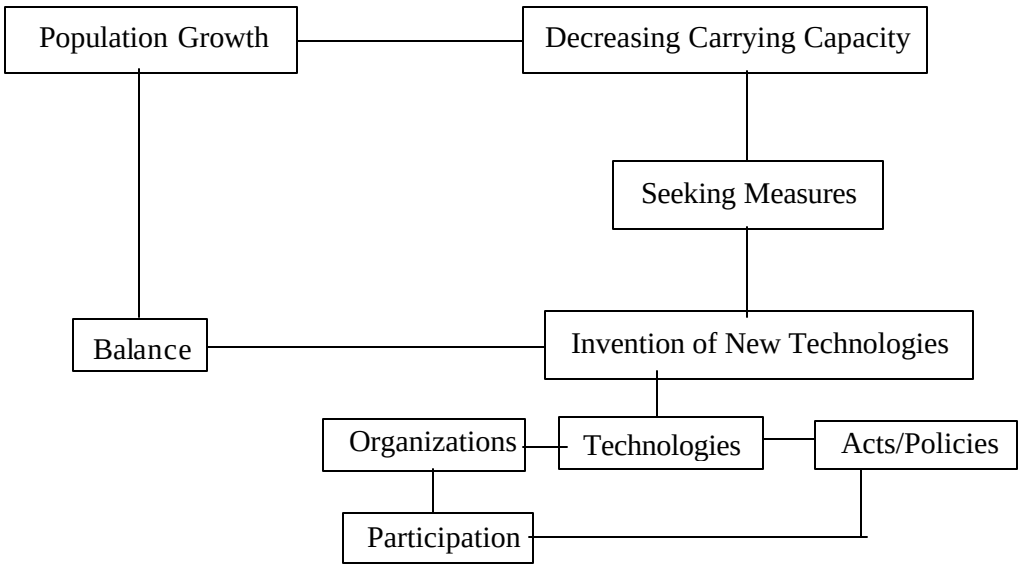
1.4.2 Natural Resource Management Process

On the basis of ground reality and experience, the concept of NRM process is developed himself by this researcher. The researcher would not like declare it a concrete concept but it is forwarded to be discussed in the scholar arena whether it is a concept or not. In depth-discussion among the scholar can provide the final shape of this concept

According to the concept, the origin point of the NRM concept is breaking of balance between population growth and natural resource. Although Gurung (1996:2) defined the population as not the major cause of misbalance and poverty, population growth leads all kinds of problems such socio-economic, political, and historical problems.

After creating misbalance by population growth declining carrying capacity, new measures of balancing are quested. The effort of seeking discovers a new technology and finally the application of new technologies establishes a new balance. NRM process is presented on fig. 2.

Fig. 2 Natural Resource Management Process



The NRM process can be compared with Darwinian concept of 'Struggle for Existence.' Fundamentally, the struggle for existence in nature arises from the different modes of change in organic and inorganic matter (Hawley 1950: 14). Human practices for establishing balance are its own struggle that developed out as process.

The concept of balance, here, is being compared with reestablishing the carrying capacity of natural resources. 'As applied to human population the concept of balance concerns the ratio of numbers to the opportunities for living (Hawley 1950:49).

In this NRM process, the issue is arisen because of population growth. Immigration and natural increase play a crucial role in growing population of particular space. That increasing population creates a high demand of resource and tries to consume to meet high level of satisfaction. Because of high

consumption, environment starts to loss its carrying capacity. Very slowly, the users notice an imbalance between the emerging population and the available resources and they start to seek some measures that help them to reestablish a balance. Their seeking effort (may) find or invent a new technology – organizational, people's participation, acts and policies, and technologies – that help to meet their goal of establishing a new balance between natural resource and its users.

It is assumed that the NRM system of the study area also passing through this process. Population of the study area also is increasing due to the migration and natural increase and users are practicing to establish a balance.

1.4.3 Elements of Natural Resource Management

This researcher have produced a ***Natural Resource Management Frame*** on the basis of his own experience and ground reality. This researcher hopes that scholars will pay their keen interest on this frame and the discussion will provide its final shape.

Various elements involve in NRM system. Natural resource completely relates with physical environment but the management aspect relates both with physical and cultural environment. Major controlling factor of NRM system is physical factors, which is the major elements of distribution of natural resources. Geographical and climatic factors vary the resources distribution. Those natural products that found in tropical zone can be varied from that of temperate zone and that found in plain can varied from that of mountain and hill. Distribution automatically differs in NRM system.

The other inseparable element of NRM system is socio-cultural factor, which contains social, political, and cultural factors including technology. These factors also play a significant role in NRM system. Nepal is one of the countries, which contains both geographical and social diversity. In such type of geo-social base, no concrete system and technology can be adopted for managing natural resource. Uphoff (1986: 93) states for the role of social aspect in NRM as 'depending upon the social characteristics of the users group and physical characteristics of resource types, we need to determine the institutional options. In small scale, homogenous societies, where traditional institutions still

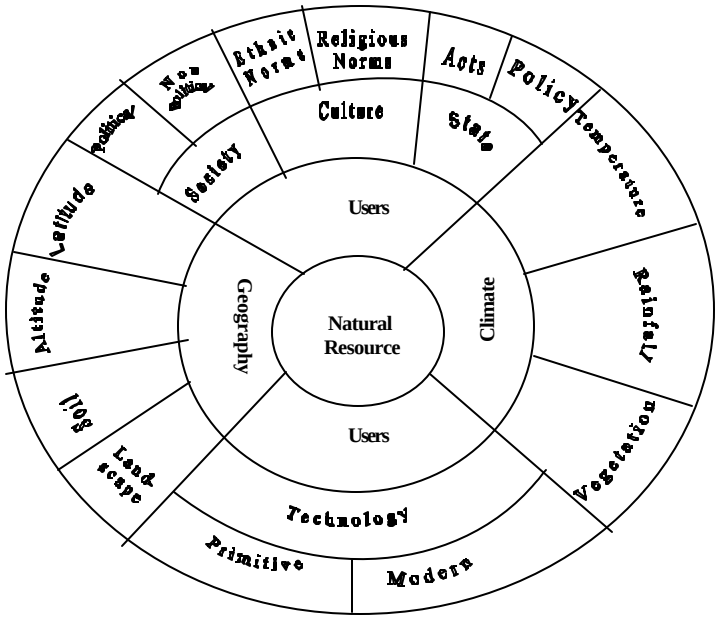
exist without marked bias in favor of privileged interest, traditional institutions should be engaged for resource management.'

Similarly, another part, which cannot be separated form NRM system, is technology. Contemporary change that appeared on technology leads a change in social living standard and in NRM system. 'Technological change is not a once-and-for-all affair. The introduction of a technological innovation is not something that happens only once and can then be taken for granted. On the contrary, technologies often go through innumerable improvements over their life times, and they, therefore, require careful attention by human agents, who are alert to develop on adopt them (Nathan 1996: 114). In some respect, at least, technological considerations seem to offer very promising prospects for the growing population of poor countries like Nepal.

The triangular combination (of environmental, socio-cultural, and technological) produces a NRM frame (Fig. 3). That is why, those, who works in the field of NRM, should consider at least these elements which are presented in the frame.

Generally, NRM system passes through above frame. But on the specialized case, those all elements, which are presented in fig. 3, may not be affected. This study has been carried out in the context of Tarai region.

Fig 3 Natural Resource Management Frame



Limiting this study in a tinny area, altitude, latitude, and landscape, we can define as geographic factor, may rest in salient side. Their strong effect cannot be felt sharply. But these factors affect permanently in NRM system as well. The other factors that are arranged in frame can affect strongly and directly to the NRM system of study area. This study is done out on the basis of above frame.

1.5 Significance of the Study

This study is closely related with resources management planning of Singiya VDC. It has sought NRM system, which are being practice by people at local level. Furthermore, it has assessed a balance between natural resource and increasing population. Population pressure on resources and natural resource related-conflict management are its other important issues. The other part that this study has carried out is the study of landuse pattern, which may more important for local planners.

This study has confined local people's participation in several NRM work on the perspective of sustainable development, equity, social inclusion and environmental justice. It is also a comparable with the effectiveness of available acts and policies that helps the national planners to draw a new idea on the field of NRM system and resoluting the NRM-related conflicts. Furthermore, this study forded the measures and suggestions, which may be adoptable to manage natural hazards like floods and fire.

1.6 Limitation of The Study

Spatially this study was limited within Singiya VDC of Sunsari district. Of many natural resources, only **land, water, and forest** resources were selected in

the study. Primary and secondary both types of information were included in the study.

1.7 Selection of the Study Area

Hayanu (1979) and Aguilar (19981), Messerschmidt (1981) gave five reason for the choosing own society to carry out study.

a. Problem of research funding
b. Exclusion of western anthropologists from the third world societies
c. Emergence of indigenous anthropologist and competition with them
d. More and more specialization within community
e. Research efficacy in one's own society

Among five, no. d and e were quite related with this researcher. Because of his own locality, the researcher selected Singiya VDC of Sunsari.

On the other hand, Singiya VDC has a crises of natural resource. Because of high population and high ethnic complexity, the resources of the study area are more vulnerable and conflictable.

Migration from hill to tarai is adding complexity of ethnic composition. Chaudhri, Musahar and Shahu are the major indigenous groups and Brahman, Chhetri, Rai, Limbu, Tamang, and Gurung are migrated ethnic groups of the study area. Because of migration and increasing ethnic complexity, land is being fragmented into smaller pieces and social conflicts are increasing on the issues of resources use. Before three or four decades, the indigenous groups were landowners but now they have little land and they are losing their dominancy upon the natural resources.

Ramdhuni forest, the other study area, where ten community forestry user groups are actively forwarding their community work, also located in the western part of Singiya VDC. It is an important and holiest religious place, where a large flame of fire uses to be lit. It is the holiest place for Hindus and thousand of pilgrims visit it every year. But, because of over population, Ramdhuni jungle is badly being destroyed by the surroundings. That is why, Singiya VDC of Sunsari district is suitably selected as the study area.

CHAPTER II

2. LITERATURE REVIEW

Literature review is a process of getting idea by reading all types of publication, which are relevant to the selected topic. Reviewing the literature helps to draw a concrete concept that leads the research systematically. It familiarizes the researcher with the relevant information about the research area. It is important for minimizing the problems, which is to be faced by the researcher because literature shares the experience which are gained by the previous researcher. These importance highlights on the necessity of the literature review.

Some of the literature what I came to touch on the course of study and related with this study, have been tried to be reviewed here.

His Majesty's Government and USAID-Nepal (1969) studied about forest resources of Bardiya Forest Division. It has less emphasized about people participation and natural resources management rather than the forestry study.

Gurung (1988) studied about local people's participation in forest development as the case study of Banskharkha Panchayat of Dindhupalchok district, which is located in the Hill region. Emphasizing of local people's participation, he sad that " in order to develop the forest or even to stop the rapidly increasing deforestation process, only government effort is not enough, local people themselves should be made conscious for their active participation in forest management and conservation. So the local people's participation plays a vital role in forest development" as well as in natural resource management.

Relating with land resources management, Brockman (1986), a foreign researcher, has studied at first about land management of Pipal Chaur Watershed of Kabhre district. He has studied the land with naïve tenure system

and geographic agents of landuse change. In his study, he has included the local technologies, which were being practiced in land management system by local people such as *Parkhal* (stonewall) for terracing the land and he has noted the importance of local people's participation in land resource management.

Using participatory research and field observation methods, he has tried to find the typical techniques out, which had been used in land management and the attitudes of local landholders towards land managing system.

Upadhyaya (1992) studied about forest resources of Bhokraha and Bhedetar community forest of Sunsari district. He presented his study report as classification report of vegetation and species of the vegetation, which he found in his study area. He studied only about forest resources.

Chalise and Gurung (1993) studied about the natural resources management only in mountain environment at a broad regional scale of Hindukush Himalayan region. They discussed about forest, diversity, water, and land resources. They discussed and studied country wise about the natural resources.

Gurung (1996) studied the customary natural resources management systems of Tarami Magar community of western hill of Nepal. He concentrated his study on NRM with cultural ecology and political history. From the perspective of cultural ecology, he focused particular attention on local cultural systems and socio-political institutions and asked whether they have served or can continue to serve as effective means for regulations of natural resources so that local communities can sustain their livelihoods. From the political and historical perspective, he reconstruct historical process, both at the nation and regional as well as the local level, and examined their effects on the local system.

Applying GIS as a major tool, Chapagain (1996), other native scholar, has studied about the landuse change of Kulekhani Watershed with landside

mapping. Using topographic map (1992), Land Utilization Map (1978/79) and other secondary information as major data source, he has studied the landuse change with geographical and physical dimension.

Concluding his findings, he has stated that agricultural land of the study area was increasing and forestland was decreasing. He has further stated that landslide was the dominant natural hazard in the study area.

Qadri (2001) has studied about natural resource management with socio-political dimension as conflict management. In this study, he has not discussed only about the geographic agents and several natural resource management techniques, but also about the resource related conflict and its resolution processes. His study was limited within five interconnected conflicts – two from irrigation system, one *guthi-land*,[3] one spring water resource, and one from forest pasture-land.

He stated that several land related conflict simply had erupted due to the present land-related acts and further weakness in their implementation, in Nepal, as these were unable to ensure the rights and interest of tenant and poor farmers. He concluded that interactive conflict management is based on a social learning perspective and it is a community-focused, learning-based, and action-oriented methodological approach to manage conflict to improve the performance of NRM. Interactive conflict management (ICM) acknowledge the knowledge, skills, and experiences of the community as social capital to the managing conflict.

Population pressure and poverty are the root causes of NR-related conflict in Nepal. Land and forest resources are over exploited because of heavy

[3] The literal meaning of guthi-land is land trust. Guthi-land in Nepal is a religious land ownership arrangement. Such lands are either allocated by the state or by individuals, for a religious or philanthropic purpose. There is special act and legal provision to manage guthi-land in Nepal

dependence of the ever growing population (both human and animals) in the NR base.

In this study, local people participation in the use and management of natural resource has been discussed and been analyzed with the sustainable and participatory development approach. Equity social and environmental justice are explore in the use and management system of natural resources through local people's participation with decentralization approach. Involvements of all ethnic and gender in the natural resources management are analyzed here with the participatory development approach that how many and which groups are participating in land and forest resources management. This study has mainly focused on management system, including customary and modern technologies that are being practiced in the study area. So that it will be quite different from former studies.

CHAPTER III

3. METHODOLOGY

3.1 Area Selection for the Case Study

Singiya Village Development Committed (VDC) of Sunsari district is the study area, where NRM practice can be found as well. After the construction of Chatra Cannel, drainage systems of Singiya VDC have got their track changed eroding hundred hector of arable land.

3.2 Data Collection Techniques

3.2.1 Primary Data Collection

Primary information were collected from the following techniques.

3.2.1.1 Field Observation: The entire meetings, discussion, firewood collection system and other forest consuming and management system, and natural hazards sides were anticipatively observed. Pesticides systems and harvesting work also were observed. By which qualitative information and field experiences were gained and that have helped to analyze the reality.

3.2.1.2 Participatory Rural Appraisal: All the members, workers, and authorities of local government, institutions and community-based organization were gathered inviting with the help of VDC at its office and PRA was done. It helped prepare social map to analyze the land-use change.

3.2.1.3 Key Informant Interview: The chairman of the VDC, the chairman of the Committee of Community Forestry Users, DFO representative, and the chairman of the Committee for Development and Protection of Ramdhuni were interviewed with unstructured questionnaire. By which attitudes

of the organization and institutions to the use and management of resources have been informed.

3.2.1.4 Structured Questionnaire: According to the CBS Report 2001, there are 2359 households and 36 ethnic groups in the study area. Ten percent of household, representing every ethnic group respectively were randomly selected for structured questionnaire. Structured questionnaire were filled up by the house head.

3.2.1.5 Unstructured Questionnaire: For primary information about consumption and management system of forest and land, general users were asked with unstructured questions. These types of interview were produced in extremely informal way so that the respondents did not know about the real purpose of the questioning. By this interview, the realities, which were not presented by the representatives, were obtained.

3.2.1.6 Experiment: An experiment is one of the scientific way of fact-findings. On the course of study, an experiment about the siltation was carried out. An irrigation service is being provided in the study area through Sunsari-Morang Cannel (Chatra Cannel) Project. Siltation rate of the irrigation was tested from an experiment.

Three plastic gallons containing ten litters of water were filled with water from the cannel and put them until the silt was deposited. After its deposition, water was piped away and silt was let to be dried to make be free from water and finally it was weighted. Through this experiment siltation ratio and rate of the irrigation water was found.

3.2.2 Secondary Information

Secondary information were collected from the following institutions.

Satellite imagery of the study area was brought from Central Department of Geography and aerial photographs were from survey-depart. It had been

analyzed in GIS and Remote Sensing to find the people's pressure to the natural resources and landuse change.

Information relating Land and Forest were obtained from the register of the office of Singiya VDC and Survey Depart of Sunsari district.

Information related with forestry were taken from the Committees of Community Forestry Users and the Central Office of the Federation of Community Forestry Users (FECOFUN).

3.3 Analytical Approaches

3.3.1 Decentralization Approach in local development planning

Decentralization refers a distribution of power to the local level, which prefers a people participation both in decision making process and implementing any plan or any local function. It refers not only the distribution of power but also a financial control at the local level. Decentralization is one of the best process by which local people can feel real democracy.

Emphasizing on decentralization, it is said that 'decentralized planning is accompanied by an adequate distribution of funds and (political) participation in the decision-making process at each level (United Nation, 1979: 73). Decentralized University[4] explained the three major function in decentralization: "To distribute the administrative function or power of a central authority among several local authorities, To bring about the redistribution of an urban population and industry to the suburban area, and To cause to withdraw or disperse from a centre of concentration."

[4] Decentralized University, www.google.com

Wachtel (2000: 247) forwarded his idea about the decentralization as "the affirmation of markets beyond the economy to a wider range of society's activities, heretofore subject to economic as well as other forces and to all societies, those in transition from central planning and to those in transition to elastic modes of economic organization. The market has become not just one of several instruments. It has become transcendent, over riding boundaries established by political process, nor to the civil society."

Emphasizing on the decentralization concept Gurung (1996: 3) argues that "the formation of the modern political nation-state and the centralization of political power, on the one hand, and the creation of a tributary state system with devolution of administrative and judiciary powers to local rules, on the other, were a source of major disruption for the local system of management, which in turn, contributed to resources degradation in the hills and mountain of Nepal.

3.3.2 Forms of Decentralization

Generally, decentralization assumes two forms:

3.3.2.1 Horizontal Decentralization

It disperse power among institutional at the same level. For example, constitutional institutions (organizations/organs) at the central level are decentralized with power ant functions apportions and the civil society at the local level are involving in the process of development helping local government.

Emphasizing on horizontal decentralization, Morch and Taqqu (1986: 93) have suggest that the creation of parallel institutions as an alternative model to development in the third world. Despite their potential role in development, the incorporation of local institutions in to formal development organizations would

either destroy or wrap these institution in ways that either reduce or undermine their present capacities or promote … economic benefits of a few households of village leaders or wealthy families of specific ethno or religious groups or class."

3.3.2.2 Vertical Decentralization

It disperses a power among institutions at a hierarchical order such as national level to regional, sub-regional level respectively. In vertical decentralization there are two types of decision-making process; Top-Down and Bottom-Up. In top-down process, decision is made in the central level and thrown it to the local level to implement it, but in bottom-up process, decision is done as the wishes of local people or local participants. About the top-down approach, it is said that 'especially in developing countries a severe shortage of skilled planners and the problem of data aggregation at lower levels presumably dictated highly centralized decision-making' (Op. cit., 26: 74).

Bottom-up process of planning is a real decentralization, in which every local people can get a chance to participate in decision-making process. For more about the top-down approach, it is stated that 'this suggest the need for a change in the planning sequence, in which the regional stage precedes the sectoral stage and the greater part of the macro stage. In other words, but before quantitative targets have been fixed, regional plans should be drafted, which are based on the regional development potential' (UN 1979: 75).

In terms of forest management system, Nepal had adopted a top-down model for forest administration for many years. A paradigm shift occurred in 1076, when the National Forest Plan recognized forest as inalienable property of society. The government also admitted that the protection, maintenances, and

development of Nepal's forest were neither possible nor practicable through government effort alone (NAFP, 1982:22).

In Nepal, decentralization was started with the establishment of Tribhuvan Gram Bikash Kendra in 1952. after long fluctuation, now it is practicing Local Self-Governance Act 1998 (2055 B.S.).

For a decade, Nepal is practicing democracy in state management, and decentralization and self-governance approach in resources management. For this respect, mass involvement in decision-making process and in implementation, monitoring, and in benefit sharing are more significant in resources management planning and these are the issues that should to be examined in the frame of equity and social justice on the sense of devolution.

Decentralization approach what we are going to be implemented in this study, will include both horizontal and vertical decentralization. But both relate with local level.

3.3.3 Participatory Development Approach

NRM states a sustainability of its. Sustainability of any resource depends on its users or stakeholder participation in its management. In recent days, development is defined with sustainability. As previous definition of development, positive change in every thing was used to be defined as development. But now a day, there should be sustainability in positive change in definition of development. And it is argued that the sustainability of any development depends on local people's participation in every step of development.

Generally, people participation refers an involvement of local people in every process or the steps of the development. UNCSD (1980) defined the people

participation as "people participation is a mass sharing of the benefits of development, mass contribution to the development and mass involvement in the decision-making process of development."

There are several stages of people's participation. People can participate on several steps of development. Gurung (1988: 29) categorized the people participation in to following five:

a) Realization of the problems
b) Implementation
c) Evaluation
d) Decision making
e) Sharing of b enefits

Sustainable development seeks the involvement of local people of every group and gender in every steps of development. This study will be done based on participatory development approach and decentralization approach.

3.3.4 Before and After Approach

For the analysis of population pressure on resource, before and after approach has been used. The whole environmental data of the study area of different period were collected and analyzed comparatively according to this approach. Especially, landuse change is analyzed with this approach that what was there before ten years and what has been changed in landuse during this period.

3.3.5 Analytical Techniques

Analytical Frame-Work helps in thinking about phenomena, to order data, and to reveal patterns (Rapoport, 1985: 255-286). Therefore, an analytical framework is a heuristic device, designed to identify and analyze the relevant

characteristics of natural resource management. The analytical framework, which deals about the analytical techniques, is derived from my own working experiences.

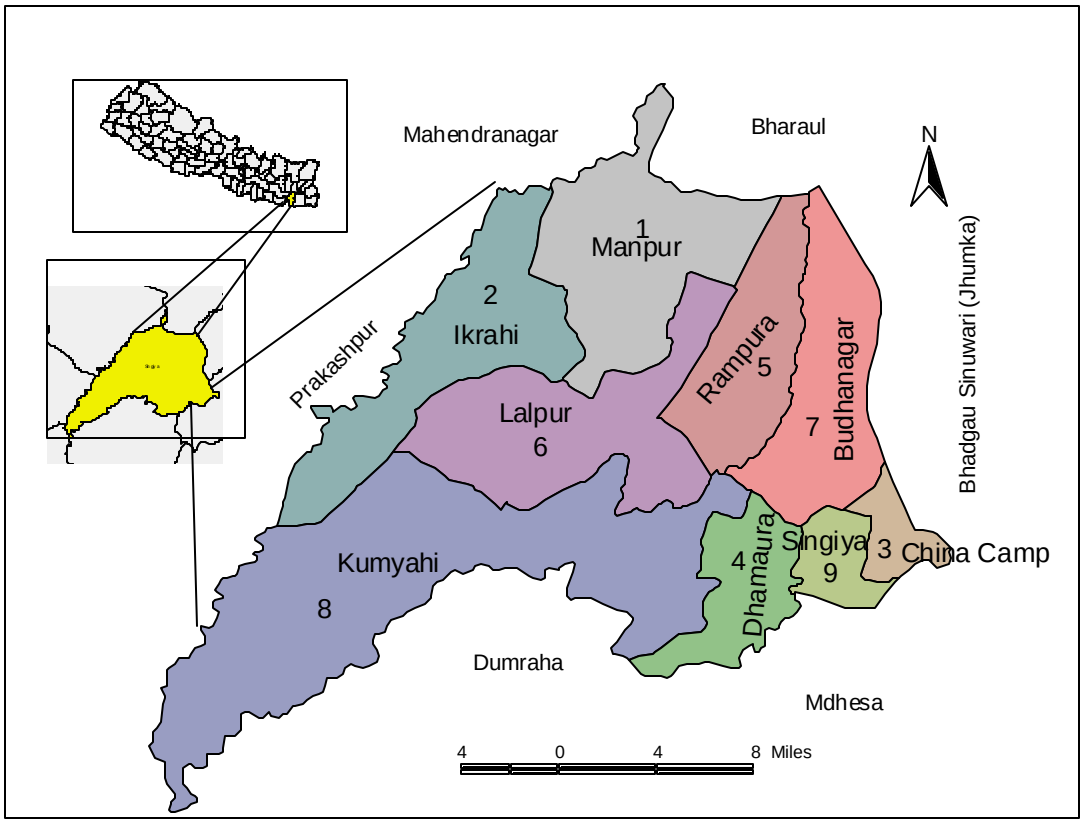
Participation of local people – ethnic participation and gender participation – were seek in land and forest resource management system. Besides of participation, decentralization – financial control at local level and democracy and inclusion of local people within the organization and decision making process – also has been checked within the natural resource management frame. This technique is drawn out by intersecting the natural resource management frame (fig. 3) and analytical approach. Both quantitative and qualitative – indicators, tables and maps as quantitative and observation experiences and interviews descriptions as qualitative – techniques have been used in this study.

CHAPTER IV

4. Introduction to Study Area

Singiya VDC of Sunsari district, which globally referenced from 87º06'39" to 87º12'03" of eastern longitude and from 26º39'25" to 26º42'49" of northern latitude, was selected as the study area, which have above three resources. It is fully lies in the Tarai region and falls in sub tropical climatic region with 170 cm to 200 cm of annual rainfall.

Fig 4: Location Map of Singiya VDC



Mahendranagar, Bharaul VDCs are the neighbor VDC of Singiya in the north. Similarly, Dumraha and Madhersa VDCs are in the south, Baklauri and Jhumka are in the east and Mahendranagar and Prakashpur are in the west.

Table 1: Population of Singiya VDC

Ward No.	CBS 2001			VDC Update 2003				
	Male	Female	Total	Male	Female	Total	Change No.	Change percent
1	648	720	1368	796	766	1562	194	14.18
2	728	792	1520	816	850	1666	146	9.61
3	334	326	660	343	349	692	32	4.85
4	650	660	1310	668	643	1311	1	0.08
5	515	496	1011	564	526	1091	80	7.91
6	694	776	1470	779	782	1561	91	6.19
7	854	807	1661	891	824	1715	54	3.25
8	535	539	1074	561	554	1115	41	3.82
9	398	432	830	443	424	867	37	4.46
Total	**5356**	**5548**	**10904**	**5861**	**5719**	**11580**	**676**	**6.20**

Singiya VDC, is located in the eastern Tarai. After the eradication of malaria in 1956, and the restoration of democracy in 1990, the migration from hill toe Tarai is increasing rapidly. Because of natural growth and migration, population of the study area is rapidly increasing with the growth rate of 3.06%, which is 0.81% greater than the national growth rate (2.25%).

Table 2: Ethnic Composition of Singiya VDC

Types	Ethnic Groups	CBS 2001	Percent	VDC Update 2003	Change no.	Change Percent
Indigenous	Chaudhari	5453	50.09	5692	239	4.38
	Mushar	398	3.65	398	0	0
	Jhagad	267	2.45	329	62	23.22
	Majhi	244	2.24	295	51	20.90
	Miya/Moslem	177	1.62	196	19	10.73
	Chamar	135	1.24	148	13	9.63
	Koiri	145	1.33	149	4	2.76
	Teli	108	0.99	108	0	0
Hill origin	Brahman	1530	14.03	1836	306	20
Extra indigenous	Chhetri	1111	10.19	1152	41	3.69
	Rai	228	2.09	235	7	3.07
	Newar	180	1.65	206	26	14.44
	Kami	206	1.89	206	0	0
	Damai	108	0.99	146	38	35.19
	Tamang	108	0.99	116	8	7.41
	Magar	98	0.90	114	16	16.33
	Other	408	3.74	254	-154	-37.75
Total		10904	100	11580	676	6.20

37 ethnic groups, including Hill and Tarai, use to live in Singiya, which is larger ethnic complexity for a tiny area. Ethnically and culturally complex society use to more conflictable than the homogenous society (Upreti 2004: 281-282). Natural resource consumption ratio is increased as increased in population and as in resource-related conflict. Because of natural growth, the change percent of Jhagd and Majhi is comparatively very high. But the change percent of Brahman includes migration.

CHAPTER V

5. Forest Resource

5.1 Introduction

Forest is the most important resource renewable natural resource in Nepal. Forest offer village people various subsistence and opportunities. The forest provides people firewood, fodder, grazing facilities, timber, wild fruits, wild vegetables, and many more raw materials required for a whole array of household and agricultural tools (Gurung 1996:53). Further more, forest can establish an environmental balance. This is why forest resource is the most important resource for the local dwellers of the study area.

There is a large forest – Ramdhuni Jungle – in the western part of the study area. There is no other option in the study area except Ramdhuni Jungle.

5.1.1 Ramdhuni and Ramdhuni Jungle

In the Hindu Philosophy, Ramchandra is accepted as the god. The word, *Dhuni*, refers a large fire that is made of big woods to get warm. People believe that thousands of year ago, god Ramchandra and his junior brother Laxman visited this area with their teacher Viswamitra.

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ufIGw ;g' ;j syf ;gfO{ h]kL ksf/ ;/;/L dlx cfO{..
tj ke'ClifGx ;d]t gXfP . ljljw bfg dlxb]lGx kfP ..Æ[5]

[5] Shreemadgoswami Tulasidasjee, Shree Ramcharitamanas (p. 152) at Bajracharya, Man (1999), *Shree Ramdhuni Darsan (Yatra Smarika)*, Laxmi Guvaju Samiti Pratisthan, p. 18.

"God Ramchandra and his brother started their journey to Videhanagar (Janakpur/Mithila) from Barahakshetra with their teacher Viswamitra. During the journey, they took rest overnight in the jungle along the Sunsari River. They collected firewood and lit fire to make the environment warm. Since those days, the jungle was started to be colled Ramdhuni Jungle as the holiest place for the Hindu (Bajracharya 1999: 18).

Because of the religious importance, Ramdhuni Jungle have been protected for thousands of year. Ramdhuni jungle is situated at the center as an island among several VDCs eg., Singiya, Mahendranagar, Prakashpur, Dumraha, Bhokraha, of Sunsari District. Sunsari River follows across the Ramdhuni jungle. After the eradication of malaria, Tarai jungle had got immense of deforestation. But Ramdhuni jungle was protected as a spot for its religious importance. Once, it was accepted as the religious forest.

Today, it is only a forest resource of the study area. There is no other option except it for the local people. Local people use to collect all kinds of forest needs from the Ramdhuni jungle.

5.2 Present Status of Forest in Singiya

There is no other forest apart from Ramdhuni jungle. It is situated in the western part of Singiya it covers 2200 hector of area. The major species of the forest are Sal *(Shorea robusta),* Khayar *(Acacia catechu),* and Sanjh. More than 96 percent of the forest is dominated by Sal. Sanjh is one of endangered species of the study area. It is only a species that is accepted as firewood in the *Dhuni.* Chatiwan *(Alstomia scholaris),* Dar, Harro *(Terminalia chebula),* and Barro *(Terminalia belerica)* are the major herbalian species of the study area. There is a Temple – Rmadhuni – at the center of the jungle. Nearly 27 hector of jungle

around the temple is fenced and protected as *Dharmik Ban* (religious forest) reserved for the temple.

Apart from it, the forest is managed by the Community Forest User Groups (CFUGs). Before organizing CFUGs, the Nepal government had practiced aforestation program in some part of the jungle. It is found that it was not more effective. 'In the jungle, we can find two types of trees: a) Old trees – more than 5 feet rounding b) Young trees – less than 1.3 feet of rounding.

After the CFUG's action are on action, the signals of improving the forest management can be noticed as well. In the study time, the distance between two old trees is recorded 90 feet (27.45m). Similarly, the distance between two young trees is 15 feet (4.57m).[6] The emerging dense young trees are the sign of improvement, which is accepted as the result of CFUGs' effort.

Ramdhuni jungle is 25 km in the south from *Charkose Jhadi* and nearly 50 km in the north-east from Koshi Tappu wildlife reservation center. Trans-Himalayan migrant birds notably Duck and Shore, which can not be found anywhere, visit Koshi Tappu and Ramdhuni every year (Dahal 2002:8)[7].

5.3 Forest Management System in Singiya VDC

We discussed on forest resources in previous topic. In this topic, we discuss on the customary and contemporary system of forest management. In the study area, two types of forest management system can be found: a) Customary b) Contemporary

5.3.1 Customary System of Forest Management in Singiya

The forest of the study area is the result of customary system. The name of the forest itself represents the system. The history of the forest is already given

[6] Field observation.

above. Ramdhuni Temple, which is located at the center of the forest, is the major cause to save the forest for hundreds of years. After the elimination of Malaria in 1956, Tarai forest had got an immense of deforestation. But the Ramdhuni Jungle was protected because of the temple. People use to pay their homage to the temple and they had a consensus that cutting trees inside the Ramdhuni Jungle was agaist the norms of supreme power. They had a belief that a people, who cut trees in the Dhuni Jungle might be punished by the god Ramchandra.

Now, there are two types of forest management system. There is an institution – Ramdhuni Area Protection and Development Committee protecting the temple and surroundings. According to the chairman of the committee, Dambar Adhikari, the main objective of the committee is to promote the conservation activities and play a crucial role to be declared the Ramdhuni area a tourist area. In spite of religious activities, this committee is actively promoting forest conservation activities. For instance, the committee has set fens around the temple covering 25 hectors of forest and strictly prohibited to entrance in the area with any kinds of weapon. The committee has organized aforestation program in the premises of the temple. More or less, this activities has contributed in forest resource management activities.

The other function of the committee is to supply firewood to the *Dhuni* (fire center).[8] Sanjh, the rare species in the area, is supplied to the *Dhuni*. It is accepted as holiest wood because people believe that the god Ramchandra had chosen it to light the fire. Now the committee has concentrated its activities to protect and re-produce the rare species, *Sanjh* and started to plant it in the specific area.

[8] People believe that god Ramchandra and Laxman had lit a fire at that area while they visited. The fire which was lit by the god Ramchandra is still alive in the temple.

In this sub-chapter, it is highlighted that how the customary system are changing into contemporary system of forest management in the study area. Here, we can say that the religious belief has a great contribution to conserve the forest in the study area.

5.3.2 Contemporary System of Forest Management in Singiya

After the restoration of democracy in 1990, forest resource management system had a revolution in Nepal. The political changes of Nepal emphasized on the local participation for natural resource management. The government of Nepal introduced Community Forestry Program (CFP) giving importance in the Forest Act 1993 and it was included in Local Self Government Act (LSGA) 1997. CFP can be accepted as popular contemporary system of forest management. The recognition of Community Forest User Group (CFUG) as separate bodies from institution under the SLGA 1997 is the landmark for community-based forest management system.

The CFP in Nepal has succeeded in generating the spontaneous participation of local people. From the participatory management perspective, formulation of CFUGs sought a real practice of local participation in NRM. Bhattarai and Khanal (2005:92) argued that one issue that is often talked about in the realm of community forest management is the participation of women and Dalits (socially considered 'low caste' members). This, basically, pertains to the issue of equity and devolution of decision-making powers within local communities.

CFUG is the major contemporary frame of forest management system in the study area. CFUGs are functioning the forest management activities in Ramdhuni Jungle.

5.3.2.1 Community Forest and User Groups

Community forest refers such a forest, which is provided by the state (DFO) to the user groups to manage, preserve, and to use for community development.[9] District Forest Office (DFO) provided a certain part of national forest to the user groups while apply to get community forest with a charter and forest development strategy and action plan.[10]

Community Forest User Group (CFUG) is defined as a team of forest users, which is registered under the DFO with certain process – preparing charter; developing strategy; and submitting action plan – to develop, preserve, and use the forest {Forest Act 1992, article 2(1)}. CFUGs can be recognized as a legal person because it is an autonomous and independent institution which have rules and regulations its own (FECOFUN 2005: 13).

5.3.2.2 Institutional Framework of Community Forest User Group

There are ten CFUGs functioning forest management activities in the study area. These CFUGs are organized by people from different walks of lives representing various part of the jungle. CFUGs are registered separately in District Forest Office (DFO), Sunsari and affiliated with Federation of Community Forest Users, Nepal (FECOFUN), Sunsari. They are getting promotional and guardianships support from FECOFUN and legal and technical support from DFO, Sunsari. Manpur Ranger Post, which is situated at ward number one of Singiya VDC, is the major government representative as well as DFO, Sunsari at the study area.

In the organizational framework (fig. 5), there are 10 CFUGs in the study area. Under the CFUGs, there are numbers of Monitoring Group (MG)[11] within a CFUG. Five to nine households are involved in a MG. The major duty of the

[9] Forest Act 1992 and Forest Regulation 1994, Article 2 (8). P. 3.
[10] Ibid. Article 25 (1), p. 11.
[11] Monitoring Groups are the lowest organization of the community forest program in the study area. The MGs do not have compulsion to register in DFO nor in FECOFUN. CFUGs formulate several MGs comprising five to nine households of the locality.

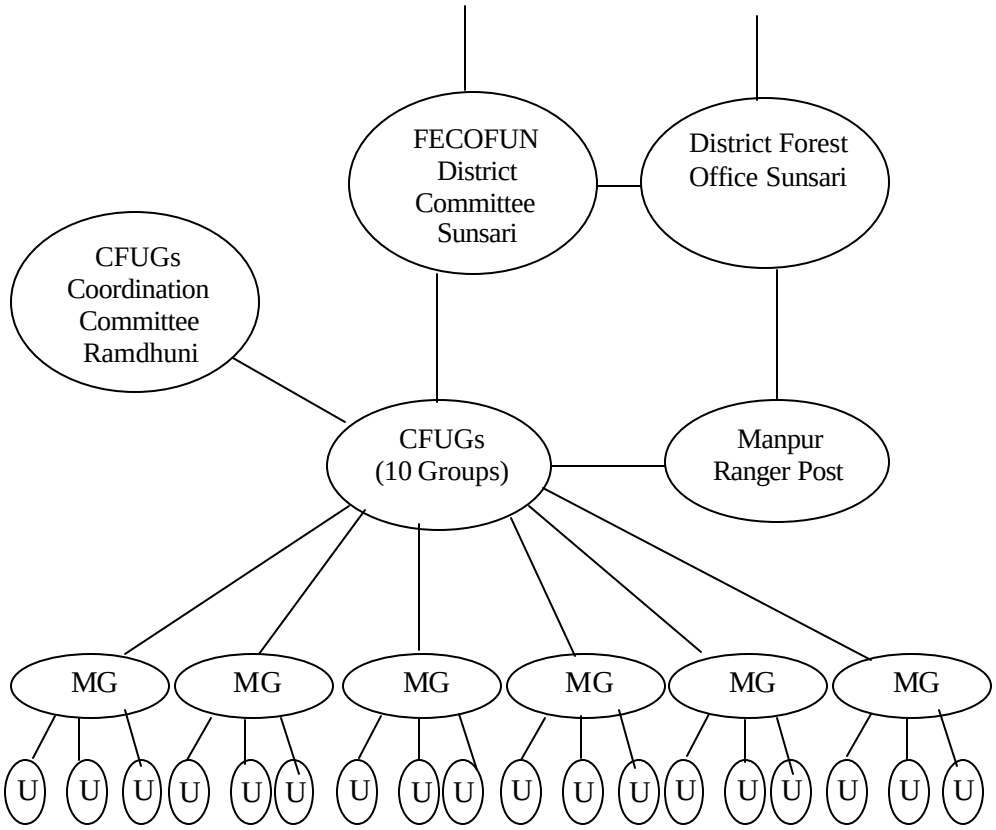
MG is to monitor the jungle. CFUG provides them (MGs) a routing with morning and day shift. One member from one household is requested to involve in the MG and is motivated to visit the forest demarked by the respective CFUG. During the monitoring, the MG can seize equipments, arrest the illegal woodcutter, and present ahead of the CFUG.

5.3.2.2.1 Coordination Committee

In the vertical arrangement, CFUGs are registered in Sunsari DFO through Manpur Ranger Post. A part from it, CFUGs (10) have formed a coordination committee – Coordination Committee of Ramdhuni Community Forest User Groups. In general arrangement of FECOFUN, there is no provision of coordination committee in its charter. Because of local situation, the CFUGs, around the Ramdhuni jungle, realized the importance of coordination committee and formulated it. There is no official relation between the coordination committee and FECOFUN Sunsari vis-à-vis DFO Sunsari. But it is playing an important role in forest resource management in the study area. We know that there are 10 CFUGs in Ramdhuni area. The meeting of the coordination committee is organized every month according to rotational routine. In the meeting, representatives of 10 CFUGs report on their respective problems and achievements. The organizer CFUG chairs the meeting. Members of the committee said that they are seeking a legal way to register it in DFO, Sunsari. According to the ranger of Manpur Post, Nhur Mohammad Miya, there is no provision in the Forest Act to register such kind of committee.

Major objectives of the coordination committee are to share the problems among the 10 CFUGs, seek measures together to solve the problems, and provide a unity in their plans, policies, and in activities. The committee is playing an important role in sharing strategies of controlling fire, deforestation, and poaching. It is helping to bring unity in activities among ten CFUGs. The importance of the committee is very high because the Rmdhuni jungle is not connected with other forest.

Fig. 5. Institutional Setting of Community Forest Users in Ramdhuni Jungle



5.3.2.2.2 Community Forest User Groups

Although there are ten CFUGs in the Ramdhuni area, only three CFUGs are in Singiya VDC – the study area. In this study, only three CFUGs are selected to include in the case study. Because of the coordination committee, we can generalize that the activities or the plans and programs carried out by the CFUGs of the Rmdhuni area are the same. Because of their system of sharing every plan and program, we can find a similarity in their every activity.

5.3.2.2.3 People's Participation

Sustainable Development seeks the local participation in all steps – identification of problem, planning, decision making, implementation, evaluation, and benefit sharing. In this topic, we measure the level of people

participation – male vs Female and Caste Ethnic participation – in community forest development. BK, Damai/Dholi, Urau, Shah, Chamar/Sarki, and Mushar are socially accepted as low caste (Dalits) in the area. Tamang, Rai, Limbu, and Newar are nationalities in the study area. On the basis of household number, ethnic composition of three CFUGs is more complex. There 23 caste in the three CFUGs. Chaudhari covers the first position in two CFUGs – Ramdhuni North-East and Ramdhuni Kumyahi – and second in one. Chaudhari is the indigenous group of the study area. Majhi, the major caste in Rmdhuni Sikdar CFUG, is nationalities in the Tarai. Brahman – the hill origin high caste – second larger caste in the three CFUGs (Table 3).

Table 3: Household-wise Ethnic Composition under the CFUGs

S.N.	Ethnic Groups	Ramdhuni North-East		Ramdhuni Sikdar		Ramdhuni Kumyahi	
		HH No.	**%**	**HH No.**	**%**	**HH No.**	**%**
1	Chaudhari	234	36.97	32	23.71	165	54.82
2	Brahman	145	22.91	16	11.85	38	12.62
3	Majhi	3	0.47	51	37.78	-	-
4	Chhetri	80	12.64	13	9.63	10	3.32
5	Shah	12	1.90	3	2.22	5	1.66
6	B. K.	8	1.26	3	2.22	4	1.33
7	Thakur	9	1.42	1	0.74	1	0.33
8	Urau	19	3.00	1	0.74	42	13.96
9	Damai/Dholi	13	2.05	2	1.48	8	2.66
10	Tamang	5	0.79	-	-	7	2.33
11	Newar	19	3.00	-	-	4	1.33
12	Rai	15	2.37	-	-	1	0.33
13	Limbu	11	1.74	1	0.74	-	-
14	Mandal	-	-	-	-	13	4.32
15	Mahato	-	-	7	5.19	1	0.33
16	Sada	-	-	-	-	1	0.33
17	Yadav	-	-	-	-	1	0.33
18	Gupta	-	-	2	1.48	-	-
19	Das	10	1.58	1	0.74	-	-
20	Kumal	-	-	1	0.74	-	-
21	Chamar/Sarki	15	2.37	1	0.74	-	-
22	Magar	10	1.58	-	-	-	-
23	Mushar	35	5.53	-	-	-	-
Total		**633**		**135**	**100**	**301**	**100**

Source: CFUGs 2005.

One issue that is often talked about the realm of the community forest management is the participation of women and *Dalits* (socially considered 'low caste' members). This basically pertain to the issue of equity and devolution decision making powers within local communities. Despite the focus of the program on the participation of weaker section of the society, upper caste male dominate many CFUGs (Bhattarai and Khanal, 2005: 92).

In the three CFUGs, the percentage of households and their representation in CFUGs committee does not match on the perspective of equity. Chaudhari covers 36.39 (234 households) percent in Ramdhuni North-East CFUG but their representation in their CFUG committee is more lesser (11.67%) then their household percentage. Difference between household and representation percentages of Chaudhari is tolerable in Ramdhuni Sikdar and Rmdhuni Kumyahi CFUGs. But the Brahman, which comprises 22.55 percent (145) households in Ramdhuni Norh-East CFUG, has a very high level of representation (58.82%) in the committee. On the other hand, the representation of *Dalits* is very nominal in all three CFUGs.

From the gender perspective, the balance between the representation of male and female is quite poor. 33 percent of female representation is provisioned in the Master Plan of Community Forest Development. Besides the provision, the female representation is very poor in the practice. Although women are working closely and actively for the development of the community forest, a discrimination between male and female (67% vis 33% of representative quota) is provisioned (Giri 2004: 37). Female representation in CFUGs of study area is no more than 29.41 percent. Further more, the representation of low cast (Dalits) female is absolutely nil in the study area (Table 4). In a conclusion, it can be said that people participation in community forest management in the study area is not on the favor of equity concept.

Table 4: People participation in CFUGs

SN	Name	Ramdhuni North-East			Ramdhuni Sikdar			Ramdhuni Kumyahi		
	Address	Singiya – 1,2, & 6			Singiya – 2			Singiya – 8		
	Covered Area				140 Hectors			200 Hectors		
	House holds	633			115			301		
	Caste/Ethinics	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
1	Chaudhari	-	2(11.67)	2(11.67)	5(29.41)	-	5(29.41)	5(26.31)	4(21.05)	9(47.37)
2	Brahman	7(41.18)	3(17.65)	10(58.82)	-	-	-	5(26.31)	-	5(26.31)
3	Chhetri	1(5.88)	-	1(5.88)	3(17.65)	-	3(17.65)	-	1(5.26)	1(5.26)
4	Urau	-	-	-	-	-	-	3(15.79)	-	3(15.79)
5	Mandal	-	-	-	-	-	-	1(5.26)	-	1(5.26)
6	Newar	2(11.76)	-	2(11.76)	-	-	-	-	-	-
7	Shah (Teli)	1(5.88)	-	1(5.88)	2(11.76)	-	2(11.76)	-	-	-
8	Sada	1(5.88)	-	1(5.88)	-	-	-	-	-	-
9	Majhi	-	-	-	4(23.53)	2(11.67)	6(35.29)	-	-	-
10	Mehata	-	-	-	1(5.88)	-	1(5.88)	-	-	-
	Total	**12(70.59)**	**5(29.41)**	**17(100)**	**15(88.24)**	**2(11.67)**	**17(100)**	**14(73.68)**	**5(26.23)**	**19(100)**

Source: CFUGs 2005.

5.3.2.2.4 Participation in Monitoring Group

Participation level in monitoring group is quite inverse from participation in the CFUG committees. Female and low cast participation is quite encouraging in monitoring. The researcher also participated several times in the monitoring group and observed the participation level that people from back-warded communities were encouragingly participating the monitoring group.

5.3.2.3 Community forest and Social Activities

It is already said that CFUGs are the autonomous and independent local institutions (Forest Act 1998: Article 43). They have own programs, plans, activities, and income resources. Following activities are provisioned in the Forest Regulation 1994 that CFUGs should include in their action plan.

a. Prepare a description of forest
b. Prepare a map of the forest
c. Demark and prepare the description of forest

d. Define objectives of forest management
e. Define the manner of forest conservation
f. Define the activities of forest conservation
g. Include the activities – nursery, plantation, income generating programs, and time-table – in their action plan
h. Describe the cash crop farming – NTFP production
i. Declare the policies and strategies of collecting, distributing, and selling of forest product
j. Define the program and policies of income management

These provisions pave a clear way to the CFUGs to operate various activities within their community. Now, we discuss on the activities that the CFUGs of the study area are practicing today.

5.3.2.3.1 Development Activities

Besides of protecting forest, CFUGs deploy many development activities. Ramduni Kumyahi has constructed two bridges in Sera and Areri Khola and built its own office building. It has organized a Briquette Production Training in the community and producing successfully. Similarly, Ramdhuni North-East has constructed a school building for Ramdhuni Secondary School – only a secondary school of the area. Besides the forest development activities, it organized quiz contest and sports – volley ball and football tournament.

Ramdhuni Sikdar CFUG, the other CFUG of the study area, has constructed tow wood bridges in Sunsari Khola, and constructed gravel road in the community. It has spent some budget in maintaining primary school building.

5.3.2.3.2 Economic Activities

There is a provision of fund management of CFUGs in the Forest Regulation 1994. According to the provision, every CFUG have a fund and bank account. This provision provides them a rights to conduct economic activities in their

community. The other provision compels them to include income generating activities in their regular program.

In this topic, we discuss on the economic activities that the CFUGs of study area are practicing today.

The major sources of income of the CFUGs are completely forest product. Forest Regulation 1994 has provisioned that CFUG can sale the forest product to the users and can make income. The CFUGs of the study area have produced a list of tariff for the forest product, which legalized the sells of the production and collection of fund.

List of Tariff

1. Grass (trees) per *Bhari* Rs. 1
2. Grass (ground) per *Bhari Rs. 5*
3. Grass Straw *(Khar)* by bidding
4. fire wood per quintal Rs. 40
5. Leaf (only for unregistered users) per person Rs. 2
6. *Halo/Haris* (only for registered users) per halo/haris Rs. 35
7. *Dhala/Pada Kath* (low quality) round, per Cubic Foot (Cft) Rs. 50
8. Sal wood round per Cft Rs. 110
9. Sal lumber high quality (only for registered users) per Cft. Rs. 250
10. *Kukath* (low quality) round per Cft. Rs 75
11. *Kukath* (low quality) sawed per Cft. Rs 150
12. Fire wood for wedding per cart Rs. 101
13. Fire wood for cremation per cart Rs. 51

Bhari – a bundle of immeasurable goods with the weight that a person can lift at once.
Khar – a kind of grass that is used on roofing house
Quintal – 100 kg.
Registered users – members of household registered under the CFUG.
Halo – Plough made of wood
Haris – a piece of wood used for preparing Halo
Dhalapada – wood, lay down on the ground/ wood with low quality

Selling these forest product, every CFUG earns thousand of rupees of income every year (Table 5).

Table 5: Annual Income of the CFUGs

SN	Name of CFUG	Income	
		Fiscal year	
		2002/03 (in Rs)	2003/04 (in Rs)
1	Ramdhuni North-East	300,000	275,000
2	Ramdhuni Sikdar Tole	250,000	275,000
3	Ramdhuni Kumyahi	225,000	238,000

Source: CFUGs

The table 4 shows that the CFUGs, as the local level institution, are earning a high level of income. It is quite comparable to the Village Development Committee, the local government.

The Forest Act 1994 have provided them a rights to expense their earnings on their own interest. CFUGs of the study area have approved their topics of expenses from the general assembly. Some of the topics of the expenses are as below.

1. Forest Development
    a. Care and clearance
    b. Developing fire line
    c. Developing water letting-out line
    d. Plantation
    e. Watcher salary
2. Community Development Work
    a. Bridge Construction

b. School Building and others
c. Road Development

3. Institutional Aid (Lumber or Cash)
4. Treatment Aid (only for poor users)
5. Disaster Aid (fire and flood)

A part from these activities, CFUGs of the study area are promoting income generating programs such as goat farming. The other interesting activities is what Ramdhuni Sikdar CFUG is breeding wild boar as income generating program.

From the perspective of decentralization (Local Self Government Act – 1998), CFUGs of the study area are very successful to enjoy the local rights. One of the major theme of decentralization – financial control at local level – can be found as reflecting in these CFUGs.

5.3.2.4 Resource Distribution System

Forest is the common property resources. Thus, community has increased eqully access in the utilization of forest product. Before registering the CFUG, list of users, covered by the community forest, is prepared to ensure the equal distribution of forest product. CFUG committee, elected from users, is responsible to distribute the forest product in a democratic way. Because of the existence of coordination committee, there is some similarity in distribution system.

There are two types of distributing process in the system.

i. Regular Process
ii. Causal Process

In regular process, the CFUG provides 10 cubic feet of lumber and 200 kg of firewood (wet) per household every year with a certain price. In this process, forest is opened only two times in a year. Users can collect fodder and grass freely paying the fixed price.

In causal system, there are several provisions for distributing forest product. For social activities, – wedding, birthday, and others – the users who is organizing program, can apply to the CFUG to get the forest product. There is a provision of providing 500 kg of firewood for wedding ceremony. For this service, the customer pays Rs. 101 to the CFUG. The user, who is constructing a new building, can apply and get 10 Cft of sawed lumber in the price of Rs. 150 to 200 per Cft. To get this service, the applicant should be recommended by the tole lane committee.

There is special provision of providing firewood for the cremation of corpses. While a person from the user households dies, his/her family member can apply to the CFUG and the CFUG provides a cart of firewood driving to the crematorium in a minimal price.

On the course of the study, it was found that the users were fully satisfied with this provisions.

5.3.2.5 Aforestation and Forest Caring System

Ramdhuni jungle, itself, is a dues forest. There is no afforestation program equally in all part of the jungle. On the lack of bare land, Ramdhuni Kumyahi CFUG has no plan of aforestation. But the Ramdhuni North-East CFUG has a long history of aforestation. His Majesty's Government (DFO Sunsari) had planted 2000 *Sissoo* in a plot of 75 hector in 1985. In that effort, local people were not participated as well. As a consequence, only 15-20 percent of plants are alive now. After the establishment of Ramdhuni North-East CFUG in 1998, it has been continuing the aforestation program every year. Till 2005, the

Ramdhuni North-East CFUG had planted 1800 plants. It is a bit different that the government had planted only sissoo but the CFUG has emphasized on herbalian species.

Similarly, Ramdhuni Sikdar CFUG also continuing the plantation practices. It has planted 200 plants in 2004. According to its work plan 2005, it was willing to plant 1300-1500 plants from various species by 2008. It is also emphasizing on herbalian product. The major species, it included in its program, were *Dar, Kadam, and Masala.* The species that the Ramdhuni Sikdar CFUG included on its next plant are *Amala (Phyllanthus emblica), Dar, Chhatiwan (Alstronia Scholaris), Kadam, Masala, and Mango.* According to Surya Narayan Chaudhari, the secretary, the major of the plantation sites false into wetland and it requires Kadam, Liptis, and Masala perfectly. Natural Flower and Herbal Pvt. Ltd., a herbalian compani of Makawanpur working currently in more than 12 districts across the country, had demanded the product of Amala, Dar, Chhaitiwan, Pawan, and Kaulo. According to the Memorandum of Understanding (MoU) made between CFUG and company, it was mentioned that the company will provide the plants of the species and purchase the product. This effort has encouraged the CFUG of the study area.

For the protection and promotion of the jungle, CFUGs organize forest thinning and pruning program twice in a year. During the program, the users fenced the program area and protected it. CFUG has managed several teams of 4 to 9 members to visit the community forest. They moved two groups – morning shift and day shift – every day. The monitoring group update the forest condition in every 6 hours.

5.3.2.6 Problems in Forest Management

Although the CFUGs of the study area are performing very high level of effort in protecting and managing the forest, they are not satisfied with the activities. According to the chairman of Ramdhuni North-East CFUG, Sankar Chaulagai, there are several legal obstacle to manage the forest independently. He argued that the government of Nepal is hesitating to implement the provision that is

made in the Forest Act 1992 and Forest Regulation 1994 to handover the national forest to the user group.

The ranger of the Manpur Ranger Post, Nhur Mohammad Miya, gave his statement that CFUGs were still incapable to hold the community forest as their own. To get the forest, they should develop their skill and ability and increase their activeness. They are still incapable to prepare and develop their action plan themselves. The Forest Directives 2000 has made of provision, which prohibits to handover the forest to the CFUGs.

Here are some problems dugout during the Focused Group Discussion (FGD) that the CFUGs facing in the management and protection of the forest.

i. Because of the government's hesitation in handovering the forest, CFUGs are not much encouraged.

ii. Users are not allowed to use the wood – more than 4 feet of circular measurement – without the permission of the DFO.

iii. The CFUG should get permission before thinning and pruning the forest.

iv. Lack of awareness among the users.

v. Lack of the knowledge of alternative energy.

vi. Because of the CFUGs have prohibited the poaching, the attack of the wild animal is increased surrounding the jungle.

vii. Lack of the concept of modernization in plantation.

viii. Lack of income generating promotion programs.

The problems, listed here, had been identified by the CFUGs themselves. That is why, it can be said that the CFUGs will able to solve their problem themselves.

CHAPTER VI

6. LAND RESOURCE

6.1 Introduction

Land is accepted as the most important resource, which provides house and food. In local communities, land is accepted as prestige. It determines the social status of community member. On the other hand, land provides pasture and other facilities. Because of precious importance, land is the most conflictable resource.

In this topic, we discuss on land resource, problems related with land resource, and land management system of the study area.

6.2 Types of Land

On the basis of its use, there is only one type of land. Entire of the land in the study area can be found as paddy land (irrigated land). Because of proper management of irrigation, there is no *Bari Land* (upland) and pasture land too.

On the basis of its quality, land of the study area is classified into three category.

i. *Abbal* – very high category of land on the basis of fertility.
ii. *Doyem* – second category of land
iii. *Sim* – tertiary category of land

Table 6. Land Classification of Singiya VDC

S. N.	Land Types	Area in Hector	%
1	Abbal	1,916	96.57
2	Doyem	67	3.38
3	Sim	1	0.05
	Total	1,984	100

Source: Singiya VDC, Sunsari

Abbal class of land is widely exchanged with high price in the study area. Second and third class of land is very limited and especially used as private pastureland.

On the basis of its registration, the land of the study area can be divided into four categories.

i. Public Land
ii. Government's Land
iii. Sunsari-Morang Irrigation's Land (Chatara Cannel)
iv. *Guthi*[12] Land

Table 7: Land Distribution

S.N.	Name of Owners	Area in Hector	%
1	Public	1633	82.31
2	Government	159	8.01
3	Sunsari-Morang Irrigation	0.9	0.45
4	Guthi	183	9.23
	Total	**1984**	**100**

Source: Singiya VDC

Among four, public land and *guthi* land are widely exchanged among. The tax and records of the public land is kept in the VDC office and record of selling and buying is in the district office of the Land and Tax, Sunsari. 75 percent of collect tax is provisioned to be spent by the VDC office and 25 percent is to be deposited to the District Development Committee (DDC), Sunsari.

[12] *Guthi* is a type of land tenure system, which grants right over land to religious or charitable organizations. According to the Trust Corporation (*Guthi Sansthan*) Act 1976, Guthi is defined as endowment made by any philanthropist through relinquishment of their title to movable or immovable property or any income yielding fund for the construction, operation or maintenance of any temple, rest house, roadside shelter, inn, well, tank, bridge, school, house, or institution, in order to run a monastery or celebrate a religious occasion, ceremony or festival or any religious and philanthropic purpose (Oli, 1998: 41).

But the tax of guthi land is collected and exchange record is registered in the district office of Land and Tax, Sunsari. 75 percent of collected revenue is spent for the regular expenditure of *Chatara Temple.* There is no record and control of VDC, Singiya, over the guthi land.

Among four, government's land and Sunsari-Morang Irrigation's land is not exchangeable.

6.3 Population Pressure over the Land Resource

After the eradication of Malaria in 1956, Tarai became an attractive destination of hill migrant. On the other hand, Tarai land is more fertile than the land of hill and mountain. Because of its fertility, it is more valuable and exchangeable too. Hill people, every year, migrate to the Tarai and purchase the land. The exchange of increase its fragmentation ratio decreasing plot size.

Table 8: Change in Number of Land Plot *(Kitta No.)* in Singiya VDC

Ward No.	Number of Plots											
	Public Land				Nepal Government				Sunsari-Morang Irrigatio			
	Fiscal year and change				Fiscal year and change				Fiscal year and change			
	2002/03	**2003/04**	**Change No.**	**Change %**	**2002/03**	**2003/04**	**Change No.**	**Change %**	**2002/03**	**2003/04**	**Change No.**	**Change %**
1	238	285	47	19.74	38	38	0	-	-	-	0	-
2	1225	1478	253	20.65	46	46	0	-	20	20	0	-
3	29	93	64	220.69	17	17	0	-	-	-	0	-
4	781	868	87	11.14	31	31	0	-	47	47	0	-
5	1592	1833	241	15.14	68	68	0	-	48	48	0	-
6	1100	1314	214	19.45	24	24	0	-	51	51	0	-
7	551	676	225	22.69	36	36	0	-	2	2	0	-
8	840	949	101	12.02	34	34	0	-	23	23	0	-
9	1	17	16	1600	13	13	0	-	-	-	0	-
Total	**6347**	**7613**	**1266**	**19.69**	**307**	**307**	**0**	**-**	**191**	**191**	**0**	**-**

Source: Singiya VDC

Table 8 shows that the land, registered under the Nepal government and Sunsari-Morang irrigation, cannot be sold and purchased. For this reason, the number of land plot is constant. But, in the public land, there is very ratio (average 1:1.2) of fragmentation. For instance, the overall land of ward no. is registered to the *guthi* and only one plot of land is registered as the public land in F/Y 2002/03. But, it is fragmented 16 times (1600%) within a year. Similarly, the public land of ward no. 3 also is fragmented 2.2 times (220%) in a year.

On the other hand, population of the study area is increasing by 3.06 percent of growth rate. Land is changing into smaller size. People need to produce more food in a little land. This need leads to use more fertilizer in the field, which is responsible to decrease the land quality.

Table 9: Use of Fertilizer in Singiya VDC

Fertilizer	Domestic (Dunk)	Urea	Compost	All	Total
No. of user	26	59	16	30	131
Percent	19.85	45.04	12.21	22.90	100

Source: Sample Survey

During the survey, 131 household heads were asked on the use of fertilizer. Domestic fertilizer (dunk), which have no site effect and accepted as a good to maintain the land quality, is used only by 26 households among 131. During the survey, 45.04 percent of respondents replied that they used urea (Nitrogenous compounds), which have more site effect to decrease the land quality. 22.9 percent of respondent, who answered that they used all kinds of fertilizer, might use urea too. This possibly might add the amount of urea. Using the urea may give more production for short time, but the land quality may decrease forever. Very few people (2.21%) used compost fertilizer, which is accepted as more favorable to maintain the land quality.

6.3.1 Productivity of Land

None of the respondent replied that they did not any kind of fertility. If all the people were using the fertilizer, question is raised that how much they got the improvement in the productivity.

Table 10: Paddy Production in *Man* per *Bigha* per Season[13]

Production in Man	> 40	41-50	51-60	60+	Total
Before 10 years	67 (51.15%)	32 (24.43%)	14 (10.68%)	18 (13.74%)	131 (100%)
Before 5 years	69 (52.67%)	34 (25.95%)	16 (12.22%)	12 (9.16%)	131 (100%)
Now	65 (49.62%)	27 (20.61%)	25 (19.08%)	14 (10.69%)	131 (100%)

Source: Questionnaire Survey

Table 10 shows the change of productivity of land in the study area within ten years. The number respondent, who produce 51 to 60 *Man* in a hector is slightly increasing. But the number farmer, who collected above 60 *Man* per season from 1 hector is quite decreasing. The trend shows that there is no significant effect of using fertilizer in the stud area.

6.4 Siltation Management

Sunsari-Morang Irrigation Project (Chatara Cannel) is irrigating the study area. Because of cannel irrigation system, siltation is being produced as prime problem. Land, fed at first from the irrigation, is rudely suffering from the siltation. Very small particles transported by the cannel are deposited on the paddy covering the soil very hard decreasing the productivity.

[13] 40 kg equal to 1 *Man;* 0.67 hector equals to 1 *Bigha;* and paddy is cultivated two times in a year in the study area.

On the course of study, quantity of silt is tested on experiment. The process of experiment is defined on methodology.

Table 11: Density of Silt in the Cannel water

Date of Collection	Quality of Water (Ltr)	Quantity of Silt (Gram)	Density
April 18, 2005	10+10+10 = 30	0.9	0.03g/Ltr
May 29, 2005	10+10+10 = 30	1.12	0.04g/Ltr
June 20, 2005	10+10+10 = 30	1.5	0.05g/Ltr
Total	30+30+30 = 90	3.52	0.04g/Ltr

Source: Experiment. Water collect from *Manik Chauri Sub-Branch* of Chatara Cannel at Singiya VDC, ward no. 6, Lalpur.

A simple experiment helps to draw an important conclusion that the density of silt into the water is very high. According to the average density, 25000 liters of water contain 1 kg of silt. You can easily imagine that how many liter of water follow in a day, in a week and in a year.

Number of farmer is suffering from siltatation. But there is no measure adopted by the government or by the any agencies. According to the Area Officer (AO) – Chudamani Chaudhari – of Singiya sub-branch water users committee, there was a provision of processing of silt in the main cannel but the machine was damaged for a year. Farmer of the study area, cut and deposited silt and heaped it up near by their land. Some of them bring the silt away to the silt free area.

CHAPTER VII

7. Water Resources

7.1 Introduction

Water is the largest and precious natural resource of Nepal. It is used for drinking, bathing, washing, and cleaning, agriculture, industries, hydropower generation, religion, and recreational values such swimming, fishing, and different form of eco-tourism (Lekhak and Lekhak, 2003: 51). River, lakes, and underground water are major source of water resource in Nepal. Nepal has more than 6000 rivulets and rivers (Manandhar, 2003:1). Annual mean flow of major river is estimated to be 4930 m^3/sec. This amounts to 70 percent of total surface run off (Lekhak and Lekhak, 2003:54).

In this topic, we discuss on source of water, its use and management system of study area.

1. Drainage System of the Study Area

Only three types of system can be observed in the study area.

a. Surface Water
b. Underground Water
c. Ponds

7.1.1 Surface Water:

i. Rivulets: Rivulets are the principal water sources of the study area. There are three major rivulets – *Duttakitcha, Sera, and Sunsari.* Dattakitcha khola[14] follows in the east of Singiya, Sera in the center and Sunsari in the western part of the study area. The origin point of

[14] Small size of water bodies, especially stream is as known as *Khola* in Nepali language

these three khola is the *Charkose Jhadi*[15] in the north and follows all to the south-west to Sunsari Khola as well as to the Koshi River. Because of their deep gorge, these rivulets are not used for irrigation and other sanitation.

ii. Sunsari-Morang Irrigation Project (Chatara Cannel): Other surface water in the study area is Sunsari-Morang Irrigation Project (Chatara Cannel). Entire of agriculture land is irrigated by this water. Chatara Cannel was constructed in 1980 by the Chinese Government covering 60,000 of hector of land of Sunsari and Morang District. It was attributed from from Koshi River at Chatara. The study area is fed by three sub-branch – Ramdhuni Sub-Branch, Manik Chauri Sub-Branch and Singiya Sub-Branch – covering 2,100 hectors of agricural.

iii. a. Irrigation Management System: There are three separate Water Users Committees (WUC) in the study area. All these committees were registered under the office of Chief District Officer (CDO) Sunsari according to the Organization Registration Act 1977.

Table 12: Management System of Water Users Committees

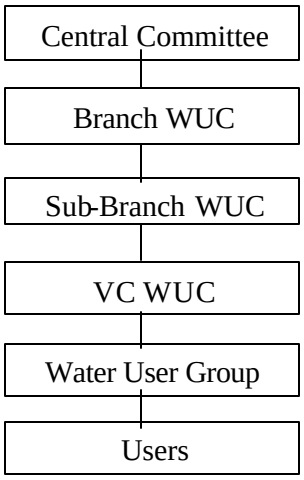
Name of water User Committee		Ramdhuni WUC	Manik Chauri WUC	Singiya WUC
Address		Mahendranagar 7/ Singiya 2	Dumrah 3/ Singiya 6	Singiya 7
Coverage (Hector)		60	1,200	800
No. of Committee Members		11	9	15
Ethnic Composition of Committee	Brahman	2	1	3
	Chhetri	3	3	-
	Chaudhari	4	-	11
	Mandal	1	4	-
	Shah	1	1	-
	Rai	-	-	1

Source: Water User Committee

Every WUC has its own office and work force. There is a central committee of Chatara Cannel Water Users. The whole system is divided into several divisions. It is known as the federation of branch and sub-branch.

[15] The dense forest extend from east to west with the width of 4 kosh on the north of the Tarai and at the foot of the hill.

Fig. 6: Vertical Arrangement of WUC[16]



Branch and Sub-Branch Committees are registered independently under the Organization Registration Act 1977. Valve Chamber (VC) committee and Water Users Group (WUG) are formed under the branch or sub-branch committee.

iii.b. Manpower

There are two levels of salary based employees – Dhalpa and AO – under the sub-branch committee. Until 2003, they were being paid by the Sunsari-Morang Irrigatio Project. But, now they are being paid by the sub-branch committee itself.

The duties of Area Officer (AO) is to collect water tax and manage the account system. On the coordination of VDC, WUCs have developed a provision that one who wants sell his/her land, s/he should submit the water tax bill to the VDC to get the recommendation latter to the Land and Tax district office, Sunsari.

The main duties of Dhalpa is to distribute water according to the approved schedule and maintain the cannel.

iii.c Financial Management

Branch and Sub-Branch WUCs are the autonomous and independent committee (Sunsari-Morang Irrigation Project, Charter of Water User Committee, Singiya

[16] Central committee represents Main Cannel Water User Committee. Valve Chamber (VC)

Sub-Branch 1996, Article 4.4.1). In the charter of WUCs, there is a provision of fund management committee. The committee is responsible to execute the rules and provisions made by the general assembly. It has its own bank account in the nearest bank, executed under the joint signature of chairman and subjected authority. The charter has provided a rights to determine and collect water tax itself. There are different kinds of rates according to provision made in different WUC. The range of tax provisioned in the charter is Rs 135-203 per Bigha. In the charter, WUCs have to submit 50 percent of water tax to the government as the revenue. Sub-Branch WUCs have to pay the salary of employee itself. According to Hari Bhandari, the secretary of Manik Chauri Water Users Coordination Committee, the Singiya VDC was supporting their program as well.

7.1.2 Underground Water

The other important source of water in the study area is underground water. All the drinking water in the study area is supplied from underground water, every house has a tube-well to pipe out the drinking water.

There is no systematic management of drinking water and pumping system and purifying system. Among 131, 97 (74.05%) of respondent replied that they were no aware of arsenic, a ground water related poison. There is no other source of drinking water supply.

7.1.3 Ponds

The other water source of the study area is pond. There is no any lake and public pond except private ponds. Some of rich and courageous local men managed ponds for fishery. But they are not aware of scientific techniques of fishery.

CHAPTER VIII

8. Disaster Management

8.1 Introduction

In this topic, we discuss on floods, floods management practice. Of many disaster, the study area is facing only floods problem. Floods causing loose of lives and property are annual phenomenon in Nepal. Each year, many people are killed and made homeless by floods. Private public property and expensive and often vital infrastructure are damaged. As a consequence, the overall development of the country has been severely affected by repeated flooding (Khanal and et. all, 2007: 3).

8.2 Floods in Singiya VDC

According to the head master of Janta Secondary Scholl, Rajendra Paudel, Singiya, Sunsari-Morang Irrigation Project collected smaller water resources and integrated in Duttakitcha and Sera Khola in 1982. Before constructing the Chatara Cannel, there was no any stream in the area. Now Sera and Duttakitcha are destroying hundreds bigha of arable land. Sunsari khola is destroying Ramdhui Jungle.

Sera Khola has already built 56m of its breadth with 6.2m of depths and Duttakitcha has 34.5m of breadth and 5.3m of depth. More than 30 houses by Sera and one school and more than 15 houses by Duttakitcha are endangered in Singiya VDC.

8.3 Vulnerability Analysis

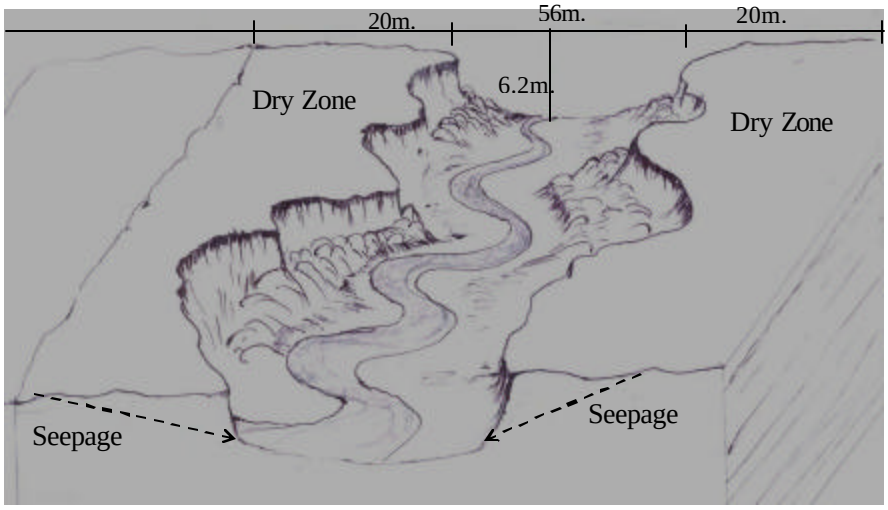
In the study area, damages made by the floods can be classified into two types – Physical and anthropogenic.

8.3.1 Physical Vulnerability

Among three rivulets, Sunsari Khola follows across the Ramdhuni Jungle. The destruction made by the Sunsari Khola, all fall into the jungle. A number trees eroded down by the stream every year. There is a new concrete bridge across the Sunsari Stream to link Prakashpur VDC, which was already destructed once by the stream.

Among three streams of the study area, Sera is the most destructive stream. After collecting smaller streams into Sera Khola, it has made 6.2 m of gorge and 56 m of width.[17] It has destructed hundred bigha of arable land by its sit-cutting and toppling process. On the other hand, 20 meter of buffer area of the Sera stream was almost dried because of seepage reducing productivity (fig 7). It has already destructed a concrete bridge and two wood bridge (Slide 1).

Fig. 7 Morphometry of Sera Khola



Janta Secondary School, one of the oldest school of the study area, is in the danger of Duttakitcha Khola. It is just aside of the Duttakitcha Khola, which has produced 5.3 meter of gorge and 9.6 meter of width (Slide 2).

[17] Measurement was taken at Sera Bridge of Singiya 7 and at Kalijhora Bridge of Singiya 8.

8.3.2 Anthropogenic Vulnerability

Although, there was no record of displacement, 41households including 229 family member, were on the risk of Sera Flood (Slide 3) within Singiya VDC. Similarly, the Duttakitcha pulled 17 households with 92 family member in the risk.[18] The trends of floods shows that they will be displaced within very few year.

8.4 Flood Management Practice

Very few practice were carried out in limited sites. According to the head master of Janata Secondary School, some observations were made by the Sunsari-Morang Irrigation Project but not applied any measure to control the floods. He also blamed that the project was careless to the destruction and its management. Sunsari District Development Committee (DDC) had provided some steel net and stone in 1999 to set gabbing near the Singiya Bridge and Janata School. But the effort was very minimal with the comparison of the destruction.

Local people had their own practice. Some of them planted bamboo aside of Duttakitcha and Sera stream (Slide 4). But the farmers of Sera Stream were planted banana densely aside of Sera Steream (Slide 5). There was no any institutional effort in Sera. Because of following Sunsari stream across the jungle, none of the individual and institution of the area had paid the attention to the destruction made by Sunsari Khoal.

[18] Field observation.

CHAPTER IX

9. Conflict Management

9.1 Introduction

In the Webster's Dictionary, conflict described as a battle, context of opposing foresees, discord, antagonism, exiting between primitive desires and instincts and moral religious or ethnic ideals. Conflict occurs when two or more people oppose one another because of difference in their needs, wants, goals or values.

That is why, conflict is a state of clashing or opposing interests and it occurs with positional differences over values and belief system. Self determination and access to and distribution of power.

Conflict management (CM) is a process of making progress. As a part of improving the conflict situation, progress may be developed in mutual gains, learning, achieving agreement, laying foundations for further negotiation or fully resolving conflict. Progress is a way of thinking about a conflict situation that recognizes that conflicts are inevitable and ongoing part of social process and management of the conflict comes from continual improvement in areas of substance and relationship (Daniels and Walker, 1997: 35). In the context of natural resources the perceived inconsistencies between people about acquired rights, incurred obligations, or contradictions of two or more jurisdiction lead to conflict. In the legal sense CM is the application of the laws and regulations to ensure rights and provide remedies that reconcile the inconsistencies and decide which systems are to govern particular cases (Oli 1998). Upreti (2002) preferred to use the term 'conflict management' instead of conflict 'conflict resolution' because it is not always possible to resolve all conflicts. But it is possible to manage them.

Land, forest and water are the most important natural resources for the economic development of Nepal (Pandey,1999). Conflict is common in the use and management of these natural resources. There fore, management of conflict is crucial to improve the performance of NRM and to achieve Sustainable Development.

9.2 Natural Resource as a Source of Social Conflict

The competition between industrial, urban, and agricultural use for natural resources is mounting and the per capita consumption of natural resources is increasing (JHPIP, 1998).

Population pressure, poverty and scarcity of resources are the root causes of social and natural resource conflict in Nepal. Land, Water, and Forest resources are over-exploited because of heavy dependents of the ever-growing population (both human animals) in the natural resources based (NPC 1998). Increasing natural resources degradation and its negative impacts on the environment and society is creating several conflicts.

9.3 Conflict Management Practice

On the basis of resources, conflict of the study area can be classified into three– forest related, land related, and water related.

Because of the major role of the CFUGs, entire of forest related conflict were managed at local level. In the fiscal year 2004/05, three conflicts were registered in Ramdhuni North-East Community Forest User Group. After making consensus in the group, all three were within the group.

According to the vice chairman of Ramdhuni Kumyahi CFUG, Budha Narayan Chaudhari, all the program and activities were developed on the consensus of users, so that very few conflict were occurred.

During the managing conflict, the CFUGs of the study area have their own punishment process and system.

a. Oral about one's faults
b. On the consensus of the users, criminal was slabbed a suitable charge.
c. Seize the membership, which avoids the criminal from the rights of using forest resources.

According to the records of the District Court of Sunsari in 2003-05, there was no any case registered relating forest. All kinds of conflict relating with forest were resolved at the CFUG in the study area.

Table 13: Participatory Conflict Management

Resources	Fiscal Years					
	2002/03	Decision context	2003/04	Decision context	2004/05	Decision context
Land	1	Self Compromise	7	6 as law 1 further on	3	Going on
Forest	-	-	-	-	-	-
Water	-	-	-	-	-	-
Public	-	-	1	Public compromise	-	-

Source: Sunsari District Court 2005.

Table 13 shows that there were ten cases relating land registered in Sunsari District Court (SDC) within 3 years. Because of the important role of CFUGs in the forest management and WUCs in water management, there was no case

relating water and forest resources, was registered in the SDC within the same year.

There was a provision in the charter of Water User Committee that if one break the norms of the charter s/he was informed orally at first, second time he was slabed 51 rupees, rupees 151 for third and 515 for the fifth. If s/she breaks again and again, s/he will charge very strong punishment on the consensus of local people as user. There is a provision of Case Committee with the role of resoluting conflict relating water.

Table 14: Ward-wise Distribution of Cases 2002-05

Resource	Wards									Total
	1	2	3	4	5	6	7	8	9	
Land	1	1	-	1	-	1	2	-	5	11
Forest	-	-	-	-	-	-	-	-	-	-
Water	-	-	-	-	-	-	-	-	-	-
Public	1	-	-	-	-	-	-	-	-	1
Total	**2**	**1**	**0**	**1**	**0**	**1**	**2**	**0**	**5**	**12**

Source: Sunsari District Court 2005.

Among the 12 cases, 11 were related with land. This number proved the land is the most conflictable resource in the study area. Conflict related forest and water were used to be resolved in the local level in the study area.

CHAPTER X

10. Findings, Conclusion

10.1 Findings

Natural Resource Management (NRM) is an important subjective in the field environmental study. In this study, Singiya VDC of Sunsari District was selected as the study area which have land, forest and water resource. Including multiple techniques, information for the study were collected on the ground reality. At the end of study, following findings were observed.

The trend shows that there is no significant effect of using fertilizer in the stud area.

A simple experiment help to draw an important conclusion that the density of silt into the water is very high.

Sera, Duttakitcha, and Sunsari Khola are the major drainage system of the study area. Duttakitcha Khola destroy the Janata Secondary School of Singiya 7.

There was no any case registered in District Court relating forest in 2003-05. All kinds of conflict relating with forest were resolved at the CFUG in the study area.

There is a large forest – Ramdhuni Jungle – covering nearly 2100 hector of land in the western part of the study area. There is no other forest except Ramdhuni Jungle. Nearly 27 hector of jungle around the temple is fenced and protected as *Dharmik Ban* (religious forest) reserved for the temple.

There are two types of forest management system in Singiya VDC: a) Customary b) Contemporary

People belief of the Ramdhuni temple which was protected the jungle and the activities of Ramdhuni Area Protection and Development Committee can be

accepted as the example of customary system. Community Forest User Group (CFUG) are the example of contemporary system.

There are ten CFUGs functioning forest management activities in the study area. These CFUGs are organized by people from different walks of lives representing various part of the jungle. Besides of the CFUGs there is a Coordination Committee of Ramdhuni Community Forest User Groups formulated by the ten CFUGs. It is a unique type of effort in the field of community forest.

But the people's participation in the CFUGs on the gender and ethnic basis is not appreciable. Despite the focus of the program on the participation of weaker section of the society, upper caste male dominancy was observed in the CFUGs of the study area. Every CFUG use to deploy the monitoring group twice in a day – morning and day shift.

CFUGs are independent and autonomous on the sense of financial control. Besides the forest protection and development, they are initiating development activities too. Some of the CFGUs constructed bridge, school building road too. A part from these activities, CFUGs of the study area are promoting income generating programs such as goat farming. The other interesting activities is what Ramdhuni Sikdar CFUG is breeding wild boar as income generating program.

CFUGs are distributing the forest product from two processes.

iii. Regular Process

iv. Causal Process

There is no afforestation program equally in all part of the jungle. Till 2005, the Ramdhuni North-East CFUG had planted 1800 plants. Similarly, Ramdhuni Sikdar CFUG has planted 200 plants in 2004. According to its work plan 2005, it was willing to plant 1300-1500 plants from various species by 2008.

The CFUGs of the study area are emphasizing on herbalian product. On the demand of Natural Flower and Herbal Pvt. Ltd., the CFUGs are Amala, Dar, Chhaitiwan, Pawan, and Kaulo. According to the Memorandum of Understanding (MoU) made between CFUG and company, it was mentioned that the company will provide the plants of the species and purchase the product. This effort has encouraged the CFUG of the study area.

Although the CFUGs of the study area are performing very high level of effort in protecting and managing the forest, they are not satisfied with the activities. They are facing following problems.

a. Because of the government's hesitation in handovering the forest, CFUGs are not much encouraged.

b. Users are not allowed to use the wood – more than 4 feet of circular measurement – without the permission of the DFO.

c. The CFUG should get permission before thinning and pruning the forest.

d. Lack of awareness among the users.

e. Lack of the knowledge of alternative energy.

f. Because of the CFUGs have prohibited the poaching, the attack of the wild animal is increased surrounding the jungle.

g. Lack of the concept of modernization in plantation.

h. Lack of income generating promotion programs.

On the basis of its use, there is only one type of land. Entire of the land in the study area can be found as paddy land.

On the basis of its quality, land of the study area is classified into three category.

a. *Abbal* – very high category of land on the basis of fertility.

b. *Doyem* – second category of land

c. *Sim* – tertiary category of land

On the basis of its registration, the land of the study area can be divided into four categories.

a. Public Land

b. Government's Land

c. Sunsari-Morang Irrigation's Land (Chatara Cannel)

d. *Guthi* Land

In the public land, there is very high ratio (average 1:1.2) of fragmentation. For instance, the land of ward no 9 is fragmented 16 times (1600%) within a year. Similarly, the public land of ward no. 3 also is fragmented 2.2 times (220%) in a year.

On the other hand, population of the study area is increasing by 3.06 percent of growth rate. A large number of farmer of the study area is using urea (Nitrogenous compounds) instead of compost and local (dunk). Although using urea, the increasement of productivity is not satifiable.

Because of Sunsari-Morang Irrigation Project (Chatara Cannel), siltation is being produced rapidly as the prime problem. Number of farmer is suffering from siltatation. But, there is no measure adopted by the government or by the any agencies except local practice.

Only three types of water source can be observed in the study area.

a. Surface Water

b. Underground Water

c. Ponds

Dutta kitcha, Sera, and Sunsari Khola which are not used any for irrigation and sanitation are the major drainage system of the study area ad are the major sources of natural disaster – floods.

Sunsari-Morang Irrigation Project (Chatara Cannel) is other source of surface water in the study area. Covering 60,000 hectors of land in total, entire of agriculture land of the study area is irrigated by this water

There are three, separate Water Users Committees (WUC) in the study area. All these committees were registered under the office of Chief District Officer (CDO) Sunsari according to the Organization Registration Act 1977.

This committee are playing important role on the management of irrigation water and conflict related water.

All the drinking water in the study area is supplied from underground water, every house has a tube-well to pipe out the drinking water. There is no systematic management of drinking water and pumping system and purifying system. Among 131, 97 (74.05%) of respondent replied that they were no aware of arsenic, a ground water related poison. There is no other source of drinking water supply.

Sera, Duttakitcha and Sunsari Khola are the major source of natural disaster. Sera Khola has already built 56m of its breadth with 6.2m of depths and Duttakitcha has 34.5m of breadth and 5.3m of depth. More than 30 houses by Sera and one school and more than 15 houses by Duttakitcha are endangered in Singiya VDC.

Number trees are eroded down by Sunsari stream every year. There is a new concrete bridge across the Sunsari Stream to link Prakashpur VDC, which was already destructed once by the stream. Because of following Sunsari stream across the jungle, none of the individual and institution of the area had paid the attention to the destruction made by S unsari Khoal.

Among three streams of the study area, Sera is the most destructive stream. It has made 6.2 m of gorge and 56 m of width. It has destructed hundred bighas of arable land by its sit-cutting and toppling process. On the other hand, 20 meter of buffer area of the Sera stream was almost dried because of seepage reducing

productivity. Janta Secondary School is in the risk of Duttakitcha Khola, which has produced 5.3 meter of gorge and 9.6 meter of width.

41households including 229 family member, were on the risk of Sera Flood within Singiya VDC. Similarly, the Duttakitcha pulled 17 households with 92 family member in the risk. The trends of floods shows that they will be displaced within very few year.

Very few practice were carried out in limited sites. Some observations were made by the Sunsari-Morang Irrigation Project but not applied any measure to control the floods. Sunsari District Development Committee (DDC) had provided some steel net and stone in 1999 to set gabbing near the Singiya Bridge and Janata School.

Local people had their own practice. Some of them planted bamboo aside of Duttakitcha and Sera stream. But the farmers of Sera Stream were planted banana densely aside of Sera Stream. There was no any institutional effort in Sera.

On the basis of resources, conflict of the study area can be classified into three– forest related, land related, and water related.

The CFUGs and WUCs are playing the very important role to resolving conflict relating forest and water. No case was registered in the Sunsari District Court relating forest and water in 2002-05.

Land is the most conflictable resource in the study area. 11 land related cases were registered in the SDC in 2005. Majority of the cases were resolved on the consensus of local people.

10.2 Conclusion

This study is related to the natural resource management of Singiya VDC of Sunsari District. It includes only three resources – land, forest, and water. On the course of study this researcher has developed concept of natural resource

management process and natural resource management frame, which are let open for wide discussion.

During the study a unique type of NRM practiced were noticed, which are more replicable. Forest related resource management practice are satisfiable. But the floods of the study area is more horrible. Participatory floods management practice is must for the management of the floods in study area stakeholders, local government and interested institution would better to initiate for it.

Most of the users of community forest are incapable to enjoy their rights and to perform their participation in the process of forest management. Awareness and technical skill will be more helpful to the users.

Including Janata Secondary School, very important physical public assets are on the risk of floods. Stakeholders, as well as local government wood better to pay keen attention to the risk. On the other hand, 58 households are on the risk of Sera and Duttakicha floods. They looked like to be displaced very soon by the floods. The authorities would better pay attention to the anthropogenic destruction.

At the end of the report, the researcher would like to request suitable suggestions from the senior and scholar.

Slide 1: A new bridge near by the old one destructed by Sera Khola.

Slide 2: Janata School near by Duttakitcha Khola

Slide 3: House at the Risk of Sera Khola

Slide 4: Bamboo Planting as the Practice of Floods Management

Slide 5: Banana farming as the practice of floods management

Slide 6: Forest Monitoring Group

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Annex 1: Questionnaire

Natural Resources Management: a participatory perspectives: A case of Singiya VDC, Sunsari

S. N. City/Village VDC Ward No.

1. Family Details

a. Name of the head of the house:

b. Name of the respondent:

c. Type of house: concrete Brick Lumber

d. Please provide your family details in the following tables

SN 1	Age	Sex	Marital status	Education	Occupation	Period of job	Monthly salary
2							
3							
4							
5 6							
7							

e. Are you an origin of (Indigenous) this locality? Yes No

f. If you aren't, from where and when did you migrate?

…….

g. What was the main cause of your migration?

…….

2. Resources use

2.1 Land resource:

a. How much land did you have before 10 years?

……..Bigha ……Kattha ……..Dhur

b. How much land did you have before 5 years?

…….Bigha ……Kattha ……..Dhur

c. How much land do you have now?

…….Bigha ……Kattha ……..Dhur

d. Do you hire other's land too? Yes No

e. If you do how much?

…….Bigha ……Kattha ……..Dhur

f. Do you lend your land others to harvest? Yes No

g. If you do, how much?

…….Bigha ……Kattha ……..Dhur

h. What do you harvest except paddy?

Vegetables hor ticulture fishery others

i. In how much land?

…….Bigha ……Kattha ……..Dhur

j. To which market, do you export your production?

…….

k. Who do you work in the farm?

Parent Parent and sons parent and daughters daughter and daughter in -laws servant all

l. How much paddy did you use to produce in a bigha before 10 years?

……..Man (40 Kg. = one Man)

m. Before 5 years, how much paddy did you use to produce in a bigha?

……..Man

n. How much paddy do you harvest in a bigha now?

……Man

o. Which fertilizer do you prefer for your land?

Urea DAP TSP Potash Organic All

p. If you preferred Urea, how many Kg. do you prefer for a Kattha?

…….Kg

q. Did you feel any change after using urea?

Yes No

r. If yes, what are?

Increased productivity Decreased produc tivity Land has been compacted Land has been soften

s. Who use to go to pay land tax from your family?

Husband Wife son Daughter son's in -laws

t. Has your village road accessibility?

Yes No

u. If yes, did you get any land-loss during the road construction?

Yes No

v. If yes, how much land did you loss?

…….Bigha ……Kattha ……..Dhur

w. Did the government pay you any compensation?

Yes No

x. If yes, how much?

Rs…….. per dhur (20 dhur = 1 kattha, 20 kattha = 1 bigha)

2.2. Use of Water Resource

a. How do you supply of sanitation?

From tap from tube -well from cannel from stream

b. Do you aware of Arsenic?

Yes No

c. Where do you irrigate your land from?

From rained water from cannel from stream from tube -well from well

d. What are the regulation and system of irrigating land?

Rain follow system turn system free system no system all system

e. I turn system, after how many time do you get your turn?

After …….hour after …… days

f. If any paying system, how many ruppies should you pay for?

Rs….. Per month Rs…….. Per week

g. Who do you go to pay for irrigation fee?

Husband wife son daughter daughter in -laws servant all

h. Who do you use to go to irrigate the land?

Husband wife son daughter daughter in -laws servant all

i. If any irrigating system will fail, who do you go to maintain the system?

Husband wife son daughter daughter in -laws servant all

2.3 Use of forest Resource

a. What kinds of fuel do you use in your home?

Fire - wood dunk - roast kerosene LP gas

b. If you use fire-wood, where do you bring it from?

From private forest from community forest from public forest

from river bank

c. When do you go to bring fire wood?

Every day thrice in a week once in a week

d. How much the fire-wood do you bring in a time?

……..Kg. or …….. bhari (nearly 50 Kgs. contain in a bhari)

e. How do you manage the fodder for your cattle?

From forest from farm -land from river bank hey only all

f. Who do you bring fire-wood and cattle-fodder from the forest?

Husband w ife son daughter daughter in -laws servant all

g. Who do you go to participate in the seminar, work shops, and meeting relating with forest?

Husband wife son daughter daughter in -laws servant all

h. If there will be any reforestations program, who do you go to participate?

Husband wife son daughter daughter in -laws servant all

i. Is there any regulation of bringing fire-wood and cattle-fodder from the jungle?

Yes No

j. If yes, what are the systems?

Fee system free system

k. If there is fee system, how many rupees do you pay for a year?

Rs …….

l. Do you like (favor) these rules?

Yes no

m. If no, what do you like to be it?

Please comment