

**AGRICULTURE AND NATURAL RESOURCE PRACTICES IN  
NAMSALING VDC, ILAM**

**A Thesis Submitted to  
Central Department of Rural Development,  
Tribhuvan University,  
in Partial Fulfillment of the Requirements for the  
Degree of the Master of Arts (M.A.)  
In  
Rural Development**

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**July, 2016**

# CHAPTER I

## INTRODUCTION

### 1.1 Background of the Study

Natural, social and economic environment and human activities are ever changing. Man has involved various activities to create the change so this study is focus natural, social and economic environment. All these varieties of natural and human activities exist due to changing in natural system. The goal of the study is to initiate for sustainable development planning of villagers. This study is focus on identified development constrains and opportunities for the social, economic and neutral environment.

Many development activities in development countries are unsustainable because planning does not consider the environmental aspects and programs are often not comprehensive. For examples, in Nepal construction of drains to alleviate flooding carried out on a piecemeal basis, transporting the drainage problem of one locality to another which does not have proper drainage layout and therefore experience of outfall Environment Impact (EIA) is a good tool of specific projects, it can not compensate lack of micro level planning. To simplify the Environment Impact Assessment (EIA) process and to have sustainable development planning is need. (Banskota, 2009).

Human activities responsibilities for environment degradation are modified and stem from socio-economic factor such as poverty, illiteracy, lack of economic development and employment opportunities other then in the traditional sector *Environment Management* (Pradhan, 2002). Community development is based on the having a

resources and its also essential, lack of resources community people do not developed. The population composition of Nepal has been increasing day by day and all wants to develop to their communities and personal life also. If the people prepare the planing without focus the environment development activities could not sustainable.

Environment problem is today's burning issue worldwide and it needs to be seriously considered before irreparable damage is caused. In Nepal, central environmental consideration must be focused on the agriculture and forestry sectors. The agricultural system in the Nepalese hills is traditional, comprising crop production and livestock raising. Increasing population density in the hills has forced people either to cultivate marginal lands using shifting cultivation, or to migrate to low-lying areas and clear low-density forests (Pandey, 1995). Forests are also cut to fulfil the increased population demand for fodder, fuel wood, timber and shelter. As a general trend, natural resources of mid-hills are over exploited. This too high pressure on natural resources generates different problems such as a high rate of deforestation, biodiversity lost, soil fertility and productivity decline, formation of gullies and landslides, riverbank destruction and the depletion of ground water resources.

Past planning effort without local people involvement had shown poor implementation performance and those which were implemented lacked accountability on the part of local people for project protection and maintenance (Makela, 2010). Now, the importance of transparent development planning involving people's participation right from beginning to end is highly realized by all concerned. Sustainable development planning is an essential prerequisite for a successful implementation of development work. Such development planning needs public participation right from the beginning. All concerned communities and groups must

be included in the needs identification, implementation, maintenance and management phases of the planning process. Moreover, the inclusion of a sustainable resource management in development works as well as the conservation of rare or sensitive ecosystems are needed to minimize the ill effects of a particular development project.

Past development efforts in Ilam district has also suffered from a lack of grass root community participation. There were many previous development efforts carried out at the VDC level, but only few outputs compared to investment were achieved. A good example of this statement can be observed in the non-sustainable secondary roads build by the VDCs in Ilam District. Most of them are washed-out and impracticable next coming monsoon after road construction completion. This example could be attributed to a development without proper planning and/or a top down planning ignoring the importance of incorporating environmental aspect and local people's involvement. This led to a serious environmental degradation due to effects of ill-planned development works as well as the presence of a delicate ecological balance.

The enactment of the Local Governance Act, 1998 and its Regulation, 1999 by Nepal government is a generous contribution towards empowering local governments with defined responsibilities and authority to take over those responsibilities. Amongst many important responsibilities defined by this act and regulation, VDCs, Municipalities and DDC are required to prepare their periodic plan with a development vision, goals and objectives for the different development sectors. Due importance is to be given to involve marginalized groups of the community and to conserve the environment. The act also seeks an integration of development and

environment through utilization of locally available resources. But unfortunately, VDCs are not in a position to take over those responsibilities, neither there are any projects to provide management support to them nor they can take the consultation services from their limited budget. In such scenario, there is need of some support to VDCs to prepare sustainable periodic plan with a satisfactory integration of environment conservation and development activities.

## **1.2 Statement of the Problem**

Environment degradation is particularly acute in Nepal, threatening the livelihoods of its rural citizens, especially those living in ecologically vulnerable hill and mountain areas like Ilam, in eastern Nepal, particularly Ilam district, environment degradation is through to be less advanced relative to other parts of the country. However, the enabling conditions leading to environment degradation exist in Ilam. If not considered in development planing these conditions can manifest into greater environment problems for communities within Ilam. Environmental degradation pressures are also present in hilly area, including population growth rates, low levels of off-farm employment and intensive use of natural resources.

Environment problem is today's burning issue worldwide and it needs to be seriously considered before irreparable damage is caused. It has now well been established that it is the socio-economic problems, which are causes of environmental degradation. The agricultural system in the Nepalese hills is traditional, comprising crop production and livestock raising. Increasing population density in the hills has forced people either to cultivate marginal lands using shifting cultivation, or to migrate to low-lying areas and clear low-density forests (Pandey, 1995). Forests are also cut to fulfil the increased population demand for fodder, fuel wood, timber and shelter. As a

general trend in Nepal, natural resources of mid-hills are over exploited. This too high pressure on natural resources generates different problems such as a high rate of deforestation, biodiversity loss, soil fertility and productivity decline, formation of gullies and landslides, riverbank destruction and cuttings and the depletion of ground water resources.

At the local level, Village Development Committees are responsible for development activities to their respective VDCs. The enactment of the Local Governance Act, 1998 and its Regulation, 1999 by Nepal government is a generous contribution towards empowering local governments with defined responsibilities and authority to take over those responsibilities. Amongst many important responsibilities defined by this act and regulation, VDCs, Municipalities and DDC are required to prepare their periodic plan with a development vision, goals and objectives for the different development sectors. Due importance is to be given to involve marginalized groups of the community and to conserve the environment. The act also seeks an integration of development and environment through utilization of locally available resources. But unfortunately, VDCs are not in a position to take over those responsibilities, neither there are any projects to provide management support to them nor they can take the consultation services from their limited budget. In such scenario, there is need of some support to VDCs to prepare sustainable periodic plan with a satisfactory integration of environment conservation and development activities. The need of integrating environment conservation with development activities can be observed through examples of non-sustainable secondary roads built by the VDCs all over the country. Most of them are washed-out and impracticable the next coming monsoon after road construction completion. This could be attributed to a development without proper planning and/or a top down planning ignoring the importance of incorporating

environmental aspects and local people's involvement. This led to a serious environmental degradation due to effects of ill-planned development works and ignoring a delicate ecological balance.

Realizing these facts, the study aims to assess the agriculture and natural resources practices and environmental condition of the Namsaling VDC and to provide realistic action plan to improve the present environmental condition through a participatory process. The research questions for the study are;

- ) What is the agriculture and natural resource practices in study area?
- ) What is the relationship between agriculture and natural resource practices in study area?

### **1.3 Objectives of the Study**

The main objectives the study is existing resource use practice for sustainable livelihood planning in local community and suggest an environmental management in order to reduce further degradation of environment. This study purposes to investigate the conditions met with in Namsaling VDC. This study focuses on the following specific objectives.

- ) To study the agriculture and natural resource practices in study area.
- ) To assess the relationship between agriculture and natural resource practices in study area.

### **1.4. Significance of the Study**

The Village Development Committee is the lowest level of government agency responsible for carrying out development activities. Local governance Act, 1998 has

identified VDCs as a type of local level government. Unfortunately, VDC representatives lack enough capacity to take over responsibilities prescribed by the act. This is more so in case of natural resource management and integration of environmental aspects into development intervention to achieve sustainable development. Thus the rationale of the study is to enhance the capacity of the VDC representative including local community of Namsaling VDC to incorporate socio-economic and environmental aspects into their development plans so that they would be able to gear up their development activities in a sustainable manner.

### **1.5 Limitation of the Study**

The study had following limitations:

- ) The study could not incorporate the previous development activities that had taken place within the VDC.
- ) The study could not show recent changes in land use due to the time constraint.
- ) The technical solutions to the problems concerned with agriculture, forestry and environment could not be incorporated in the paper.
- ) There were limited studies of this kind done previously, thus there were limited references to consult from.

### **1.6 Organization of the Study**

The study has been divided into five chapters. The first chapter deals general background, statement of the problem, objectives of the study, rationale of the study and limitation of the study. The second chapter deals review of literature especially theoretical reviews, and review of sustainable development planning.



The third chapter discussed the research methodology for the research. In this chapter, rationale of the selection of the study area, research design, nature and sources of data, universe and sampling, data collection techniques, data presentation and analysis and presentation and preparation of action plan. The Fourth chapter has data presentation and analysis which depicts general background of the study area, demographic, economic, employment, social situations, infrastructure development and environment situation. Fifth chapter focuses as summary, conclusion and recommendations .

## **CHAPTER II**

### **REVIEW OF LITERATURE**

#### **2.1 Conceptual Review**

Natural Resource Management means appropriation, distribution, utilization and conservation of natural resources and the legitimate way of controlling them. Natural resources are valuable environmental and economic factors for supporting natural systems and for promoting human welfare. Land, forest and water are the most important resources for the economic development of Nepal (Brady, 2006).

The natural resource management began from the ancient period with the ecological simplest societies known as nomadic bands of hunters and gatherers when that had populated refuge areas like deserts. In Nepal, traditional and indigenous management of natural resources have/had been found from the historical period. Talukdari system, Chitdari system, Shingo Naua system, Guthi system, Kipat system, Birta system, Jagir system, Rakam system etc. are some examples of traditional and indigenous management systems of natural resources existed in Nepal (Banskota, 2009).

Forest resources are one of the major resources directly contributing to the survival of rural people in Nepal (Kat and David, 2010). Forest resources directly fulfill forest related subsistence needs of women, poor and backward people as well as commercial needs of well-off people. They are providing inputs for agriculture, livestock, and supply medicinal herbs, fruits, root-tubers, timbers and non-timber forest products. Forests also support irrigation, conserve watersheds, improve the condition of the soil, provide recreation for tourists through forest based eco-tourism and national parks

and wildlife reserves, provide a habitat for flora and fauna and provide raw materials for the forest based industries (Manandhar, 2008).

When the productivity of the forest sector was decreasing due to uncontrolled migration and encroachment, smuggling, illegal hunting, grazing, forest fire, and lack of scientific forest management, poor political commitments and bureaucratic performance, the government implemented community forestry policy to control over degradation of forest by the task of protection, management and sustainable use of forest from community level. Community forestry is a major forestry programme of government as embodied in the Master Plan for the Forestry sector, 1988 (Dahal and Guru-Gharana, 1995).

Many natural resources of the world are depleting in order to pay for development and Nepal is no exception. The lack of promotion of environmentally compatible projects has resulted in further deduction of natural resources. Of course, animals and clean water are the major parts of our ecosystem but in my point of view forests which serve as the natural habitat for many terrestrial animals and source for clean ground water have greater importance on account of environment sustainability (Makela, 2010).

The first thing the study would like to discuss about is natural disaster like soil erosion and landslides. Men are still overwhelmingly dependent on forest resources for their daily needs. Felling of trees for more land for cultivation, for lumber and for firewood to cook food and to keep his room warm have been long used phenomena. As a result of which forests in many developing countries as well as in developed countries are reducing day by day. Consequently, trees which hold soil are no longer greater in number to stop soil erosion and landslides. The geography of many parts of

the world has become quite fragile because of this massive encroachment of forest and forest resources.

Secondly, the global green house gases like carbon dioxide, produced as a result of using petroleum products in many industries and automobiles and which are the causes of depletion of ozone layer, are consumed by these forests. As a result of massive cutting down of trees, these gases have become a serious problem to our environment in particular and to our existence in general.

Oxygen, the most important element for the survival of living beings is produced by the plants. In many parts of the world people are suffering from different air borne diseases due to lack of fresh oxygen, which is of course, one of the consequences of felling of trees. Moreover, these forests nos that we eat for good health are also the products of these forest resources.

Hence, in study the point of view, for long lasting survival of living beings on our mother earth, preservation of forest and forest resources bear prime importance and suitable mitigation measures have to be practiced in order to conserve these forests.

At the dawn of 22<sup>nd</sup> century, it has become clear that humankind is facing one of the greatest challenges of recorded history: how to reconcile continued economic growth and all this implies with the constraints imposed by a shrinking resource base and an increasingly degraded environment.

Nepal, a mountainous country, is divided into five physiographic regions from the plain (below 100m above the sea level) to high Himalayas (Mt. Everest-8848m). There is a sharp contrast in elevation and steepness. Only 11 percent of the total land is below 305m as and two-fifths of the area lies in between 300 to 1500m. Similarly

about 60 percent of the total land is steep to very steep in between 20-35 degrees. The soil and climate also differ in different physiographic zones. The ecological setting and physiographic condition are likely to generate environmental problems of different magnitude and scale. In general, environmental problems emanated from excessive dependence on the use of natural resources, and inadequate integration of the environmental aspects in development planning and implementation. Major environmental issues have been emerged form land degradation and depletion on forest resources (Manandhar, 2008).

Energy demand is met from a combination of both traditional and commercial sources. About 92 percent of the total energy is obtained from traditional sources such as fuel wood, agricultural residues and dung, and the remaining 8 percent from commercial sources- the petroleum products, coal and electricity. Loss of top fertile soil and land degradation has direct bearing on food production. The land use information revealed the tendency of cultivating the marginal lands. Several studies have concluded that soil erosion is one of the major environmental concerns in Nepal. At present, about 0.4, 1.5 and 11.7 percent of the total watershed is reported very poor, poor and fair condition in terms of laoved away by crop harvested and erosion processes. Out of this, only 0.3 million tons are replenished by organic and mineral fertilizer and the rest is taken out of the soil reserves (Barnelt, 2009).

About 75 percent of the landslide occurrences are natural in origin. It has been accelerated by human-induced activities such as cultivation practices in the steep slopes. Nepal also experiences frequent flood and landslide in the monsoon season, and the human beings and the infrastructures are affected significantly. Land degradation and soil loss has direct impact on crop production. In spite of increased

agro-inputs, there is no change in per unit area agriculture production and food deficit is prevailing in number of areas. In case of livestock, the production is on increasing trend. The interdependence of agriculture, livestock and forestry is pronounced in the mountains (Burghart, 2009).

Population growth has been one of the major causes of environmental degradation. It has a constant pressure on natural resources base such as forests and land. Rural-Urban migration has tremendous impacts on social service facilities in the latter areas.

Several attempts are underway to create public awareness. Environmental programmes are regularly aired on radio and televisions. Print media have also contributed a lot to enhance the level of environmental understanding. Governmental and non-governmental organizations are individually or jointly involved in creating public awareness. In order to address these concerns, Government has enunciated environmental policies and has integrated environmental aspects in the development projects and programs since the mid-1970s. Commitments have also been made by incorporating environmental policies and integrating environmental aspects in the development projects and programs since the mid 1970s. Commitments have also been made by incorporating environmental aspects in the sectoral policies. Environment-friendly provisions are included in sectoral legislation which are enacted or amended after 1990. Government of Nepal has articulated in recent legislative and policy reforms its intention to support the decentralization of development planning and environmental protection. This policy imperative has been expressed in the enactment of the Environmental Conservation Act (ECA), 1997, the Environmental Conservation Rules (ECR) 1997 and the Environmental Planning Guidelines (1995) which are scheduled for revision this summer. Additionally, the recent promulgation

of the much-anticipated By-laws under the Local self Government Act (1999) is seen by many people as laying the legal foundation for the decentralization of development efforts to local authorities throughout Nepal. The By laws outline the roles and responsibilities for development planning at the village and district levels, and identify the guidelines for public involvement in the planning process. A major aspect of government's environmental policy thrust, reflected in this reformed regulatory regime, is that environmental management is to be conducted in a collaborative manner inclusive of the participation of the public sector, the private sector, and non-governmental organizations (NGOs). In addition to these regulator reforms, government has also adopted Nepal's National Conservation Strategy, formulated Pollution Control Regulations, passed National Impact Assessment Guidelines, created an Environmental Protection Council and Environmental Coordination Group, and developed master plans for forestry, irrigation and agricultural sectors, As described in the Nepal's National Environmental Protection Action Plan (Negi, 2010), government's environmental policy has five principle aims:

- ) to manage efficiently and sustainable natural and physical resources
- ) to balance development efforts and environmental conservation to sustainably fulfil the basic needs of the people
- ) to safeguard national heritage
- ) to integrate environment and development through appropriate institutions, adequate legislation, economic incentives, and sufficient public resources

The concept of sustainable development has arisen to curb the environmental degradation. In April 1987, The World Commission on Environment and

Development issued its report, *Our Common Future*. The theme of the report is sustainable development, which it defines as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 2010). The report argues that the current use of natural resources should be maintained at level that does not reduce the prospects for future consumption. Sustainable development therefore advocates a process of change that does not increase poverty, degrade the environment, and leave future generations worse off. " Sustainable development is not a fixed state of harmony, but rather a process of change in which exploitation of resources, the direction of investments and the orientation of technological development on institutional changes are made consistent with future as well as present need" (WCED, 2010). There are many practical questions regarding how to operationalize such an approach. However, a consensus is emerging in terms of what is not sustainable development. The best way to demonstrate concern for the future generation is by reducing and ultimately eliminating the major sources of unsustainable practices as they exist today in the areas of demand, production systems, behaviour, and value structures. From the point of view of operational utility, this approach may be more relevant as it addresses directly the current situation.

It argues that the use of natural resources should be maintained at a level that does not reduce the prospects for future consumption. The sustainable development means the equity between environment and economic development, and to put effort on better management of natural resources. Economic growth must be able to relieve widespread poverty because 'a world in which poverty is endemic will always be prone to ecological and other catastrophe' (Banskota, 2009). It also follows the continuous poverty increases the difficulties of sustainable development in future.



Today's demand, production systems and behaviour are major issues of sustainability because the current consumption pattern and life-style are resulting in the depletion and degradation of natural resources in continuous manner.

Sustainable development can only take place through an integrated approach in which the present situation and condition is acceptable as starting point. By the 1960 and 1970s the World Bank and the United Nations were promoting what they termed "Integrated rural development in which conventional planning methods were cast aside in favour of a measure of community participation for sustainable development.

### **2.1.1 Sustainable Development Planning in Nepal**

Sustainable development is probably the most attractive and easily accepted but operationally most complex a concept to articulate. Much of the difficulties lie in the most encompassing nature of the concept. Understood and practiced in different ways in the traditional societies to meet the limited needs, the concept got new and universally acceptable and operationally feasible definition in the Butt land report appeared as "Our common future"

In Nepal, being a mostly traditional peasant society, the sustainable use of natural resources was, practiced in the past. The effectiveness of the traditional way of practice to ensure sustainability was seriously challenged by the ever-increasing need for exploiting the natural resource. The increasing demand of the people was pushing the country to the unsustainable path. New way for the sustainable development, therefore, was explicitly accepted as an organizing concept of the 8th plan. This inclusion of the concept in the National Development Plan coincided with the Rio Conference. The country moved fast in liberalizing the economy and replacing the

undemocratic regimes with more upon the pluralistic one. That was the time when Nepal also adopted pluralism in its social, economic and political sphere.

The first five year plan of the 21st century, the 10th plan is a continuation of the previous two plans, it is farmed around poverty reduction. The underlying assumption is that sustainable development to be meaningful.

Nepal's sustainable development rates on our pillars of sustainability-economic diversity, social/ cultural diversity and ecological diversity. We must ensure that they are strengthened. The economic openness and liberalization, pluralist democratic policy, broad-based decentralized governance, and the conservation oriented environment friendly development strategies and programs are designed to achieve sustainable development goal. Nepal has accumulated wealth of experience of operationalizing sustainable development concept over the paste decade. Future plan and strategies should build on these achievements (Shrestha and Gurung, 2005).

### **2.1.2 Peoples Participations' for Sustainable Development**

People participation is essential to carryout all the development efforts. Barnelt (2010) explains participation as an essential part of human growth that is the development of self confidence, pride, initiative, creativity, responsibility and cooperation. Without such a development within a people themselves all efforts to alleviate poverty will be immensely difficult, if not impossible. In the peasants' charter, FAO emphasises participation of rural disadvantaged group on institution building. This is elaborated as:

Participation by the people in the institutions and system which govern their lives is a basic human right and also essential for realignment of political power in favour of

disadvantage groups and social and economic development. Rural development strategies can realize their full potential only through the motivation, active involvement and organization at the grass root level of rural people, with special emphasis on the least advantaged, in conceptualizing and designing policies and programmes and creating administrative, social and economic institutions, including cooperative and other voluntary forms of organization for implementing the evaluating team.

With the process of participation people learn to take charge of their own times and solve their own problem by themselves. This is the in sense of development.

Katy and David (2010) pointed out that until recently the notion of participation as a means to achieving development has dominated the development practice. According to them, there are two main vehicles for implementing this notion of participation:

- ) Community development programs with government development plans
- ) The establishment of formal organizations (cooperatives, club etc) which were to provide the structure through which the rural people could have some contract with, voice in, development programs. They believe that participation is an unavoidable tool in the process of empowering and linearization. Meaningful participation is concerned with achieving power: that is the power of influence the decisions that affect one's livelihood. Thus the meaningful participation on the rural poor in development is concerned with direct access to the resources necessary for sustainable development and some active involvement and influence in the decisions affecting those resources. To participate meaningfully implies the ability to positively influence the course of events.

Participation is important for sustainable agriculture development to involve the farming population in programs and projects. Participation is essential part for sustainable development because it enhances local capacities to adapt to changing conditions and to improve the efficiency of resource use. Program and methodology have to be set-up in order to stimulate and support farmers organize themselves and to activate their role in technology development.

### **2.1.3 Community Based Sustainable Development**

Sustainable Community Development Program (SCDP) has developed an integrated and holistic community based sustainable development that has catalysed the rural communities to the organized in self-governing local institutions on settlement basis. The local communities have lead role to identifying the local socio- economic and environment problems designing and implementing development activities that has led the program towards the success. A number of practical lesson and experiences were gained during the course of implementation

- ) Indigenous knowledge and skill should be need for sustainable development (As its save time and resources)
- ) High priority be given to community integrated development activities that peoples immediate socio-economic needs (as if has highly effective in ownership creation and self sustenance)
- ) High priority should be given to integrated development activities (As if addresses various community needs- natural resource management and socio-economic development - at a time)
- ) SCDP promotes integrated program linking environmental conservation with socio-economic development (Shrestha and Gurung, 2005).

#### **2.1.4 Role of Forest in Sustainable Development**

It is widely organized that forests play important role in sustainable development. This is the mystical believe that the presence of forest actually rainfall and hance improves stream flow. But there is indeed specific condition which forests can influence the occurrence of mists.

Afforestation is highly successful in reducing flood peaks and sediment load. The trees bound the soil on the mountain slopes, enabling it to soak up the fierce rains. They help to release water ground ability to enrich the whole system. Forest management is integral part of environment management in spite of variability in findings.

In recent years a number of studies focussing on the human transformation of natural ecosystem and development and management of environment and natural resources, have emerged. District agencies like District Forest Office, District Plant Resources Offices have done studies on natural resources condition of the Ilam district But the study are not complete enough to suggest management recommendation at VDC levels. The Word Conservation Union (IUCN) has made environmental and social assessment of Siwalik areas of Ilam. Namasaling Community Development Centre (NCDC), a NGO in Ilam district is doing works on environment sector in Ilam district. Its main emphasis is to create awareness of local communities on environmental issue so that they can take correct action to mitigate environmental hazards on their surroundings.

#### **2.2 Empirical Review**

Dahal (2010) in the case studies from eastern Nepal found that among the seven FUGs with a total of 656 users, only 23 (3.5%) women were recorded as users and only 2.7% participated in the executive committee. He argued that this is because of the several reasons such as: traditional perception of women's role and obligations and customary practices in family and property relations do not permit women to participate in the public domain. In other words, Nepali culture does not permit women to participate in forestry activities. Forests belong to the public domain in which males participate, where as women are perceived as belonging to the domestic sphere, i.e., household. According to the traditional perceptions, forests are associated with masculinity demanding roughness, strength and courage. Forests are symbolized as the dwelling place of evil ghost, spirits and wild animals and a shelter for thieves and dacoits. Unless this very basic cultural element is withdrawn from Nepali culture, women's participation in forestry programmes will exist only in name. He further writes that the Nepali cultural model is strictly hierarchical even today. The position of females is lower than that of males, i.e., if females request male users to attend meetings, probably very few males will attend. Because of the illiteracy women are still unaware of their legal rights.

Chhetri and Pandey (2012), carried out eight case studies in Baitadi and Achham districts. They argue that the main users of the forest are women and children. They have to collect leaf litter, fodder and fire wood. Women have to do most of the farm work as well as all work related to collection of forest products, apart from timber collection. Out of eight case studies, only in Bhatwada Ban, Achham, where women have been recently included in the user group committee. However, it is doubtful as to how far the voices of the female members have been heard in the user group committee meetings of Bhatwada. In other rest of Bans namely - Karkiko Ban, Seliko

Ban, Koti Gaunko Ban, Kalapaniko Ban, Dhamiko Ban, Siddhesworiko Ban, and Majarkholako Ban - no women are directly involved in decision-making. Decisions and other strategies regarding the forest are made by local elites. Later the decisions are conveyed to the women. The main reason that the women are not invited to the meeting is the local cultural norms and values prescribe that women should not take part in public meetings along with men.

A very good example for women's role in protection and management of forest can be taken from "Chipko Movement" in Uttarkhand, India. The local women saved the forest resources in their communities from logging and deforestation by hugging the trees. The widespread participation of women in Chipko Movement has been frequently commented upon. Women have always played an important role in local economic life, and their involvement in Chipko is due to their dependence on the natural environment (Makela, 2010).

There are several factors affecting women's participation in development programmes. One of such factors is the gender division whereby men are expected to be involved in outside activities providing an economic return. Such gender norms result in women being discouraged from participating in development programmes which entail outside work (Negi, 2010).

When women are asked why they are not participating in committees and meetings, rural women respond that they can spare too little time from domestic chores. The social norms, in which women are discouraged from speaking publicly and interacting with male members of society and professional staff, also limit women's participation. This is compounded by the prevailing high illiteracy rate among rural women. As such, most of the women members of the FUG have no option but to

agree to what the men decide in FUG meetings. However, things are changing, if slowly. There is now a gradual realization of the importance of women's participation in community forestry. More activities focusing on women are being incorporated to enhance women's participation. Female workers or extensionists are being recruited to implement women-centred activities such as literacy programmes and special training and study tours for women (Jackson, 2004).

Hoskins (2013), argued that women's expertise in forest related activities is generally unnoticed by the concerned agencies and as a result, programmes can't achieve their commitments. The involvement and participation of women is crucial for the success of community forestry because they are the primary users of forests. Many field studies suggest that women spend more time in the forests than men collecting various forest products. Thus, scarcities of forest products immediately affect women who have to endure the hardship of walking further to collect fuel wood and fodder. In addition, women can contribute in the identification of the real users of the forest area and have an intimate knowledge of tree species. Thus, women should play a vital role in decision-making process related to forest resource management and utilization.

Yadav (2014), argues that in community forest management conflicts emerge due to the scarcity of resources and the lack of knowledge, understanding, position and power. For example, two chairpersons of a FUG can't be nominated in the same period of time. He found an extreme example of conflict for position in Chichling Pokhari community forest in Terathum district where two different committees were formed for the same FUG. He further explains origin and source of conflict as follows- i) Identification of users ii). Access right to use of forest products iii). Participation (active/passive) iv). Leadership politics v). Nature of resources vi).



Gender participation vii). Conflict between castes and ethnic groups viii). Conflict for grazing ix). Conflict between FUG and VDC x). Conflict between FUG and FD xi). Conflict between FUG and Urban group xii). Choice of species selection for plantation.

Baral (2014) argues that clear problems lie within the FUG itself. The group members in general feel that the forest is more like a “Chairman forest” rather than a “community forest”. They are least happy about the way the restrictions are made in terms of product collection, about the sale arrangements and about the use of the funds that have been generated. He further wrote (in his article in *Ban ko Janakari*, May 2013) the term “major five” is widely used in Jhapa district, which they say, make decisions about all community forestry matters. The term has been used to denote people who hold key positions in the committee namely, chairman, vice-chairman, secretary, Joint-secretary and the treasurer. People, in general, thus have least role in decision-making. This creates intra group conflict.

Upreti (2014) focused on conflict as a source of learning to create opportunities for social change in society. When there is conflict it gives people opportunities to think, understand the causes of the problems and look for solutions. He argued that the forest and pastureland cases involve conflict between powerful village elite and common villagers about access and control of forest and pastureland. The most common conflicts related to forests are ownership issues between individuals and the local community and/or government, identification of users and access to forest products. Other frequent conflicts are royalty payments, illegal exploitation and export to non-timber forest products, hunting and poaching of wild animals and animal products from the forests.

Gilmour and Fisher (2014) argued “while there are encouraging results of community forestry, a number of unintended outcomes are also apparent”. Problems exist in the intra-group, inter group and between FUG and forest offices. Some major types of conflicts and their causes as explained by Upreti (2014) and Yadav (2014) in their literatures are as follows.

Identification of users: In case of community forestry, poor and especially low caste people are not included when forming CFUGs. Likewise people living far from the forest, perhaps not using it regularly, who are called secondary users, such as charcoal makers who do not contribute to protection of forests are often excluded from the FUG list. Later they are not allowed to use forest products and this serves as a source of conflict (Upreti, 2014).

Sharing of benefits: Powerful and rich people take more forest products. Conflicts are observed in sharing forest products such as grass, fodder, timber and other edible products (Upreti, 2014). There may be conflicts for equitable or equal sharing of benefits. The households with larger family size demands equitable share on the basis of family size whereas, other argue that benefits should be shared on the basis of households, irrespective of family size, because the contribution of voluntary labour for forest management depends on the household. Often an equal amount of forest products are allocated to both large and small families.

Participation: All FUG members can't actively participate in meetings, in contributing voluntary labour and in other forest management functions. Some members are bound to be inactive because of their nature, physical condition, or the absence of the head of the family from the village for various reasons. The active members may feel that, because of their limited participation, the inactive members should not enjoy benefits

equal to those of active members. This causes conflicts and disagreement (Yadav, 2014 and Upreti, 2014).

**Leadership:** The position of chairperson of a community forest is prestigious in a village and is sought by many people. It is further exacerbated by the political interest of various parties. People, who are interested in active politics, use this position as a stepping ladder. This creates a lot of conflict in the community, which then turns to political conflict (Upreti, 2014).

**FUG's written arrangement V/S practice:** FUGs often deviate from their OP and constitution to get more income or benefit from the forests, which have led to conflicts between FUGs and DoF (Upreti, 2014).

**Unclear boundaries between FUGs:** Some forests are quite extensive and their boundaries include several VDCs. Due to lack of clear cut boundaries, two or more VDCs claim the same patches of forests to be lain in their side. This causes conflicts between FUGs (Yadav, 2014).

All above mentioned types and origins of conflict suggest community forestry programme, planning and implementation is not as simple as it sounds.

## **CHAPTER III**

### **RESEARCH METHODOLOGY**

#### **3.1 Rationale for the Selection of the Study Area**

Ilam is one of the mountainous and hill districts of Nepal. Ilam being one of the important tourist destinations, infrastructure development activities have attained a priority. Past development efforts in Ilam district has also suffered from a lack of

grass root community participation. There were many previous development efforts carried out at the VDC level, but only few outputs compared to investment were achieved. A good example of this statement can be observed in the non-sustainable secondary roads built by the VDCs in Ilam District. Most of them are washed-out and impracticable next coming monsoon after road construction completion. This example could be attributed to a development without proper planning and/or a top down planning ignoring the importance of incorporating environmental aspect and local people's involvement. The study aims to enhance the capacity of the VDC representative and the local community to integrate socio economic and environmental concerns of the VDC for their sustainable development planning and implementation.

### **3.2 Research Design**

This research design was conducted under the research design of exploratory cum descriptive. By employing the exploratory research design the information relating to the significance of sustainable resource and the knowledge toward the sustainable development planning and implementation has been extracted. Descriptive research design was used to describe the aims to enhance the capacity of the VDC representative and the local community to integrate socio economic and environmental concerns of the VDC.

### **3.3 Nature and Sources of Data**

Both primary and secondary data from published/unpublished books/journals were used during study. Primary data were collected by observation, field visit and discussion with key informants of the VDC. Furthermore, local level volunteers, two from each ward were trained to collect primary socio economic data.

### **3.4 Universe and Sampling**

The every ecosystem (settlement, agriculture and Forest) of the VDC are the universe and only the representative 54 respondents in ward no. 1,2,3,4 and 5 were taken as sample and visited for observation and necessary assessment. Random sampling method was used to visit different representative sites. To find out the person specific information about the village situation, a field survey was done. It was not possible to visit each and every places in a limited time, thus a multistage random sampling technique was used for the study. For this study, multistage random sampling has been chosen because the study area has big coverage of VDC. The objective of this method is to draw maximum information within limited budget and short period of time. This method is practicable to get out of this problem when it is carried out without violating the basic principles.

### **3.5 Data Collection Technique & Tools**

For socio-economic data collection, questionnaires are developed and enumerators within the VDC are selected to collect the data. They are given an extensive training to collect necessary socio-economic data. VDC's biophysical data is collected by the investigator, with the help of one volunteer from within the VDC having good knowledge on geography and natural resources of the area. To represent every ecological system of the VDC, each ward is visited.

#### **3.5.1 Survey**

The survey is a most important step of a data collection. Therefore, probability question are prepared verifying of various questions, which are result oriented according to the objectives. A serious discussion was made about the survey before

preparing the question, if they were according to the objectives of the study or not. Questions are prepared in the circumstance of individual and reference statement of interviewer. The interview is based on the survey of livestock, landholding size, occupation, education and other facilities.

### **3.5.2 Key Informant Interview**

In case of the absence of the sufficient information from the respondents, the necessary assistance has been taken from the related key informants to get more information about the local level sustainable development activities. The relevant key informants were key personalities of the study area; former ward chiefs, former VDC chief, Secretary of VDC office, former secretary of VDC office, officials of the related NGO/INGOs; leaders of political party, officials of government and officials of Local Development Office

### **3.5.3 Secondary Data**

General type of information were collected on from secondary sources like VDC, project office, Non Government Organization (NGO), related institutions and general outlook of the village and from Pre-studies publications. Apart from this information were gathered by visual observation during the visit in different part of the study area.

## **3.6 Data Presentation and Analysis**

The data collected from the field and other sources coded and entered into the computer for processing. Both questionnaire data and information were collected during the field work. Previously arranged and tabulated data of ward level were compiled at VDC. The data were then categorized and analyzed on the basis of nature of data so obtained. Major developmental issues were treated and related to the local

data set. Other bases of data analysis were maps and primary and secondary data available

## CHAPTER IV

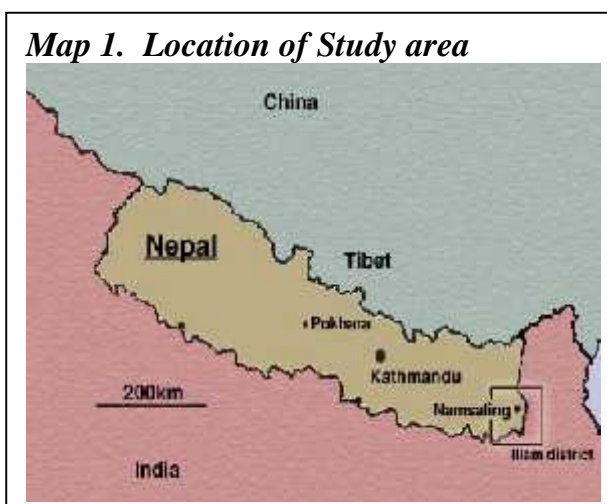
### DATA PRESENTATION AND ANALYSIS

Before starting a planning process, socio-economic and biophysical information collection is paramount to come-up with a clear vision of the VDC strengths, weaknesses and opportunities for a sustainable development. The VDC's social information is first presented followed by biophysical information and environmental consideration. The data was carefully analysed with the helps of basic statistical tools presented in the report with tables, graphs and maps in order to prepare a realistic action plan and management recommendation.

#### 4.1 General Background of the Study Area

##### 4.1.1 Background of Ilam District

Ilam is the one of the beautiful eastern hill district of Nepal. It lies between the Jhapa district to the south, Panchatar district to the north and Darjeeling district of India to the East. Situated at 26'. 40 to 27' North longitude and 87'.40 to 88' go east latitude and spread up to 1703 sq. km. long with weather of minimum 15.90' d. to maximum 23.60'c. The Geographic distribution is quite unique ranging from about 150 m. sub-foothill to 3636 meters height mountains range which spreads from sought to north. Due to the smooth formation of the sub-foothills and the mountains the climatic condition is very pleasant to live in.



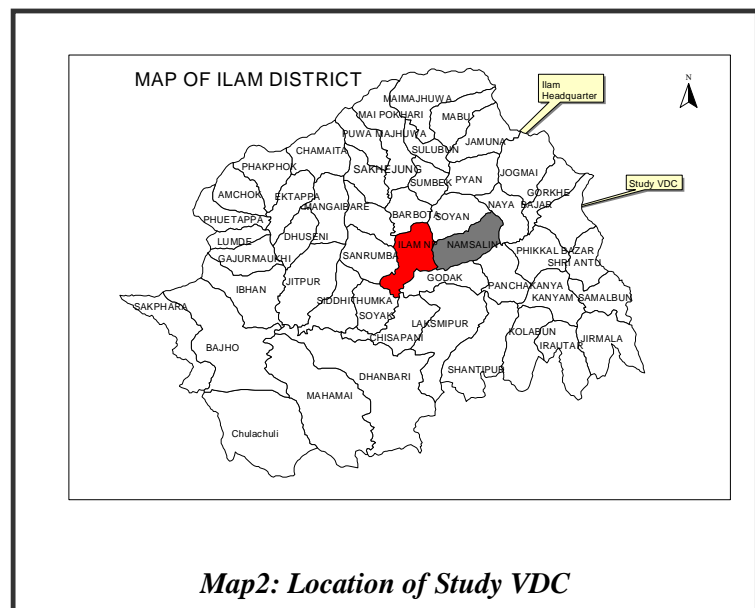


Ilam is the agricultural district and the farmers are busy all the year round in their field. Mainly people follow Hindu religion but they give equal priority for other religion, The district gets rainfall three times annually. Because of this people grows almost all types crops including famous crops like potato, tea, cardamom, ginger etc.

Among the Ilam district there are 48 VDC and one Municipality. The selected VDC is the eastern part of centre of district of Ilam. Namsaling VDC located in Ilam District of the Eastern Development Region (*see map no.1*). It lies in the middle hills and includes over thirty communities settled by more than then castes and ethnic groups.

#### 4.1.2 Location of Study Area

This study area is located in mid hill region of Ilam district 13 kilometres of 3/4 hours walk east of Ilam bazaar, the district headquarter (*see map no. 2*). It is bordered by Nayabazar VDC in the East and North, The Godak and Panchakanya



**Map2: Location of Study VDC**

VDC in the south, and the Ilam Municipality in the west. The total study area is 2505 hectares. It is situated between the longitude of 80° east and latitude 27° north. The lowest point of the study area is Maibeni at the altitude of 600 m. where as its highest point is Lalikhark at the altitude of 1800 m. from sea level.

### **4.1.3 VDC Introduction**

The VDC is populated by 6443 people with 1126 households; out of which male population accounts for 3304 and that of female is 3139. The literacy rate of the VDC is 69.5 percent, the male literacy rate being 42.64% in contrast to female literacy rate, which is 33.33 percent. The major cereal crops grown in the VDC include paddy, corn, millet, wheat and potato. Zinger, cardamom, broom grass, and cow milk are the major sources of income to the village dwellers.

Although majority of people speak Nepali, other languages in vogue in the VDC include Rai, Limbu, Tamang, Sherpa and Madwari. Major religious groups in the VDC are Hindus and Buddhists. The ethnic groups in the VDC in descending order are Brahmin/Chetri, Rai, Limbu, Kami, Tamang, Yalmu, Newar, Gurung, Magar, Madwari and Lepcha. The presence of Chitre Monastery, Shiva Temple and Devasthan and respect of people towards each other reflect the religious harmony in the VDC.

Looking into social service centre, the VDC has got one sub health post, One post office in the VDC without its own office building is an important means of communication except a VHF telephone which is out of order most of the time, One famous NGO established in Namsaling is called NCDC, There are some recently established Community Based organizations including Milk cooperatives, Women Saving and Credit Groups and Agricultural and Livestock farming groups. The VDC is in desperate need of mobilizing its natural resource bases in order to improve infrastructure of development.

Agriculture productivity seems to be declining owing to traditional farming and unavailability of necessary agricultural inputs like irrigation and technical services. People have preferences on cash crops over cereal crops. The values of products are

low due to poor market structure and management. Increasing trend of pesticides and chemical fertilizers should need immediate attention to prevent future environmental hazards.

The VDC is endowed with many important places of tourism importance like Maibeni, Sukrabare Bazaar, Jaue Pokhari lake and many more, which are suitable place to sight Himalayan range. Tourism potential of the VDC is overshadowed by lack of any concern from government side.

#### **4.1.4 Local Geography**

Namsaling is located about 20 km east of the district headquarter, Ilam Bazaar. With an area of 16.76 km<sup>2</sup>, the VDC is bordered by the Nayabazar VDC in the east, Soyand and Ilam VDC in the west, Nayabazar and soyang in the north and Panchakanya and Godak VDC in the south. Naturally beautiful Namsaling lies between 26<sup>0</sup>53'45" to 26<sup>0</sup>57' 54" north latitude and 87<sup>0</sup> 47' 03 to 88<sup>0</sup>01'54" east longitude with an elevation ranging from 500m to 2020m from mean sea level. The VDC is covered by a complex of small and large hilltops. Parts of the VDC are covered by steep slopes or even cliffs. But generally speaking, the Namsaling VDC topography is moderate compared to the surrounding areas. Almost all parts of the VDC, including other beautiful landscapes of the district, of Mahabharata range, can be overviewed from Nayabazaar bazaar.

#### **4.1.5 Climate**

Climate data from the VDC are not available. The closest climate data collection stations are in Ilam Bazaar and at the tea estate of the Ilam District. The climates for the this region range from temperate in the highest part to sub tropical at lower

elevation. The mean annual rainfall ranges from 1270 to 2550 mm in Ilam station. Maximum rainfall had been recorded in August 12, 1991, with 180mm in 24 hours. Most of the rainfall load is received from July to August. In Kanyam station (near Fikkal), 352 mm of rainfall had been recorded in 24 hours (18th Oct. 1985). Annual average temp is 15.28°C in Ilam and 18.98°C in Kanyam Tea estate of Ilam district.

## 4.2 Demography

### 4.2.1 Population Size

Household survey carried out during the study period shows the population of the VDC to be 6443 and number of households to be 1126. This data indicates approximately 5.7 people per household in the VDC.

### 4.2.2 Population Structure

The VDC's male and female population ratio is seems more or less equal. The female population comprises 3139 of total population while male accounts for 3304. Table 4.1 shows ward wise population according to sex.

**Table 4.1: Ward Wise Population by Sex**

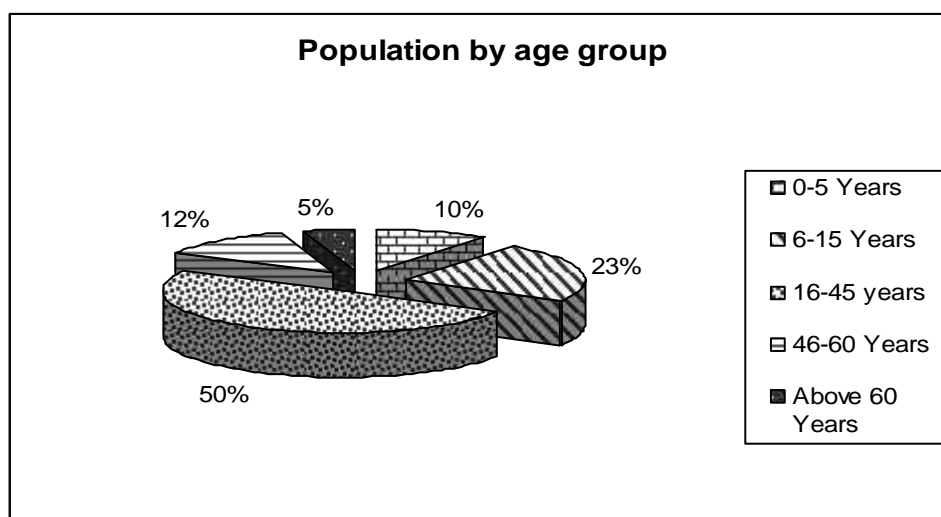
Ward No.	No. of household	Female	Male	Total	Percentage
1	131	351	379	730	11.3
2	74	209	203	412	6.4
3	133	395	408	803	12.5
4	151	372	435	807	12.5
5	132	393	385	778	12
6	107	338	337	675	10.5
7	97	269	296	565	8.8
8	189	532	550	1037	16.7
9	112	289	311	600	9.3
Total	1126	3139	3304	6443	100.00

*Source: Namsaling VDC Profile, 2016*

#### 4.2.2.1 Population by Age

Out of the total VDC population the age group of 0-5 years comprises 13.06 % (842) while the age group of 6-15 years accounts for 26.07 %(1680). The largest in number is the age group of 16-45 years which comprises 45.22 %( 27914). The age group of 46-60 years accounts for 10.52 % (678) and the age group of more than 60 years comprises 5.10 % (339). The population structure in Namsaling VDC is similar to the national population structure giving rise to a pyramid shape. Figure 3 and annex 2 table 2.4 shows VDC population distribution by age.

**Figure 4.1: Population by Age**

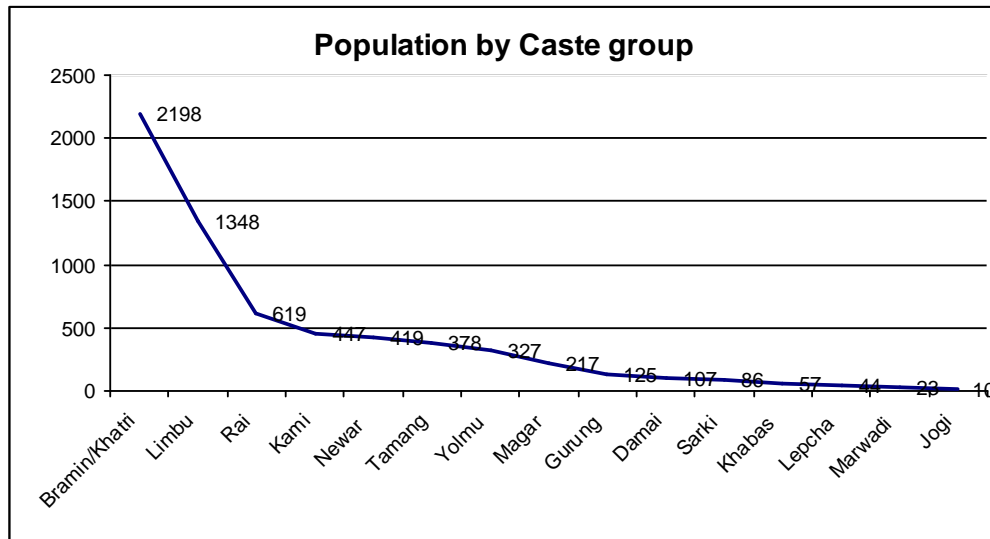


Source: VDC Profile, 2072

#### 4.2.2.2 Population by Ethnic Groups

Nineteen different caste groups inhabit the VDC. The largest percentage of caste group is Brahmin/Chhetri comprising then others caste population Figure 4.2 and annex 2 table 2.5 shows ward wise population by ethnic groups.

**Figure 4.2: Population by Caste**

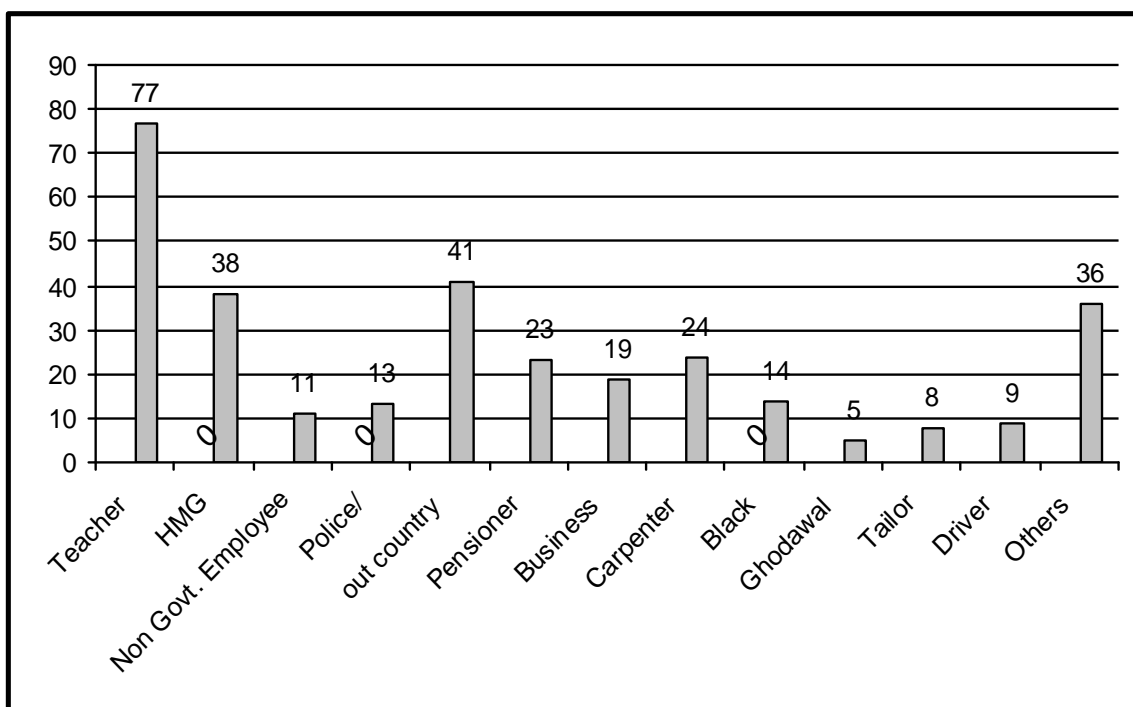


Source: VDC Profile, 2072

#### **4.2.2.3 Population by Occupation**

Agriculture is the mainstay of Namsaling with livestock husbandry as the major component of the agriculture system. However, the local economy is also supported by other occupations. The upper part of the VDC is not suitable for cereal agriculture and hence livestock rearing is the main occupation of that area. People are also engaged in short-term business, contracts, employment, and wage labour due to easy access to India. The market community have business as the main occupation. Some are as well engaged in private or government employment. Figure 4.3 shows population of the VDC by occupation, except for agriculture, which is practised by 94.91 percent of the VDC population

**Figure 4.3: Population in Non Agriculture Occupation**

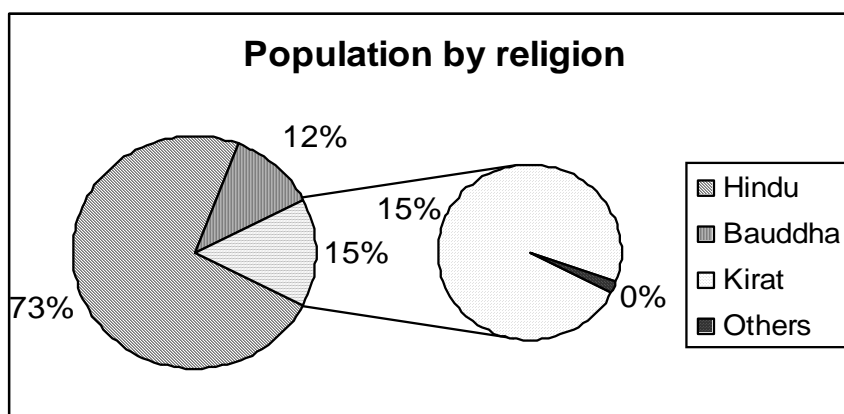


Source: VDC Profile, 2072

#### 4.2.2.4 Population by Religion

Three major religious groups reside the VDC. Hindus make largest share of population followed by Buddhists and Kirants. Hindus' share in total population is 41.26%. Buddhists make 34.46% and Kirants make 24.28%. Rai and Limbu caste group falls under Kirant religious group. Figure 4.4: Shown of Population by religion

**Figure 4.4: Population by Religion**



Source: VDC Profile, 2072

Most people in this study area are Hindu, although many groups also observe Buddhism, Sherpa, Tamang, Gurung and Yolmu in particular practice Buddhism. There is no Buddhist monastery in this VDC so Buddhists travel to other VDCs for religious events. There are four Hindu temples: Maibent Shivalaya temple in ward-8, at the confluence of the Mai Jogmai rivers, Sukrebare Shivalaya Temple in Sukrebare Bazaar, Simhabahini Mindir (Hatedhunga) ward -2 and Chamlethar Mindir, dedicated to the worship of a local goddess.

#### **4.2.2.5 Population temporarily leaving outside the VDC**

Some percentage of VDC population temporarily leaves outside the VDC for different purposes. These include student and employee. The population leaving outside the VDC for those purposes is 7.25% (480). Out of this, number for female is 176 and that for male is 304.

#### **4.2.2.6 Settlement**

Population density seems higher in bazaar area and productive area of Namsaling. However, VDC's settlement areas are also densely populated due to the suitable climate, good cash crop production and flat land. Average population density of the VDC is 331 people/sq km. Main marketplaces and settlement areas of the VDC include Sukrebare Bazar, Ghumaune, Mijare and Dokpile gaun, Nepal danda and Maidan gaun.

#### **4.2.2.7 In and out migration**

For the last five years period three families out migration from the VDC. Large number of population out-migrated to different places after the construction of Mechi highway reducing the importance of Namsaling as one of the largest market centres in



the district. (Oral information). During last five year, 43 families have found to be migrated to Namsaling VDC from nearby districts and VDCs.

### 4.3 Social Situations

#### 4.3.1 Education

Looking into the situation of education, currently there are 2 children development centre, 7 primary, 1 secondary and 1 private primary schools. Ward number 9 do not have any schools. The presence of these academic institutions has contributed to the increased educational status of the VDC population and also in other parts of the district. However, lack of sufficient teaching materials, insufficient teacher postings, and lack of physical facilities are reducing the quality of the VDC education. Pressure from population increase and geographical difficulties pose another threat to quality education in the VDC. People appear to be aware of the importance of education. Communities have identified 2 more primary schools and one higher secondary school as their primary need. Students, after completion of S.L.C., generally go to Ilam, Karphok, Biratnagar, Dharan, and Kathmandu for higher studies.

**Table 4.2: Number of Students and Teachers in the Different Schools**

S. No.	School	Ward No.	Boy	Girl	Total	Teacher M	Teacher F	Total
1	Nar Primary School	1	29	18	47	2	1	3
2	Bidhodaya primary School	1	35	28	63	3	1	4
3	Suryodaya primary School	2	23	26	49	2	1	3
4	Bauddha primary School	3	51	55	106	3		3
5	Namsaling Secondary	4	398	379	777	17	1	18
6	Sarada Primary	5	142	180	322	5	1	6
7	Sharaswati primary School	6	20	31	51	2		2
8	Nepal Joti primary School	7	131	127	158	1	1	6
9	Hattitar primary School	8	99	95	194	5		5
10	Pashupati Acadami Boding	4	41	15	56	4	1	4

*Source: District Education Office Ilam, 2016*

The need for an equitable opportunity of primary education to all children is highly acknowledged. At the same time, to increase the quality of education of government schools, adequate supplies of physical facilities, like additional buildings, library, laboratory, hostels and sports goods is needed. Nevertheless, teachers' teaching skills is by far the most important factor influencing the quality of education. Properly trained and motivated teachers are therefore needed to substantially increase education quality in the VDC. Some primary schools need upgrade to welcome lower secondary students. The needs of informal and technical education were also identified, such as literacy programs for illiterate communities; agricultural sustainable technical skill development or organisational management. Local communities want every government school of the VDC to be capable of providing quality education to their children. Table 4.2 present a summary of the main VDC education status by school and by VDC.

#### **4.3.2 Literacy**

The literacy rate of the VDC at present level, it is found to be 76.07%, which is by far higher than average district or national rates. Out of total population, female literacy rate is 33.35 % and that of male is 42.66 %. Age group of 0-5 years has been omitted from these literacy figures. Informal education like child, adult and parent education has contributed a lot to this high literacy rate.

Although the educational status of the VDC seems good, still disadvantaged groups are backward in education due to lack of awareness, poverty, and geographical difficulty. Damai, Kami, Magar, Yolmu are less represented in VDC schools compared to other ethnic groups. Table 4.3 presents literacy situation of VDC.

**Table 4.3: Ward wise Literate and Illiterate Description**

Ward No.	Literate		Total	Illiterate		Total
	Female	Male		Female	Male	
1	206	280	486	91	41	132
2	166	180	346	22	6	28
3	251	322	573	90	27	117
4	261	327	588	69	46	115
5	288	310	598	58	28	86
6	225	261	486	71	44	115
7	176	237	413	57	28	85
8	225	355	580	205	133	338
9	203	203	406	51	58	109
Total	2001	2195	4196	714	411	1125

*Source: Namsaling VDC Profile, 2016*

### **4.3.3 Health and Sanitation**

The VDC has one health post. At present, the health post lacks adequately trained health personnel, proper maintenance, medicine and other resources. Consequently proper health care is not readily available from Namsaling's health post. Women health volunteers and Sudenis (midwife) are functional at ward level but the services they offer are limited. Four staff persons are technically employed by the Health Centre including an assistant health worker, a volunteer health worker, and a maternal and child health workers.

Poor people die secondary to lack of medical facilities in the VDC. Other more fortunate people, who have access to some financial resources, depending upon the nature of their illness, go to Darjeeling and Siliguri of India, Bhadrapur, Dharan and Kathmandu for treatment.

Community members believe that it is the government's responsibility to provide skilled medical personnel and improved medical facilities for effective functioning of the health centre.

Awareness regarding community health issues amongst community members is lacking in the VDC, for example there is haphazard disposal of waste and drinking of unsafe water. Water borne diseases, such as cholera, are common in the VDC. As a result of water sources being unprotected, pesticide residue is contaminating the community's drinking water and no efforts have been taken to control the situation.

#### **4.3.4 Status of Women**

The Nation-wide poor socio-economic status case of women is not any different in Namsaling with people showing a distinct lack of awareness for equity issues. Female community members account for 48.23% of population however the discrepancy in women's literacy, health, and employment compared to males is high.

##### **4.3.4.1 Women and Health**

Discussion with women group revealed the fact that an insufficient health service is implicated in the premature deaths of women in need of proper maternity care. Mental depression resulting from too much workload of women is never a matter of discussions in the VDC.

##### **4.3.4.2 Women and Education**

Women in VDC are backward in education compared to men. This is demonstrated by illiterate women in the VDC which is 546 against illiterate men whose number is 212. This discrepancy in education can be seen in all ethnic groups within VDC. Out of total population, female literacy rate is 33.35 % and that of male is 42.66 %.

## **4.4 Economic and Employment**

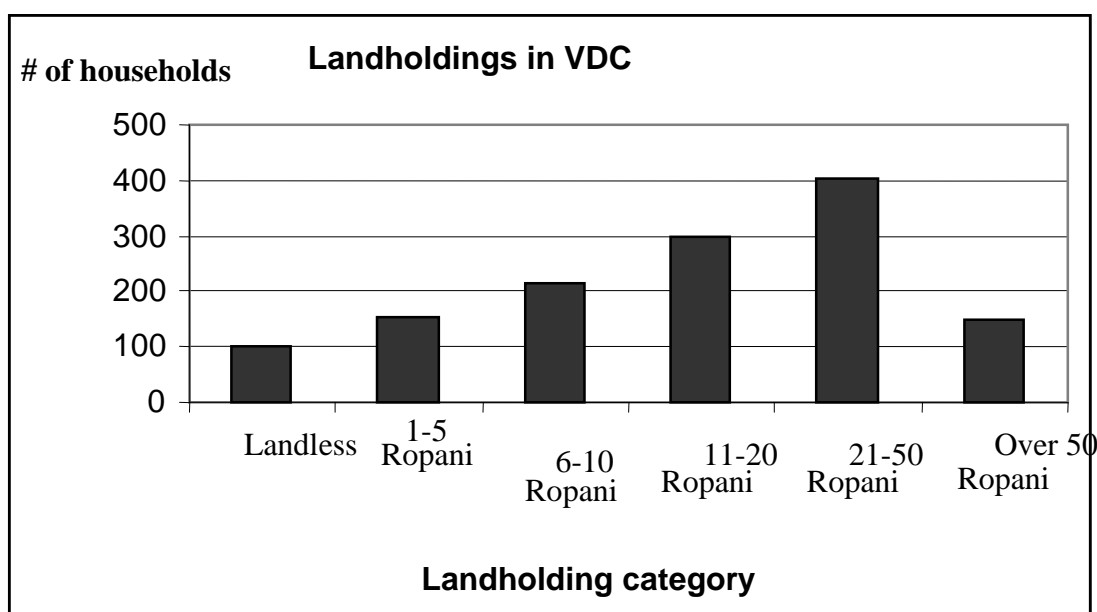
### **4.4.1 Structure of the Local Economy**

Agriculture is the central economic activities of the area. In recent years, cultivation of cash crops such as ginger, broom grass, cardamom, and tea has begun. Animal husbandry, mainly cattle milk, contributes significantly to the local economy. In addition, earnings from seasonal migrants supplement the farm economy. Business is also an important economic activity in the bazaar area. The major economic centre for the VDC is Sukrebare bazaar.

### **4.4.2 Landholdings and Ownership**

The number of sukumbasi (Land and homeless in a strict sense) in the VDC is 102 comprising 7.72 % of the total households. This figure includes completely landless people to those with up to 1 ropani of land. Landless people of ward no. 4 (bazaar area) are not necessarily poor. The majority are involved in business activities but not farming and thus do not have their own land. Still this large number of homeless and landless people increases the poor socio-economic condition of overall VDC. Since they do not have land to cultivate and home to live they are forced to depend heavily on VDC's natural resources, thereby creating greater pressure on the environmental condition of the VDC. Majority of the remaining landless households make their livelihood from wage labour. Some of them practice agriculture as tenant farmers. Figure 4.5 shows the landholding area of the VDC communities' households.

**Figure 4.5: Landholdings in the VDC \* One Ropani is equal to 1/20 hectare**



Source: VDC Profile, 2072

#### **4.4.3 Agriculture Productivity**

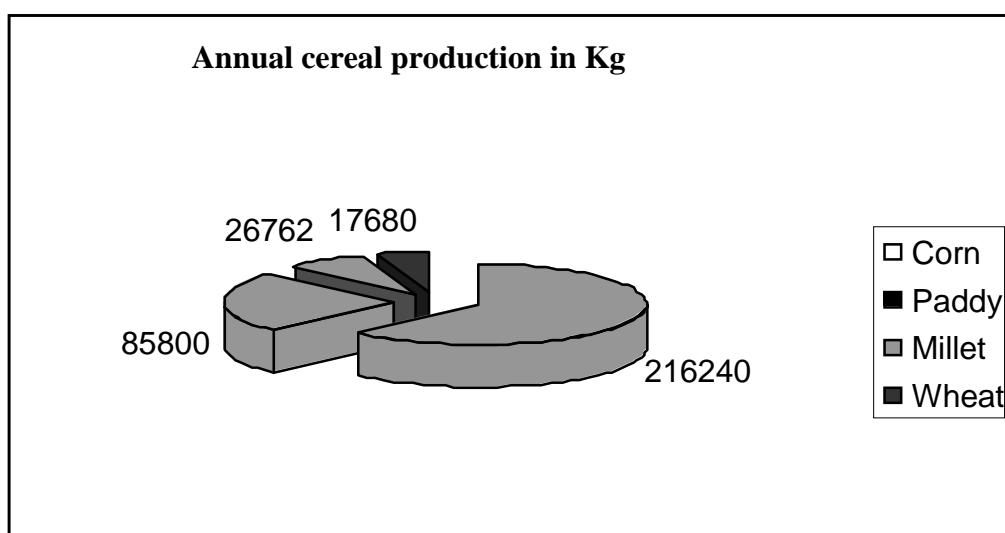
94.91 % of the VDC population is engaged in agriculture. 525.7 ha (or 31.36%) of the VDC area is covered with agricultural land (Topographical map and field identification). Main cereal crops include corn, paddy, millet and wheat. The main cash crops grown include cardamom, ginger, broom grass, and tea. Major vegetable crops grown in the VDC are potato, cabbage, cauliflower, carrot and radish. Very few farmers cultivate fruits on a commercial scale.

##### **4.4.3.1 Cereals Production**

Cereal crops in decreasing order of production are namely corn, paddy, millet, and wheat. Corn is dominantly grown as almost every part of the VDC lack irrigation facilities. Millet is grown in upper part of the VDC. In lower part of the VDC, where few irrigation facilities are available, paddy and wheat are grown. 80.15 % of total household grow corn giving a yearly production of 2162.4 quintal. The second large cereal production in the VDC is paddy grown by 19.75 % farmers giving an annual

production of 858 quintal. The millet is grown by 37 percent and its annual production is 267.62 quintal. Wheat is grown by 22.72 % farmers giving a total annual production of 176.8 quintal. The cereal productivity per hectare was found to be quite low compared to the agronomic potential. Proper seed varieties are rarely used; good soil conservation and fertility methods neither and few farmers applied multi-crop farming techniques. The annual cereal production is presented in figure 4.6 and Annex 2 table 2.3.

**Figure 4.6: Annual cereal production in the VDC**



Source: VDC Profile, 2072

#### 4.4.3.2 Cash Crop

Major cash crops grown in the VDC are cardamom, ginger, broom grass and tea. These cash crops are grown only in soil, humidity and climatic suitable areas. Although potato is a vegetable crop, they are treated as cash crop since they can be stored for a long period and fetch cash shortly after they are harvested. Broom grass and potato grow almost in every part of the VDC and therefore greater numbers of farmers have grown it. Cardamom requires a moist and shade environment to give a good production. 40.65 % farmers grow cardamom and its annual production in VDC

is 32405 Kg. Long persisting nature, simple management and high returning value of cardamom sells may have attracted farmers for its cultivation. However, lack of irrigation, shade and dampness has limited its production. Broom grasses not only fetch cash to farmer, but also serve as nutritive fodder to their cattle. Being easy to establish in harsh condition also, it is a useful species for soil conservation. Broom grass is grown by 52.73 % farmers with a production of 51272 Kg every year. The figure for Ginger is 29.43% and 181416 Kg respectively. The figure for Tea is 3.06% and 10454 Kg respectively. Tea has recently been introduced in the VDC and ward number 7, 8 and 9 do not have any tea garden. Potato is grown by 76.41% households giving an annual production of 635000 Kg. Milk production shares a reasonable percentage of cash crop income and is produced by 54.36% households. Table 4.4 shows annual production of cash crops including milk and percentage of farmers growing it.

**Table 4.4: Annual Production of Cash Crops and Farmers Growing it.**

<b>Particulars</b>	<b>Annual production (Kg)</b>	<b>Producing households (%)</b>
Cardamom	32405	40.65 %
Broom grass	51272	52.73 %
Ginger	181416	29.43%
Tea	10454	3.06%
Potato	635000	76.41%
Milk	1764 litres/day	54.36%

*Source: Namsaling VDC Profile, 2016*

#### **4.4.3.3 Vegetables**

Commercially grown vegetables of the VDC mainly include cabbage, cauliflower, carrot, radish, skus (chayote), green leaves, peas, pumpkin, cucumber, beans. The VDC has a favourable environment for growing vegetables (good soils in several parts, temperate climate) and has a nearby Indian market access.



Vegetables are grown in larger proportions in the upper colder part of the VDC. People residing in lower warmer parts also grow both seasonal and off-season vegetables. The reasons for the attraction towards vegetable growing is the high production with low investment, short return period, less demanding, less labour input, grown everywhere, market and access and off-season growing nature of vegetables

#### **4.4.3.4 Horticulture**

The lower parts of the VDC is suitable for citrus fruits, guava, mail, pomegranate while upper colder part is suitable for pears, aru, arubakhada, alcha and low chilling apples. In spite of high potential for fruit production people are indifferent about it. Very few farmers are involved in commercial fruits production. Lack of appropriate suggestions from technicians, good return from other cash crops and lack of interest on the farmer's side could be the reason for the low fruits production in the VDC. Nevertheless, fruit tree plantations require a lot of care, particularly during summer when high air moisture induces fungus formation on leaves. Local fruit tree seedling nursery as well as awareness on economic and environmental advantages of fruit tree production would probably change the actual trend.

#### **4.4.4 Irrigation**

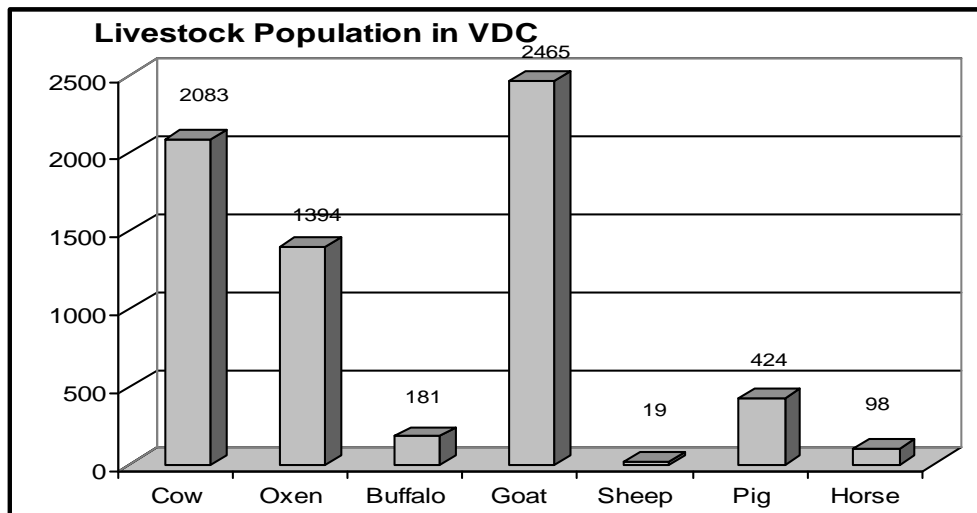
The most important component of an agricultural production system, the irrigation, determines the agriculture production distribution of the area. Managed irrigation system for such area where more than 94% people are engaged in agriculture is essential. There is no real irrigation system in the VDC. Farmers use drinking water they bring from nearby water sources through pipes for irrigating their land. Few farmers can afford expensive and uncertain complete irrigation systems. Furthermore,

few permanent sources of water for large irrigation projects are available. However, there is potential for smaller irrigation schemes. Some small irrigation projects have been constructed through government efforts, while some are constructed by user groups. These constructed irrigation projects are in fair condition but need proper maintenance.

#### **4.4.5 Livestock Rearing**

Livestock rearing is the main component of the VDC's agricultural systems. Cattle, goats, pigs, horses are reared in the VDC. Cattle are reared for milk, goats and pigs for meat and horse for transportation. Livestock rearing has been practised from time immemorial according to people's caste and culture. Livestock contributes significantly to local economy and thus has great positive effects in the socio-economic condition of the VDC communities. A genetically improved livestock population is generally used in the VDC and high milk production is disposed by 3 cheese factories and Dairy Development Corporation through milk collection Centres established in different parts of the VDC. An average of 1764 litres of milk is produced per day by 54.36% household of the VDC. Figure 4.7 and annex 2 table 2.1 display the VDC livestock population for all animal categories.

**Figure 4.7: VDC Livestock Population**



Source: VDC Profile, 2072

#### **4.4.6 Food Sufficiency and Situation of Poverty**

Only 28.64% of total food required is supplied through internal production and the remaining 71.36% are imported from India and other parts of Nepal (see table 4.3 for complete detail on food sufficiency and wealth). Rice, maize, pulses, rapeseed oil are mostly imported. Food grains are bought by the farmers from their income of cash crops, vegetables and livestock, but all farmers cannot afford year round food grain from their income. Thus, the means of livelihood in the area is cash crops, livestock rearing, vegetable production, small business, wage labour and sometimes loans. The loans are provided by the local affluent, businessmen and agriculture development bank. Although banks do not approve loan for buying food grain, farmers are forced to spend the loan they normally get to run some business. Local affluent people provide loans for harvesting cash crops as an advance to future production at prices lower than prevailing market prices. Loans, as such is not harmful for improving agriculture productivity. Improved agriculture practice is needed for an increased production and it requires loans. But farmers take loans not only for agriculture purposes, but also for unproductive economical purposes such as food consumption,

religious and cultural ceremony and in the case of illnesses. Table 4.5 shows the food sufficiency and wealth.

**Table 4.5: Food Sufficiency and Wealth**

<b>Portion of family income spent for food grain</b>	<b>Level of well being</b>	<b>Percentage of total household</b>
Capable of saving after yearly expenditure of food grain	Richer	18.1
Capable of sustaining year round expenditure from agriculture production	Rich	27.0
Capable of sustaining only 6 months from agriculture production	Poor	42.8
Capable of sustaining only 3 months from agriculture production	Very Poor	24.7

*Source: Field Survey, 2016*

#### **4.4.7 Industries**

Agriculture based small industries like dairy, small mills, and handicraft industry are present in Namsaling. Altogether there are 17 small scale industries (13 milk dairy, 8 mills, and 18 handicrafts). The strong point of Namsaling industries is that they consume large amount of local agricultural production such as milk. Similarly other factories are helping to increase the employment opportunities directly or indirectly in the VDC by hiring factory staff and buying products from local farmers. At the same time several weaknesses do exist regarding industrial development. Due to the Indian market policy, products from Nepal have not been able to reach international markets. The Indian custom charge is too high for the local industries to bear the expense. This is a national issue to be addressed rather than dealing it locally.

#### **4.5 Natural Resource Practices**

##### **4.5.1 Forest Ecosystems**

Looking into the forest resources in the VDC, one can not satisfy with the existing condition. Forest area of nearby Ilam municipality has been heavily destroyed in one

hand and other parts of the forests are being actively used for fuel wood and timbers on the other. All these pressure has resulted into diminished forest area in the VDC. Situated between 500m to 2020m altitudes, Namsaling VDC contains broadly two types of forests. These are natural and plantation forests.

#### **4.5.1.1 Forest Types**

##### **Natural Forest**

Geologically fragile natural ecosystem of the VDC includes two main types of natural forests, namely low elevation or sub-tropical natural forests and high elevation or warm temperate natural forests. Low elevation or sub-tropical forests are found above elevations of 1000m. Under this category of forest, 2 sub-types have been found. The first one is *Chilaune/ Katus* forest with other mixed tree species and the second one is pure *Uttis* forest.

The dominant species in *Chilaune/Katus* forest ecosystems are *Chilaune* and *Katus*. Other associated species include *Mallato*, *kharane*, *Jhingane*. This forest ecosystem is distributed over the lower part of the VDC, mainly located in wards 1,2,3,4 and 5.

In "*Uttis*" forested ecosystems, more than 80% of the species is comprised of *Uttis*. These are frequently observed in newly exposed soil by landslides and areas of abandoned cultivation. These forests are normally used for cardamom plantation if the soil moisture is high enough.

Forests found within 1000 to 1700 m altitude in the eastern part are categorized under lower temperate forests. Only one type of temperate forest is found in the area, namely lower temperate mixed broadleaved forests. *Chap*, *Bante*, *Khumle*, and *Rhododendron* are the dominant species. Most species found in these forests were

uneven aged with a low regeneration rate (few seedlings or saplings were observed). In general they were found to be quite degraded with little or no management. No mature forest of this type was observed. Though these kinds of forests do not seem to be much productive, they can be of high value for economic development if high biodiversity within it is harnessed properly.

### **Plantation Forests**

Forest plantation rate and occurrence in Namsaling VDC are found to be exceptionally high. A good proportion of the area is covered with plantation forest. Its plantations are large enough in the area to be called as forests. Important fact to remember is that these are all planted on private land. "*Dhupi Sallo*" plantation in Namsaling VDC over the last 20 years has considerably reduced forest biodiversity. All plantations were done in monoculture (only "*Dhupi*" planted). Furthermore, the litter produced by this species is really acidic and suppresses undergrowth regeneration. Another category of plantation includes enrichment plantation of *Utis* in forest gaps or fallow lands. These enrichment plantations are at the initiative of local community themselves to provide shade for cardamom. This initiative is positive for the VDC natural environment as it protects the soil and enriches it with nutrients. Enrichment plantation of high economic value (timber, medicine, etc.) shade tolerant tree species must be encouraged to complete the plantation process. Among other planted species are fodder plants like *gagoon*, *Nimaro*, *Bakaino*, *Bamboos*, *Nigalo*, *Narkat*, or timber species like *Champ*

#### 4.5.1.2 Forest Land Tenure

From a tenure viewpoint, only 3 types of forests are present in Namsaling. They are government forest, Community forest and private forest. Religious and leasehold forests are absent from the area.

**Table 4.6: Description of Community Forest**

S. N.	Name of community forest	Handover date	Area	Present Situation
1	Gopini CFUS	2048	5 Hector	Well Manage, Old forest and New plantation
2	Lepsi		5 hector	Well Manage, Old forest
3	Pakhera	2052	4 hector	Deforestation
4	Gaddi CFUs		15 hector	Deforestation
5	Chachale	2048	35 hector	Deforestation
6	Banpala CFUs		3 hectors	Deforestation
7	Lahure Community forest		20 hector	Deforestation

*Source: District Forest Office, Ilam, 2016*

#### 4.5.1.3 Existing Forest Uses

There is heavy pressure on existing forest resources to fulfil the demand of the ever-increasing population. The forest resources in the VDC are used for following purposes

##### **Fodder**

Livestock husbandry is an important means of livelihood in Namsaling and forests have been heavily used for fodder collection and occasionally for grazing of livestock. But the pressure on government forest is relatively low since several households have planted fodder species on their land.

## **Fuel Wood**

Use of alternative energy like gas and kerosene is limited. Fuel wood is then the only source of energy used in all areas. Obviously forests have been heavily used for fuel wood. Not much of the forest was clear-cut for fuel wood but green branches and old trunks are constantly collected degrading the overall forest health. Utis is the main specie used for fuel wood. IUCN (IUCN, 1999) estimates a per capita fuel wood consumption rate of 1629 kg for Siwalik area of Ilam. The situation is not much different in Namsaling compared to the Siwalik. The fuel wood consumption rate in VDC was found to be 550Kg per person per year. This figure is less than the national figure of 800 kg per capita. The use of alternative energy source in the area is negligible. Still, biogas and solar energy have a high potential.

## **Timber**

Almost all houses are made of timber in Namsaling. Dhupi Sallo is the main timber specie used. Other timber species used are Katus, Chilaune, Latikath and Utis. There have been reports of illegal cutting of trees in natural forests by villagers. Apparently, the deforestation crisis has diminished in recent years in the mid-hills region with a remarkable development in forest plantation (Messerli, 1989; Glimour and Fisher 1991; Oli, 1998). The forest cut rate is not too high and seems sustainable at this moment in time. If future illegal cutting rates increase with the increasing population, the natural forests will soon be depleted of their valuable timber. Even with cutting rates at sustainable levels, improved forest management would considerably increase timber productivity



## **Non Timber Forest Products (NTFPs)**

The local community, particularly poor people, uses available medicinal herbs. Similarly, fruits like *Ainselu*, *mail*, *amala*, and others from the forest are consumed by local people, but commercial use of such NTFPs is not practised. Forest space has been utilised by local people only for cardamom plantation. Although there is high potential of utilising other NTFPs, they are under-utilised due to a lack of knowledge and non-existent market structures.

### **4.5.1.4 Existing Forest Management Practices**

Some forest management works such as enrichment plantation, including cardamom plantation under the shade of *Utis*, are found in study area. Cultural operations such as pruning, singling, cleaning to improve the forest productivity are not practised by the local community due to lack of knowledge and awareness. Planting of species in the government forests, however sound it may be from management point of view, can create the possibility of legal complications due to land ownership. This fact cannot be ignored when time comes to formulate a management plan for a particular government forest.

### **4.5.1.5 Situation of Agro-Forestry**

There is much evidence of agro-forestry practices although they are sometimes not well managed. On the nearby *bari* land corn plantations, fodder species plantation and broom grass plantation on bunds are often practised. Another category of common agro-forestry practice in the VDC includes cardamom and broom grass plantation under forest shade. These practices have utilised the otherwise "wasted" land and contributed positively to erosion control and to increase biodiversity.

#### **4.5.1.6 Link Between Local Poverty and Forest Conservation**

It has been a well-established fact that forest plays an important role in poverty alleviation. So many forest products are essential for the VDC communities' everyday life. Community forestry justifies its importance through different income generating activities that can be carried out within the forest area. Also, forest management becomes sustainable if undertaken by community.

#### **4.5.1.7 Economic Development and Forest Condition**

The possibility of economic development through scientific management of existing forest resources in Namsaling is not out of the local communities reach. Before efficiently managing the forest for the VDC's economic development, there is a need to gather greater details of the growing stock and the demand of the forest products within the area and the distances away. Similarly, the communities' right to manage and use their forest resources is another prerequisite to an economically sustainable forest management. Furthermore, forestry and agriculture have to be considered separately by the local authorities as forest takes a lot of time to grow and demands specific management techniques.

#### **4.5.2 Agriculture and Environment**

Agriculture is the major occupation inside the VDC area. As mentioned above, more than 94 percent of the economically active population claims farming as their primary occupation. Agriculture plays a vital role in food supply and economic activities of the VDC population. Unfortunately, improper traditional and subsistence farming systems result in soil erosion, fertility depletion or land loss, threatening the economical and ecological sustainability of the VDC's agricultural system. Major VDC problems noticed for the agriculture sector are slope cultivation, destruction of

the terraces risers to cultivate tea, low yielding crop varieties and improper traditional water management practices. Often, water flows from the field without any conservation measures, leading to massive topsoil lost. Heavy rainfall and lack of substantial vegetation cover on farm sloped lands also causes severe erosion. Furthermore, land capability and slope classes are not always considered before choosing a particular crop system.

Population of the VDC has steadily increased but cultivated land cannot be expanded. To feed the growing population, farmers must increase the per unit production in such a way that there will be little pressure on natural resources including forest. This increase in production must be sustainable and can be achieved by using conservation agriculture practices.

Two or three decades before, agriculture systems were environmental friendly, cultivation being based on natural production and locally available manure. But recently, there has been uncontrolled and heavy use of chemical fertilisers and pesticides. The subsistence type of agriculture has been gradually shifting towards commercial agriculture due to the introduction of cash crops like ginger, cardamom, broom grass, tea, and chilli. Moreover, a massive shift from traditional agriculture to tea plantation is observed in the VDC. Most of the time, marginal lands (thin and rocky soil often located on the top of humps) were used to plant tea. Traditional agriculture was often unsuccessfully practised on these lands before the shift to tea plantation. Old terraces are still present in some new tea plantations, confirming the past history of traditional agriculture. Still, an appreciable percentage of the new tea plantations were planted on old forestland or fertile agricultural soil. This type of

conversion has led to an increase in farmers' allowance but also reduced soil fertility and biodiversity.

## **4.6 Relationship Between Agriculture and Natural Resource Practices in Study Area**

### **4.6.1 Transformation from Forest to Agricultural Ecosystem**

In the recent years deforestation in the hills has been reduced and plantation area has been increased. Before 2 decades or so, especially after introduction of tea crops, the transformation of forestland to agriculture land was significant. The study of aerial photograph of 1992 and recent field visits shows an estimate of 1-2% of forestland was converted to agricultural land (mostly tea plantation) over a 10 years period. Forest degradation, however, is undoubtedly proceeding as demand for many products exceeds supply in conveniently located forests. There is also change in land use systems though the extent of this change is difficult to assess. Generally speaking, most of the agricultural lands have been transformed from forestland at some stage in the past.

#### **4.6.1.1 Agricultural Systems**

Cereal crops, cash crops (tea, ginger), livestock husbandry and agro-forestry form the main agricultural systems. The agricultural system is labour intensive. The Namsaling's lower altitude area has paddy and corn as the main crops while the upper altitude area has corn and vegetables comprising the main agricultural crops. Both traditional and chemical manure are used. Few farmers have practised modern sustainable agriculture. Corn crops are mostly planted with legumes.

The cropping pattern observed in Namsaling reveals the fact that the majority of farmland remains fallow for a significant part of the year and hence is under utilized. Two reasons can be outlined for this. The first one is that no crop can grow without irrigation during the dry season (January to April). The second is related to the fact that farmers do not feel the need to keep a cover crop during the dry season.

#### **4.6.1.2 Agriculture Productivity & its Relation with Environment Protection**

Existing land resources would be insufficient to feed growing population if the productivity is low or constant from previous years. The only options left is either to seek for new lands which is unavailable or to use sustainable farming practices to ensure that the productivity is not reduced. These facts clearly support the statement that the more sustainable the productivity, the less the adverse impact on ecological balance. If agricultural productivity sustainably increased, less new land would be needed, reducing pressure on forest land.

Selection of species good for their cash values and not harmful for nature will help to strengthen the economy and protect the environment. A good example of this is cardamom plantation. This crop is easy to grow and has a high cash value. Moreover, cardamom helps to conserve forests because it only grows under shade provided by trees. On the other end, fuel wood is needed to dry cardamom. Pressure from cardamom growers may then tend to destroy existing low-density forests.

#### **4.6.1.3 Livestock**

Study area has developed a high standard of livestock management system especially for high breed cattle. There is stall-feeding system for cattle, but no fodder grass or tree species known for their great nutritional potential were planted on public land.

Fodder is mainly collected in fallow land, natural or planted forests. There is no grazing area as such in study area. Uncultivated fallow land and no man's land are marginally used as grazing area. Negative impacts of grazing on forest resources are limited due to the pre-eminence of the stall-feeding system. Still, nutrient value of the grass and fodder tree species used within the VDC is generally low. Species selection on the basis of nutrient efficiency would be an asset to reduce the amount of fodder consumed.

Fodder collectors are mostly women and children. Time spent collecting fodder for cattle detracts from the time these housewives spend caring for their growing to fix this problem. Goat, pigs are other livestock tamed in the VDC. Horses are widely used as well to transport agricultural crops and milk.

#### **4.6.1.4 Pesticide and Fertilizer Use**

Misuse of pesticides seems to be the rule more than the exception inside the VDC area. Farmers often use inappropriate pesticides for a particular crop, and improper concentrations at unsuitable times of the year. Furthermore, they do not wear protective equipment such as rubber boots, gloves, long trousers and masks when applying pesticides. Farmers also use pesticides to kill insects on livestock. Side effects on others plants and animals are seldom considered. Pesticides normally used inside the VDC are: Malathin, Metasit, BHC polder, Monocil (wide action insecticides for vegetable like potato and mustard or for tea), Blitox (fungicide for tea plantation) and Round-Up (herbicide for tea plantation). Most of the pesticide uses in the VDC are limited to tea crops. There is heavy use of herbicides in tea crops to kill unwanted weeds as well as fungicide and insecticide during the rainy season. If the present trends of uncontrolled and unsafe use of pesticides are continued their ill

effect on the environment especially biodiversity loss and diminished productivity is sure to occur.

Improper use of chemical fertiliser can lead to a long-termed decrease in crop productivity caused by soil acidification and bacterial flora destruction (Brady, 1990). If used in excess, chemical fertilisers can also pollute the water and reduce its drinking quality (high nitrogen and phosphate content in water). The use of traditional cow dung manure is limited to nearby bari land. Greater use of chemical fertiliser is found in tea crops. The indiscriminate use of pesticides and chemical fertilisers has brought about the following types of adverse effects in the VDC area.

- ) Rise in production cost;
- ) Negative effect on human health, due to dermal contact and inhalation while spraying insecticides and to drinking water contamination;
- ) Developed resistance to insecticides by crop pests;
- ) Contaminated food, milk, eggs and vegetables with the insecticide residues;
- ) Eliminated parasites and predators of crop pests;
- ) Drinking water contamination with chemical fertiliser;
- ) Reduction of soil fertility due to the use of chemical fertiliser.

In resume, importance of an integrated management (i.e. moderate use of pesticides and chemical fertilisers, along with traditional and new biologic agricultural methods) is very high for the development of a sustainable agriculture in the area.

#### **4. 6.1.5 Relation between Agriculture Development and Biodiversity Conservation**

The VDC area has experienced a loss of different local varieties of agricultural crops. Local varieties are gradually being replaced by new exotic ones. Practice of

monoculture such as tea only could lead to food insecurity in the future. A very limited number of agricultural plant species are cultivated in the area, even if greater number of crops can potentially grow there. There is a great need for agricultural diversification by identifying areas specifically for new crops and for establishing NTFPs.

#### **4.6.2 Soil Erosion**

##### **4.6.2.1 Soil Erosion**

Many areas in VDC without proper soil conservation suffers from surface or sheet erosion. Evidence of rill erosion was found in the sloping cultivation areas. Gully erosion was not found in agriculture land but was commonly observed in improperly constructed roads and bald hills. No evidence of major landslide was observed, but the possibility of one occurring in the future has been increased by inappropriate land use practices. Slope steepness is moderate in the majority of the VDC area, reducing the severity of the soil erosion problem. Detailed geological surveys are needed to determine the actual risk associated with landslides.

##### **4.6.2.2 Actual Level of Awareness on Erosion and Erosion Control Efforts**

Local people do not seem to give much importance to the erosion problem. Some farmers are aware of the need to control erosion but they are unable to adopt soil conservation measures due to a lack of knowledge, and technical and financial assistance. However, some innovative farmers have adopted soil conservation measures through their own efforts. For example, multiple cropping systems, planting broom grass and fodder trees on the terrace risers as well as agro-forestry was observed in all VDC's wards.



### 4.3.3 Waste Management

The waste management system is neither individually nor collectively or institutionally performed in Namsaling. The problem is particularly significant in the bazaar, school and settlement area where wastes are disposed of haphazardly in piles or scattered. If disposed, domestic waste is directly thrown in permanent or seasonal streams, contributing to water pollution. Few septic tanks are build in bazaar areas, with sewage pipes going directly to the closest stream, modifying a natural stream into an open air sewage system. These facts show minimum level of awareness of local people on waste management and of the potential associated diseases.

### 4.6.4 Land Uses

Considering all land uses separately is crucial for the overall development of VDC. Seven different types of Landuses are found in Namsaling. A brief description of the major land uses are described below.

#### **Landuses.**

#### **Farm land**

© ***Khet* land (irrigated):** *Khet* lands always have irrigation facilities. They are generally found in the lower part of the VDC, where water is more available and the temperature is suitable for rice growth. The lands are levelled man-made terraces. According to Sherchan and Gurung (1995), soil fertility is more constant within *khet* land compare to *bari* land. Soil erosion is also lower compared to *bari* land (Vaidha, 1995). Soil is relatively high in organic matter content with a heavy texture (high sand content). Rice is the principle crop in *khet* land, but farmers

also produce wheat, corn, mustard, potatoes and green vegetables. This land use covers 18.51% (530.37 hectares) of the VDC area.

- © **Bari land (non irrigated):** *Bari* land does not have irrigation facilities and therefore is found in all VDC parts. Many *baris* are found in good man-made terraces, but others are located in gentle or steep sloped areas. Experts agree that *bari* lands on slopes are poorly managed (Vaida, 1995). Cultivation on steep slopes leads to massive losses of fertile topsoil and ultimately a decrease in agricultural productivity. Growing crops in *bari* land doesn't require much water; the chief crops grown include maize, cabbage, potato and ginger. Broom grass and several fodder tree species were often planted on *bari*'s terrace risers. This land use covers 34.93 % of the VDC area (NCDC, 2014).

### **Forested land**

All forest lands including government forest, private forest and community forests cover 31.94 % of the VDC area (NCDC, 2014). Forest lands in the VDC fall under three categories. Old forest, Young and mature forests and degraded forests. The availability of young and mature forest is high in the VDC.

### **Other land uses**

- © **Settlement area:** Settlement areas are one of the land uses categories. But their area have not be identified.
- © **Grazing area:** The fallow land in the uppermost part of the VDC is used as grazing area and such area cover 138 hectares of the total VDC area.
- © **Landslide area:** Filed survey during the study period revealed one large landslide area of 6.28 hectare near Jigmai and Mannchok Khola.

## CHAPTER V

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Summary

The study shows that Namsaling's VDC environmental problems are not as serious as those in other parts of Nepal, and recent farming practices have in fact had beneficial effects on forest and water resources. These farming practices are part of the recent introduction of cash crops into Namsaling, which have also had positive social impacts, improving the economic standing of many residents. This new stage of development for Namsaling raises different kinds of problems and opportunities. Reliance on cash crops rather than subsistence crops, the adoption of chemical fertilisers and pesticides for improved production and equitability are concerned when planning the future direction of cash crop development in Namsaling VDC. Another important social consideration is Namsaling's VDC high population growth rate, which has increased stress on natural resources if uncontrolled. The profile clearly shows that both social and physical environmental impacts must be considered when planning for development.

Cultivation of cash crops has direct and indirect effects on the farmers' socio-economy status. Cash crops have a positive role in the upliftment of living standard of farmers and indirect effects on environment conservation. Presently, mismanagement of the cash crops is causing some negative environmental consequences. Farmers are able to get year round food grain supply, thanks to cash crop production, which was not the case before the introduction of cash crops in the VDC. Unfortunately, these cash crops are suffering from new kinds of diseases. Lack of technical services and

improved seeds as well as uncontrolled use of fertiliser have reduced land productivity and diminished production of crops.

Fluctuating market condition, low cash crops price levels and heavy imports of cereals may create food insecurity in the future. Farmers are transforming their cereal growing land into cash crops for short-term benefits and are indiscriminately using fertilisers and pesticides as well. This could create large scale and long-term crisis in future if present trend is not controlled.

The analysis which led to these observations recognizes the need for a planned approach for managing Namsaling's development so as to protect and improve both their social and physical environment. This plan should take an integrated approach to environmental planning, recognizing the interrelationships between the various components, which make up the total environment. Therefore, the physical, social and economic dimensions of environment and sustainable development should broadly be represented in the plan. In practice, this means that planning for a specific projects or sector consider the entire VDC socio-economic and ecosystems dynamic. For example, when planning for a drinking water project, planners need to consider sanitation and health awareness, forest protection and education issues as well.

## **5.2 Conclusion**

The strengths, weaknesses and opportunities have been summarised from PRA data, discussions with various representatives as well as personal observations. They are presented in the following sub-sections.

### **Strengths and opportunities**

- ) Although the area is hilly, it is not characterised by much steep terrain which would limit any heavy interventions such as land use exclusion zones and severe landslide engineering,
- ) Namsaling was an important cash crop production centre.
- ) The VDC is supported by a large number of laborious and economically active population,
- ) A good percentage of area is covered by private and govt. forest,

### **Overall VDC weaknesses**

- ) Individualistic behaviour by a large part of the population means that greater efforts are required to mobilise them for collective efforts,
- ) VDC not being able to utilise available human and natural resources effectively,
- ) Disparities between male and female,
- ) No concern or efforts carried out so far by VDC for environment and biodiversity conservation,
- ) No previous effort to carry out development efforts in a planned and systematic way,
- ) No sustainable road construction. Road constructed without proper soil conservation measures,

- ) No efforts to bring disadvantaged groups to share equitable benefits of development.

### **VDC Threats**

- ) The great threat to VDC is its countless needs against limited resources,
- ) Fragile mountainous geography with more soil erosion and landslides compared to plains,
- ) Migration of economically active and educated youths for wage labour to different parts of India or abroad,
- ) Deep-rooted conservative thinking is great hindrance to bring women and lower castes in forefront of development,

### **5.3 Recommendations**

The present need is of sustainable development and for Namsaling VDC, even from the villagers' point of view of the current development activities are not sustainable. More than ninety percent infrastructural development activities have been largely unsuccessful due to unplanned activities so local people and the implementing agencies have to realize and follow the following recommendations for sustainable development

#### **Biodiversity Conservation**

- ) Endangered species conservation is a complex issue that requires research and assessment to generate specific management activities for specific species. It is however possible to take a multi-species or ecosystem approach and hence focus on conserving important habitat areas which contain endangered plant and animal species.

) To generate greater awareness among the public of their conservation responsibilities in the use and protection of their biodiversity, an awareness raising program is needed.

### **Population awareness on forest degradation**

Forest conservation doesn't mean the end of timber production. Instead, it could be the increase of forest productivity with a long-term vision of sustainability. High value timber can be processed locally for the production of furniture or plywood. Bamboo also can be used for furniture making, reducing pressure on timber resource. All of these ideas and more need to be communicated to the VDC population. Local and regional NGOs can help to create awareness on forest conservation among the community.

### **Sustainable Natural Resource Management**

The actual level of natural resource management inside the VDC has been revealed as quite low according to the community data collection process. There are a few examples of successful natural resource management, particularly for agriculture but not enough to cover the whole VDC needs. A total lack of integrated natural resource management was observed in the fields of water, forestry and biodiversity conservation. By implementing improved methods in natural resource management, the community can maintain the well-being of the people and the environment.

### **Environmental education and awareness**

Awareness creation among the entire community is also important. Environment related videos could be presented as a start during Ward wide workshops and followed by a discussion period. Opportunities for NTFP projects, increased

agricultural productivity projects, nursery establishment and other sustainable activities can be presented at the end of the workshop. The plan implementation presents the environmental awareness among schools and local communities.

### **Alternative Sources of Energy Development**

Biogas, solar energy and improve stoves are all potential alternative source of energy for the VDC area. Alternative energy should be raised to reduce deforestation arising out of the increased demand of fuel wood.

### **Agriculture Management**

Improper traditional and subsistence farming systems have resulted in soil erosion and fertility depletion in Namsaling VDC area. The most immediate priorities identified by the local community are lack of irrigation facilities, diseases outbreak in cereal and cash crops and uncertain market prices. Among other less significant issues include declining soil fertility, lack of agriculture technical services and heavy use of pesticide

### **Action Planning**

To address the socio-economic and environmental problems outlined in previous section, an action plan has been prepared recommended. This action plan tries to integrate development and socio-economic environment. The action plan is an outcome of group discussion, workshop involving local VDC members and communities and investigators' judgement.

The action planning has been developed from the priority challenges identified by the community. The plan is composed of a manageable number of activities that together



will improve the wellbeing of the VDC ecosystems and people. Each section consists of a set of activities that villagers can take without help, actions they can take with some help, and actions that need to be taken by other people or organisations outside the community. To ensure implementation is realistic only the top, most immediate priorities have been included. However, all challenges identified during the PRA are important and the community should be encouraged to implement the challenges that they see are the most significant.

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