GINGER CULTIVATION IN NEPAL

(A Case Study of Siddhithumka VDC, Ilam District)

A Thesis Submitted to
The Central Department of Rural Development
In partial fulfillment of the requirements for the
Degree of Masters in Arts in
Rural Development

Submitted By
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Recommendation Letter

This thesis entitled Ginger Cultivation in Nepal: A Case Study of Shiddhithumka VDC, Ilam District" has been prepared Goma Devi Rai under my guidance and supervision in a partial fulfillments of requirement for the master's Degree of Arts in Rural Development. I hereby forward this thesis to the evaluation committee for final evaluation and approval.

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Date: 2015-06-23

2072-03-08

Approval Letter

The thesis entailed "Ginger Cultivation in Nepal: A Case study of Shiddhithumka VDC, Ilam District" submitted by Goma Devi Rai in partial fulfillment of the requirements for the Master's Degree of Arts in Rural Development has been approved by evaluation committee.

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Declaration

I hereby declare that the thesis entitled "Ginger Cultivation in Nepal: A Case Study of Shiddhithumka VDC, Ilam District" submitted to the Central Department of Rural Development, Tribhuwan University, is entirely my original work prepared under the guidance and supervision of my supervisor. I have made the acknowledgements to all ideas and information borrowed from different sources in course of preparing thesis. The result of this thesis has not been presented anywhere else for the award of any degree or for any other purposes. I assure that no part of the content of this thesis has been published in any form before.

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Date: 2072/03/01

Abstract

This thesis entitled "Ginger Cultivation in Nepal; A Case Study of Siddhithumka VDC, Ilam, Nepal" has been prepared for partial fulfillment for the degree of Master in Arts in Rural Development Kirtipur, Nepal. The major objectives of the study were to explore present status of Ginger, to find out the methods of ginger cultivation and to highlight the problems of the ginger cultivation in Siddhithumka VDC of Ilam District. The researcher adopted descriptive research design but to analyze the collected information qualitative as well as quantitative methods have been used. Semi structure questioners are used for household's survey and key informants interview and focus group discussion of PRA tools was use to identify present status of ginger cultivation, applying methods of Ginger cultivation and find out the problems that farmers are facing to cultivate.

Ginger is a potential crop for high income even though crop is cultivate traditionally with poor seed quality. Cultivated land is also constant in study area due to the limited land availability. In many cases farmers divided land in 3 pertain to manage the ginger crop rotation. For high yielding ginger crop require at least 2 years gap to cultivate in same land and other crops are plant in remnant land.

Farmers apply their own knowledge to cultivate crop. External support has not existing for cultivation in the study area. Farmers attempt to manage all procedure of ginger farming as much as they can. Quality seed selection, fitting site selection, proper crop rotation, proper land preparation and fertilizer supervision, planting in time, mulching, weed management, mau-extraction, earthing-up, nutrient management, weed Control, irrigation, shade and harvest and storage management are reviewed in detail.

Ginger crop suffered by several disease mostly affected by the disease like paheli (yellowing leaf), shukha (drying), shukha (drying), gano kuhine (damage rhizome root and dath ma puwal parne (Borer). Other problems are disorganized market and post harvest management. Ginger market is extremely fluctuated thus most of farmers doesn't buy quality seed or seed from other, they plant own on hand seed even being diseased. Post harvest management practice is very poor in the study area farmers apply their own knowledge store crop so there can be incident of damage and drying crop in

store house. Most of farmers sell the crops as soon as harvesting because of storage problem as a result they can't get good price of their crop.

Agriculture is the main occupation in the study area. VDCs economy and local inhabitants are highly depend on agricultural production. History of ginger cultivation is unmemorable in the study area because people have religious connection with ginger. Due to unavailability of rural road construction and history commercial cultivation has not long. But rural road play significant role for accessing the product market. After constructed rural road farmers highly increase to cultivate ginger crop. Ginger cultivation has great possibilities for both grower and country for the earnings. It is a high value crop in comparison of other crops in production and productivity. Despite the great potentiality of ginger production does not seems satisfactory due to the problems on cultivation. This has created the barrier for ideal growth. Due to the traditional cultivating practice and low yielding varieties has used.

Successful production of ginger depends on efficient use of available resources by adopting suitable agronomic practices. For the scaling-up from present low productivity and constant status or ginger cultivation in the study area further trainings should be lunched focusing the farmer for advance technology adaption. Action research program should be conducted for the management of rhizome rot diseases and practical training in seed selection mainly.

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Acronyms and Abbreviations

ADO	Agriculture Development Officer
AEC	Agro Enterprise Center
APP	Agriculture perspective Plan
CBC	Central Bureau of Statistic
DADO	District Agriculture Development Office
EDR	Eastern Development Region
FAO	Food and Agricultural Organization
Fig	Figure
FNCCI	Federation of Nepalese Chambers of Commerce and Industries
GDP	Gross Domestic Production
Govt.	Government
Ha.	Hector
HDI	Human Development Index
HH	Households
INGOs	International Non-Government Organization
Kg.	Kilogram
M	Meter
MEDEP	Micro-Enterprise Development Program
MOAC	Ministry of Agriculture and co-operative
NARC	Nepal Agricultural Research Council
NCDC	Namsaling Community Development Center

NEHHA	Nepal Herbs and Herbals Producers Association
NGOs	Non-Government Organization
NGPTA	Nepal Ginger Producers and Traders Association
NGRP	National Ginger Research Program
NPC	National Planning Commission
PACT	Project for Agricultural Commercialization and Trade
SNV	the Netherland Development Association
TEPC	Trade and Export Promotion Center
VDC	Village Development Committee
WFDD	Woman Farmer Development Division
WTO	World Trade Organization

CHAPTER - ONE
INTRODUCTION

1.1 Background of the Study

Agriculture is the main occupation in developing countries. Agriculture plays an important role for sustainable development contributing the poverty reduction of the country. It plays primary sector of economy in developing countries. It provides the basic needs for the existence of mankind and raw materials to agro-based industries. It helps to increase national income of country through livestock keeping, commercial fruit farming, poultry farming and large quantity of cereal crop production. It provides more employment and sustains life of people. Agriculture is the back bone of economic development of the developing countries.

Nepal is characterized as agricultural country. Despite being rich in natural resource, lack of adequate industrial development and traditional agrarian economy. Agriculture is the dominant sector of Nepalese economy. More than 80 percent of the total populations of Nepal drive their livelihood by agro- based activities. Agriculture sector contributes 32 percent of Gross Domestics Production (Economic survey: 2014) which is one third percent of national income. It is the backbone of the Nepalese economy occupying a place of pride in the field of national income, livelihood, employment, industrial development and international trade.

Nepal is characterized by numerous micro-environment conditions resulted by scope gradient and dissected landforms. The hilly region of the country is characterized by terraced upland and high rate of soil erosion where paddy, maize, millet-barely wheat and other cereal crops are massively cultivated to fulfill the demand of food and other requirement of the hill people. There are different types of agriculture activities such as livestock rising, cash crop farming, cereal crop farming, horticulture etc. The climate condition of Nepal is suitable for all types of agricultural activities lying in the sub-tropical temperature. Among them, horticultural is an important sector on Nepalese agriculture where there are possibilities for development. The favorable soil and climate condition of Nepal permits to grow

almost all kinds of horticultural crops, which can contribute significantly to the economic development of the country.

Cash crops are one of the main sources of cash income for the small farmers of Nepal. Cash crops are also called high value crops. Sugarcane, potato, oilseeds, tobacco, jute, pulses are great range cash crop production of Nepal. However ginger, cardamom, tea, coffee are also cultivated in large quantity in Nepal for the use of local consumption and export other country to earn foreign currency. Cash crops have crucial role on foreign trade of Nepal.

According to USAID there are about 700 spices in use all over the world and twenty countries actively engaged in the production and export of one or more of them. There are more than twenty spices and common use in Nepal and half of them are grown in Nepal too. "Spices crops have significant contribution to raise the socio-economic status of rural people, to earn foreign currency and decrease environment degradation. Similarly Mercy Crops reports spices are very popular in Nepalese cuisine and kitchen and the demand is increasing. The major spices of daily use are ginger, chilly, garlic, large cardamom, cumin, coriander, pepper, onion, turmeric etc. Among them, large cardamom and ginger are the best known for export while other are produced in small quantity and also imported from other countries. India is the major trading partner for spices of Nepal.

In the same way FBC (2008) spicy production is one of the key economic activities of Eastern Development Region. Ginger is an important spice crop traditionally grown in the mid-hill area of Nepal for cash income. Eastern region is second most important ginger growing area in Nepal. Raw and dry ginger alone makes about half of the total export of spices to India .Cardamom is the largest commodity being exported to India.

Ginger is identifying as one of potential high value crops and one of the main sources of cash income in Nepal. The net income of farmers involved in ginger cultivation is significantly higher than that of competing crops (paddy, maize, wheat and fresh vegetables).The value of ginger export has been increasing .Nepal is

significant producer of ginger ranks with in the top 15 world exporter. Nepal is traded of ginger three forms of ginger like fresh, dry and processed.

In this context, the study has been prepared on order to examine the ginger production trend in Siddhithumka VDC, Ilam District.

1.2 Statement of the Problems

Agriculture of Nepal has long been based on subsistence farming. Particularly in the hilly regions where, farmers-drive their living from fragmented plots of land cultivated in difficult conditions. The economic well-being of Nepal is very closely bound to its natural resources land, water and forest area. Nepal's agriculture's growth is constrained by poor infrastructures, weak institutions and inadequate technical support for commercialization. Cash crops are the most effective means of production in hilly region of Nepal. If cash crops production is rise up, they can play a vital role to increase production. The potentiality of ginger farming mainly in hilly region of Nepal is high due to its suitable geographical climate.

The production and productivity of ginger could not be found to increase properly in a whole country as well as Ilam district due to various reasons such as heavy rainfall or drought or disease which may destroy the crops. Besides them, the absence of modern technology in cultivation, unavailability of scientific fertilizer, improved seeds in proper time, lack of skilled labor, lack of market, lack of transportation, lack of storage are the main problems of ginger cultivation. However, farmers' economic condition has been changed by ginger cultivation. With reference to the above stated problems this study is attempt to investigate the following research questions.

- How the farmers producing the ginger in Siddhithumka VDC?
- What types of methods are applied by ginger cultivator to produce the ginger in the study area?
- How is ginger marketed by the farmers?
- What are the difficulties and problems of ginger farming?
- What is the recent trend of ginger cultivation in the study area?

1.3 Objectives of the Study

The general objective of the study is to study the ginger cultivation in Siddhithumka VDC, Ilam District. The specific objectives are as follows:

- To explore the present status of ginger cultivation in the study area.
- To find out the method of ginger cultivation in study area.
- To highlight the problems of ginger cultivation in the study area.

1.4 Significance of the Study

Ginger is an important commercial crop. It supports uplift economy of local farmers. In the mild hill area of Nepal cash crop farming is regarded as the most important occupation. Among the other cash crops ginger is easier to produce because ginger is suitable for wide range of climate and be produced by labor intensive technique which is easily available in local area. There have been a number of theoretical and empirical works carried out at different times. Almost all the theoretical works and most of the empirical works have been conducted for other crops. Very few studies have been conducted on ginger cultivation. Ginger cultivation is helpful to reduce the income inequality in the study area as well as check to hill to Terai migration and even rural to urban migration.

This research can be helpful for the improvement and betterment of present condition of local farmers who are facing a lot of problems like lack of transportation, lack of systematic market, lack of new technology etc.

This study will encourage the farmers to change their traditional cropping pattern. It will also be useful to draw the attention of farmers and concerned authorities towards the crops cultivation and to improve the present situation. Finally, this research will also be very helpful for the future scholars, researchers, students in the related field and it is fruitful for the government, NGOs and INGOs and for others who are interested in ginger cultivation in the area.

1.5 Limitations of the Study

Ginger cultivation area of Nepal is scattered from east to west of mid hill region of Nepal and it was difficult to cover all the region of ginger cultivation in this study. Due to the short time of period of the study, it was impossible to understand detail information of overall status of ginger cultivation. The limitations of the study are as follows:

- So this study covers only Siddhithumka VDC of Ilam District. Thus, its finding may not be applicable to the other parts of the country.
- This study is carried out on the micro level due to limited time and resources.
- This study is focused on only ginger crop though various other food crops as well as cash crops are also grown in the study area.

1.6 Organization of the Study

The study is organized in to six chapters, references and appendices are also included at the end of the study. The structure of the study is as follows;

Chapter one deals with the background of the study with statement of the problem, significant of the study, objectives, Limitations and organization of the study to acquaint the readers about the study.

Chapter two provides the gained information from the literature reviewed and also the source of secondary information.

Chapter three deals with the research methodology applied for conducting research to fulfill the research objectives.

Chapter four consist the information about study area Siddhithumka VDC of Ilam District.

Chapter five constitutes the presentation of related information and data about the Ginger cultivation collected from field survey and analysis of them to reach closer to the actual result.

Chapter six is deals with the Summary of major findings, conclusion and Suggestions of overall study. At the end an extensive references and appendices are also included.

CHATPER - TWO
LITERATURE REVIEW

The literature review is an important part for research work. It is impossible to research on any topic without observing some previous studies. Comprehensive reviews of related past studies sharpen one's understanding of the problems and to build alternative areas and approaches of analysis. In this chapter, an attempt is made to review the available literature related to Ginger cultivation.

2.1 Review of Concepts and Theories

Purseglove (2000) has mentioned that Ginger (*Zingiber Officinale Rosc*.) (Zingiberanceae), a perennial herbaceous monocotyledon, usually grown as annual, is known to human generations as a medicinal and spice crop. It is a flowering plant in the Zingiberanceae, whose rhizome, ginger root or simply ginger is widely used as a spice and medicine. It is an herbaceous perennial, which grows annual stems about a meter tall being narrow green leaves and yellow flower. Ginger produces a hot, fragment kitchen spice. Young ginger rhizomes are juicy and fleshy with a very mild taste. It is explained that ginger is a plant of very ancient cultivation and the spice has long been used in Asia. It is one of the earliest oriental spices known to Europe and still in large demand today. He point out the economic part is the underground rhizome, which is pungent and aromatic and used for culinary purpose in ginger bread, biscuits, cakes, puddings, shops and pickles. Ginger is treated in three basic forms- green (fresh), pickled or preserved and dry. Only dry ginger (whole, peeled or sliced) is regarded as a spice; green or fresh ginger considerate as a vegetable, while pickled or preserve ginger is destined largely for trade connected with Chinese and Japanese cuisine(purseglove,2000). In additional ginger oil and oleoresins are also traded. Although a number of countries produce ginger, exports of dry ginger on a significant scale are limited to India and China, the two dominant suppliers, followed by Nepal, Nigeria, Sierra, Leone, Australia, Fiji, Bangladesh, Jamaica and Indonesia. The UK, USA, Saudi Arabia, Morocco, Japan Germany, Canada are important importer of ginger.

Paudyal (2010) has give details Ginger requires a tropical or sub tropical climate. The base temperature requirement is 13ºc (day/night) the favorite range being 19-28ºc. The optimum soil temperature for germination is between 25-26ºc and for growth 27.5ºc. The crop requires long or short day length for its growth. Brilliant sunshine heavy rainfall and high relative humidity are necessary for good yield. A rainfall of 1500-3000mm, well distributed in 8-10 month is ideal. Ginger is cultivated reined and irrigated condition. In areas receiving less rainfall, the crop has need regular irrigation. The crop is sensitive to water logging, frost and salinity and tolerant to wind and drought. Deep slopes in hilly areas are not recommended for cultivation as it leads to soil erosion during heavy rainfall and rhizome yield has been negatively correlated with slope. Partial shade also increases rhizome yield. He mention that Ginger has wider adaptability for different soil types, and higher yield the soil should be loose, friable and minimum resistance to rhizome development. Well drain soil with 30 cm depth is essential, but by adopting bedding and surface mulching, shallower soil can be used satisfactory. As depth of soil increase, its suitability for cultivation is also increases. Compact clay soils which are subject to water logging or sands water holding capacity, gravelly soil or those with hard pan are not conductive for production of high yielding healthy plants. The most favorable soil PH is 6.0-6.5. Ginger require tropical, subtropical and humid climate for its commercial production, it can be successfully grown to an altitude of 1500mt. and well distributed rainfall. During growing season dry season and land preparation as well as before harvesting rainfall is required for good growth and field of the crop. Dry weather with a temperature ranges of 28°–30°c is ideal. High humidity throughout the crop period is necessary. Ginger prefers good garden soil, rich in humus, light, loose, friable, well drained and of at least 30cm depth. Rhizome growth is better on slightly acidic soil. But in the study area farmers randomly cultivate the crop in available land without concerning soil quality and climate.

Keith (2013) has explained that ginger (Zingiber officinale Roscoe) is a member of the Zingiberaceae family of plants. It has been a part of healing Strategies in Asia, India, Europe, and the Middle East for centuries for treatment of such disorders as arthritis, Stomach upset, asthma, diabetes, and menstrual irregularities etc. There is scientific support that ginger may alleviate the symptoms of nausea and

vomiting following pregnancy, surgery, cancer therapy, Sickness and suggestive evidence that ginger reduces inflammation and pain. Cell culture studies show that ginger has antioxidant properties. However, it is not known whether ginger antioxidant constituents are bio available in humans once ingested and whether they can affect markers of oxidative stress in human in vivo. There are preliminary data that ginger has antimicrobial potential, although there is little evidence supporting ginger's practical usefulness in combating infections in humans. Based on evidence primarily from animal and in vitro studies, ginger may have beneficial effects toward cardiovascular disease through its multiple actions counteracting inflammation, platelet aggregation, and hypertension. Overall, based on the current body of scientific literature, more information is needed from clinical studies to confirm these promising multiple health benefits of ginger in human subjects and the doses that are most effectual.

Ghosh (2000) has made the study about plant varieties, agro-techniques, harvesting and oleoresin of ginger in the North-Eastern region of India. He has defined ginger is an herbaceous, perennial plant; its rhizomes are aromatic, pungent and are being used mainly as spices. He identified several types of ginger such as Rio-de-Janeiro (Kerala), Maran (Indigenous type of Assam), Nadia (West Bengal) etc. He found that Indian ginger is the high fiber content by the rhizomes hence its quality is considered to be very good in international trade. Ginger is usually cultivated in the jhum fields. The burning of the field is brought under fire as helps in reducing the weed growth, soft rot disease and increase the availability of certain plant nutrients particularly the potash. Mulching with green leaves not only ensure better sprouting but also helps in adding sufficient organic through its decomposition .Crop rotation should be followed rigorously in order to avoid serious disease as well as balancing the nutrient status. Regarding diseases, he found in the sloppy land under well drained condition and where soil is burnt before planting, the disease is comparatively less pronounced. He also pointed that there are three types of ginger products namely dried ginger, ginger power and ginger.

Collier (1998) pointed out about the origin and cultivation of ginger all over the world. It made ginger (zingier, official), perennial herb of the ginger farming is taken as a native of tropical Asia, from which it has been introduced into cultivation

in the world. The tuberous root stock has been used as a spice and in medicine from past age. It was taken as an important item of business between Europe and the east during the middle ages. It sizes is up to 3 feet tall with grass, which leaves seem like a grass. It can be used as dried form or green form but dried ginger is useful for a longtime. According to this study the name 'ginger' is derived from zingier when it was imported from Europe in the fifteenth century.

2.2 Review of Previous Related Studies

NARC (2008) Stated that Ginger grows well in sandy or clay loam soil planted in the last week of mid-February to mid-April (Falgun to chaitra) with spacing of 15-20 by 20-30 cm. the seed rate (rhizome of 40-60gm) is 4-6 tons per hector. Ginger require per hector 25-30 metric ton manure, 100 kg nitrogen, 50 kg phosphorus and 50 kg potash. Mulching is essential to enhance germination, prevent washing-off soil due to heavy rain, and maintain soil temperature and to conserve moisture. It need to earthing-up, first after 50 days and second after 75 days of planting. Ginger is grown during rainy season and thus requires good drainage. Crop is harvested 8 months. Depending on the verities, the average yield is 15-30 mt/ha. There are fibrous (Nase) and fibreless (Bose) verities cultivated in Nepal. Kapurkot 1 is the recommended verity for cultivation in the mid-hills.

Govinda (2003) has made a study "Income generating ginger cultivation improved technology" which has shown that ginger is also cash generating crop which plays a crucial role to improve living standard as well as earning foreign currency by exporting it in the international market.

The study is basically based on how to cultivating ginger, and what types of diseases seen. According to him, in Nepal, 8189 hector land is cultivated ginger farming but few districts hold better position in its farming.

Shakya (2003) has written in a brochure entitled "The Ginger Candy". According to her view agricultural prospective plan (APP) has given a priority in industrialization and commercializing to eradicate the poverty alleviation by the help of agricultural production. On the one hand we can save various agricultural productions by processing, preserving and hoarding. And the other hand; it helps to

solve the problems of unemployment. The researcher said also that work can be started investing lower capital even unskilled women. The women who are not skilled on their own occupation, they can be benefited to improve their living standard involving in such types of small and cottage industries. If the agricultural products can by the price promotion, the country gets better income by exporting agricultural purified goods in the national and international market.

Fuel (1998) studied different aspects of ginger production. Through this study he came to know that labor and farmyard manure are the most important variables explaining the major changes in output of ginger. Study showed the absurdity or the ginger farmers as still they do not know the causes behind the decreasing of output. Farmers have been commercially farming ginger since long time but productivity has been decreasing gradually year by year. This lower productivity is mainly due to fatal disease like rhizome not and will. In some cases, whole ginger in field damaged and rotten as a result amount of output is lower than the amount of planted seed.

Rai (2001) has made a study "Ginger Cultivation in Sikkim". He has found that ginger is a popular cash crop of Sikkim (Zoom & Gelling-Samsing), 80 percent of people of the study area are depend on agriculture. Due to the sudden price of ginger, it is famous mainly the commercial point of view. Nevertheless, it is still cultivation in traditional way in the absence of modern facilities. Generally; it is cultivated by hand with the help of oxen. So, it could not be effective in quality and quantity pattern. His study reflects that the Rai community mainly cultivates ginger crops. In general, farmers start to prepare land from January and extracted mother rhizomes during the month of June-August. It becomes mature from December. The study shows that the ginger cultivation is influenced by several factors in the study area such as types of soil, temperature, crop rotation and economic condition of growers and size of land holding. Furthermore, he shows that the average farm size from total, sampled households range from 3.7 area to 10.29 area while in ginger it ranges from 0.5 acre to 3.33 acre of land and its productivity range from 7.86 quintal to 11.47 quintal depending upon the bio-physical condition as well as the use of agricultural inputs. He also expresses about the trend of area under the ginger cultivation and its production have fluctuating nature as well as the cost of ginger production in higher than other crops by 1.83 times but the net profit of ginger is

higher than other crops by 3.1 times. Therefore, they have become able to improve their living standard which has shown positive impact on the rural area at the same time.

Gartaula (2001) has done a study on "Tea cultivation". He has concluded that the farmers of Fikkal VDC have been changing their traditional types of farming into modern agriculture system and suggested there should be changed seed, chemical fertilizer and pesticides for the higher production and yield. His study is only based on the primary database and there is addressed very few variable but many variables are not addressed so that the study seems to be half.

This study has shown that cash crop farming like tea may be more profitable than food grain farming. So, effort should be made to encourage the farmers for the tea cultivation at Fikkal VDC. Tea can be cultivated various types of land i.e. Bari, Khet, Jungle, Cardamom farm, Amlisho Bari and Grazing land. They cultivate it by avoiding all types of farming. Tea farming is successful to increase employment opportunities as compared to other crops.

Due to the price fluctuation of tea, the farmers cannot get better opportunities. It means price fluctuation is created by the unsystematic, disorganized and limited market.

Pandey (1994) carried out a research on Ginger cultivation. In the study he concludes that there was a great possibility of ginger production factors. On the account of its geographical despite the great probability of ginger production, the ginger production does not seem satisfactory due to so many problems, which have created an obstacle of its ideal growth. He has traced out ginger production was important crops in various ways. Ginger farming holds the first rank amount the commercial crops production in different reasons of Nepal. Its cultivation has been providing employments to a large number of people.

FBC (2008) has conducted extensive study of ginger production. This study has shown ginger is an important spices crop traditionally grown in mid-hill area for cash income. The study identified, ginger cultivation in eastern development region contributes about 27% of total national production. Ilam district is the biggest ginger

growing area. Ilam district alone produce more than 55% of the total production in EDR. The use of poor quality seed is one of the main imitating factors and rhizome root is the most important bottleneck of the ginger production. Farmers use to born high loses due to diseases.

The study also shows the traders, brokers and commission agents are involved in marketing ginger. The intensification of research efforts on post-harvest technologies especially value addition in important in light of recent trends in increased demand for spices oils and oleoresins in international market is of utmost importance. The research presents production of originally grown ginger should be promoted and adequate marketing support must be ensure for large –scale adoption of such farming systems and the farmers should become competitive through reduction is the cost of production and increased quality consciousness.

According to the study in Eastern Development Reign more than 80% of total production goes to market and the household consumption is very little, producers lack of appropriate skills, knowledge and information on ginger marketing and they are compelled to sell their products at relatively in low price. Growers generally sell their product immediately after harvest and no past harvest operation are carried out by the farmers. Traders/wholesalers generally perform the post-harvest operation like grading, cleaning, washing. Local traders are generally involved in collection and transportation up to road head Centre. The cost incurred for custom clearance, taxes collected by different groups and transportation makes the marketing cost quite high. The losses are also very high at the marketing level due to immediate post-harvest management at the production level.

Khadka (2004) has performed a study "Effect of ginger cultivation on local livelihood." The study shows that the ginger is a main cash crop for cash income among various crops in Arun Thakur VDC of Sindhuli District. Ginger is included different crop rotation and is also grown as a mixed crop or inter crop with maize and vegetables. A piece of 25.60 gm. young rhizomes is used as a seed and is planted in Falgun - Baisak (Feb-April) and harvested in Mansir - Magh (Nov-Jan). It is generally cultivated on upland (Bari). It absorbs too much nutrients from soil. So, to prevent is from diseases and to increase its production it is better to cultivate on the same land

after two or three years gap and by changing the place from time to time. It is noted mulching is also necessary to prevent from heavy drought rain and to minimize weeds.

Researcher has mentioned the season for Ginger selling of ginger products 38.9 percent household sell their ginger immediately harvesting 30.6 percent ginger farmers sell when price increase. Similarly, 11.1 percent household sells in planting time. There was found that only two ways of ginger selling i.e. self-carrying and by laborer. As for the cost, non-ginger cost is higher than ginger cost but ginger income is higher factors of ginger cultivation, 59.7 percent household were influenced by demonstration effect and rest of them influenced by own self. On the one hand, 77.8 percent households have succeeded to save but rest of them not. On the other hand, 72.22 percent households were satisfied with the present market price and rests 21.78 percent have expressed dissatisfaction about the market price. He has concluded that ginger farming made drastic change on the ginger cultivators' life style.

NRCRI (2005) has studied about ginger cultivation and says ginger require a favorable climate to grow, it does best in sandy clay-loam soil is good for well-shaped rhizomes. In hard soils, the rhizomes tend to be malformed. Ginger can be grown on beds, ridges or flat beds. Ginger can't tolerate water logging. Ginger requires a mean rainfall of 1,000 mm of rainfall that is well distributed over a period of six month. The crop requires supplementary irrigation where the rainfall is less than 800mm for better production of ginger. Conventional methods of planting clean ginger rhizomes are cut in to sets each having at least two viewable bids and weighting about 10-20 gm. These seeds are placed in shallow holes of 5cm deep and spacing of 20cm2°0cm and covered with soil.

WFDD: (2051) has conducted a program on Salyan District of Nepal on the topic Women in Ginger Production". The objectives of this study are closely related with the women's contribution in ginger production and to analyze the effect of ginger production on the improvement of economic standard of rural women. Regarding women's participation in ginger production, it has been found that women participation is high in case of farm yard manure application, mulching, weeding and cleaning of ginger, but the women participation has been found lowest in the

operation where high physical strength is required, hence, except land preparation and marketing in almost all the operations women play companion on the improvement of economic standard of rural women. As per the view of rural women of study area, they needed firm support from the government such as government should fixed the price of ginger as in other cash crops like cotton, tobacco etc. and women should also get participation in the training conducted by government.

SNV (2010) has performed a study spicy crop ginger specially grown in mid hill area. Traditionally cultivating for cash income, the study shows country produce 11.5% of the world total ginger production and became 4th largest ginger producer in the world in 2008. The study shown the production has made the country self-sufficient for domestic consumption. And sutho (dried ginger) is major processed product of Nepal. Farmer are marketing their production traditional way. The study recommended other value added ginger products are candy, powder, squash, pickles etc. were emphasized. Study shows the production portion is very nominal. Due to its high volume in a units area compared to competitively crops like Maize. It has bigger impact on small holder farmers.

The study mentions that Nepal has mostly remained biggest exporter of ginger. However, Nepalese ginger has not received good price. Almost all of the exports are to India. There is great export potential to other neighboring countries. There is incident of import in Nepal especially during off season.

Most of these studies are focused on production, consumption and export volume of ginger in macro level. All of these studies point out the importance of ginger cultivation in national or local economy. But very rare study is done to study the problems and prospects of ginger cultivation in micro level. This study is aiming to identify the constraints of ginger cultivation in Siddhithumka VDC. Who are cultivating small scale suffering from many diseases and highly discouraged by the unstable market price.

CHAPTER - THREE
RESEARCH METHODOLOGY

Research Methodology is most important aspect to solve the research problem. Reliable and relevant study can be possible only by applying scientific method. Hence, purpose of this chapter is to discus and design the framework for the research.

3.1 Research Design

Research design is the plan, structure and strategy of investigator conceived so as to control variance. This study entitled to explore the present status of ginger cultivation in Siddhithumka VDC on the basis of the specific objectives of this study. The researcher has adopted descriptive research design but to analyze the collected information qualitative as well as quantitative methods have been used.

3.2 Selection of the Study Area

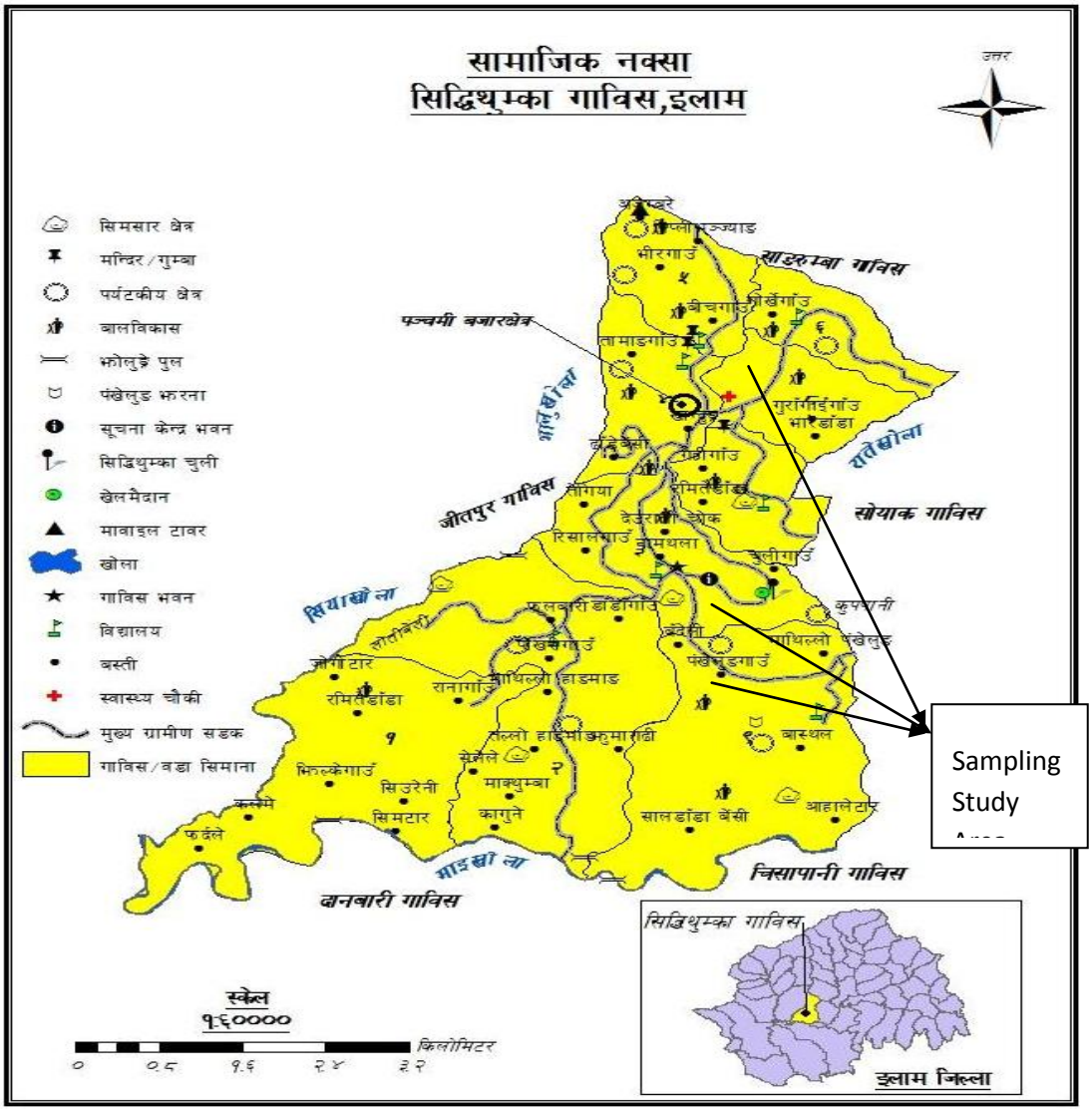
Ilam is well known district for cash crop farming. The district is famed for 7'A' (crops name start from 'A') cash crops production. These crops Aduwa (Ginger), Amriso (Broom Grass), Olan (Milk), Akabare (round chilly), Alaichi (cardamom), Aalu (potato) and Orthodox tea are the best 'A' production of Ilam District. They play great role for the development of village economy. This study has been conducted in Shiddhithumka VDC of Ilam District. These 7'A' crops are massively produced in Shiddhithumka VDC too. Ginger crops are also highly cultivated in this area. Being an inhabitant of the village, this researcher became very interested in studying Ginger cultivation. The researcher is familiar to this area being a local inhabitant of study area.

Basically following points were the basis of selection of the study area.

- As the researcher herself is very familiar with ginger cultivation, it was easier for her to collect data and her own experience could apply at the time of collecting data, which supports to get accurate information.
- For conducting the research work more effectively 2, 6 and 9 wards of Siddhithumka VDC in Ilam District was chosen as study area. There are

sufficient households and population for the basic study. The researcher could not take the whole District and VDC as the study area due to the financial and time constraints

LOCATION MAP OF STUDY AREA



3.3 Population, Sample Size and Sampling Procedure

In many places ginger cultivation is successfully done in Nepal. Siddhithumka VDC of Ilam district is selected for the study as the sample area. There are 9 wards in this VDC, 3 wards (2, 6 and 9) have been selected purposively for the suitability of data collection and these areas are densely ginger cultivated area. This study has been done on 38 households.

For the purpose of primary data collection, field survey was done during the 2nd December 2014 to 26th February 2015. In the study area, all together there are 254 households (VDC profile 2068), among them 240 household cultivate the ginger crop. Out of which 15% i.e. 38 households have been taken as a sample size. This sample size is sufficient to carry out the detailed study of the proposed area. But in the context of individual ward, it has different sample size in different wards. It is generally due to the heterogeneous and homogenous nature of ginger cultivator.

Data were collected from both large as well as small growers. A judgmental sampling technique has been applied while choosing the sample unit.

3.4 Sources of Data

The study was mainly based on primary information. The primary data were collected during the field survey by informal interview and questionnaires. Response of ginger growers were regarded as the major source of field observation. The primary data has been collected by conducting households Survey of the ginger producer of Siddhithumka VDC through questionnaire. An appropriate questionnaire has been prepared covering all area necessary for the purpose of the study.

3.5 Primary Data Collection Tools and Techniques

In order to collect the required and relevant primary data from the sample households following tools and techniques were used.

3.5.1 Household Survey

Semi-Structured questionnaire is one of the effective data collection instrument to get appropriate information from the research field. A set of questionnaires were prepared intending to capture the method of cultivation influencing factors, present status and problems of ginger cultivator. Household heads were administrated those structured questionnaires. In the case of absence of heads other senior family member were interviewed. Questionnaires have been kept in appendix.

3.5.2 Field Observation

Field observation is an interaction between the respondents of various nature and activities. The problems and experiences depend upon the attitude of researchers. During the period of study the researcher has been participated as an observer. Direct observation was done to get the relevant information for the study to minimize the possibility and inaccuracy of information.

3.5.3 Focus Group Discussion

The focus group discussion event was organized during the study. The participants of FDG were local farmers, local traders and local elites. The participants of FDG were divided in two groups as a farmers, traders and elites, researcher as a facilitator. Farmer's group discuss about present status of ginger cultivation and problems that they are facing. Similarly traders and elites calculating marketing condition of ginger. In the meantime researcher analyzed the sector enabling environment of ginger sector of Nepal. At the end of group work representative presented the findings and made recommendation to upgrade the ginger production.

3.5.4 Secondary Data Collection

Beside the primary sources, secondary sources have also been used, whatever relevant to complete the study. Especially secondary data have been used for understanding about comparative situation of ginger farming in the study area. Such secondary sources of data have been collected from different government and non-governmental organization, books, journals and reports contributes by different scholars. The relevant literature whatever and whenever were available have been studied and the required information were extracted.

3.6 Method of Data Analysis

Qualitative data have been collected by using group discussion interviews and field observation. The study is mainly descriptive and the analysis of the result is described logically.

Information's are collected as raw data. Information was grouped, sub-grouped and classified as necessary and so as to meet the research objectives. Collected data has been processed and analyzed using simple statistical tools (e.g. Percentage, average, tables, charts and figures).

CHAPTER-FOUR
GENERAL INTRODUCTION OF STUDY AREA

The purpose of this chapter is to provide detail information of the study area. It is important to know about research area in detail in the research. All of findings of this research are based on the study area.

4.1 Introduction of the Ilam District

Ilam, a hilly district situated in the far eastern part of Nepal, is divided in to 40 Village Development Committee. The district is fully covered by hills except some part of inner Terai. It is covered by pleasant natural geo-structure, temperate climate, low Green Hills and fertile lands have been made prosperous by the hard work of the farmers.

The District is famous for gorgeous tea orchards. Tea cultivation is done successfully in every Village Development Committee of Ilam District. The pleasing tea orchard is the main attraction of internal and external tourists of this District. Ilam is rising tourism Place of Eastern part of Nepal. This place carried the touristic nature with panoramic views of tea orchard, different hills, sunrise, sunset and eye-catching views of Terai.

The district is very well-known for cash crops production. Especially 7 "A" cash crops are famed namely Arthodox Tea, Aalu (potato), Alaichi (Large Cardamom), Aduwa (ginger), Akabare (round Chilly), Olan (Milk) and Amliso (a grass from where Brooms are made) in the District. The District is processing towards modern agriculture business from traditional cereal farming. Among 7 "A" Potato, Ginger, Cardamom, Red round Chilly and Amliso are exported to Siliguri and Darjeeling in India. Whereas Milk is taken to Kathmandu via Biratnagar and Tea is exported to other foreign countries.

Ilam is inhabitant by the people from various sects and ethnic group and is an interface of different cultures and Religions. The district has existing natural hills covered with the Tea plantation and forest, diverse climate, simple living style and

houses depicting its own art and unique styles. The study area Siddhithumka VDC is lies at the western part of the district.

4.1.1 Geographical Setting

The study area Siddhithumka VDC is situated Eastern part of Nepal. And almost 15 km far from to the District headquarter Ilam Municipality. It has been separated by neighboring VDCs Soyak in the East, Jitpur in the West, Sangrumba in the North and Danabari in the South.

In term of absolute location Siddhithumka VDC lies at the latitude 26Es48’30” north to 26Es53’40” north and at the longitude 87Es47’45” to 87Es52’30” east. It lies at average 272m to 1693m above the sea level.

4.1.2 Soil

Soil constitutes the physical base of any agriculture enterprises. Agriculture is often by the collaboration of the physical, chemical and biological characteristics of the soil. But soil condition doesn’t determine the land use as well as cropping pattern in the study area. Because soil is not tested and types of soil are not verified in the study area yet.

4.1.3 Drainage

The study area is mainly drained by four major rivers namely Mai khola, Pankhelung khola, Rate khola and bhalukhola and several small streams (kholsas). Among them Mai khola (Kankai River) is the biggest one, flows from North West to South East. But these rivers do not role for ginger cultivation in the study area. Ginger cultivators don’t irrigate the ginger crop.

4.1.4 Climate

The climate of the study area varies generally sub-tropical to alpine depending upon the elevation of the place. Generally climate of the study area is sub-tropical in nature is located at the altitude between 272-1710meters. Climatic nature is

completely monsoonal. The winters are dry and warm while summers are hot and low rainfall.

4.1.5 Rainfall

Rainfall is the primary ecological parameter which creates a variety of farming enterprise, types or system. While observing the study area rainfall pattern, two distinct seasons are appeared. The summer (April-September) is hot and wet. Rainfall is heavy and well distributed, From June to September during which July is the rainiest month. The winter is dry and warm. It is only during October to February that there is hardly any rain. The study area has minimum 1000ml to maximum 1500ml average rainfall.

4.1.6 Temperature

Temperature and moisture constitute the major climatic elements which have the greatest significance to the agriculture. Each crop plat requires own optimum temperature and moisture condition. The study area has average 3°c to 34°c temperature.

4.1.7 Natural Resources

The study area is richly endowed with forest resource and herbal medicine. There are dense mixed jungle and thick saal forest. Likewise herbal medicine such as Harro, Barro, Amalo, sarpagandha, Chiraito, Majito etc. similarly Rudraksha and Rittha are emerging forest production. Two community forests are successfully mobilizing by local people in the study area.

4.1.8 Land utilization

The land use classification of study areas recorded under forests land put to non- agricultural uses, barren and uncultivated land, pastures and grazing land miscellaneous tree crops and groves, cultivable waste land, fallow lands other current fallows and net area shown.

4.1.9 Population

The total number of occupied residential households of siddhithumka VDC is 839 with the population of 4089 in 2068. Out of which 2026 were females and 2063 were males.

However, these above information are not enough, hence in order to understand more about the study area other information has been shown in the table.

Table No. 4.1

Ward wise distribution of households and population of 2068

Ward no	Total households	Male	Female	Total population
1	44	124	123	246
2	91	232	232	455
3	146	363	367	730
4	138	324	305	629
5	89	181	191	372
6	60	166	156	322
7	80	195	180	375
8	88	203	227	430
9	103	275	254	529
Total	839	2063	2026	4089

Source: VDCs profile 2068

The table 4.1 shows that the study area is consisted by 839 households with the population of 4089 out of which 2063(50.45%) are males and 2026(49.55%) are females. In comparison to the households and population of 2058 census, it has increased by 25 percent and 22 percent respectively in 2068. As a result density of population increased.

4.1.10 Food Crops Production

Food crops are grown with the primary purpose of consumption by human or animals. Several agricultural and horticultural crops are grown in the study area. Among them major crops are Rice, Maize and Millet.

Table No. 4.2

Food crops production (in Muri)

Ward no	Paddy	Maize	Millet
1	479	470	5
2	1190	300	7
3	1661	99	8
4	705	183	9
5	216	212	11
6	503	166	34
7	523	399	22
8	522	98	13
9	866	133	12
Total	1696	2060	121

Source: VDC Profile 2068

According to table no. 4.2 there is cultivated 3 types of crops mainly. Among them Paddy is the main crop and highly cultivated. Maize occupied second position in term of area and production and thirdly is Millet. Other crops also cover some land portion in the study area.

4.1.11 Cash Crops Production

Ilam's tops tricking facts for tourists are in agriculture especially in cash crops sector. Ilam is the most famous District of Nepal for the production of Tea, Milk, Ginger, Cardamom, Red Round Chilly, Amliso (broom grass), Potato, Turmeric, Timmur (Sichuan pepper) etc.

Table No. 4.3

Cash Crop production (in000 kg)

Ward No	Potato	Ginger	Amliso	Tea	Cardamom
1	43	200	155	0	0
2	25	240	144	1	0
3	126	344	125	8	8
4	97	188	112	2	4
5	55	334	190	6	2
6	96	430	118	1	3
7	71	411	126	4	2
8	88	234	122	4	1
9	188	230	270	1	1
Total	789	2521	1362	27	21

Source: VDC Profile 2068

The table recalls information regarding cash crops production in the study area. It shows that 789 quintal potato is grown in 9 wards if Siddhithumka VDC. Similarly, 2521 quintal ginger,1362 quintal amliso,27quintal Tea, 21 quintal cardamom are grown.

4.1.12 Land Holding Size

Land ownership is still the most important index of wealth in Nepal. However, the possession of the land is greatly valued among the people of Siddhithumka VDC. It is not value as a factor production but continues source of income and security. In the other hand it is an index of social status and prestige also.

Table No. 4.4

Land Ownership status

Land (in Ropani)	Total households
>10	150
11-20	226
21-30	295
30+	168
Total	839

Source: VDC profile 2068

The table 4.5 states that the 150 households have less than 10 Ropani of land whereas 226 households have 11-20 Ropani land, 295 households have 21-30 Ropani land and 168 households have more than 30 Ropani land.

4.1.13 Service and Facility

There is only a health post for primary treatment. There are three primary level schools named Kankai primary school, Pokhari primary school and Gorkhe primary school. Similarly, there is a Lower secondary level is Aadharsha lower secondary school and there is a higher secondary school named khandrung higher secondary school.

Transportation facility is rough motor road from district head quarter. But rough tract tractor road is everywhere. So there is only a taxi service from Ilam bazar.

4.1.14 Income Generation Source

Food crops along with Cash crops are the main income generating sources in the study area. Among the cash crops ginger cultivation is the first one. People sell their cash crops to trader who takes to sell in Indian Market. Broom grass production and tea leaf production are the main sources of income generation. Animal husbandry is also another income generating source in the study area.

CHAPTER - FIVE
DATA PRESENTATION AND ANALYSIS

This chapter constitutes the presentation of related information and data about the Ginger cultivation collected from field survey from the study area and analysis of them to accomplish the research problems the present status of ginger cultivation in the study area, methods that are applying by farmer for ginger cultivation and problems of ginger cultivation in the study area.

5.1 Present Status of Ginger Cultivation in the Study Area

Ginger cultivation has long history in the study area. This crop is considered as a high ranking traditional crop. The study area as a whole producer produce over 234 thousand quintal of raw ginger in every year. The product is mostly marketed in the fresh form in nearest market center when market price is high and as soon as harvesting. The local consumption is very low. Production system is organic and hesitation to adopt more forward technology because of unknowing procedures. Even though most of farmer give satisfactory views and motivated for cultivation further more.

5.1.1 Area of Ginger Cultivation by Sampled Households

In Siddhithumka VDC different types of crops are cultivated in different time of period. Cultivating different types of crops, farmers should not lose completely their crop, if crop affects by disease. Therefore, farmers are devoted into different crops. Predominantly farmers cultivate the ginger crop in Bari (not irrigated land). Land for Ginger cultivated land of the study area is given below.

Table No. 5.1

Relationship between total land and ginger cultivated land

	Total land Holding size	Ginger Land Holding Size(In Ropani)				
		<2	2-5	6-10	11+	Total
1	<10	2	1	0	0	3
2	11-20	3	2	3	0	8
3	21-30	3	6	9	1	19
4	31+	0	2	4	2	8
	Total	8	11	16	3	38

Source: Field Survey 2014

The table No. 10 indicates relationship between total land and ginger cultivated land of the study area. It shows that the group having less than 10 Ropani land 2 households farmer cultivate ginger crop less than in 2 Ropani. Similarly 1 household is in 2-5 and no household in 6-10 and above 11 Ropani. In 11-20 Ropani land holding group, 3 households cultivate less than 2 Ropani. Similarly 2 households are in 2-5 and 3 households in 6-10 and no households in above 11 Ropani. In 21-30 Ropani land holding Group 3 households cultivate less than 2 Ropani. Similarly 2 household are in 2-5 and 9 households in 6-10 and 1 household is in above 11 Ropani. In having 31 Ropani land holding Group no household less than 2 Ropani. Similarly 2 households are in 2-5 and 4 households in 6-10 and 2 households are in above 11 Ropani. It is found that neither low nor high landholder cultivate high ginger farming but middle land holders cultivate high ginger farming as compared to low and high holders. Moderate land holders are real farmers who cultivate large scale of crops and large land holders are landlords. They may not involve in agricultural production.

5.1.2 Production in Quantity of Ginger and its Monetary Value

The production of agricultural goods helps to boast up the economy by selling surplus production. But the agricultural product in Nepal is not satisfactory due to the deficiency of modern technology. So the producers are compiled to produce traditional way and lack of unskilled labor. Production of ginger is influence by

family members. Another difficulty is fluctuation nature of market price. As a result the producers get low level of profit. The production quantity of ginger and its monetary value of study area are shown below in the table.

Table No. 5.2

Production Quantity and its Monetary Value of Ginger

Ginger Land (in Ropani)	Number of Households	Production (in quintal)	Average Price	Total Income (in thousands)
<2	8	40	2300	92000
2-5	11	200	2300	460000
6-10	16	452	2300	1039600
11+	3	80	2300	184000
Total	38	772	_	1775600

Field Survey: 2014

The table 5.2 shows that 8 households cultivate ginger in less than 2 Ropani and their production is 40 quintal. 11 households cultivate ginger from 2-5 Ropani and their production and total income from ginger is 200 quintal and Rs. 460000 Respectively. 16 households produce 452 quintal and only 3 households was found cultivating ginger in more than 11 Ropani and income of those households is Rs.1039600 and Rs.184000 respectively. In conclusion it can be said that higher the ginger cultivation higher the production as well as higher the amount of income level. Farmers report, they use same portion of land. So in the study area ginger cultivated area is constant in every year only mere fluctuate. The main reason of cultivated land being constant is limitation of land availability, unstable nature of market price of production and high prevalence of disease in crop.

5.1.3 Motivation towards Ginger Cultivation

Ginger is identifying as a high value crop. The farmers are motivated for cash crops then cereal crops. In the study area farmers are motivated towards ginger cultivation because of its high value. And rural road support to marketing the crop easily in the market. The motivated factors are given in the table below.

Table No. 5.3

Factors Initiatives of Ginger Cultivation

Response	Frequencies
Agricultural Office	0
Own self	13
Demonstration Effect	25
Total	38

Source: Field Survey 2014

The table 5.3 shows information about motivation for ginger farming activities. It indicates that 13 household were motivated for ginger farming by own inspiration and 25 households had motivated for ginger farming influenced by demonstration effect. The above table indicates most of the ginger farmers were influenced by the demonstration effects and rest are own self but there were not influenced by other factors.

5.1.4 Marketing Trends of Ginger

Efficient marketing system is the key issue of ginger marketing. The development of marketing is fundamental part of agriculture development in developing countries. Marketing influences economic transformation of a subsistence agriculture. Thus, development of suitable market structure assumes much greater importance in the case of agricultural commodities.

Farmers clean and wash the dug outer ginger rhizome to remove the adhering soil particles before marketing. They retain only good quality for seed purpose and remaining they sell directly in the local market, but if the crop is infected it is sold immediately in the market. As per the reports of respondents about 2/3 percent of total product is marketed and about 1/3 percent is retained by producer themselves for seed purpose. Of the remaining little amount utilized for domestic consumption. However, marketing and quantity retain of ginger is very much depend upon the quality and nature of products. If the crop is not infected, they retain almost all the rhizomes except rejected portion. Growers reported that they do not sell those retained amount

of ginger except in some special cases. They further mentioned that instead of selling in the market seeds are sold in the village to other farmers or given for “ADHIYA” cultivation system.

The study area is being a hilly area, all the places are not connected by the roads hence ginger has to be carried by labor or themselves on the their back up to the road head. They use both ‘Doko’ and Bora. Labor charges as per the distance between the producing center and market center. Generally, labor charges Rs. 5 per kg from village to near market center. People of these areas transport their product by tractor if they have large amount of product in once, otherwise carried by labor if they have small scale product for selling. Labor charges as per the distance between the producing center and market center. Generally, labor charges Rs. 5 per kg from village to nearest market center

5.1.5 Ginger Selling Market

In the case of market center, Namthala, Khandrung, Bhanjyang and Soyak are the principal market centers where almost all the growers use to sell their product or almost all the ginger of the study area is collected in this market. Mother rhizomes are sold mainly during the month of July. Market rate seldom governs the extraction and sale of mother rhizomes because if they wait for higher price in the market the mother rhizomes might get decayed. However the conditions are not similar in the case of fresh ginger. Fresh ginger of the study area is available in market generally from November beginning. The peak marketing season is of course, in the month of December to January.

Attempt to explain the factors determining the price and rate of output for a particular commodity must take into account the nature of its market. Each producers sell their productions in different market either it be industrial or agricultural goods. Regarding farmers of the study area, they sell their ginger by two way i.e. local market and brokers or local collectors it is cleared below in the table.

5.1.6 Season for Ginger Selling

The nature of ginger market is very unstable. The producers have many difficulties to sell their production in the market in desired time. There is not proper market price information to the farmers. When price is high difficult to manage time due to the other agricultural activities reported the ginger farmer. Basically, when the price is high, then producers sell their goods, which are shown in the table.

Table No. 5.4

Season for Ginger Selling of Ginger Producers

Response Alternative	Frequencies	Percentage
Immediately after Harvesting	12	31.58%
At the time of Planting	3	7.89%
When Price is rise	16	42.11%
When necessary	6	15.79%
Randomly	1	2.64%
Total	38	100%

Source: Field Survey 2014

The table asserts season for ginger selling of ginger producers on the basis of their total production pattern, it shows that 12 households sell their production immediately harvesting. Similarly 3 households sell at planting time in purpose of ginger seed and 16 households sell when price increases as well as 6 households sell when they need and 1 household sells production randomly. At last, it can be said that most of farmers sell their ginger immediately harvesting and when price increases because of price fluctuation.

5.1.7 Response of Ginger Producers about Market Price

Generally, production is determined by the market price, all farmers may not be satisfied with the market price, which is dependent on productivity of land and cultivating cost. If the productivity of land is low and moderate, the farmers should bear high cost, consequently, the producer s can't get better profit. As a result, they

express dissatisfaction. Ginger producer who are satisfied or not with the market price is presented on the table.

Table no. 5.5

Response of Ginger producers from the present market price including production

S.N	Production in quintal	Satisfaction	Dissatisfaction	Total
		Number	Number	Number
1	<10	4	6	10
2	10-25	11	7	18
3	26-50	8	0	8
4	51+	2	0	2
	Total	25	13	38

Source: Field Survey 2014

The table 5.7 explains the ginger producers are who are satisfied or not from the present market price. It shows that 4 households who produce less than 10 quintal are satisfied and 6 households are dissatisfied with present market price within their group. Similarly the households who produce 10 to 25 quintal, 11 households are satisfied and 7 households are dissatisfied with present market price within their group; the households who produce 26 to 50 quintal, 8 households are satisfied and no households are dissatisfied with present market price within their groups and households who produce above 51 quintal, 2 households are satisfied and no household are dissatisfied with present market price within their group. At last, it is found that 25 households are satisfied with the present market price due to the attractive income but 13 households are not satisfied with present price due to the high price fluctuation.

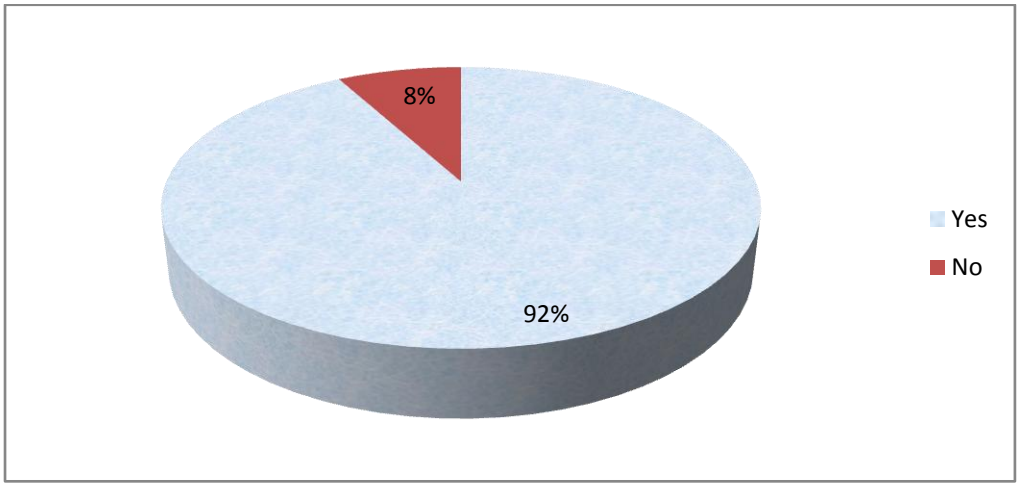
5.1.8 Ginger Farming and Production Technique

Agricultural goods are still produce in traditional way in Nepal because of the lack of the availability of the modern technology. Due to this fact, production pattern is not satisfactory as compared to cost. It is found in the study most of the farmers

don’t interest for modern technique because of they are uninformed and untrained about the modern technology. The ginger farmer of the study area, who want to cultivate or not modern way is below in figure.

Figure No. 5.1

Ginger Farming and Production Technique



Source: Field Survey 2014

The figure recalls that almost all the household who are using local seeds only but in case of ginger farming 35 i.e. 92% households want to use modern farming technology where as 3 i.e. 8% households do not want to use modern farming technology. The farmers who don’t want to use modern technology, because of their low economic condition.

5.2 Methods of Ginger Cultivation

5.2.1 Seed Selection

Healthy seed is an important factor in successful crop production. It knows from field survey that all growers select seed for planting. Farmers have a reasonable knowledge about healthy seed, although many growers do not follow the seed selection procedure completely. As per respondent’s ginger fields which remain comparatively healthy till November and December are considered suitable for seed. During seed preparation, damaged and infected parts of the rhizomes are rejected only

healthy pieces with two to their healthy buds are retained for planting. The survey showed that the most popular method of judging good seed is to look the inner tissues of ginger finger have a green color when broken.

5.2.2 Site Selection

Usually, ginger is planted on slopes to avoid water logging. Most of farmers preferred virgin land or land that has not been planted to ginger for at least three years. All growers are aware of the need for crop rotation, however shortage of land is a problem .All growers have mentioned that red soil is comparatively best soil for ginger cultivation as it produces a glaze over the rhizome and as such they get a high market price.

5.2.3 Crop Rotation

Farmers do not cultivate ginger continuously for more than 2-4 years on the same land depending on the size of holdings. It has been noticed that by rotation of fields, the incidence of sort rot is reduced. After harvest of ginger, maize-pulses, maize-millet-vegetable is grown during the remaining period.

5.2.4 Land preparation and Fertilizer

Ginger requires fine slope soil and plowing is mostly done by using bullocks. Usually three to four times plowing is done during land preparation. Ginger is an exhaustive crop so requires reasonable amount of manure and fertilizers. Well decomposed cattle dung or compost at the rate of 150 Bhari (2000 Kg) per Ropani is recommended to apply at the time of planting. The recommended dose of inorganic fertilizers depends on the fertility of soil and organic manure used.

Some farmers keep their cattle in the field from November to January where they intend to plant ginger in the coming season, but actual digging land preparation starts from January according to the nature of field. After removing the weeds and leveling the soil, the field is divided into beds of 40 -50cm.Width and 15-20cm. High with a spacing of 30-40 cm. between beds to drain rain water. The beds are made with a gentle outwards slope to avoid water logging to safe guard from soft rot disease.

5.2.5 Planting

After land preparation, planting of ginger is done. The ginger seed is carried out from the pit and rhizome finger is separated then it is planted in the shallow pits in rows. Normally, 25-50grams of seeds are planted between 8-10 inches of distance within a row, but size and distance of planting differ from place to place. About 90 percent of growers plant ginger at the side of channel to facilitate extraction of Mau (mother rhizome) because if the seeds are planted in other ways, roots are damaged when the Mau is extracted, and this affects yield .Quantity of seed rate per Ropani depend on the individual size of seed. Some farmers planted large size of rhizomes, but most of the farmers sow smaller size rhizomes. Ginger is started to sown from the last week of March to April in most places but it may continue up to the end of May. Maize and tapioca (Simal Tarul), other cash crops are sown around the periphery of beds.

5.2.6 Manuring

Ginger consumes highly nutrient present in the soil as it is a tuber crop. To maintain the loss of nutrients, manuring is compulsory for the better yields. In the study area , after planting rhizome seeds in the shallow pits, farmers apply about 150 “Bhari” (One Bhari equals 45 kg.), Farmyard manure per Ropani on average. They do not use chemical fertilizers during planting time. Very few growers use inorganic fertilizers just after mau- extraction. Most of the growers reported that farmyard manure is more essential for the production of ginger than that of chemical fertilizer. They further said that yields are directly related with the amount applied. Hence, they prefer to use more farmyard manure than the chemical fertilizer.

5.2.7 Mulching

Immediately after planting the seeds, mulching is done which helps to maintain the soil moisture, enhance sprouting, enhance organic matter in soil and suppress the growth of weeds. Locally available materials like wilted or rotten green leaves of forest, rice straw, rice husk etc. can be used as mulch.

Growers of the study area are aware of the advantage of mulching this operation keeps the soil shaded and cool, minimize soil erosion, and protect the young plant from heavy rains.

One row of maize in every inter row space of ginger with maintenance of 100% maize population and application of additional fertilizer to maize additional yield of ginger can be obtained. Mulching is essential as it enhance emergent, increases infiltration and organic matter. First mulching should be done at the time of planting with quick rotting green leaves.

5.2.8 Weed Management

The first round weeding is carried out before Mau-extraction in the month of July-August. Generally 2-3 rounds are done, It is repeated depending on the rainfall and intensity of the weed growth or at on interval of 45-50 days. During weeding, every care should be taken so that the rhizomes should not be disturbed, injured or exposed. As per the opinion of growers, should delaying weeding during rainy days otherwise increase incident of disease on crops.

5.2.9 Mau-Extraction

Mother rhizome removal, called Mau-extraction is found common practice in study area. Almost of all farmers harvest mother rhizome from May or June, i.e. when ginger crop attains 50 to 60 days age with 3-4 leaves. Farmers remove mother rhizome leaving the sprouted piece of rhizome in the soil. The removed mother rhizome is sold in local market with good price. This practice is believed to give proper space to the developing rhizome and although the quality of rhizome is inferior farmers get income due to off-season price advantage.

Generally, the growers started to extract Mau (mother rhizomes) from June – august with the help of “kute” (iron made) and bamboo knife. The optimum time for Mau-extraction is at the two or three leaf stage. Farmers do not extract the Mau in the rainy day as they believe that entering in the field during this time increase disease. To extract the Mau require the skilled labor as if it is extracted by the ordinary labor roots may damage and causes yellowing of leaves.

5.2.10 Earthing-up

Growers are earthing-up rhizomes during the month of June–September after 20-30 days of Mau extraction. They used “kanta” for the purpose of earthing-up. If the rhizomes are not covered by soil, the soft buds may become exposed during winter and dry up. During field survey growers pointed out that they earthing-up rhizomes I order to improve yield, to protect rhizomes from direct sun and rain, to improve plant growth etc. but some the farmers do not earthing-up in order to save the plant from damaging.

5.2.11 Harvesting, Cleaning and Storage

Ginger is harvested twice always. On the stage during July-August, the mother or seed rhizomes are harvested. This is known as “Mau” and is of inferior quality. According to farmers, the harvesting of mother rhizomes gives proper space to the developing rhizomes. They also get a good price of mother rhizomes during the off season. The second stage of harvesting is done after 7-8 months of planting is decided by market demands. The crop is ready for harvesting when the green leaf stem turn yellow and winter. It is dug carefully with a spade taking care not be bruise or break the fingers. Harvesting continues up to December and January. Most of farmers leave or portion of the crop not harvested for seed purpose and dig it during the first week of February. But diseased crops harvested during the month of October and sold.

The crop will be ready for harvesting after 7-9 months of planting and this is when the leaves begin to turn yellow and the stems start lodging. Harvesting is normally done by digging with spade and collected manually. Depending upon the usage, ginger is harvested at different times. For selling ginger is harvesting in pre mature stage and while for seed purpose it should be fully matured.

After rhizomes lifted digging spade, it has to be cleaned. Cleaning operation is done either at field or at home. The operations include removing of soil particles attached on rhizomes and small root.

There is a gap of 2-4 months between harvesting and planting of ginger. For seed purpose, fully matured rhizomes are selected and generally stored in pits in a shady place. Some people spread a thick layer of leaves over the entire area of the pit and covered with soil to prevent the rhizomes from drying while other stored inside the room of their houses. According to the growers crops that are harvested early contain more moisture, and if stored above ground there is a chance that rhizomes will dry .Later harvested crops contain less moisture, and can be stored in shade.

The time of different activities performed for ginger cultivation is presented in figure.

Figure 5.2

Ginger Cultivation Calendar

Operation	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Land preparation												
Planting												
Manuring												
Mulching												
Weeding												
Mau-extraction												
Earthing-up												
Harvesting												

Source: Field Survey, 2014

5.3 Major Problems of the Ginger Cultivation

Nepal being an agricultural country has faced so many problems in the agricultural sector. Main obstacle is not to increase the agricultural production. On the one hand, government can't provide fertilizer, pesticides and quality seed on time. On the other hand, farmers have no capacity to buy agricultural inputs. Despite of suitable topography for the cultivation of ginger; still ginger growers have been tackling many

problems in the study area. Consequently, area under crop and its productivity have not been increasing remarkably. Hence, in this topic an attempt has been made to analyze the problems faced by ginger growers in various aspect of its production. Major contractions in ginger cultivation as indicated by local people have been described below.

5.3.1 Traditional Knowledge on Seed Production and Seed Quality

Most farmers have a proper knowledge of what constitutes quality seed, but they do not always high practice good seed selection. Most of the farmers use local varieties of seeds. Local seed may suffer from pets and disease. Very few people use to buy seed from other growers during the planting time. They also reported that improved or good quality of seeds is not available in time and reasonable price. Seed costs are very high in planting time small growers cannot afford to purchase of quality seeds. Hence, unavailability of improved seed is one of the major problems of ginger cultivation.

Ginger producers are not adopting recommended seed production technologies. Normally, farmers select the seed from main crop they produce and keep for the next season in pit stores.

5.3.2 Lack of Knowledge of Disease and their Protection

About 80 percent growers complained disease problem related to ginger cultivation. Disease problem started in the study area 5 to 8 years ago. Generally, disease outbreaks occur at the time of Mau-extraction, with 80 percent of the growers reporting.

As per report of respondents, ginger crops are mostly affected by the disease like paheli (yellowing), shukha (drying) and Gano kuhine Dath ma pwal parne (Borer). These are local name of ginger given by local people. As they disturbed, the symptoms of paheli (yellowing and rhizome rot) is yellowing of upper leafs, steams easily pulled out and insects seen in the stem or leafs yellow, stem collapse, rhizomes rot and nothing remains. Rust colored leaf margins with general yellowing, stems and leaf manure early and collapse, and rhizomes become dry during December /January

are the symptoms of “Shukhkha” (Drying). In the disease like “Gano kuhine” plant generally started to yellow due to collar rot and it is easily pulled out. In this way, various insects and fungi destroy the crop quantitatively as well as qualitatively. Despite of this, farmers generally make use of insecticides and fungicides in negligible quantities, very few farmers have been observed using plant protection measures. Majority of farmers completed that they are ignored of the measures to be adopted against the disease and insect pests. As a result they get low return from the land. Rhizome rot is a complex problem caused by multiple factors. The disease is spread unintentionally by the use of infected seed pieces from the previous crop. This disease is found in almost all ginger growing areas of the study area.

Major insects of ginger are white grub, stem borer, spice insect, scale beetle etc. according to DAO. Rhizome rot is the major disease of ginger which is caused by Pythium and Fusarium fungus which is seed and soil borne disease.

5.3.3 Insufficient of land Rotation

Ginger crop need rigorous and continuous crop rotation, particularly in views of occurrence of serious disease. It is also essential for balancing the nutrient status. Since it is an exhausting crop, it is advisable to grow certain leguminous crops after two or three crop of Ginger. But due to the fragmentation and sub-division of land, most of the grower of the study area has very limited landholdings. Therefore due to the land availability of land growers to reduce the interval between ginger crops planted on the land though all farmers are well aware of the need for crop rotation, with a gap of a few years between consecutive ginger crops.

5.3.4 Lack of Irrigation Facilities and Fluctuating Nature of Rainfall

Ginger crops require irrigation many times for the better production. Even though, the ginger grower doesn’t irrigate ginger crop in the study area. The growers totally depend on the monsoon, but nature of rainfall is fluctuating. Due to the fluctuating nature of rainfall and unequal distribution of rainfall affect the ginger crops. Summer season is wet and hot, while winter dry and cold. Study area has high rainfall in June to September. Ginger is risk during this time as the crop doesn’t tolerate stagnant water, possibilities of spreading disease is high in rainy season. Most

of the growers are aware of the risk, but they do not always pay sufficient attention to drainage. Irrigation is not possible due to the steep topography of the study area.

5.3.5 Shortage of Farmyard Manure

The Farmyard Manure is very essential for the high production for ginger crop and yield is directly related with the amount applied. Farmers are aware of the importance of farmyard manure to ginger production. However there is no availability of enough farmyard manure, as a result especially large growers can't increase the land under ginger crop as well as production. The growers reported, they would increase production if farmyard manure has more overflowing.

5.3.6 Insufficient and Unskilled Labor

Ginger crop is cultivated very traditional way in the study area. Unskilled labor force is used. Due to the other job opportunity and most of young man use to go for employment of foreign countries, there is shortage of labor force. Many farmers delay land preparation and planting the seed and this result in deterioration in the quality of seed shown. Man and women both labor forces are involved operation except plugging. Most of the farmers used family laborers. When more laborers are require they go to for "parma" and hired labor. For the hired labor charge is Rs.200 per day, plus lunch and for plough Rs.400 for a man for a day from 11:00am morning to 5:30 pm. Sometimes they contract between owner and labor called "Thekka" for certain work in fixed price.

5.3.7 Credit

Ginger is a capital intensive crop; farmers need lot of capital during the course of production. The growers of study area reported that they do not credit for ginger cultivation. They also said the local money lender easily provide lone to go foreign country, but not for agricultural production. They reported they have not insurance facility for their agricultural production, if the product damage and production not get market price. Growers don't take Lone from agricultural Bank and co-operatives also because, lot of formalities have to be done to have agricultural credit. Due to the many reasons they don't take loan for ginger cultivation.

5.3.8 Lack of Extension Assistance

Most of growers reported that still they have not received proper advice for ginger cultivation from village level workers and other agricultural inspector from the concerned department. Most of the farmers do not have ideas about the use of chemical fertilizer insecticide, pesticide and other usage. They are own ideas for cultivation.

5.3.9 Storage

Storage provides protection against weather, moisture, insects, microorganism, rodents and any type of infestation and contamination. As a matter of fact, the ginger market has always been unstable and farmers are enforced to keep their produce in the storage for some period after drying until they get proper price. Producers can’t store their production in sustainable way. Thus they can sell their production desired time and when the price is high. Growers are following traditional storage system so they are facing big loss in their production.

CHAPTER-SIX
SUMMARY OF FINDINGS, CONCLUSION AND SUGGESTION

The rationale of this chapter is to summarize the thesis research and conclude of research and suggestion for the further analysis. In this chapter summary of findings has been described, concluded of major findings and stated some suggestion for the further research.

6.1 Summary of Major Findings

Ilam is a well-known District in cash crop production of eastern part of Nepal. Where sub-tropical and temperate climate is found, such climate is suitable for agriculture production. There are different types of cereal crops and cash crops are grown. Among various types of cash crops Cardamom, Potato, Ginger, Tea, Broom, etc. are the main cash crops.

Agriculture is the main occupation in the study area. It plays significant role of VDCs economy as well as local inhabitants of Siddhithumka VDC. Most people of study area are involved in agriculture for their livelihood. Farming system remains primarily substance-oriented in the study area. They cultivate the different kind of food crops and cash crops also. Among various cash crops ginger is the main cash crops. This became most important alternative economic activities in the study area.

The history of ginger production in Siddhithumka VDC is since time unmemorable. Earlier, it was mainly cultivated household use and religious propose in small scale. Rai and Limbu community as “Rai Bijuwa” and “Limbu Phedanwa” used the ginger for religious propose to conduct their Puja and cultural ceremonies. It shows the cultivation of Ginger attachment with the people of the study area from ancient time. But the cultivation of Ginger crops for economic propose has not long history. The farmers has been started cultivate the ginger crops in large scale since 18 years in the study area. When the rural road was constructed, the farmers were highly encouraged for cultivation of ginger. Rural road helped for marketing of ginger production and there were access of market through the rural road.

Ginger production has great possibilities for both growers and country for the income. Despite the great probability of ginger production does not seems satisfactory due to so many problems, which have created an obstacle of its ideal growth. Ginger crop is suffering from several diseases in the study area. Many farmers loss their production very bitterly, by this causes farmers has been discouraged terribly some times. Price fluctuation is another great problem for the farmers. Due to the price fluctuation they bear great loss investing in ginger crop. Because growers have bought the seed in the time of price is high, but selling period price is relatively low. So they have fear of investment for the buying quality seed.

Yield of ginger in study area relatively low due to the low yielding varieties used and poor agronomic practices including planting without mulching introduction or breeding of new varieties and research in to improve agronomic will help to solve this problems. Ginger producers traditionally use mulch they did not apply it to achieve better rhizome yields. As a result of those poor crop husbandry practices yield were very low. Seed verity is not identified in the study area Ilame local seed are used for plantation.

On the basis of field survey, the following facts have been listed.

- Ginger farmers cultivate the crop traditionally their own land (Bari), farmers doesn't hired land for ginger cultivation.
- Seed quality is very poor and lack of appropriate variety of seed.
- Lack of awareness on quality production.
- Lack of skill and knowledge on processing.
- Cultivating trend is constant due to the price fluctuation and land availability of the growers.
- Most of the farmers used compost / organic fertilizer. Most of them assume if chemical fertilizer used damaged crop and not give good production. So farmers easily refused to use the chemical fertilizer. They also reported they have fare to buy seed from other growers too.
- Growers do nothing to care diseased ginger except pull down and throughout diseased crop.

- Most of the farmers sell the fresh Ginger, due to lack of adequate storage
- Access of production areas to market points is still lacking resulting in increased transportation cost.
- Post-harvest facilities like ware house; grading, washing, packaging facilities are completely lacking.
- Ginger is still cultivated in traditional way in the study area. Cultivation is done by hand and oxen are used to plough the land. It is because of hilly topography.
- High incidence of disease. (Rhizome Rot)
- Farmers change cultivated land every year, but they have small portion of land, that is the limitation of intense farming.
- Growers keep ginger seed themselves even being diseased.
- Growers don't use any insecticide to the storage seed and storage production.
- It was found ginger growers are hesitated to take loan for farming due to the unstable nature of market and fare of damage crop caused by the disease.
- Lack of market information, there is not organized marketing system of Ginger crop in the study area, local traders self collects the crop and sell to Indian traders, some of the cases of when price is high traders go to buy crop in the ginger field and pay advance for crops. So there is very hard to find accurate data of Ginger production.

6.2 Conclusion of the Study

Ginger has been produced as an important commercial horticulture crop in study area. Farmers produce the ginger applying traditional management practice through their own knowledge and experiences. External support in promoting improved varieties and management practices is almost non-existent. Ginger product markets are very volatile and price fluctuations create a disincentive for farmers in the production of the crop.

There is predominance of traditional practices in cultivation and processing of ginger in study area. Sutho (dry ginger) is the major value added product and it is made with traditional methods but lack of adequate knowledge of can't take place in

study area. Apart from Sutho, farmers can make other products like candy, squash, pickle but their access is limited in the local markets. Final disposal of ginger production is Indian market. There is minimum consumption of fresh ginger in local market. Study shows that the lack of farming method using modern agricultural inputs, limitation of land, instable market price, lack of storage facility and primary processing Centers for access to market, unavailability of and appropriate plant protection remedies; prevalence of rhizome rot disease; traditional cultivation practices resulting in low productivity, lack of modern knowledge and technology on production, lack of collective marketing practice, lack of cleaning/washing facilities and heavy dependence on India for trade and discouragement of import from Nepal whenever Indian ginger production is high, insufficient collection and storage facilities etc. are the major barriers to upgrade the ginger farming. Some of the farmers who are distantly located from the road have cited transportation as the major problem for upgrading their production.

It is learnt through this study, the government of Nepal ought to develop the program and projects focusing ginger farming for high yielding of crop and also facilitate the growers for upgrading activities and support them to increase the competitiveness of the products. To get profit for from this sector, supports on product diversification, branding and market diversification has to see must and work on Rhizome rot disease management. Because Rhizome rot is the main disease being faced by ginger producers in the study area and is regarded number one reason for loss in production. It is prevailed throughout study area and many farmers have discontinued the cultivation due to the disease. The disease has various sources of infection mainly due to fungus. Due to this, rhizome become soft, new leaves turn yellow, close to the soil start rotting and finally dry up. The disease spread unintentionally by the use of infected seed pieces from the previous crop, although these may appear normal and healthy.

6.4 Suggestions of the Study

The researcher has suggests assist farmers in identifying improved varieties with desirable market traits, appropriate agronomic and post-harvesting management practices including drying methods. Extension workers and other development

practitioners have to join hand with the farmers in addressing marketing problems such as: easing barriers to entry in to markets by organizing ginger producers.

The researcher suggest for intervention to ginger cultivation in following points.

- Convinced to make use of improved agronomic perform like high yielding better seed, land preparation, with adequate fertilizer and other agronomic practices along with easy access to the farmers.
- Encourage farmer to cultivate large scale insuring their crop and providing loan at a reasonable rate of interest through the Agricultural Development Bank and Co-operatives to the Ginger growers who need it, more ever loan procedure from supporting institutions should be simplified so that more farmers will be motivated to take lone for ginger cultivator, because of it ginger growers can afford the quality seeds, chemical fertilizer, agricultural equipment and so on which they required.
- Provide require fertilizer to farmer and aware about better yielding with using chemical fertilizer in the insufficiency of organic fertilizer with knowledge to farmers quality seed for planting such as use the seed with at least one eye, without disturbing the skin and healthy rhizome.
- Administe easy access of improve post-harvest practices: Cleaning, sorting and grading are the basic post-harvest handling practices which can be easily adapted at farmer's level especially small scale dryer machine like solar dryer to make dried ginger (sutho). Those simple post-harvest handing practices can add value to the product and get more prices by producers.
- Provide trainings of knowledge suitable land selection for ginger cultivation, which the water does not log, maintain well drainage with raise bed of 10 to 15 cm. and not grow ginger in the field which has been previously affected by ginger disease.
- Aware the farmers to emphasis the rotation of crops, it is always recommended for healthy plant and better yield, before growing ginger better to grow pulses, which crops manage soil nutrition.
- Support farmers in quality seed production, in the study area farmers are not properly aware about quality seed and keep seed themselves because price is

very high in the time of ginger plantation, so they select seed from their own production field, even effect of bacterial wilt is seen.

- Deal with organized market where producer can sold such production their desired time and when price is high.
- Promote the knowledge to improve from disease and pest management practice. Such as treat seeds with insecticide and pesticide Indophil M 45 or Bavistin powder before storage. Use 100 Kg Neem or Mustard cake with 3 Kg Zanthoxylum powder during seed planting.(DADO reports)
- Encourage to the farmers Product healthy ginger for exportable quality and store appropriately for good price for production.
- Guaranteed of their crop by insuring because growers of the study area are very discouraged because of disease and fluctuation of crops price.
- Address additional work on Rhizome rot disease management.
- Facilitate for systematize group organization for communal collection, storage facilities and marketing of production.
- Support for product diversification between organic and non-organic products, establish quarantine labs for the quality test of production.

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APPENDIX 1

Questionnaire for the study of Ginger Cultivation in Nepal
(Case study of Siddhithumka VDC Ilam)

General information: Date:

Name of household head: Name of respondent:

Sex: Age:

Occupation: Education:

Ethnic Group (Caste): Religion:

1. How much land do you have? (In ropani) _____
2. How much land is used for Ginger cultivation? (In ropani) _____

3. For how long are you cultivating Ginger? _____

4. Do you irrigate ginger crop?

a. Yes b. No

5. Do you change the cultivated land for Ginger annually?

a. yes b. No

6. Do you keep Ginger seed yourself?

a. Yes b. No

7. Do you use any insecticide to the storage of seed?

a. Yes b. No

8. Have you taken loan for Ginger cultivation?

a. Yes b. No

If yes …….

Source of loan amount Interest rate in %

a. financial institution

b. co-operatives

c. money lender

9. Do you cultivate other crops inside the Ginger field?

a .Yes b. No

If Yes Name of crops: a. b. c. d.

10. Which system of cultivation are you using?

a. Traditional b. Modern

11. Have you taken other assistance from Government/Agriculture Department?

a. Seed b. fertilizers c. Chemical d. Others

12. Are you extending land and production of ginger crop?

a. Increasing b. Decreasing c. Constant

14. What type of fertilizer is used for ginger crop?

a .Compost/Organic b. Chemical

15. What are the problem and difficulties of ginger cultivation to you?

a. Unavailable sufficient land

b. Financial problem

c. High wage rate

d. Price fluctuation

e. Problem of daises

f. Transportation

g. Market

h. storage

16. Ginger suffers from the disease?

(a) Yes (b) No

If yes, what type of disease? How much crops per Ropani are damaged from this? ……...

17. What have you done to care the disease of ginger crops?

(a) Done (b) Nothing done

If done what_____

18. Is insecticide used if there is diseased in ginger crops?

(a) Yes (b) No

If Yes_____

Name of insecticide	Cost per Ropani	Applying method
I	Rs	I. Through sprayer
II.	Rs	II. Through hand
III.	Rs	III. Through Duster

If No1. Unavailable

2. High price

3. Unavailable of instrument

4. Unknown

19. Where do you sell your ginger?

(a) Nearest market center (b) Middle man

20. Can you sell your product in desired time?

a. Yes b. No

21. Are you getting satisfactory price of your product?

a. Yes b. No

If No what are the causes?

(a) Lack of suitable market

(b) High transportation cos

(c) Lack of storage

(d) Middle man agent

22. What types of ginger do you sell?

(a) Fresh (b) Dried (Sutho)

23. When do you sell?

(a) As soon as harvesting

(b) At the time of planting

(c) When price raise

(d)When necessary

24. Do you have insurance facility for your ginger cultivation?

a. Yes b. No

25. Do you have adequate storage system?

a. Yes b. No

26. How do you inspire to cultivate ginger crop?

_____

APPENDIX 2

Ginger grower preparing land

Inner Maize cropping with Ginger crop

Ginger Growers Wedding Ginger Crop