

CHAPTER ONE

INTRODUCTION

1.1 General Background

Nepal is situated in the lap of Himalya which is located in between the latitude $26^{\circ}22'$ N to $30^{\circ} 27'$ North and longitude $80^{\circ}4'$ E to $88^{\circ}12'$ east and elevation ranged from 90 to 8848 meters. The average length being 885 km east to west and average breadth is about 193 km north to south. The country borders between the two most populous countries of the world, India in the east, south and west and China in the north. Nepal is a land locked country and home place of natural beauty with traces of artifacts. The temperature and rainfall differ from place to place. Population census 2001 enumerated more than 100 caste and ethnic groups. Population projected for the year 2005 is 25.3 million (CBS, 2005).

The country is characterized by three distinct geographical regions (Mountains, Hills and Terai) and divided administratively in 5 development regions and 75 districts. The mountain region of Nepal includes some of the world's famous peaks including Sagarmatha or Mount Everest (8848 metres), the highest peak of the world.

Economic growth of the country has not improved substantially over time to overtake population growth. As the current population growth is 2.2 percent per annum, the gain achieved by development activities has been overshadowed by growing population. According to population census 2001, 53.1 percent population of age 10 years and over are employed. The preliminary estimates of per capita GDP and per capita GNP in terms of US dollar are 294 and 300 respectively for the

year 2004/05. About 31 percent of the population are below the absolute poverty line. (CBS, 2005)

According to census of 2001 the total population of Nepal was 23,151,423 having 11,563,921 males and 11,587,502 females with 4.1 total fertility rate per woman. In 2001, 7.3 percent, 44.3 percent and 48.4 percent of the total population were found in the mountain, Hill and Terai respectively. These regions comprise 35 percent, 42 percent and 23 percent respectively of the total land area of the kingdom.

Agriculture is the backbone of Nepalese economy where the agriculture sector absorbs more than 80 percent of the total labour force of the country and 60 percent of total population are employed in agriculture. It is a major source of GDP, which contributes 39 percent of the total GDP. It has been the major source of foreign currency and raw materials for agro- based industries also. To improve the living standard of the people at large, it is very necessary to exploit agricultural potentialities. The agriculture sector needs to have a change from subsistence status to an industrial and profitable business, so that productive employment and income are generated from this sector for the benefit of the poor people and serve the objective of alleviating poverty.

The agriculture sector plays a significant role to be self- sufficient in food supply and to supply raw materials for agro- based industries. For the desired changes in agricultural system adequate supply of chemical fertilizer, high yielding variety of seeds, improved animal breed, access to agricultural credit and irrigation facilities are the primary factors, so, agriculture sector deserves high priority in the public sector development programme. This priority sector could help to overcome economic problems of the country (MOF, 2001).

There are different types of agricultural activities such as livestock raising, 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 horticulture is an important sector in Nepalese agriculture where there are possibilities for development. The favourable soil and climatic condition of Nepal permits to grow almost all kinds of horticultural crops, which can contribute significantly to the economic development of the country.

The government has put forward the concept of “Corridor Development” from the fourth plan (1970-75) suggesting middle hill area as a suitable area for horticulture development. Additional stress has been given in the fifth plan (1975-1980) to the production of fruits with a view to maintaining ecological balance, providing nutritive value for people and discouraging import of fruits from India. Again the seventh plan (1985-90), has emphasized to the citrus development especially in some middle hill district as ‘Priority Programme’ (Adhikari, 1992).

Generally, total agricultural products consist of two main types: field crops and horticultural crops. Nepal produces different fruits under the horticulture. These fruits can be divided as tropical fruits, sub-tropical fruits and temperate fruits. The sub-tropical fruits are very important in our context, because of middle hill has such a climate. Among the various sub-tropical fruits, citrus species are comparatively suited for the cultivation as per the agro-climatic conditions. Among the citrus species, orange is specially grown in Eastern Hill Region of Nepal.

Orange is one of the major citrus fruits grown all over the world in the areas of tropical and sub-tropical climate where there are suitable soil and sufficient moisture to sustain the tree and not enough frost to kill them. In Nepal, the climatic condition of mid hill region stretching right

from the east to the west is favourable for growing mandarin (citrus reticulata blanco). The favourable soil condition, wide range of rainfall, varying altitude between 750 metres to 1400 metres and position between 26.5⁰N and 28.5⁰N latitude are unique conditions for the cultivation of almost all the citrus species. Citrus species, particularly mandarin, sweet orange, lemons and limes are grown in Nepal since prehistoric time (Department of Agriculture, 2037). Local mandarins (citrus reclusa) are the most important citrus fruits of Nepal, grown particularly in Dhankuta, Sankhuwasabha, Bhojpur, Ilam, Panchthar, Khotang, Dhading, Kabhre, Sindhupalchok, Gorkha, Tanahun, Syangja, Kaski, Palpa, Parbat, Baglung, Gulmi, Pyuthan, Dailekh, Lamjung, Rolpa, Salyan, Dadeldhura, Baitadi districts.

Syangja has a long history in the form of homestead fruit garden. The prospects of orange production are seen significant in Syangja district, but there is lack of modern type of orange farming with a view point of commercial aspects. Now with the help of district Agriculture Development Office as well as Agricultural Development Bank, the production of orange is increasing in Syangja. The climate of almost all places is suitable for orange production, mainly middle range of district and the Siddhartha Highway has facilitated the orange growers for transportation. Orange production can also be a source to improve the socio-economic condition, because it has started from the occupational point of view in various parts of hilly regions.

Jagathbhanjyang VDC has a long history of orange cultivation and it has been an important as well as famous area of the mid-hill region. The Eladi VDC, Malyankot VDC and Waling municipality, adjacent to Jagathbhanjyang VDC of Syangja district are also famous area for orange cultivation. The sub-tropical to temperate climate, diverse terrain,

favourable soil and good average precipitation has favoured orange cultivation in Jagathbnanjyang VDC. The orange cultivation has not only been the tradition but it has also been an important source of income generation playing a significant role in the socio-economic life of the people.

1.2 Statement of the Problem

More than 80 percent of Nepalese people make their livelihood from farming. However, between 1984 to 1996, growth in agricultural output averaged 3 percent a year, barely, keeping up with a population growth rate of 2.5 percent. The percapita production of staple food grains is actually declining (World Bank, 2000). Nearly 21 percent land of Nepal is used for cultivation and 39 percent of GDP is covered by agriculture sector. Excessive use of chemical fertilizer in some areas, soil erosion, land degradation and low productivity are major problems of agriculture. The input-output ratio in agriculture is regularly increasing which is a serious concern. Similarly, quantity with quality agriculture production and food security are important issues of Nepalese agriculture.

Land is a principal resource, constituting about 97 percent of Nepal's total area. Agricultural land is being expanded but at the same time the most fertile lands have been turned into non-agricultural uses, such as conservation areas, urban area, industries, road construction etc. Major cities have been expanded encroaching upon prime agricultural land.

Nepal has domesticated a wide variety of plants and animals. Over 400 species of agrohorticultural crops and about 200 species of vegetables have been reported. More than 100 varieties of 15 fruits, 200 varieties of vegetables and 10 varieties of potatoes are under commercial cultivation.

To meet the challenge of economic development, Nepal has focused its development policy on increasing production at increasing rate by increasing productivity, employment opportunities, so that basic needs of the people can be fulfilled. To attain these objectives, Nepalese economy relies heavily on agriculture sector. The GDP rate is not steady, rather it is fluctuating with seasonal climatic condition. In the same way the balance of trade has always been unfavorable to Nepal. The problem of unbridled population growth has posed a serious threat on this sector.

Hilly region has been emphatically designated for various kinds of fruit production. Among the different kinds of sub-tropical fruits citrus species are comparatively more suited for the cultivation as per the agro-climatic condition of the hills. So, cultivating fruits in more areas would be a healthy step towards popularizing fruit cultivation on the one hand and improving the economic condition of the people in those areas on the others. But fruit production in Nepal, is not done in commercial basis, even though, there is sufficient prospect of fruit cultivation. So, bringing more area under citrus cultivation could bring specialization in fruits. This would lead more production with high productivity which would induce more business based on them. It would generate more employment and additional income to the people and eventually reduce the foreign dependency on fruit leading to improved balance of payments. The income distribution would be proper between Terai and Hill and it would reduce the internal migration problem from hill to the Terai to some extent.

The history of orange cultivation in Jagatbhanjyang VDC has been practiced since many years ago, and gradually improving its cultivation. Now a days, farmers are more attracted towards it due to suitable climatic atmosphere as well as geographical condition. Among the different cash

crops orange occupies an important place in the field of agricultural economy. Due to the different problems such as problem of transportation, lack of scientific storage, systematic marketing, diseases, insects and other related problems have hampered its productivity as compared to the other crops.

If proper attention is given towards the above mentioned problems, it will be the major source of cash earning in the study area. But due to less emphasis given by government and private sector, till today, only a few research has been conducted in this field. Hence, this study tries to investigate the true picture of the problems and prospects, farm size and production, socio-economic status of orange growers and the production trend in Jagatbhanjyang VDC of Syangja district.

The study, focuses on the following aspects of orange cultivation.

1. Farm size and production
2. Socio-economic status of the orange growers.
3. Condition of market system and supply of orange.
4. Trends of the orange production in the study area.
5. Problems and prospects of orange cultivation.
6. The profitability of orange farming in comparison to other traditional cultivations.

1.3 Objectives of the Study

The general objectives of the study are to give some reflection on various aspects of orange cultivation, marketing system and its problem and socio-economic change of the people in the study area. The specific objectives of the study are as follows.

1. To find out the present condition of orange growers in Jagatbhanjyang VDC.
2. To examine the major problems of orange growing farmers and suggest measure to solve them.
3. To evaluate the profitability of orange cultivation.
4. To analyze the various physical and non physical factors controlling orange farming.

1.4 Significance of the Study

Orange farming is expanding as a very important cash crop in the middle zone of Nepal, where it offers an opportunity for higher income per hectare in areas of acute land scarcity with favourable income generation, poverty reduction and positive environmental effects. Orange is one of the major raw materials for the localization and development of industries producing orange juice, jams, squashes, jellies, marmalades, pickles etc. The secondary employment potential in processing and marketing is large. These products as well as the fresh orange can be exported and can compete in foreign markets also. In addition, environmental benefits as well as the high value of output per hectare helps to withdraw marginal lands from farming cereal crops and tree crops on slopes. This study is justified since no research has been conducted on orange cultivation in Jagatbhanjyang VDC of Syangja. This study will be helpful for the farmers to improve their present condition regarding market, transportation, storage, irrigation, diseases and insects problem. It will be useful for the local people, researchers, planner, administrator as well as policy makers, and to those who are interested about it.

1.5 Limitation of the Study

A study carried in a limited sphere of time and budget cannot comprise all the aspects related to citrus fruits farming. Therefore the

present study is not free from limitations. The major limitation of the study are:

- a. The study is based upon a limited number of households due to time and budgetary constraints. Therefore sample households cultivating orange have been taken as the representative of the VDC.
- b. The details of seedling and plantation techniques were not considered in the study, because of the lack of long term continuous seasonal records of farming.
- c. The researcher being a student has not been able to increase sample size by including sufficient number of respondents due to budget and time constraints.
- d. This study has mainly focused on orange cultivation, only mandarin or “Suntala” has been selected for the study.
- e. The detail of soil quality and rate of soil erosion could not be analyzed due to limited time, expertise and financial support.

1.6 Outline of the Study

To fulfill the objective, the study is divided into six chapters. The first chapter highlights introduction of orange and geographical location of the study area, introduction of numerous aspects of the study area like population, caste, education etc. Chapter two is devoted to present review of relevant literature. Third chapter deals with the research methodology, which includes research design, nature of data, methods and instruments of data collection and method of analysis. The fourth chapter contains factors supporting orange farming which includes physical factors such as terrain, climate, soil, drainage system, vegetation, precipitation and cultural factors such as nature of inputs, intercropping system, supporting services, loan facility and irrigation facility. In chapter

five, data is analyzed to meet the objectives of this study. Along with others, cost-benefit analysis is also used to show the profitability of orange production in the study area. Chapter six is devoted to present conclusion and recommendation of this study.

1.7 Introduction to the Study Area

1.7.1 Location

In the ancient period, Syangja was a part of the Magrat state, 'Sinjali' is a clan in the major tribe. According to a legend the name Syangja is derived form of Sinjali (DEO/S, 2062).

Syangja district is located at the southwest part of Gandaki Zone. Geographically it is bounded by Kaski on the north, Tanahunu on the east, Palpa on the South, Gulmi and Parbat on the west. Syangja lies between 27⁰52' to 28⁰13' north latitude and 83⁰26' to 84⁰46' east longitude (DDC/ S, 2062). The total area of this district is 1036.87 sq.kms. The total number of residential households of the district are 64,646. According to population census 2001, the population of Syangja is recorded as 3,17,320. Out of the total population of Syangja district, 1,43,619 (54.26%) are males and 1,73,701 (54.74%) are females (Population Census, 2001).

There are two municipalities and sixty VDCs in Syangja district. Jagatbhanjyang is one of the VDCs of Syangja district with an area of 9.98 sq.kms. It shares borders with Waling municipality on the north and west, Eladi VDCs on east, Keware Bhanjyang and Malyankot VDC on the South. There are 754 households in Jagatbhanjyang VDC with a total population of 3784, out of which 1654 are males and 2130 are females (District profile of Syangja, 2062).

1.7.2 Natural vegetation

Out of total area of Syangja district 317.28 sq. kms (30.6%) land is covered by forest. The area covered by forest in Jagatbhanjyang VDC is 1.824 sq. km (18.24%) (DFO/S, 2061). Forest is one of the important natural resources of Nepal. During the past few years forest was in state of rapid decrease. To control deforestation and to develop the forest, consumer groups have been formed and many programmes such as plant production and distribution, plantation of community forest, implementation and evaluation etc. have been conducted to enhance general awareness of the people in the forest sector (MOF, 1995/96). Various species of plant are found in Syangja as well as in the study area. Jagatbhanjyang VDC has some dense forest, mixed forest, open bushes and grass lands. Mainly Katus, Chilaune, Sal, Saj, Tuni, Bar, Pipal, Champm, Bans, Simal, Sami, Tanki, Koirala, Salla, Nigalo, Kafal, Jamun are found in the study area. Hence the study area is rich in natural vegetation.

1.7.3 Climate

Nepal has a great topographical variation, which is reflected in the diversity of weather and climate. Most of the hilly area of Nepal have sub-tropical temperate climate. The altitude of Syangja district ranges from 366 m to 2512 m. above sea level. Owing to different nature of landscape and other geographical parameters, there is some climatic variation in different parts of Syangja. We can find both tropical as well as subtropical climatic condition in Syangja but the study area lies in subtropical climatic condition.

There is no meteorological station in the study area. So, it is difficult to present the exact climatic condition of the study area.

According to the record of district meteorological station, the record of rainfall and temperature from July 2004 to June 2005 has been shown as follows:

Table 1.1: The Record of Rainfall and Temperature.

Months	Temperature in ⁰ c		Rainfall (mm)
	Minimum	Maximum	
July 2004	21.7	29.7	578.0
August 2004	22.4	31.1	572.0
September 2004	21.1	29.4	666.1
October 2004	15.6	27.4	183.3
November 2004	10.3	23.4	0.00
December 2004	7.2	21.2	0.00
January 2005	6.0	18.1	69.8
February 2005	7.5	22.6	10.4
March 2005	12.9	27.3	45.8
April 2005	13.3	30.1	95.3
May 2005	16.5	29.7	256.7
June 2005	20.3	31.7	318.0

Source: DMS/S, 2005.

Table 1.1 shows that the maximum temperature fluctuates between 18.1⁰c to 31.7⁰c where as minimum temperature fluctuates between 6.0⁰c to 22.4⁰c through the year. The above table also shows that June is the hottest month in which the highest maximum temperature is 31.7⁰c and January is the coldest month in which the lowest minimum temperature is 6.0⁰c. The average maximum and minimum temperature is 26.80⁰c and 14.56⁰c respectively. Similarly the average annual rainfall is reported to be 328 mm from July 2004 to June 2005.

1.7.4 Drainage

The study area is mainly drained by rivers and small streams such as: Adheri Khola, Keware Khola, Jhharlengdi Khola, Shahi khola. Among them Keware Khola and Jhharlengdi Khola are biggest two, flow

from south-East to South-West and North-East to South-West. There are some other tributaries such as: Angetari Khola, Dumse Khola and Chhilaundi khola. Water obtained from these tributaries is used for seasonal irrigation, most of the tributaries are permanent but volume of water decrease in dry seasons. The top of the Pitalek hill has very less water sources so there is problem of water.

1.7.5 Soil

Soil constitutes the physical base for any agricultural enterprise. The three nutrients namely nitrogen, phosphorus and potassium contribute to soil fertility. Generally, three soil types are found in Jagatbhanjyang VDC such as, sandy soil, red soil and mixed soil. The percentage of mixed soil is higher than sandy soil and red soil. Mixed soil is considered as appropriate soil for orange cultivation. So, the district agriculture development office has recommended cultivation of orange in this area (DADO/S, 2060).

1.7.6 Family size

The average family size of the study area is 5 persons, which is lower than the national average figure of 5.4 in 2001 (CBS, 2001). The family size in this VDC is found to range from two to seventeen (Sample Survey, 2006).

1.7.7 Infrastructure

Infrastructure of the study area is comparatively better than other rural parts of the district. The study area is nearby the Siddhartha Highway. People of Jagatbhanjyang VDC have benefited from this road.

Siddhartha Highway has benefited the people of Jagatbhanjyang VDC by providing access to other parts of the country. Most of the village roads of this VDC are linked with this Highway. There are six primary and one secondary school in the study area. The literacy rate of Syangja district is 66.70 percent (DEO/S. 2062). The literacy rate of this district is higher than the national average of 55.5 percent (9th plan). This indicates that the 70 percent literacy target set by the Tenth plan is likely to be achieved in this district.

1.7.8 Ethnic composition

Among the various ethnic groups such as Brahmin, Chhetri, Gurung, Magar, Damai, Kami etc are scattered on different parts of the VDC. The distribution of population by ethnic group is presented in Table 1.2.

Table 1.2: Ethnic Composition in the Study Area

S.N.	Caste group	Population	Percentage	Remarks
1	Magar	964	25.48	
2	Chhetri	756	19.98	
3	Brahmin Hill	745	19.69	
4	Gurung	438	11.58	
5	Thakuri	280	7.40	
6	Giri	181	4.79	
7	Sarki	166	4.39	
8	Kami	156	4.13	
9	Damai/Dholi	29	0.77	
10	Undefined Dalit	27	0.72	
11	Gharti/Bhujel	20	0.53	
12	Teli	8	0.22	
13	Newar	7	0.19	
14	Others	7	0.19	
Total		3784	100.00	

Source: Population census 2001.

1.7.9 Historical Background of Orange Cultivation

Orange is the most important citrus fruit and rich in vitamin C (ascorbic acid), phosphors, sugar, citric acid, Iron, and salts.

The name orange for a tree of the family rutaceae (Reu or Orange Family) seems to be derived from the Chinese word 'Reu' meaning 'Orange' in Chinese. Columbus brought the orange to the West-Indies from Florida and it is known as orange tree. There was well established

in Florida before 1565 and growing of orange in California started by 1800 (Colombia University press, New York, 1975).

It is believed that orange is a native fruit of tropical regions, Asia, especially China and India. It was brought into Europe from China before the end of the 15th century. It was taken to the New world by the Spaniards in the 16th and 17th centuries. The Genus citrus, to which orange, lemon, grapes etc belong have about 30 species of plants all are native to the old world. The spread of sweet orange was the most important of all the citrus fruits and it reached Europe from its original home China by 1498 (The Chambers Encyclopaedia Vol, 10-London). The sweet orange and mandarin is the principal species produced commercially in the following countries, listed in order of importance, such as USA, Brazil, Mexico, Spain, Italy, Israel, Egypt, Argentina and Turkey. Mandarin originated in China (cochin China). Span people who migrated towards the southwest (that is Assam) from East China might have brought this to India prior to the beginning of the Christian era.

The word orange used in this study is called mandarin (orange) or ‘Tan-ger-ine’ in English and Suntala in Nepali and it is an important fruit of citrus species. This was one among the four major fruits of this species in USA in 18th century and major in Nepal too. In Nepal Khoku village located in Dhankuta district was the first area to grow mandarin (Ministry of Land Reform, 2024.).

1.8 Method of Plantation

Cultivation of orange is based on topography, climate, soil and plantation method itself. Modern method of plantation is beneficial than traditional method. Preparation of hollow, quality of saplings, space maintaining between and among the plants, mark point of plantation in terrace etc, should take care perfectly while we apply the modern

plantation method. But in traditional method farmers plant saplings and leave for growing without any technical care.

In the study area most of the big commercialized orchards are setup implementing modern method, according to modern method, the hollows are of two types. The farm of graveled loamy soil needs 1.5 feet wide and 2 feet deep hollow and in graveled stony soil 2 feet wide and 3 feet deep hollow is needed. Hollows should be prepared before 6 months of sapling plantation, meanwhile of plantation, proper amount of fertilizers as well as proper irrigations is compulsory.

CHAPTER TWO

REVIEW OF LITERATURE

Though agriculture is the main occupation of Nepalese economy, horticulture has been initiated only to negligible extent. Mandarin (orange) is one of the most important species of genus citrus. There are some studies on horticulture as well as citrus in Nepal. Very little literature has been found on orange cultivation in particular. The main focus of all studies is placed on the problem of production and marketing situation. These studies indicate that there is favorable climate and soil condition for citrus cultivation in the hilly region and by providing the infrastructural and institutional development there would be great possibilities for its production.

Mandarin (orange) is successfully grown in the south and west part of Syangja. Jagatbhanjyang VDC from Southern part of Syangja district is selected as the study area, for research and for this fulfillment of research objectives available materials relating to the orange cultivation has been reviewed.

Sundar Kumar Rai has done a research entitled “A study of orange cultivation” in 1998. The researcher has determined some special objectives for the study. The specific objectives are to analyze the main determinant of orange cultivation, to describe the orange farm size, their distribution and production trend, to highlight the problems and prospects of orange cultivation.

The study has focused on production constraints, marketing channels, price and demand situation of orange. The study shows that the orange production has slightly been increasing particularly due to the increasing number of farmers or plants and it's relative importance is

high in the market among cash crops. However the production has not increased proportionally to an increase in the farm area.

The researcher has taken interview from orange growers and concerned technicians, out of 638 households of Chhintang VDC, 96 households (i.e. 15 percent) were selected for interview. Primary as well as secondary data has been used in this study. Research papers, published and unpublished previous studies, CBS data, map and different publications were the source of secondary data. Similarly field survey, questionnaire and interviews were the source of primary data. Different statistical tools and quantitative technique have also been used to analyze the data.

The problems identified by this study are lack of irrigation, unavailability of improved seeds, lack of pesticide, insecticide, manure and chemical fertilizer, lack of transportation, marketing storage and processing facility. Besides this, lack of institutional support, lack of timely supply of agricultural inputs, technical knowledge and diseases are other problems identified by the researcher.

The study has made some recommendation which are as follows: supply agricultural tools and improved seeds, establish storage and processing industry, provide loan facility at normal rate of interest, organized market for reasonable price of production, build motorable road for marketing orange and follow the modern technology. The study concluded that the socio-economic status of orange growers in terms of literacy, occupation, land holding size and food sufficiency is higher than non-growers (S.K. Rai, 1998).

Basudev Bhatta has conducted a study entitled “Orange cultivation in Gulmi district” in 1995. This study is of micro level and the study is focused on historical development, spatial distribution and production

trend of orange. He has also explained physical as well as non physical factors influencing to it.

The specific objectives of the study are: to show the historical development and spatial distribution of orange cultivations, to analyze the physical and non-physical factors influencing the orange cultivation, to compare investment and benefit of orange cultivation to cereal crops and to study the production trend.

To fulfill the above mentioned objectives, 265 households were selected out of 5297 households from Naya Gaon VDC of Gulmi district by applying simple random sampling and stratified sampling method. The research design for this study is of descriptive type. The study is based on primary as well as secondary information collected from villagers, school teacher, JTA and various offices related to the study. The researcher has used quantitative tools such as frequency table, diagrams and graphs, percentage figure has been applied to analyze the data.

The study has identified some problems such as, bio-physical conditions, technical condition, socio-economic condition, lack of good markets, transportation and storage facilities, disease and pests etc.

The study shows that the orange cultivation is more profitable than cereal crops which have also provided job opportunities for hill people. It also concludes that, despite the various problems its production trend is increasing day by day. The author believes that it should be developed from commercial point of view and the farmers should create an organization so that they can manage to enjoy reasonable profit. Efforts should be made to grow improved variety of seeds in the study area.

The study has made some recommendations to solve the problems of orange growers such as, to establish the orange processing factory,

systematic management of irrigation, improved variety of sapling, supply adequate agrochemicals, improved tools and provide storage facility. According to the study technical knowledge and use of modern technique are essential factor for better production. The author has also recommended that J.T and J.T.A should frequently supervise in their service areas.

The study has concluded that the post-harvesting practice is still traditional, only some change has brought out by the establishment of cellar storage. Furthermore, the prospect of development of orange cultivation in Naya Gaon is good (Bhatta B.D, 1995).

K.B. Basnet has conducted a research entitled “Orange Cultivation Problems and Prospects” in 1998. The study states that farmers earn cash through selling orange. The change of farmer’s life is influenced by orange cultivation. The study indicates that orange cultivation helps to rise the level of income of farmers and reduces the number of migration to urban area. This study shows that in the study area orange farmer’s life style has been found changed significantly in comparison to a decade before. According to this study, 43 percent of the farmers have cultivated orange between 5 and above Ropanis of land followed by 27 percent of the farmers who have planted orange between 1 to 3 Ropanis of land. The broad objective of the study is to evaluate the orange cultivation and to find the problems and prospects of commercial and the orange farming.

Armala VDC of Kaski district has been selected for the study in which descriptive research design has been followed. Primary and secondary data were collected for the study in which the primary data was collected from orange growers and the secondary data from various agriculture development officers, horticulture officers, agriculture

research council and other concerned sectors. Out of 1012 households, 60 active commercial orange growers defined as universe in which 30 households (i.e. 50% of universe) have been selected as sample size through lottery method.

This study concludes that this research is helpful for the improvement and betterment of the present condition of the local farmers, who are facing a lot of problems like unsystematic market, lack of transportation facility, lack of cold storage, lack of irrigation facility and fruit diseases and insects. The study indicates that the socio-economic condition of the respondents has been influenced by orange farming in the study area and agriculture development offices have helped them to plant orange. It has provided encouragement to the interested farmers.

The study has made some recommendations to solve the problems of orange growers. According to the study, construction of motorable road is a must to have access to market. Government or agricultural development offices must provide technical assistance or agriculture training for orange growers. Inputs like seedling, agriculture tools, fertilizer, chemical pesticides etc should be supplied in a subsidized price. Provision should be made to provide loan from Agriculture Bank at a low rate of interest. And provision should be made to provide loan in 'Group' without collateral. Farmers have to be motivated to cultivate fruit using integrated method of production. Government or non-government organization should develop a programme that can motivate poor farmers in cultivating orange (K.B Basnet, 1998).

Rudra Shrestha has done a study entitled “A Diagnostic Study on Sweet Orange Marketing in Ramechhap” in 2001. The study is focused on the production and supply situation of sweet orange. The study is an attempt to identify the weakness of the existing marketing system and

suggests measures to improve the marketing system of junar in Ramechhap. The specific objectives of the study are, to account the area under cultivation, to estimate the quantity of production and estimate marketable surplus, to analyze the existing overall marketing system and to identify the major problems in the marketing system.

The study was conducted by using primary as well as secondary information collected from concerned institutions, research report. The information was analyzed and presented in tabular and descriptive form. The study has identified major problem such as transportation that is followed by custom/check points, cold storage, damage of fruit during transportation, unnecessary burden on custom clearance.

The study has concluded that sweet orange is being produced in Ramechhap district with ought agricultural road network. The district is fully self sufficient in supplying seeding. The study has found that 76 percent farmers use organic fertilizer. The study also concludes that Japan International Co-operative Agency (JICA) played most important role and contributed for Junar cultivation under horticulture development project.

The study recommends some points for effective marketing system of Ramechhap junar. The report suggests to establish the collection center and cellar store in collaboration with private sectors, to construct main road upto Ramechhap Bazar across the district head quarter Manthali and to establish the close linkage between farmers, middlemen, wholesalers and consumers (Rudra Shrestha, 2001).

APROSC had conducted a study in 1989. This study has explained different aspects of citrus production in the mid Hills of Nepal. The study has identified that the nation's policy for developing citrus farming programme is still unsuccessful due to the poor performance of

institutional support related to the citrus development programme. On the basis of land use, it has indicated that the citrus production is limited. However, the potentiality of citrus production in mid hill is still higher than the cereal crops. Citrus production according to this study, can provide tangible as well as intangible benefits to the country. Increase in income is the tangible benefit that citrus farming provides whereas improvement in the environment is the intangible benefit that it provides. Further it has suggested that effective governmental effort should be lunched practically to develop this field (APROSC, 1989).

Ashok Rajbanshi has done a study entitled "A Study of Mandarin (orange) Farming in Mankamana village development committee, Gorkha district" in 1997.

The study made by Mr. Rajbanshi was aimed to analyze the various physical and non-physical factors controlling the mandarin cultivation. It has also attempted to find out total area of orange orchards and its productivity, harvesting practices as well as major problems of the mandarin cultivation.

The modern techniques were implemented to fulfill the objectives in the study. Primary and secondary data were collected to achieve the objectives of the study. Secondary data was collected form various sources. Primary data were collected by the researcher himself. 96 farm households were interviewed with the help of structure questionnaire. In which 96 households were selected from ward no. 1, 2, 3, 4 and 5 randomly. In selecting the samples, the wards having large farms of mandarin were given more weight and less mandarin plantation ward were given less weight. After an observation the weighting method was implemented.

After analyzing the information of the study area, the researcher came to a conclusion that mandarin farming of Manakamana VDC has not enhanced the level of the farmers to a desired level. The apparentness for this situation is the assurance of diseases and pests and the existence of marketing problems. Inclusion of 21 point's recommendation is also remarkable which provides some measures for improving the condition of mandarin cultivation. This study supports this undergoing study by providing some information about mandarin of Gorkha, Manakamana and the citrus of Bharat Pokhari is also not so different form citrus of Manakamana (Rajbanshi, 1997).

HMG/DFACMS has made a study on "Fruit production in Kaski and Syangja" in 1976. The study has focused on the production, cost and existing marketing channels of major fruits in these two districts. The objectives of the study are: to estimate the cost of cultivation of major fruits grown in these two districts, to estimate the total production and existing number of different fruits in general and those of citrus trees in particular and to study the existing marketing channels and methods of marketing as followed by the fruit growers in particular.

The study confirmed that the favorable climatic and soil condition of the hilly areas had attracted the farmers towards fruit production and also suggested that various support service programmes are necessary for providing supplementary means of additional income generation for the farmers. The study has also pointed out some of the difficulties of farming fruits. The main barriers pointed out by this study, for producing fruits in these two districts are: lack of administrative efficiency, lack of co-ordination between the government and private agencies and inadequate transportation and storage facilities (HMG/DFACMS, 1976).

E. Banavia prepared a comprehensive effort entitled “The Cultivated Oranges and Lemons in India and Ceylon” in 1973. He has consized his objectives of the work on presentation of different figures concerning the size, shape of leaves, fruits and their variation in citrus trees of the countries. Altogether 259 plates of illustrations and short information about orange and lemon fruits type are systematically printed in the book. It is considered as a remarkable contribution in this sector. This work has helped to identify various orange and lemons grown in India, Ceylon and in Nepal as well (Banavia, 1973).

A book of thirty-three articles created by 16 different authors was edited by Edward Hyams and A.A Jakson in 1961. Bolded with a handsome title “The Orchard and Fruit Garden” (a new pomona of hardy and sub tropical fruits). The entire literature is targeted to survey contemporary achievements in the growing of fruits familier in the temperate zones.

The editors arranged chapters separated with devotion on soil, climate grafting and pruning techniques. The book has been able to provide a bunch of information on noted fruit types. The present study is benefited from Jafferson’s work in general information of the sub-tropical fruits though this work doesn’t deal with citrus in a separate category, it gives partial information about them (Hyams and Jakson, 1961).

Lumle Agricultural Research Center has conducted a study entitled “Production Constraint of Mandarin in Western Development Region” in 1989. The study was based on the potential citrus growing areas of Syangja, Kaski, Tanahun, Gorkha and Lamjung districts and it indicates that the mid-hills are largely characterized by terraced upland and food grain crops like maize, millet, wheat and barley are mostly grown under rainfed conditions in these areas whereas it is experienced

that mandarin farming is economically more profitable than cereal crops under similar conditions. Thus orange farming is found to provide a good source of cash income to the poor farmers of hill area, besides this it also help to protect environmental degradation.

The objectives of the study were to identify problems associated with citrus farming. To fulfill the objectives, a survey team was made which consisted of two horticulturists, one plant protectionist and a junior technician. To fulfill the above objectives, the following methodology was used.

Orange production area was chosen as special area to examine the enhancement in the income of rural household in western development region. Out of Kaski, Gorkha, Tanahun, Syanja, Manang, Lamjung, Baglung, Mustang, Parvat, Magdi, Gulmi, Arghakhanchi, Rupandehi, Nawalparasi, Palpa, Kapilvastu Districts of western development Region Syangja, Kaski, Tanahun, Gorkha and Lamjung were selected for the study. Especially data are taken from households. The tools used to collect data were questionnaire, unstructured interview, observation and case study. District Development reports was one of the main sources of secondary data.

The study was mainly concerned with the technical type of problems specially the problems of disease. So many types of diseases were found as the problem of orange production such as greening, root rot due to phytophthora, pink disease, fruit fly, fruit dropping due to green stink, bug etc. The study recommended to remove the affected (diseased) trees, to shift the citrus nurseries to higher but accessible areas and to involve government station in plating foundation trees completely free of greening. Mosher plants for grafting budding should be indexed

properly for certification and must be kept under good management (LARC, 1989).

Nar Bahardur Chhetri has done a study entitled “Orange Cultivation in Sikkim” in 2002. The study states that the cash crops play a significant role in increasing the economic welfare of the state. Orange, according to this study, is considered as nutritive as well as commercial cash crops in the study area. So many people of the study area are attracted towards orange farming. The specific objectives of the study were to investigate the farm size and production of orange, to examine the socio-economic status and to study the production trend, problems and prospects of orange cultivation.

Some reliable methodology was used to fulfill the specific objectives. The study was performed by using primary data collected from households members, District Development Committee, Village Development Committee. Information from 97 households out of 617 households were collected for the study in which quantitative tools and techniques such as, percentage, ratio, average, pie chart etc has been used to analyze the information.

This study has concluded that the orange farming in the study area has been a successful profession. It is because it has helped to enhance the socio-economic condition of the farmers. The study has identified some problems, such as traditional cultivation system, inadequate use of modern inputs like chemical fertilizers, lack of irrigation facility, and lack of accessibility to main markets. To solve the above mentioned problems, some recommendations have been done, which are as follows: sufficient literature and references should be provided in the state library published by Sikkim government and Government should take immediate steps to overcome above mentioned problems (N.B Chhetri, 2002).

Food and Agricultural Organization (FAO) has presented “The Role of Government in Agricultural Marketing” in 1975. It concludes that a successful government official is one who builds many institutions to handle goods and services. The paper has further stressed that the government should take responsibility among others for agricultural development through infrastructures development, supply of inputs, extension programmes, and creation of marketing institution for agricultural goods.

The paper has suggested that traders should be organized. They should recognize new market, channels for extending information and technical assistance to trades. They should collect information from various sources, discuss and seek advice from them and implement joint programmes and campaign with them. The mass media should also be encouraged to improve the image of private marketing entrepreneurs.

The government should pay attention in rural marketing though improved agricultural inputs, feeder roads. Government should ensure rural trading and it also should provide concessional agriculture credit to fruit producers. The government should manage institutional measuring system of fruits in rural areas. Government should organize practical training programmes for small and medium scale fruit traders in rural areas. Commodity handling technique, processing, storage, business, management of efficient marketing are some of areas in which small and middle farmers need some exposer. Government should strengthen their activities in the field of marketing research, information and forecasting data and possibilities for the future development in order to encourage wide spread participation in agriculture marketing (FAO, 1975).

Babu Ram Acharya has done a research entitled “Citrus Cultivation in Kaski District” in 2002. The study has focused on citrus cultivation, citrus cultivation plays significant role for improving environment through planting new fruit trees in marginal land. The study states that since last decade, farmers are more optimistic towards citrus fruit cultivation. The study generally aims to analyze the general picture of citrus fruit farming. The objective of the study were to examine the current production situation of citrus fruits, to search out prevailing problem of citrus farming, to examine future prospect.

Bhart Pokhari VDC of Kaski district has been selected for the study in which primary as well as secondary data were collected from orchard farming households, local leaders of VDC, relevant technicians, government/non government offices, Department of Agriculture and Agriculture Development Bank (ADB). Descriptive research design has been used in this study. Quantitative tools and techniques such as percentage, average, tables and diagrams has been used to analyze the data.

The study has concluded that citrus fruit production has increased slightly, the study also concludes that the area and production quantity have been in increasing trend.

The study has identified some problems, such as, rugged topography, extreme steep slope, hailstone, uneven rainfall, wind storm, insufficient service of J.T/J.T.A. lack of chemical fertilizer and pests.

To solve the above mentioned problems the study has made some recommendation which are as follows: to establishes the sufficient nurseries, to provide training and to encourage the orange farmers to plant sapling grown from nuclear seedling and grafting in their orchard from concerned agricultural technicians (Acharya, 2002).

In 1995 B.M. Shrestha, has conducted a study entitled “The Role of Fruit Production in Rural Development” with the specific objectives of identifying socio-economic status, level of fruit crop production, economic contribution and farming of major fruit crops in the community. He has pointed out that agriculture is the major source of income of the people, which comprises food grain, fruits, vegetables, livestock, poultry etc. He has identified 15 species of fruit crops that are mainly cultivated in Bunkot VDC. The main are: mandarin (orange), lemon, pear, mango, apple grapes etc. Among them orange is found prominent to be the one in Bunkot VDC.

The sample comprises of 61 orange growers among 338 orange growers of the Bunkot VDC of Gorkha district. The study was performed by collecting primary data. The primary source of data were orange farmers and knowledgeable persons. The study has also used secondary sources of information. Benefit-cost ratio was the main tool used in this study to attain the objectives of the study.

The conclusion of this study is that the trend of fruit cultivation is very positive and the expansion was found most rapid in case of mandarin. Expansion of market, greater profit margin, easy to grow, easy access to market due to construction of road network, relatively low cost of production and increase in domestic demand for orange are the main factors that have encouraged farmers to increase orange farming in the study area. The farmers make handsome profit from orange farming but they generally make better profit from lemon farming. He has found that the bargaining capacity of the producers is very weak. They are bound to accept the price offered by the brokers. So brokers made more profit than the producers. Thus, the study has given some recommendation such as: farmers should be oriented to become commercial, farmers should be

oriented to use grafting techniques as recommended by the technicians rather than seed to propagate orange seedlings, scientific and improved harvesting and post harvesting practices should be oriented to the farmers, local co-operatives should be organized as soon as possible for the marketing of fruits, quality plants, extension services, fertilizer and plant protection measures should be provided at the reasonable price in appropriate time, training should be provided to the orange growers (B.M Shrestha, 1995).

Another study was conducted by New Era entitled “Effective marketing strategies for mandarin in Dailekh” in 1989. The study has indicated that mandarin farming could be a major source of cash income to enhance the level of income of the farmers of the district but unfortunately, the orange growers have not been able to gain reasonable return from the production of this fruit. Various factors may have contributed to this situation, the perishable nature of orange, very poor and old age transportation facility, inappropriate storage methods, problems of processing and marketing etc. Despite of a few attempts made by different government and non-government agencies, it is still true that the orange growers have not been able to reap returns that enhance their level of income, the study indicates.

The objectives of the study were to examine the existing orange farming practices, marketing situation, to assess the existing mandarin processing facilities and to prepare a plan of action and recommend alternative startages for resolving the marketing problems of orange.

The study has identified many problems of orange production and presented in detail. But here, only some of the important problems identified by this study are reported. They are, lack of improved cultural practices in orchard farming, lack of input supply, lack of information

about proper time table of farming orange, inappropriate uses of fertilizer, insecticide and pesticide, unawareness of the quantity and quality of the product, low quality product due to lack of irrigation facilities, inappropriate and inefficient techniques of harvesting, grading, packaging and a vary low return received by the farmers due to a high transportation cost. A lack of trained manpower is also one of the notable problems for this occupation.

The study has also given various recommendation for removing the problems related to the orange cultivation such as, to provide transportation and irrigation facility, technical knowledge, to develop price information system and to establish processing industries at farm level (New Era, 1989).

Y.K. Chapagain has conducted a study entitled “A study on Orange Marketing in Bhojpur, its Present Position, Problems and Prospects” in 1987. In this study, the researcher has argued that the orange marketing is one of the ways to uplift the rural economy of mid-hills. According to him orange is one of the most suitable fruits that can be farmed in this area and only an efficient marketing technique can derive economically justifiable return to the orange farmers. Hence efficient marketing can fulfill the necessities of the orange farmers. The objective of this study was mainly concerned with the problems of production and marketing of orange farming.

A special area of Bhojpur district was chosen for the study in which 81 households out of 300 households were selected randomly to collect information and some simple statistical tools and techniques like, measure of central tendency, percentage, bar-diagram, pie chart, were used to analyze the information.

Some of the main problems of the study area identified by this study are: unequal distribution of income, a low level of employment opportunities, a high population pressure on land, ecological disbalance etc. The extent of these problems, according to the study, have to be reduced and can be reduced by persuading the farmers to farm orange in the study area.

However, the study has shown that the cost of marketing is very high. Hence, to improve the situation, the study has recommended to develop market information system, storage facilities and to provide credit facilities to orange growers from the organized sectors (Chapagain, 1987).

Annual Report- NARC (1999) has noted that the citrus is one of the most important and popular fruit crops grown in the hills of Nepal. It is grown commercially at different climate condition like tropical and subtropical, and even in some favourable parts of temperate regions. This report focuses that the core problem is the low production and low market price at harvesting time. It is caused mainly due to the small area under citrus, lack of suitable varieties for growing in different seasons. (early, medium and late) and poor management practices. Poor fruit quality and lack of suitable storage methods are the main reasons for low market price at harvesting period (NARC, 1999).

A study entitled “Orange Production in Syangja District” was done by Janga Bahadur Gurung in 1995. The main purpose of this study were to evaluate the profitability of orange production. The study states that to improve the economic condition of hilly region, horticulture is most important occupation.

The objectives of this study were to find out: the present condition of socio- economic life of the orange growers, present status of

production, consumption and marketing of orange, profitability and to assess the role of supporting institutions in orange production.

The study has concluded that orange growers are optimistic about better prospect of orange farming. The climate condition of the study area is favorable for orange production but most of the lands are used to grow food grain crops like maize, millet, wheat etc. which are less beneficial than orange production. It also indicates that due to suitable climate condition horticulture is profitable for hilly region.

The study was conducted by using primary and secondary data. Primary data were collected from Orange growers and secondary data were collected from Agriculture service centre, horticulture offices and libraries. Out of 275 households, 33 households (12%) were selected in the study in which different quantitative tools and techniques were used to analyze the information.

The study has identified some problems such as: inadequate marketing, technical assistance, irrigation and storage facilities, disease and pests, short supply of agricultural inputs, labour, institutional credit and poor transportation facility.

To encourage the orange growers of the study area as well as hilly region for better production the study has recommended to establish horticulture station, modern cold store and processing factory, provide cheap transpiration facility, institutional credit and to manage broad extension services.

Food and Agricultural Services Department has done a study entitled "Fruit Production in Kaski and Syanja" in 1996. The major objective of the research was to estimate: the total production of different citrus fruits, existing number of different fruits tree and cultivated area. In the same manner to estimate the cost of cultivation of major fruits particularly citrus fruits in the districts was another objective.

The study conformed that the production of the citrus in Kaski and Syangja was not good considering to the number of trees planted there. The high cost of cultivation was found but market facility was good. The Study indicated that citrus fruit production can be enhanced through intensive and extensive cultivation process. This study conformed that Kaski and Syanja districts are favorable for citrus farming (FASD, 1996).

Tilak Bahadur Rai has conducted a study entitled "Orange Production and Marketing in Sikkim" in 2003. The specific objectives of the study are: to study the orange production and it's productivity, to estimate the extent of marketing of orange by the farmers, to identify the marketing agencies, to study the pricing system and to suggest policy measures to encourage the orange growers. Out of 150 households of commercial orange farmers, 36 households were taken as sample according to the size of orange orchards from five Gram Panchayat Units of Melli Constituency in south Sikkim. Primary as well as secondary data have been used in this study collected from structured questionnaire, informal interview and various publications of horticulture department and government offices.

The study has concluded that orange cultivation is very important and is a more profitable crop which can be cultivated as intercropping with other cereal crops. Moreover the production trend is good and the productivity of orange is at an increasing trend in the study area.

The problems identified by this study are as follows: problems of market, problem of credit facility, problem of cold storage and processing, Problem of technical knowledge about orange cultivation.

The study has made some recommendation to solve the problems which are: to develop the link between production and marketing center, to establish co-operative organization for marketing, to provide technical support to farmers, to make media effective as well as practicable for the

information about marketing system. In the same way this study has also recommended to establish storage and processing center and to provide credit facilities to orange farmers (Rai, 2003).

Another study was conducted by Bed Bahadur Thapa entitled "A Study of Orange Cultivation in the Western Hill Region" in 2005. The specific objectives of the study are: to analyze the main determinants of orange cultivation, to explain the access to the market and factors influencing to it, to compare the socio-economic status of orange growers with non-growers and to highlight the problems and prospects of orange cultivation. Out of 540 households of Shankar Pokhari, 135 households (25%) were selected using random sampling technique.

The study has identified some major problems such as: transportation problem, technical problem, problem of market, problem of irrigation, disease and pests, low productivity and price etc.

The study has concluded that the socio-economic status of orange growers is higher than non-growers. It has also concluded that there is no systematic care and management in orange cultivation, modern inputs as well as irrigation facility are not available. Furthermore the orange production in Shankar Pokhari VDC has slightly increased, however it is not proportional to the increasing rate of cultivation.

The study has made some recommendations to solve the problems of orange growers such as: to use modern technology, to provide training facility, to develop irrigation facility, to manage transportation and marketing facility, to provide modern tools and agrochemicals, to establish storage and processing center, to provide loan to orange growers from organized financial sectors at normal rate of interest (B.B. Thapa, 2005).

CHAPTER THREE

RESEARCH METHODOLOGY

Methodology is the most important aspect of research work. Reliable and relevant study is possible only by applying scientific method. In this chapter, the methodology of this study is presented. The methodology includes selection of the study area, definitions and concepts of the terms and variables, research design, source and nature of data, sampling procedure and data collection instrument, method of data analysis and the limitation of this study. The primary purpose of this chapter is to discuss and design the framework for the research.

3.1 Selection of the Study Area

Jagatbhanjyang VDC of Syangja district has been selected as the study area in this research project. Various research works have been carried out in different parts of Nepal. The western Nepal, especially the mid-hilly area is one of the orange production area of Nepal. Orange cultivation has been practicing in Jagatbhanjyang VDC since long. The researcher of this study being a student, time and money are two main constraints. To minimize the cost and time of collecting data and to finish thesis within the time limit of the university, the researcher has selected Jagatbhanjyang VDC where he has his own house. Therefore there is less chance of facing problems and difficulties for finding detailed information in various aspects of the study area. The purpose of selecting the Jagatbhanjyang VDC is on the basis of area coverage, diversified places among the pocket area, easy accessibility for the researcher and expecting as representation of the district as a whole. Thus, the selection of the study area is justified and is also convenient for researcher too.

3.2 Research Design

Research design is a logical and systemic plan prepared for directing the study, which helps the researcher to study in related area working on the topic of orange cultivation in Jagatbhanjyang VDC. The plan and structure as well as strategy of the study is conceived in proper manner. Maximum effort has been made to obtain answer to research questions validly and objectively. The framework of the research has been designed to collect accurate information as far as possible and practicable. In this study quantitative as well as qualitative methods have been used to analyze the collected information as far as practicable.

3.3 Nature and Source of Data

Most of the information needed for this study was collected from primary sources. Among them the farm household survey was the main source of primary data. Besides the households, primary information was also collected from mandarin businessmen, knowledgeable persons, VDC leaders and school teachers, technicians working at Agriculture Development Offices, Agriculture Development Bank and Agriculture service center. The informations have been taken by using field observation method, structured questionnaire and unstructured interview method by the researcher of this study from 27th August to 30th September 2006. Besides this various publications of Village Development Committee, District Development Committee, sub branch of Agriculture Bank, Horticulture Development Office Kirtipur, Central Library of Kirtipur and Central Bureau of Statistics were some of the other important sources of secondary data.

3.4 Sampling Frame

Out of nine wards of Jagatbhanjyang VDC, orange cultivation has been practicing only in four wards (i.e. ward No. 1, 2, 3 and 9). Hence this study has covered only these wards. The sample size of the study is

20 percent of the households. This was done by assuming that the sample size will represent almost all the phenomena of the study area. The study area is more or less homogenous in geographical structure, climate and socio-economic status of the people.

The household number of the orange farmer and the name of household heads of each ward were listed at first. Then 20 percent of the households from each ward were selected randomly by using lottery method. Assuming that, all the president candidates may not be reached due to various reasons, the researcher has selected 15 percent of the president households as alternative candidates. The alternative candidates were selected just to fill in if the president candidates were out of reach. Table 3.1 shows the sample frame of the study area.

Table 3.1. : Ward wise Distribution of Sample Size.

Ward No.	No. of H.H	Sample size %	Sample H.H	Sample H.H. in round.	Percentage of sampled H.H.
1	86	20	17.2	17	19.76
2	69	20	13.8	14	20.29
3	72	20	14.4	14	19.45
4	62	20	12.4	12	19.36
Total	287	20	57.40	57	19.86

Source: Field survey, 2006.

3.5 Tools of Primary Data Collection

In order to collect the required and relevant primary data for this study, following tools were used.

3.5.1 Structured Questionnaire

Structured questionnaire is one of the effective data collection instruments. On the basis of declared objectives an appropriate and full fledged questionnaire has been prepared for recording the method of cultivation, trend of production and marketing system. Almost all the information that were required for the study such as composition of family on the basis of sex, age, education, occupation, animal husbandry, land possession, religion, caste and income source were collected from the questionnaire.

3.5.2 Unstructured Interview

Informal and open interview was taken from horticulture offices, their staffs and local people who are known to have more information about it. A checklist was prepared to interview the informants. Based on this checklist the interview was performed. Local elites, VDC chairman, selected technicians, staffs of ADB, officials of Agriculture Research council, Agriculture Development offices, forward farmers were the main informants. The questions related to the socio-economic status of orange growers, orange farming, marketing problems, transportation, benefit from orange, harvesting system, storage facility, loan and assistance for the orange growers, irrigation system and diseases, technical advice, difficulties to get chemical fertilizer were asked.

3.5.3 Field Diary

A field diary was maintained to record necessary information observed during field survey. It was to record supporting information not captured by the survey questionnaire. Details of important incidents, events and discussion were noted in the diary.

3.5.4 Field Observation

The researcher of this study performed field observation while conducting the interview with the interviewees from the selected sample households. In this process informations were collected through direct observation of farm trees as well as the overall condition of the respondents family. The researcher was able to get a tentative idea of the size of orange farm, their distribution and farm management system, marketing of orange.

3.5.5 Secondary Source of Data

Besides primary sources, secondary sources of data have also been used when it was necessary to complete the study. Informations were collected from different secondary sources during the field visit including VDC office, sub-branch office of ADB, District Agriculture Development office, Agriculture Service Center at Dahathum. Secondary information were also collected from various horticulture offices, agriculture research council, central library and CBS.

3.6 Definition of Terminology

Some of the terminologies which are essential to analyze and interpret the data are as follows:

Household: A household for this study is defined as a group of people sharing the same kitchen and living under one roof.

Earner: Economically active members of the households are considered as earner.

Earning: Whatever a person gets from the management work or labour is known as earning in this study. In other words earning is monetary returns that occure to an individual from his labour and other resources.

Education/Educated Person: Education in this study is assumed to enhance people's ability. People will be able to enhance their ability if they adopt modern/new technology. People adopt modern/new technology if they understand it. Here, in this study educated person signifies those who can read, write and understand Nepali without any problem.

Employment: If a person used his/her mental/physical ability to generate physical goods/money is considered as employed, in this study.

Housing Condition: Housing condition is classified in three categories such as: level H, level M and level L. This classification is based on the roof of the house.

Level 'H': If the roof of the house is made from iron rod, concrete and cement (RCC) the house is categorized as 'H' level house.

Level 'M': If the roof of the house is made from zinc sheet it is termed as 'M' level house.

Level 'L': If the roof of the house is made from straw it is termed as 'L' level house.

General Meaning of Orange: A round juicy edible fruit with a thick skin that is reddish-yellow colour when ripe. In Nepal, this fruit is known as orange, however it is widely known as mandarin. Orange is one of the geniuses of citrus trees. The subtropical climate is considered the most favorable climate zone to farm orange or mandarin. Orange being a citrus fruit is basically sour in taste and rich in vitamin C.

3.7 Techniques of Data Analysis:

Information collected from questionnaire has been transformed into a master sheet and raw data has been tabulated on the basis of master

sheet. Information has been grouped, sub grouped and classified as necessary as to meet the objectives of the study.

The systematic analysis has been done by using quantitative as well as qualitative techniques. To analyse the quantitative data simple statistical tools such as percentage, ratio, average etc. have been used. The study is mainly descriptive and the analysis of the result will be described logically.

3.8 The Method of the Study:

This study is mainly based on qualitative method of analysis of the problem. However, a widely used quantitative method known as benefit-cost ratio has also been used in this study to find the prospect of orange farming in the study area. The benefit- cost ratio is briefly described below. The benefit- cost ratio is defined as present worth of benefit divided by the present worth of cost. B/C ratio can also be evaluated by the incremental cost and incremental benefit.

This is done by using following methods.

$$D = \frac{1}{(1+i)^t}$$

Where, D = discount factor,

i = rate of which future benefits and costs are discounted

t = time period

$$NPV = \left[\frac{B_1}{1+i} + \frac{B_2}{(1+i)^2} + \dots + \frac{B_n}{(1+i)^n} \right] - \left[\frac{C_1}{1+i} + \frac{C_2}{(1+i)^2} + \dots + \frac{C_n}{(1+i)^n} \right]$$

Where, $B_1, B_2 \dots \dots \dots B_n$ = Benefits of years 1, 2 $\dots \dots \dots$ n

$C_1, C_2 \dots \dots \dots C_n$ = Cost of years 1, 2 $\dots \dots \dots$ n

Therefore, the orange farming will be profitable under the following two conditions.

1) The present value of benefit exceeds the present value of cost. It can be expressed symbolically:

$$\left[\frac{B_1}{1+i} + \frac{B_2}{(1+i)^2} + \dots + \frac{B_n}{(1+i)^n} \right] > \left[\frac{C_1}{1+i} + \frac{C_2}{(1+i)^2} + \dots + \frac{C_n}{(1+i)^n} \right]$$

2) Similarly, orange farming is profitable where the ratio of present value of benefits to the present value of cost is greater than one symbolically:

$$\frac{\left[\frac{B_1}{1+i} + \frac{B_2}{(1+i)^2} + \dots + \frac{B_n}{(1+i)^n} \right]}{\left[\frac{C_1}{1+i} + \frac{C_2}{(1+i)^2} + \dots + \frac{C_n}{(1+i)^n} \right]} > 1$$

CHAPTER FOUR

FACTORS SUPPORTING ORANGE FARMING

Entire agriculture is influenced by physical and cultural factors. So there is no doubt that orange cultivation is supported by both factors. Like all agricultural activities mandarin (orange) farming is influenced by both physical and cultural factors such as: terrain, climate, soil, agricultural inputs and size of the farm etc.

4.1 Physical Factors

All human activities are influenced by physical environment directly and indirectly. Men's agricultural activities depend upon the physical environment in which he lives (S.S. Dhillon, 1901). The major physical factors controlling the orange farming in Jagatbhanjyang VDC are terrain, climate, soil, wind and vegetation.

a) Terrain

The three most significant aspects of terrain, namely, altitude, slope and drainage pattern, exercise both a direct and indirect influence on orange farming. For mandarin (orange) cultivation an altitude ranging from 1000 meters to 1500 meters had been recommended as an optimum belt. Altitude is itself an influencing factor of orange farming. Moreover as elevation increases, there is decrement of temperature and increment of precipitation. High wind velocity, poor soil and rugged relief usually observed in high altitude; so citrus fruits can not be grown in such altitudinal areas successfully. In this VDC the mandarin growing areas lie at an altitude of 1000 meters to 2000 meters, in which subtropical warm climate with frost free winters prevail, which is suitable to the mandarin growing. During rainy summer season, soil erosion and

landslides are common. The plantation of mandarin (orange) trees has conserved the soil to some extent.

b) Climate

The three most important factors of climate from the stand point of plant response are, temperature, water supply and light. Mandarin (orange) grows better in the temperature range of 14⁰c and 34⁰c. Growth is best at 32⁰c and maturation, sugar content and rind color reach its highest perfection in the lower range of growth temperature. In addition, low humidity gives good color and external appearance, whereas high humidity favours thin skinned, smaller sized and juicy fruits. (Citriculture India, 1985). The humidity condition of the mandarin (orange) growing areas in Jagatbhanjyang VDC is high due to the presence of surrounding water bodies in low altitudes. So, the orange fruits produced here are juicy. The temperature conditions of Jagatbhanjyang VDC is quite suited to for orange farming.

c) Soil

Mandarin (orange) can be grown on a wide range of soils. In the context of study area, light black mixed soil along with hill slopes is ideal for orange cultivation. Abundant soil moisture and rain as well as irrigation results high juice, but low acid content.

d) Drainage System

Drainage system of land connected directly to the intensity of soil erosion. Seasonal difference in rainfall causes difference amount of water in river. So, permanent type of river system is beneficial for orange farming areas for irrigation. There are small but regular water sources in the study area, that is why lower sides of hills are more common for

citrus culture and upsides are lacked of water sources therefore these places are nearly empty of citrus fruits.

e) Nature of Wind

Frequency, intensity and direction of wind influence the orange orchard to large extent. A light wind with less moisture is beneficial for orange orchard (according to JTAs), whereas windstorm is harmful.

The wind direction and intensity influence the orchards of Jagatbhanjyang VDC too. In the study area valley and mountain braezez occurs usually. Mountain breeze are more harmful. In the study area, some times it blows rapidly and damages branches of orange trees, fruits and flowers. Because of that wind action, production of the citrus fruits ultimately goes down.

f) Vegetation

Citrus fruits orchard can not bear the shadow of big trees. Under the Shadow of big trees the orange plant comes lean, thin and yellows. Such as elephant grass, Newly bored Banmara and ferns harm the plant growth while they remain in growing stage.

Although vegetation harms the plants it gives some benefits also. The dried leaves of other plants can be used as manure and chilling which protect soil from drought. Farmers are growing a ring of big trees at outer border of orchard to protect orange trees from the heavy windstorm in the study area.

g) Precipitation

Mandarin plants need water throughout the year mostly gentle rainfall in winter is needed. Hailstone is a complete natural evil for orange orchard. The place where orange farming is practiced should not be water stagnated. Generally, January, February, March and April are

the months that remain dry in Nepalese hills. During the dry months proper irrigation facility is needed in the study area.

4.1.1 Cultural Factors

Cultural factors also play a vital role for any agricultural activities. Literacy, ethnicity and attitude of farmers, technical knowledge of farmers, use and accessibility of modern agricultural inputs, availability of marketing and transportation facilities, size of holdings, credit facilities, national or government policies are the major socio-economic factors which influence the agricultural phenomena in an area. Commercial farming is much more influenced by these socio-economic factors than the subsistence farming. Nowadays the production of mandarin (orange) in Jagathnanjyang VDC is done mainly for the purpose of selling in the markets. Thus cultural or socio-economic factors play a vital role for growing mandarin in the study area.

4.1.2 Motivating Agents for Establishing Orchards.

Table 4.1: Farmers Motivated for Establishing Orange Orchard by Different Agent

S.No.	Motivating Agent	No. of house holds	Percentage
1	Self motivated	30	52.64
2	Neighbours	8	14.04
3	Earlier generation	9	15.79
4	Friend and relatives	7	12.28
5	Agriculture service center	3	5.27
	Total	57	100

Source: Field survey 2006.

The successful implementation of orange orchard establishment in the study area seems mainly due to the fact that more than 52% growers are self motivated. The rest are influenced by neighbours, earlier generation, friends and relatives and agriculture service center.

4.1.3 Ethnicity of Farmers Growing Orange

Hilly region of Nepal is the meeting point of Tibeto-Nepalese and Indo-Nepalese tribes, so this region has various castes and ethnicities. Brahmins/Chhetriya are the largest ethnic groups engaged in mandarin growing in the study area as shown below.

Table 4.2: Number of Households Engaged in orange farming by their Ethnicity:

S.No.	Ethnicity	No. of households	Percentage
1	Brahmin/Chetriya	37	64.92
2	Gurung	8	14.04
3	Magar	8	14.04
4	Giri	2	3.51
5	Kami	2	3.51
	Total	57	100

Source: Field survey 2006.

Orange cultivation in the study area is mainly practiced by Brahmin/Chhetriya (64.92%). Only two of the households are economically and socially deprived ethnic group such as 'Kami'. Out of 57 sampled households, 3.51 percent are engaged in orange farming from this ethnic group. Similarly, only two households of Giri caste have practiced orange cultivation (3.51%). Gurung and Magar are also engaged in this high value crops by the equal number of households (14.04%) Brahmins and Chetriyas are the dominant ethnic groups of this VDC, hence majority of the orange farmers belong to this ethnic groups .

4.1.4 Nature of Inputs

The amount of expenditure in the field of orange farming plays an important role. Generally, good investment carry out good output and bad results into bad output. In the study area, investment is going on the basis of personal interest so it is different in nature.

a) Nature of Labour Inputs

Orange farming needs two types of labour, technical and non-technical. Technical manpower is needed for treating diseases, using chemical fertilizer and identifying seasonal impacts on the orange orchard. Rest of work can be done by non-technical manpower.

The big source of labour is family members in the study area. In the last few years most of the energetic young manpower have begun to leave this village for better earnings. This phenomenon has created shortage of manpower and due to this reason the wage rate of manpower has increased in the study area.

Table 4.3: Labour Inputs/Ropani in Orange Orchard

S.No.	Type	No. of labour	Wage rate in Rs.
1	Male	10	165
2	Female	5	120
3	Total	15	2250

Source: Field survey 2006.

Table 4.3 shows a general picture of labour investment per Ropani in orange orchards. In the study area total 15 labours are used per Ropani of land for various works. Mostly male labour are used for manuring, weeding orange orchards and preparing of the land to cultivate another crop in the garden. Female labours are used for weeding, picking down

the ripen fruits and carrying fruits to the local markets. The wage rate for male worker is higher than that of female in the study area.

4.1.5 Capital Investment

The nature of capital investment is a significant cultural factor which plays vital role in orange farming compared to cereal crops farming. It needs more amount of capital investment.

Table 4.4: Total Expenditure for Establishing Orange Orchards by Households.

S.No.	Expenditure in (Rs)	No. of households	Percentage	Area in Ropani	Average Farming in Ropani
1	Below 5,000	6	10.53	30	5
2	5,000 to 10,000	13	22.81	59	4.53
3	10,000 to 15,000	17	29.83	108	6.35
4	15,000 to 20,000	12	21.06	67	5.58
5	20,000 to 25,000	6	10.53	60	10
6	Above 25,000	3	5.27	48	16
	Total	57	100	372	

Source: Field survey 2006.

Table 4.4 reveals that out of 57 sampled households, 17 households (29.83%) have spent Rs ten thousands to Rs. fifteen thousand to establish their orange orchards in which the total orange farm size is 108 Ropani and average farm size is 6.35 Ropani. Similarly only 3 households (5.27%) have spent more than Rs. twenty-five thousand for same purpose in which the total orange farm size and average farm size are, 48 Ropani and 16 Ropani respectively.

4.1.6 Intercropping System

Almost all the mandarin growing farmers practice intercropping while the fruit trees are small and young and when they do not shade sunlight. It is because most of the mandarin orchards are located in the dry land where the farmers can grow various crops. This provides them some amount of food as well as some money until the permanent crop to come into bearing. Thus, farmers in the study area show millet, maize, ginger, oil seeds, and vegetables. Among them, inter cropping of coriander and vegetables are more beneficial in the orange orchard than other cereal crops.

4.1.7 Irrigation Facility

Irrigation is another essential factor for orange farming. Irrigation plays a vital role in bringing up the orange saplings and it enhances the production of orange when they are mature. About 88 percent of the farmers depend upon rainfall because irrigation system is very poor specially in the winter season in the study area. There is no government or non-government irrigation project in the study area. However development of the irrigation and a proper drainage system are felt absolutely necessary in order to boost up the agricultural production by adopting crop rotation in the study area.

Table 4.5: Irrigation facility in the sampled households

Irrigation facility	No. of households	Percent
Yes	7	12.28
No	50	87.72
Total	57	100

Source: Field Survey 2006.

The table 4.5 shows that out of 57 sampled households only seven households (12.28%) have managed their irrigation system in the study area. They have managed pipeline which are diverted from the main stream and irrigated their farm in a rotation basis. It is the reality that about 88 percent of respondents depend upon rainfall because irrigation is very poor in winter season in the study area.

4.1.8 Supporting Services

There are many institutions which are directly or indirectly involved in the supporting activity to the orange cultivation at district level such as Agriculture Development Bank, Agriculture Service Center, UNDP, District Agriculture Branch Office. The main support needed for orange cultivation is provision improved saplings, credit facilities, extension service, inputs, insecticide and pesticide etc. Government of Nepal has provided some extension services like JT/JTA to the farmer at the farm level in the study area. However, in practice, they have not been able to serve the problems accounted by the orange cultivations.

Table 4.6: Extension services provided by J.T, J.T.As

Extension service	No. of households	Percentage
Yes	28	49.13
No	29	50.88
Total	57	100

Source: Field survey 2006.

Table 4.6 shows that about 49.13 percent households are getting help from extension services and other 50.88 percent of households said that they have not got any help from them. There is an agriculture service centre "Krishi Sewa Kendra, Malyangkot" which is 9 km far from the

study area which provides extension services for eight VDCS of the district such as Keware, Jagatbhanjyang, Malyangkot. Chinnebas, Ratnapur, Shekham, Shankhar and Kyakmi VDC. According to the respondents they could not visit JT and JTA frequently due to lack of transportation facility.

4.1.9 Loan Facility

Loan is also one of the essential supports for orange growers. Agriculture Development Bank has a provision to provide loan facility for orange farmers in the research area. This bank has provided loan facility for different purposes such as planting of orange, establishing and protecting orchard. This type of credit facility has played a vital role in production process in the study area. Similarly, village merchants and UNDP are other sources of loan to the orange growers.

Table 4.7 : Distribution of Number of Growing Households by Source of Loan

S.No.	Source	No. of Households	Percent
1	ADB/N	11	19.30
2	UNDP	13	22.81
3	Village merchant	4	7.08
4	No.of households without any loan	29	50.88
	Total	57	100

Source: Field Survey 2006.

Table 4.7 reveals that only a few number of households have borrowed loan from moneylenders. Only four households have borrowed loan from village merchants. Eleven households (19.30%) have taken

loan from ADB/N and 22.81percent of households have taken loan from UNDP. Most of the farmers (50.88%) have not taken loan from any sources because of the complex loan distribution system and inability to go through the complicated administrative procedures.

CHAPER FIVE

ANALYSIS OF THE STUDY

This chapter deals with the analysis and interpretation of the general socio-economic aspects of the study area. Apart from the sample survey and direct observation, some of the secondary data have also been used in this analysis. This chapter is sub-divided into five parts according to the predetermined objectives of this study. The first section of this chapter deals with the determinants of orange cultivation. The second part of this chapter is concerned with the analysis of benefit-cost ratio on orange farming. Similarly, orange farm size and production trend is analyzed in the third part of this chapter. In fourth part socio-economic condition of the study is analyzed. Problems and prospects of orange cultivation in Jagatbhanjyang VDC of Syangja district has been presented in the fifth part of this chapter.

5.1 Determinants of Orange Cultivation

There are many factors that affect orange production, including climate, altitude, soil. Similarly other important factors such as plantation, preparation of land, cost of fertilization, labour cost, irrigation cost and cost of herbicide, insecticide and pesticide, transportation cost, harvesting cost, marketing cost are other main determinants to cultivate cash crope like mandarin. Natural factors like climate in the study area is suitable for orange cultivation. Mandarin (orange) grows better in the temperature ranged from 14⁰c to 31⁰c. The climate in the study area ranged under above mentioned climatic condition. Moreover, soil and altitude in the study area is better.

Orange farming is a long-term activity so it needs different types of cost since sowing to harvesting. The fixed cost, which needs at the time

of establishment of orange orchard, was found to be the highest. The variable costs, which were found need on inter-cultural operation, maturing, irrigation and plant protection, harvesting and store etc. are not that high in comparison to fixed cost.

5.1.1 The Cost of Production

The expenditure involved in different sectors such as manuring and fertilizer, irrigation, harvesting and storage etc. were considered as the operational costs. The summary of the cost involved in different items is presented in table 5.1

Table 5.1: Establishment Cost (Rs./Ropani)

S.N.	Particulars	Unit	Rate	Total	Percent
1	Labour for land preparation	15	150	2250	43.27
2	Sapling (Small plants)	25	8	200	3.85
3	Manuring	25	15	375	7.21
4	Fertilizer	10	30	300	5.77
5	Plant protection chemical	5	43	215	4.13
6	Opportunity cost of land	-	-	800	15.39
7	Tools and equipments	-	-	620	11.92
8	Others	-	-	440	8.46
	Total			5200	100.00

Source: Field survey 2006.

Table 5.1 clearly shows that labour cost is found to be the highest cost on establishing of an orange orchard which is 43.27 percent of the total establishment cost. Similarly the table reveals that the opportunity cost of land for orange cultivation per Ropani is 15.39 percent of the total

cost. The cost required for tools and equipments is 11.92 percent of the total cost in which the cost of maturing, fertilizer, plant protection chemicals and the cost of seedlings are, 7.21 percent, 5.77 percent, 4.13 percent and 3.85 percent respectively. Furthermore, the cost required for different activities in different years and stages is summarized below:

Table 5.2: Annual Cost (Rs/Ropani)

Stage of plant	Year	Establishment cost	Variable cost			
			Labour	Manure and fertilizer	Other	Total cost
Planting stage	1 st	5200	2250	675	2275	5200
Growing stage	2 nd	-	1440	360	380	2180
	3 rd	-	1520	400	460	2380
	4 th	-	1600	780	520	2900
	5 th	-	1440	820	580	2840
Fruiting stage	6 th	-	1550	1600	700	3850
	7 th	-	1550	1600	700	3850
	8 th	-	1550	1500	700	3750
	Total				6315	

Table 5.2 shows that initial cost/establishment cost is found the highest and growing stage cost increases. It is due to the cure of plants and use of manuring should be greater than initial stage. However in fruiting stage the cost is nearly constant. It is because the quantity of manure and labour force and other cost remains constant in fruiting stage. According to the respondents, cost fluctuates only when plant are affected by any diseases.

5.1.2 Labour Cost

Labour cost is also required for establishment, manuring, weeding, irrigation, pruning and training, harvesting etc. Labour cost becomes more or less constant after growing stage. More labour force are needed in the period of establishment for digging, planting holes and refill them in which fifteen labours are needed to establish orange orchard in one Ropani of land and the average wage rate is Rs. 150. Therefore the total cost of labour is Rs. 2250 to establish orange orchard in one Ropani of land. The weeding process was found another high labour intensive one, since 2nd to 5th year until plants being matured.

5.1.3 Manuring and Fertilization

The cost of manure is based on both chemical as well as organic manure. It was found increasing successively until the plants being matured and then remains constant. In the planting stage, ten kg. of chemical fertilizer and twenty-five doko (750kg) of compost/dung is used on orange farming for one Ropani of land (According to JTA). Total cost of manure and fertilizer is Rs. 675 which has been shown in the table 5.1. In an average the matured plants consume the same amount of manure in each year.

5.1.4 Diseases and Pest

Various kind of diseases and pests affect orange plants. They are very dangerous and harmful for orange cultivation. Citrus leaf manor, gummosia, citrus decline, phytophthora rots are important diseases and pest that affect orange production. Due to the lack of information and knowledge about plant disease and pests, the control of harmful diseases and dangerous pests are mostly neglected in the study area.

5.1.5 Other Costs

The cost for tools and equipment, cost for sapling and for different purposes such as digging, training, mulching pesticides etc. are include in other costs. The amount of other cost from first to eight years of planting was Rs. 6315 per Ropani, which can be seen in table 5.2.

5.2 Production Cost and Revenue Generated on Cereal Crops

To compare the profitability of orange cultivation with cereal crops production it is necessary to calculate the cost and production of such crops. Generally, the crops such as maize, millet, wheat and oilseeds are grown in the study area. Thus this study aims to compare the profitability of orange production with cereal crops production. The cost of production on such crops consist of seeds, compost, land preparation, transplanting, weeding, harvesting and others. Similarly the production consists of production of food grain and byproducts such as hay. The detailed statement about cost and benefit from these crops are shown in table 5.3.

Table 5.3: Cost of Production and Return of Cereal Crops (Per Ropani)

S.N	Particulars	Cost(in Rs)
1	Seed	60
2	Compost	284
3	Land preparation	605
4	Transplanting	317
5	Weeding	192
6	Harvesting	270
7	Others	122
8	Total cost	1850
10	Production in muri	2.75
11	Value of production (in Rs)	1900
12	Other benefit (in Rs)	300
13	Total Benefit (in Rs)	2200
14	Net Benefit (in Rs)	350
	$\frac{B}{C}$ Ratio	1.19

Source: Field Survey, 2006

Table 5.3 shows that total cost of production and total benefit of cereal crops in one Ropani of land which are Rs. 1850 and Rs.2200 respectively. Similarly, the table reveals that net benefit is Rs 350 and Benefit-Cost

ratio (B/C) is 1.19. This proved that cereal crops are profitable in the study area.

5.3 Production and Income

The production is found to start only after 6 to 8 years of plantation. During this period, farmer use to cultivate other crops. Both cereal and cash crops were found grown by the farmers.

Specially, the goal of the researcher in this chapter is to calculate the benefit-cost ratio of orange production and its profitability over the other crops.

Table 5.4: Average Annual Revenue (Rs/Ropani)

Stage of plants	Year	Production of orange in no.	Revenue from orange (Rs.)	Production of cereal crops in (muri)	Revenue from cereal crops in Rs.	Total Revenue in Rs.
Planting stage	1 st	-	-	2.75	2200	2200
Growing stage	2 nd	-	-	2.56	2048	2048
	3 rd	-	-	2.48	1984	1984
	4 th	-	-	2.18	1744	1744
	5 th	-	-	1.85	1480	1480
	6 th	480	480	1.62	1296	1776
	7 th	1500	1500	1.42	1136	2636
	8 th	3300	3300	1.31	1048	4348
	9 th	3520	3520	1.25	1000	4520
	10 th	3840	3840	1.75	936	4776
	11 th	4400	4400	1.17	936	5336
	12 th	4900	4900	1	800	5700
	Matured Stage		-	-		

Note: Price is taken as 1 Rupee per piece of orange.

Source: Field survey, 2006.

Table 5.4 shows that in planting stage there is no revenue from orange cultivation and its production. Orange plants take 6 to 8 years to provide fruits. As we can see in table orange plants do not provide significant numbers of fruits upto 8 years of its plantation period. Hence, the orange growers generate no significant revenue upto this period. According to the respondents, the orange tree starts giving fruit from 6th year but in small scale. Then subsequently production increases when it becomes matured.

5.3.1 Cost Benefit Analysis on Orange Farming

“The cost-benefit analysis is used for project evaluation and it helps the planning authority in making correct investment decision to achieve optimum resource allocation by maximizing the difference between the present value of benefit and cost of a project. It involves the enumeration, comparison and evaluation of benefit and cost (M.L. Jhingan, 2000). The cost benefit concerned includes not only direct pecuniary cost and benefit but also externalities, meaning that external effects not traded in markets. These include external costs and benefit and it also consists of total social cost and total social benefits. But this study aims to evaluate the profitability of orange farming in the study area hence the study has not total social costs and total social benefits, as well as external costs and benefits but included only the internal costs (labour cost and capital cost on it’s production) and internal benefits from only orange production per Ropani of land.

Orange farming is a long-term project so it is necessary to evaluate the profitability of orange cultivation on the basis of net present value (NPV) criteria. “Therefore, the appraisal rules for project evaluation require discounting of future benefits and costs because society prefers the present to the future” (M.L. Jhingan, 2000). To apply net present

value criteria, it becomes essential to discount future benefits and costs of orange farming. The discount factor is expressed as:

$$DN \frac{1}{(1+i)^t}$$

Here, $i = 10\%$

$$t = 1, 2, \dots$$

Thus,

NPV=

$$\left[\frac{B_1}{1+i} + \frac{B_2}{(1+i)^2} + \dots + \frac{B_7}{(1+i)^7} + \dots + \frac{B_n}{(1+i)^n} \right] - \left[\frac{c_1}{1+i} + \frac{c_2}{(1+i)^2} + \dots + \frac{c_n}{(1+i)^n} \right]$$

$$= (2000+1692.56+1365.80+2190.69) - (47242.27 + 1701.65 + \dots + 405.39)$$

$$= 51288.08 - 32579.62$$

$$= 18708.46$$

This shows that the NPV is positive means the project is viable in the study area. Also this emphasized that orange cultivation is profitable in the study area.

Similarly,

$$\frac{\frac{B_1}{1+i} < \frac{B_2}{(1+i)^2} < \dots < \frac{B_n}{(1+i)^n}}{\frac{c_1}{1+i} < \frac{c_2}{(1+i)^2} < \dots < \frac{c_n}{(1+i)^n}}$$

$$= \frac{51288.08}{32579.62}$$

$$= 1.57 > 1$$

This shows that benefit-cost ratio is greater than 1. So, the cultivation of orange in the study area is admissible.

“The NPV criteria is considered as the most appropriate rule for project evaluation” (M.L. Jhingan, 2000). Thus on the basis of above mentioned rules and the annual costs and benefits on the orange farming, since 1981 to 2005 (not for overall life period of orange tree), has been calculated. Here the cost benefit analysis is shown at 10 percent discounted rate.

Table 5.5: Simple Cost Benefit Analysis on Orange Farming

S.N.	Year	Total benefit	Total cost	Net benefit	Total benefit*	Total cost*	Net benefit*	B/C ratio
1	1981	2200	5200	-3000	2000	4727.27	-2727.27	
2	1982	2048	2180	-132	1692.56	1801.65	-109.09	
3	1983	1984	2380	-396	1490.60	1788.12	-297.52	
4	1984	1744	2900	-1153	1194.52	1980.87	-786.35	
5	1985	1480	2840	-1360	900	1763.97	-863.97	
6	1986	1776	3850	-2074	1009.09	2173.91	-1164.82	
7	1987	2636	3850	-1214	1365.80	1976.38	-610.58	
8	1988	4348	3750	598	2050.94	1749.88	301.06	
9	1989	4520	3750	770	1939.91	1591.00	348.91	
10	1990	4776	3750	1026	1865.62	1446.20	419.42	
11	1991	5340	3800	1536	1898.93	1331.93	567	
12	1992	5700	3820	1880	1844.66	1217.33	627.33	
13	1993	6800	3820	2980	1969.87	1106.60	863.27	
14	1994	10765	3820	6945	2835.13	1006.05	1829.08	
15	1995	11617	3820	7797	2781.18	914.53	1866.65	
16	1996	14337	3880	10457	3120.80	844.57	2276.23	
17	1997	13987	3952	10035	2767.51	781.95	1985.56	
18	1998	13752	3994	9758	2473.82	718.47	1755.35	
19	1999	15294	4029	11265	2501.06	658.87	1842.19	
20	2000	15917	4081	11836	2366.13	606.65	1759.48	
21	2001	17667	4119	13548	2387.43	556.62	1830.81	
22	2002	20653	4250	16403	2537.22	522.11	2015.11	
23	2003	19833	4250	15583	2214.98	474.64	1740.34	
24	2004	18611	4281	14330	1889.63	434.66	1454.97	
25	2005	23734	4392	19342	2190.69	405.39	1785.30	
Total		241519	94758	146760	51288.08	32579.62	18708.46	1.57

* Discounted at 10% discount rate

Source: Field Survey, 2006.

From the above table, it is found that the present value of benefits and costs are Rs. 40423.42 and Rs. 32579.62 respectively. Thus our first condition is fulfilled because here, NPV of benefits is greater than the NPV of costs at 10% discount rate in total. Similarly, the second condition is also fulfilled as the ratio of present value of benefit to the present value of costs is 1.57, which is greater than 1. Thus the cultivation of orange in the study area is viable.

The table 5.5 also shows that the benefit of orange cultivation, upto 7 years in negative, then slightly increased. The amount of benefit is highest in the 16th year. It means, it is the most fruitful period of orange production. Then it increases in decreasing rate. Similarly cost in the initial stage is very high, due to various reasons like digging, manuring, irrigation etc. Then the cost was slightly increased in fluctuation trend. When orange trees become matured, the cost was decreased smoothly by very little rate.

5.3.2 Synthesis (Analysis of Orange Production)

Table 5.5 simply shows that the viability of orange production in the study area with the help of cost benefit analysis method. It does not further describe about the impact of orange cultivation. For this, another case is presented. The process is that what is the impact of orange cultivation in the study area if the discount rate is taken as 8 percent, whether or not orange cultivation is viable in the study area. Which is explained with the help of table below.

Table 5.6: Cost-Benefit Analysis on Orange Farming (at 8% discount rate)

S.N.	Year	Total benefit	Total cost	Net benefit	Total benefit*	Total cost*	Net benefit*	B/C ratio
1	1981	2200	5200	-3000	2037.63	4814.81	-4814.81	
2	1982	2048	2180	-132	1757.54	1869.63	-1869.63	
3	1983	1984	2380	-396	1517.80	1890.38	-1890.38	
4	1984	1744	2900	-1153	1279.03	2132.35	-2132.35	
5	1985	1480	2840	-1360	1007.35	1933.28	-1933.28	
6	1986	1776	3850	-2074	1134.69	2427.49	-2427.49	
7	1987	2636	3850	-1214	1537.69	2247.51	-1371.86	
8	1988	4348	3750	598	2350.58	2027.02	-243.24	
9	1989	4520	3750	770	2261.58	1875.99	-115.05	
10	1990	4776	3750	1026	2414.60	1737.72	41.70	
11	1991	5340	3800	1536	2290.86	1630.20	257.40	
12	1992	5700	3820	1880	2264.24	1517.07	431.91	
13	1993	6800	3820	2980	2500.91	1404.92	1095.99	
14	1994	10765	3820	6945	3665.30	1300.64	2364.66	
15	1995	11617	3820	7797	3662.35	1204.28	2458.07	
16	1996	14337	3880	10457	4185.98	1132.84	3053.14	
17	1997	13987	3952	10035	3780.27	1068.10	2712.17	
18	1998	13752	3994	9758	3441.44	999.49	2441.95	
19	1999	15294	4029	11265	3544.38	933.71	2610.67	
20	2000	15917	4081	11836	3415.66	875.75	2539.91	
21	2001	17667	4119	13548	3510.23	818.39	2691.84	
22	2002	20653	4250	16403	3799.30	781.82	3017.48	
23	2003	19833	4250	15583	3378.12	723.89	2654.23	
24	2004	18611	4281	14330	2935.02	675.13	2259.89	
25	2005	23734	4392	19342	3465.82	641.35	2824.47	
Total		241519	94758	146760	67138.30	38663.70	16657.39	1.73

* Discounted at 8% discount rate

Source: Field Survey, 2006.

According to the table 5.5 orange cultivation in the study area is suitable due to the B/C ratio is greater than 1, which is 1.57 at 10% discount rate. Again when we decrease the discount rate (i.e. 8% instead of 10%) then the B/C ratio is 1.73 which is also greater than 1. So the project is viable in the study area.

5.4 Comparative Profitability Between Orange and Cereal Crops.

On the basis of the results presented on the table 5.5 the profitability can be compared. The NPV of net benefit on orange production is Rs. 18708.46 per/Ropani which is presented in table 5.5 whereas the net benefit from cereal crops come to be Rs. 350. Similarly benefit cost ratio on cereal crops and orange come to be 1.19 and 1.57 respectively which are shown in table 5.3 and table 5.5.

Table 5.7: Comparative Profitability (Per Ropani)

Particular	Total benefit	Total cost	Net benefit	B/C ratio
Cereal crops	2200	1850	350	1.19
Orange	51288.08*	32579.62*	187.46*	1.57

*Discounted at 10% discount rate

Source: Field Survey, 2006.

Table 5.7 shows orange production is more profitable than other cereal crops production in the study area because benefit cost ratio of orange production (i.e. 1.57) is greater than that of cereal crops (i.e. 1.19)

5.5 Orange Farm Size and Production trend

5.5.1 Introduction

Orange cultivation in Jagatbhanjyang VDC has a long history. It has been started as a commercial occupation since 2037/38 B.S. In the

beginning they had planted one or two plants of orange trees around their houses where some organic fertilizer and water remain unused. After some years, they realized that orange cultivation could be good for them and soil was also suitable for orange cultivation so, they extended its cultivation from 2037/38 and subsequently in the study area.

5.5.2 Landholding size

Agricultural land is being expanded but at the same time the most fertile lands have been turned into non agricultural uses, such as conservation areas urban area industries, road construction etc.

The tendency of landholding in Jagatbhanjyang VDC is similar to the other areas of the country. The larger number of smaller farm have been unevenly distributed. Khet Bari and Kharbari are popular land classification which basically depend upon the agronomic practice and slope gradient in the country in general and in the Jagathanjyang VDC in particular.

Table 5.8: Landholding Size in the Study Area

Categories of land	No. of households	Area in Ropani	Percentage	Average landholding size in Ropani
Khet	43	229	15.00	5.32
Bari	57	1032	67.62	18.10
Kharbari	51	265	17.36	5.2
Total	57	1526	100.00	9.54

Source: Field survey 2006.

The total land is about 1526 Ropani in 57 sampled households. There is no landless household in the study area. The above table shows that 229 Ropani Khet is distributed among 43 households. It shows that 14 households do not own Khet. The average land of khet is 5.32 ropani .

Similarly, all sampled households have their own Bari and the average land of Bari is 14.10 Ropani. Likewise average land of Kharbari is 5.2 Ropani, which is distributed in 51 households.

5.5.3 Orange Farm Size

The size of farm determines the volume of agricultural field, production and productivity of crops. The use of modern farm machinery is virtually impossible in small farms, no irrigation development is possible unless the consolidation cost of agricultural products are high and a good proportion of land is wasted in boundaries, hedges, footpaths etc. The major cause of small holdings are land fragmentation practices and hilly topography. There are different sizes of orange farm in Jagatbhanjyang VDC. Generally, most of the orange orchards are very small and scattered over many places due to traditional way of farming and lack of commercialization. The size of orange farms ranges from 0.25 Ropani to 25 Ropani in the study area which are categorized in the following table.

Table 5.9 Orange Farm Size (in Ropani)

Area of farm	No. of Household	Percentage of household	Total orange growing area	Percent of total area	Average orange farm size
0-5	27	47.36	82	22.04	3.04
5-10	14	24.56	91	24.46	6.5
10-15	10	17.54	118	31.72	11.80
15-20	5	8.77	53	14.24	10.60
20 and above	1	1.75	28	7.52	28.00
Total	57	100.00	372	100.00	6.53

Source, Field survey, 2006

Table 5.9 shows that there are about 47.36 percent of households having farm size of 0-5 Ropani under orange cultivation. The average farm size of this group is 3.04 Ropani and they have owned 22.04 percent of total orange growing area. Similarly, 24.56 percent of households having farm size 5-10 Ropani under orange cultivation. The average farm size is 6.5 Ropani and they have owned 24.46 percent of total growing area. Likewise, 10 households whose farm size is 10 to 15 Ropani and 5 households have 15 to 20 Ropani and their percentage farm size are, 31.72 percent and 14.24 percent respectively. There is only one household having more than 20 Ropani of land. The percentage of total orange growing area and the average orange farm size are, 7.52 percent and 28 Ropani respectively.

In this way the table shows about the real picture of orange farm sizes of the study area. It depicts that most of the people have very small farm. On the other hand, there is very small number of people who have larger farm size.

5.5.4 Trend of Orange Production

Orange production is not new practice in Jagatbhanjyang VDC, and it has been popular since long. Although the actual starting time was not recorded, according to local cultivators it has been started since 2037 B.S. Initially it has been cultivated for self-consumption. After some time the trend of orange production is increasing due to suitable climatic condition, suitable soil and altitude and profitability of it's cultivation, which can be seen in the above mentioned cost-benefit table no. 5.4. The production of orange has been slightly increasing particularly due to the increasing number of farms or plants and its relative importance is high in the market among cash crops. However, the production is not proportional to the increasing rate of farms. But it is fluctuating year by year due to some constraints such as, drought, hailstone, storm, diseases

and pests etc. Thus, the production of orange is in fluctuation but there is an increasing trend in general.

Table 5.10: The Trend of Orange Production in the Study Area (2000-2005)

Year	Area (in Ropani)	No. of fruitable plants	Production (in number)
2000	274	2742	1253094
2001	287	2872	1283784
2002	324	2920	1305242
2003	337	3015	1221260
2004	346	3120	1628640
2005	372	3254	1613522
Average	323.33	2987	1396788

Source: Field survey, 2006.

Table 5.10 shows that there are 2742 fruitable plants in fiscal year 2000 in which the total area under orange cultivation was 274 Ropani and the total production of orange was 1253094 in number. The table also depicts that the area of orange cultivation has been increased in the study area that is to say the area increased to 287 Ropani in the fiscal year 2001 from 274 Ropani in 2000. Similarly the area has increased to 372 Ropani in 2005 and the number of fruitable plants has reached to 3254. This shows that the inclination of people is greater in cash crops than cereal crops. They have still been cultivating new plants on their land. The table also shows that the production of orange has increased in the year 2002 in comparison to the year 2000 and 2001. And it decreased in 2003 due to bad weather and the bad impact of hailstone. The highest amount of its production is in the year 2004 and it decreases in 2005. This shows

the fluctuating trend of orange production. The production of orange in the study area is increasing slowly but it is not satisfactory due to the lack of training about orange cultivation, lack of modern technology and other facilities.

5.6 Socio-Economic Condition

5.6.1 Population Composition by Age and Sex

The total sample population in the study area is 388. Out of which 201 (51.80%) are male and 187 (48.20%) are female. To study the age composition and activities of the population the total population is divided into different age groups, such as, children, young, active and adult.

Table 5.11: Population composition by Age and Sex

Age group	Male	Female	Total no. of population	Percentage
0-4	17	19	36	9.28
5-9	15	12	27	6.96
10-14	19	29	48	12.37
15-19	17	19	36	9.28
20-24	18	16	34	8.76
25-29	29	19	48	12.37
30-34	14	13	27	6.96
35-39	14	12	26	6.70
40-44	10	6	16	4.12
45-49	9	10	19	4.9
50-54	9	12	21	5.41
55-59	6	5	11	2.84
60-64	5	8	13	3.35
65 and above	19	7	26	6.70
Total	201	187	388	100.00

Source: Field survey, 2006.

Table 5.11 shows that there are 36 persons less than 5 years of age, they depend upon their parents and are not active population. Similarly, 26 persons (i.e. 6.7%) of the total population are above 65 years of age in sampled households in which 19 are male and 7 are female in this age group. The total number of active population that is 14 to 60 age groups are 235. The table also shows that there are 201 male (i.e 51.80%) and 187 female (i.e. 48.20%) which is different to the national level sex ratio.

At the national level there are 49.95 percent male and 50.05 percent female (population census, 2001).

5.6.2 Educational Status

A nation can not develop without education. Education is the key sources of development.

The literacy rate of whole Syangja District is 66.7 percent in which male and female literacy rate are 77.9 percent and 57.7 percent respectively (Population census, 2001). To understand clearly about the literacy rate of the study area, following table has been used.

Table 5.12: Educational level of the people in the study area:

S.N.	Status	Male	Percent	Female	Percent	Total	Percent
1	Illiterate	31	17.12	67	41.10	98	28.49
2	Literate	150	82.88	96	58.90	246	71.51
3	SLC	19	10.50	9	5.53	28	8.14
4	Intermediate	13	7.19	4	2.46	17	4.95
5	Bachelors	6	3.32	1	0.62	7	2.04
6	Above Bachelors	3	1.66	-	-	3	0.88
	Total	181	100.00	163	100.00	344	100.00

Source: Field Survey 2006.

The sampled households have 344 persons excluding children below 5 years. Out of this total population aged more than five, 181 are males and 163 are females. Table 5.12 shows that 71.51 percent of the people are literate including those persons who can write their name and 28.49 percent illiterate. 98 persons are found illiterate in which 31 are males and 67 are female in the study area. Out of total literate 82.88 percent are male whereas 58.90 percent are female. Out of this

population 8.14 percent has passed the SLC level exam, where the percentage of male and female is 10.50 percent and 5.53 percent respectively. This indicates that there is vast difference between male and female to get the opportunities for higher level education. The percentage of people who have attained higher level of education in the study area is not satisfactory. Only 7.85 percent of the people have passed I.A., B.A. and above level of examination.

5.6.3 Occupational Status

The study area is a rural area. Agriculture is a dominant economic activity in this area. People are engaged in different types of occupation such as Agriculture, Business, services, labours etc. Out of total population of sampled households in the study area 69 percent (267 persons) are economically active who are engaged in different activities, 26.62 percent (103 persons) are children below 14 years and 4.40 percent (17 persons) are above 65 years who are considered inactive, in this study.

Table 5.13: Occupational Pattern of Orange Growing Households

S.N.	Occupation	Male	Percent	female	Percent	Total	Percent
1	Agriculture	71	50.36	95	75.40	166	62.18
2	Service	23	16.32	9	7.15	32	11.99
3	Business	18	12.77	6	4.77	24	8.99
4	Labours	29	20.57	16	12.70	45	16.86
	Total	141	100	126	100	267	100

Source: Field survey 2006.

Table 5.13 clearly depicts that out of total economically active population (267 persons), 166 persons (62.18%) are engaged in agriculture 32 persons (11.99%) are engaged in services (this includes out

of the country) and 24 persons (8.99%) are engaged in business. Most of the female people have agriculture as a basic occupation rather than in business, services and labours.

5.6.4 Households Income Pattern

The orange growing households of the study area generate their income by various activities such as agricultural activities, services, business and labour.

Table 5.14: Average Annual Income of Orange Growing Households

S.N.	Source of Income	Income in (Rs)	Percent
1	Agriculture	69488	61.00
2	Services	20504	18.00
3	Business	6834	6.00
4	Labours	17087	15.00
	Total	113913	

Source: Field survey 2006.

Table 5.14 presents the average annual income of orange growing households. A households generate Rs. 1,13,913 in a year from different economic activities. Agriculture occupy 61 percent out of total income whereas 18 percent, 6 percent and 15 percent income is occupied by services, business and labours respectively. This table has indicated that agriculture is the main source of income in the study area which has greater proportion out of total income generation.

5.6.5 Annual Income Earning of Households

Nearly 62 percent of the respondents are engaged in agriculture in the study area. Except agriculture, business, service and other economic activities are also important sources of income. To find the actual income is not possible, it is because respondents do not want to provide the real

figure due to national conflict and some other fear like paying tax to the government etc. However the researcher has done some exercise to take the estimates of income of the study area. The nature of income in the study area is presented in the table 5.15.

Table 5.15: Annual Income Distribution of Households

S.N.	Income Rs: (In thousands)	No. of household	Percent
1	Below 5	8	14.04
2	5 to 15	8	14.04
3	15 to 20	16	28.07
4	20 to 35	10	17.55
5	35 to 50	11	19.30
6	Above 50	4	7.02
	Total	57	100.00

Source: Field survey 2006.

Table 5.15 shows that the income of orange growing households by orange farming alone. There are 8 households who earn below Rs. 5000 annually. Only 4 households are those who earn more than Rs. 50,000 annually in the study area. Many households earn less because of large number of growing plants are yet fruit bearing plants in the study area.

5.6.6 Livestock Raising

Livestock is an integral part of agriculture. It is also an important economic activity of hilly region, which supports to earn cash to the farmers. It plays a vital role in enhancing agriculture productivity, farm power and income for households and nutrition for family. In Jagatbhanjyang VDC, most of the farmers keep at least two buffalo. In the same way goats and poultry are also common. Cow and buffalo are

kept for milk and manure, where as goat and poultry are kept for meat and eggs. The types and number of livestock is given in table

Table 5.16: Number of Livestock in the Sampled Households

S.N.	Animals	Total number of animal	No. of households	Average
1	Cow/ox	53	44	1.21
2	Goat/sheep	605	54	11.21
3	Buffalo	130	52	2.5
4	Pig	36	10	3.6
5	Poultry	180	22	8.2

Source: Field survey, 2006.

Table 5.16 shows that almost all the farmers keep large stock of animals usually at least two buffalos. Cows and buffalos are basically the source of milk in the study area whereas ox are used to plough the agricultural field. Farmers used to prefer the dung of cattle and goats in their field. Cows are usually kept by Brahmin and Chhetri community in the study area for the purpose of milk, Goats which is another sources of income is kept by 95 percent of the sampled households in the study area. Hence, directly or indirectly animal husbandry supports to earn cash to the farmers, who are specially engaged in agriculture.

5.6.7 Food Sufficiency

Food sufficiency is one of the major indicators of socio-economic status of the people. It is due to the insufficiency of land, lack of modern techniques of cultivation and other so many problems are faced by the farmers. The actual figure of the study area is presented in the table below:

Table 5.17: Number of Households having Food Balance, Surplus and Deficit Households in the Study Area

Food sufficiency situation	No. of Households	Percentage
Balance	21	36.85
Surplus	7	12.28
Deficit	29	50.88
Total	57	100.00

Source: Field survey, 2006.

Table 5.17 shows that out of total sampled households about 36.86 percent households are in food balance condition, 12.28 percent are in surplus and remaining 50.88 percent are in food deficit. Food deficit is a major problem of the study area. Major cereal crops like maize, millet and wheat are grown in the study area however that is not sufficient to the study area. The survey shows that more than fifty percent of the respondents are in food deficit condition.

5.6.8 Housing Structure

Change in the agricultural techniques has affected the rural community with the invention of new agricultural tools, techniques, chemical fertilizer etc. It has increased agricultural production, as a result the standard of living of rural people also raised. People of Jagatbhanjyang VDC have practiced orange cultivation in which they use chemical fertilizer, some insecticides and pesticides. Therefore as the use of modern techniques and tools for orange cultivation has helped to increase orange production and helped to improve the living standard of the people of the study area. Housing structures also show the economic condition of the people because most of the wealthy people make large and modern house and poor can not afford to do so. Poor people spend

their lives in small and congested houses with difficulty. The housing condition in the study area is presented in table.

Table 5.18: Housing Structure in the Study Area

S.N.	Description	No. of households	Percent
1	Level 'H'	4	7.02
2	Level 'M'	36	63.16
3	Level 'L'	17	29.83
	Total	57	100

Source: Field survey 2006.

House is categorized in three different levels, i.e. level 'H', level 'M' and level 'L'. They are described in methodology chapter. About 7.02 percent of respondent have made 'H' level house, similarly about 63.16 percent of respondent have made 'M' level house and the rest 29.83 percent of the people have made 'L' level house. This shows that most of the people in the study area are medium level people it is because most of the people are not economically strong in the study area.

5.7 Problems and Prospects of Orange Cultivation

Orange cultivation plays a significant role for promoting rural economy of the Nepalese hills. It can provide additional cash income to the farmers by generating many employment opportunities. Despite a suitable topography for the cultivation of orange, orange cultivators are found to have many problems in the study area. Consequently, area under orange cultivation and its productivity have not been increased significantly. Hence, an attempt has made to analyze major problems faced by orange cultivators with regards to various aspects of its production.

Although climatic condition of study area is favourable for orange production, climatic records indicates that there has been seasonal hailstorm in the months of March, April and May causing damages to the plants and affects production. Lack of rainfall during the dry summer months and hailstone also causes negative impact in orange production. Major constraints in orange cultivation as reported by the orange producers are described below:

5.7.1 Technical Problems

Fruit farming appears to be more technical than other field crops with respect to their particularity in the factorial requirement such as soil, climate, and cultivation practices. Inputs such as water, fertilizer, pesticide etc, have positive effect only when they are technically appropriate or optimal. For example, fertilizer application will exhibit its beneficial responses under definite sets of condition. However, in the study area the farmers have no knowledge about such condition. They cultivate orange in traditional way. Technically they are very poor . They are not aware of the modern management system specially with regards to orchards. The farmers do not have proper ideas of using chemical fertilizer, pesticide, insecticide and above all water. They have also reported the non availability of agricultural credit, lack of timely supply of agricultural input as well as lack of storage facility for their production. According to the respondents 76.26 percent of them are facing technical problems.

Technically low priority has been accorded to fruit research in this area, because of this reason farmers of this area are not familiar with high quality tools and improved technique that can be in orange cultivation. They are using traditional methods in orange farming. J.T. and J.T.A. provide insufficient services to the real practitioners. Most of the farmers

have to face inadequate supply of chemical fertilizer, pesticides and insecticide. Due to the lack of knowledge farmers do not use water fertilizer, pesticides and other inputs timely as well. Because of these problems orange growers have not been able to reap the monetary benefit they are supposed to. More than 76 percent of the sampled households reported that they are facing the above mentioned technical problems.

5.7.2 Problem of Transportation

Among the major problems of orange cultivation in the study area, lack of transportation is the dominant one. There are some village roads which are not graveled. However, they have facilitated to the orange growers to extent but most of the orange orchards are not linked with such roads. So the people in the study area are bound to use labour for transportation. Orange is carried on human back for a certain distance and then by truck or small vehicle. Farmers have to pay 40 to 50 rupees per Doko (40 to 50 kg) of orange to carry from the study area to the nearest roadsides. And it takes 15 minutes to one hour per trip. Due to the unavailability of road and organized market system the farmers have to incur extra monetary burden in the study area. About 73 percent of total farmers are facing this problem.

5.7.3 Problem of Market

Farmers are facing the difficulties of marketing in the study area. There is no marketing facility such as weekly or monthly Haatbazar. Similarly, there is no marketing collection centre and no marketing information centre as well. There is no organized co-operative bodies providing marketing facility.

The nearby urban areas, Waling municipality and district headquarter Syangja, absorb only a small fraction of the total product.

Hence, the main market center are Butwal and Kathmandu which are 118 km and 265 km far from the study area. Similarly, most of the orange growers do not have any marketing experience. Hence, they are not interested to sell their product in the market by themselves. Thus, most of the orange growers are compelled to sell their products at their orchards to the middlemen or contractor usually at a lower price than the marketing price. In the study area, no one has sold their products by themselves to the consumers in the market. Only 26 percent of them have sold their products to the traders in the market and 74 percent of the sampled orange growers have sold to the middlemen or preharvest contractors at their orchards.

5.7.4 Problems of Irrigation

Irrigation is essentially the artificial application of water to overcome deficiencies in rainfall for growing crops. It is one of the most important factors for orange cultivation. Orange cultivation requires frequent and light irrigation in dry season. Watering orange plant before and after harvesting season makes the plant very healthy. However, in Jagatbhanjyang VDC, there is lack of irrigation facility for orange cultivation. Mostly orange trees are planted in dry and terrace surface which seriously suffers from shortage of water in dry season. It reduces the quality and quantity of orange production. There is great difference in production of orange between irrigated and non-irrigated land. The production of orange is 10.2 metric ton per hectare on the irrigated land whereas the production is 8.5 metric ton per hectare on non-irrigated land. Only 12.18 percent of the sampled households have got irrigation facility in the study area.

5.7.5 Problem of Low Productivity and Low Price

Due to the lack of modern farm management system and improved technical implements, the productivity of farm is very low. According to the orange growers, their production fluctuates year by year. About 14 percent of the sampled households have pointed out that the low productivity of orange and fluctuating trend of production are two major problems in the study area.

Similarly, due to the lack of marketing facility there is no fix price of orange. About 62 percent of sampled households have reported that they have to sell their products in low price. It is due to the lack of organized marketing system. According to the respondents brokers buy the orange from orange orchards at the rate of Rs. 8 to Rs. 14 per kg in the months of Kartik and Mangsir, and Rs. 15 to Rs. 20 in the months of Paush and Magh. But the sale price in the market of Butwal are Rs. 30 to Rs. 35 respectively in these months. Also, there is no storage facility in the study area. So, the farmers are bound to sell at the price offered by the brokers. The farmers usually do not command any bargaining power due to lack of storage facility.

5.7.6 Problems of Diseases and Pests

About 32 percent households of the study area have pointed out that orange plants are suffering from various diseases and pests. According to them these are serious problems of orange cultivation. As per the reports of the respondents orange are mostly affected by diseases and pests like powdery mildew (Black and white), patero (fruit sucking Bugs), Gabaro, Fungus, citrus psylla, leaf miner, leaf mosaic, leaf roller, blackfly, leaf spot etc. Although 32 percent of the orchards have diseases but they are not spread much. At present time diseases and pests have not

hampered that much but farmers and concerned authorities have to pay attention to it otherwise it may go beyond their control.

5.8 Prospect of Orange Cultivation

Eventhough there are several problems in cultivating orange in the study area, there is still sufficient possibilities to promote the orange production.

Due to the favourable climatic condition and increasing demand of orange, the local orange growers are still increasingly interested towards its cultivation. It is necessary that the governmental and private sector should be interested in developing orange farming. Continuous cultivation of cereal crops resulted in the decline of soil fertility of land and increasing population pressure on marginal land creates various environmental imbalances which results many kinds of natural disasters i.e. landslide, flood, desertification, soil erosion etc. Thus orange cultivation plays an important role in balancing the declining environmental condition. On the other hand it has been found more beneficial as compared to the cereal crops giving a good source of cash income. Moreover the cultivation of orange may generate additional employment opportunities to the people, which can help to reduce the problem of immigration.

Now a day, continuously increasing population and development of tourism has encouraged the demand for fruit, whereas Nepal still imports fruits to fulfill the increasing demand of it. In this context, orange cultivation has better prospect not only in the study area but also in the whole hilly region of the country.

Particularly in case of Jagatbhanjyang VDC, the whole sampled orange growers are agreed with its good future prospect. And more than

27 percent of non-orange growers are also interested to cultivate it. Moreover, they have informed that they will also try to cultivate it as soon as possible.

In this regard, orange cultivation has better prospect in future in the study area but there should be provision of necessary infrastructural and institutional development at farm level of orange cultivation.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATION

6.1 Summary

Orange plantation in Jagatbhanjyang VDC has started a long time ago and some old plants can still be seen there. At present it has become one of the important agriculture activities in the study area. However, but in spite of many efforts of different institutions of government of Nepal and other organizations, it is still true that the returns to the orange growers have been at limited level and this economic activity has not enhanced the level of income of the farmers to a desired level. Identification of crucial factors related to production, distribution and processing of oranges must be the starting point to devise ways to resolve the existing problems. With these perspectives this study was undertaken to provide appropriate suggestions to improve the production system and effective marketing strategies.

The main objectives of this study were to find out the present condition of orange growers, to examine the major problems, to evaluate the profitability and to analyze the various physical and non-physical factors controlling orange farming.

For this study, data were collected from the structured questionnaire, unstructured interview and observation. The research design in this study is exploratory as well as descriptive. Both primary and secondary data has been used in this study.

There are 754 households in Jagatbhanjyang VDC. Out of nine wards only four wards have been chosen for this study. There are 287

households in the study area which is taken from ward no. 1, 2, 3 and 9. Out of these 287 households 20 percent households has been selected by using random sampling technique. The sampled households in the study area is 57 in which total number of population is 388 with 201 males and 187 females.

Generally, most of the orange orchards are small in size. The average orange farm size ranges from 3.04 Ropani to 28 Ropani. Most of the people in the study area have very smaller sizes of farm.

Orange production in Jagatbhanjyang VDC is found an increasing trend. However it is not proportional to the increasing rate of cultivation. Mostly production is found fluctuating but in general it has an increasing trend. According to the field survey 2006, total number of fruitable plants were 2742 in the year 2000 in which the production (in number) was 1253094 (in number). After 6 years that is in the year 2005, the amount of fruitable plants and production (in number) reached to 3254 and 1613522 respectively. This also shows that the trend of orange production is increasing.

To show the cost of production and return from it, cost benefit method is applied at 10 percent discount rate. At the side of cost, labor cost, sapling cost, cost for tools and equipment, cost of compost /dung and other costs are included. Production starts from six to eight years from the planting year.

Orange cultivation is profitable in the study area because the ratio of benefit to the cost is greater than one. According to this research NPV is positive and B/C ratio is found 1.57. As B/C ratio is greater than 1, it suggests for the cultivation of orange in the study area.

Lack of good marketing facilities, transportation facility storage facilities and processing facility are causing many problems to the orange growing farmers in the study area. Due to the lack of modern farm management system and improved technical implements, the productivity of farms are low. According to the respondents, production fluctuates occasionally, sometimes it decreases as well. In the same way the price of orange is not fixed. Due to lack of marketing facility, farmers do not receive satisfactory price for their products and they are compelled to sell their products at a lower price level than market price. Furthermore there are other major problems such as problem of technical knowledge, problems of irrigation, problems of diseases and pests, problem of loan facility, lack of storage facility, lack of chemical fertilizer etc.

Even though there are several problems in farming orange in Jagatbhanjyang VDC, but the future prospective of orange farming in Jagatbhanjyang VDC is very bright due to favorable climatic condition and increasing demand of orange. There is no doubt of its better prospect in this VDC. However, it is necessary to provide both infrastructural and institutional development for orange cultivation.

6.2. Conclusion

1. Orange cultivation had started in Jagatbhanjyang VDC from 2033/34 B.S. But occupational production in this VDC started in 2037 B.S.
2. The sampled households had a total production of orange (in number) 1253094 in the year 2000. It increased to 1613522 in the year 2005. Hence it is concluded that the level of earning from orange production in the study area, is in increasing trend.

3. The sum of total cost of 25 years at 10 percent discount rate is Rs.32579.62 per Ropani whereas the sum of total benefit at the same period and at same discount rate is Rs. 51288.08. It is clear that NPV is 18708.46, which is positive. Hence, it is concluded that the orange farming in the study area is beneficial. In other words this encourages the orange growers in the study area.
4. The price of orange is not fixed. Orange growers have to sell their products at a lower price than they desire. Brokers usually buy the orange at the rate of Rs.8 to Rs.14 per kg but they sell it at Rs. 25 to Rs. 30 at the market of Butwal.
5. In spite of the prevailing problems and limitations, orange growers are really optimistic towards cultivating orange in the study area. Present study finally concludes that for further development of orange cultivation it is necessary to remove the identified problems

6.3 Recommendations

The production of orange in Jagatbhanjyang VDC has become more popular due to the favorable climate and it is more profitable as compared to other cereal crops. The following recommendation as revealed by this study could be helpful for improving the orange cultivation.

1. A survey should be conducted to identify major diseases and pests on orange in this VDC and proper trial should be conducted to determine feasible methods of controlling these diseases and pests.
2. Chemical fertilizer and plant protection chemicals are required for better production of orange. It should be made readily available in the district or in the nearby markets.

3. Farmers should be provided technical and financial assistance in establishing small scale cottage industrial units for producing semi processed products or primary products from orange.
4. Farmers should be encouraged to form their co-operative organization to produce quality fruits and develop business skills to sell their products.
5. The orange farming method is traditional, so modern technology and method should be launched.
6. There is no systematic management of irrigation. So irrigation system should be established to enhance agricultural production in general and orange production in particular.
7. There should be loan facility to orange growers at normal rate of interest.
8. The existing system of marketing is not systematic. Because of far located main market centers most of the growers are being exploited by middlemen. So, emphasis must be given for the development of organized marketing system and storage facility.
9. A participatory systematic uplifting programme targeted to orange cultivations should be organized. At present a direct investment from government side is not sufficient enough for the improvement of citrus culture that is why an organization for the development of citrus farming is necessary.
10. Due to the limited time and resources, many other aspects of the orange cultivation in Jagatbhanjyang VDC are not included in this research. So, other interested scholars should conduct more research works in those field.

APPENDIX-I
AN ANALYSIS OF ORANGE CULTIVATION
 (A case study of Jagatbhajyang VDC of Syangja)
QUESTIONNAIRE FOR HOUSEHOLD SURVEY 2006

A. Household Survey

Date: -----

District: Syangja

VDC: -----

Ward no.: -----

Tole: -----

Name of the Household head: -----

Respondent name: -----

Age: ----- Sex: -----

Religion: -----

Caste: -----

No. of family members: -----

1. Family Structure

S.N.	Name	Sex		Marital status	Age	Education	Occupation	Annual income
		Male	Female					
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

2. Animal husbandry

Types of livestock	Sell in 5 years										Buy in 5 years										
	2001		2002		2003		2004		2005		2001		2002		2003		2004		2005		
	No.	Price	No.	Price	No.	Price	No.	Price	No.	Price	No.	Price	No.	Price	No.	Price	No.	Price	No.	Price	
Cow																					
Buffalo																					
Goat																					
Pig																					
poultry																					
others																					

1. When did you start orange farming? Also tell me the numbers of orange plant in the beginning.

2. Has the number of Orange tree increased or decreased? Reasons

3. Please describe the size of your land under orange cultivation in the beginning.

4. Please tell me the number of plant at present?

5. What type of crops did you produce before orange farming?

a) Maize b) Millet c) Others

d) Wheat e) Mustard

6. How much income did you earn at the same land when you produce other crops instead of orange?

7. What are the reason to cultivate orange now?

8. What is the difference of orange production per tree between large and small farm size? Reasons?

9. Are you interested to expand your orange farm size?
 a) Yes b) No
 If Yes, reasons.....
10. Do you get any compensation while your crop is damaged?

11. From where did you get the idea of orange cultivation?

12. What is the main purpose of orange cultivation?
 a) Self consumption b) Commercial purpose
 c) Both
13. From where did you get seedling plants?
 a) Local nurseries b) Agriculture department
 c) Your self d) Others
14. Do you use fertilizer for orange cultivation?
 a) Yes b) No
 If yes, What types of?
 a) Chemical b) Composite c) Both

Utilization of Fertilizer for Orange Per Ropani.

Particulars	Quantity	
	Doko	Kg
Dung (Domestic animals)		
Chemical fertilizer		
Manuring		

15. Cost of Orange Production (per ropani in Rs)

Particulars	In Rs/Ropani
Seedling	
Labour	
Fertilizer	
Irrigation	
Harvesting	
Storage	
Plant Protection	
Rent	
Equipments	
Other	

16. Please describe your Orange farming situation

Period	Producing Period	Duration	Product in kg/Ropani	Sales per year/Ropani (in Quintal)	Sales of old tree (in Quintal)	Benefit
Planted period/1st year						
2-5 years						
5-8 years						
8-11 years						
11-14 years						
14-17 years						
17-20 years						
>20 years						

24. What is the trend of your orange production?

- a) increasing b) decreasing c) constant

25. After harvest, how long can orange be kept safe in ordinary storage?

.....

26. Please tell me your production trend and price in the last five years.

Years	Area (Ropani)	Production in kg	Price per piece	Price in Rs/kg.
2001				
2002				
2003				
2004				
2005				

27. What do you think about orange farming? It is beneficial than cereal crops farming?

- a) Yes b) No

28. What type of change is brought in your family?

Changes	Quantity	Cost
Purchase new land		
Maintenance the old house		
construction new house		
Schooling child (Govt. to private)		
Others		

29. Have you taken loan for orange farming?

- a) Yes b) No

If yes

Source of loan	Amount	Interest Rate %
Financial institutions		
Co-operative agencies		
Money lender		
Others		

If, No, do you like to take loan for orange farming?

- a) Yes b) No

30. Where do you sell your product? Please describe the place, market rate and quantity sold as follows.

Place.	Distance from orchard (km)	Means of transportation	Price/kg (in Rs.)	Quantity of selling (in quintal)	Total amount in Rs.
From Orchard					
Market Centre					
Middle man					

31. Can you sell your product in the desired time?

- a) Yes b) No

If, No, why?

.....

32. When did you sale?

- a) As soon as harvesting
b) When necessary
c) When the price is high

33. What are the difficulties of marketing of orange?

.....

34. What are the problems of orange cultivation?

- a) Lack of transportation b) Technical problems
- c) Low productivity d) Low price
- e) lack of market f) No required labour force
- g) Others

35. What types of difficulties do you have to get the seedlings?

- a) Unavailable at required time b) Financial problems
- c) Lack of good seedling.

36. What are the harmful insects or diseases to injure the orange trees?

S.No.	Diseases	Reasons	Prevention/cure

37. Is your crop damaged?

- a) Yes b) No

If yes, the reason

- i) diseases ii) insects
- iii) natural disaster iv) Fruit slighting
- v) Others

38. Do you use pesticide to control harmful insect or diseases?

- a) Yes b) No

If yes, types

39. Beside loan have you taken any other assistance from government/Agriculture Department?

- a) Seed b) Fertilizers
- c) Chemical d) Others e) Technical

40. What is your suggestion to solve these problems?

- a)
- b)
- c)
- d)
- e)

41. What do you suggest to expand the orange cultivation and improve it's marketing?

.....

42. What is your opinion about the future of orange farming?

- a) Good b) Bad

43. What are the main problems and prospect of orange cultivation in Jagatbhanjyang VDC? Describe in details

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