THE CONTRIBUTION OF LARGE CARDAMOM FARMING FOR ECONOMIC GROWTH OF FARMERS:

A Case Study of Dokhu VDC Taplejung, Nepal

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VIVA-VOCE SHEET

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DECLARATION

I hereby declare that the work reported in this thesis entitled The Contribution of Large Cardamom Farming for Economic Growth of Farmers: A Case Study of Dokhu VDC Taplejung, Nepal submitted to Office of the Dean, Faculty of Management, Tribhuvan University is my Original work. It is done in the prescribed form of partial fulfilment for the Master's Degree of Business Studies (M.B.S) under the supervision and guidance of Mahananda Chalise of Central Department of Management TU Kritipur.

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ABBREVIATION

ADB/N	-	Agricultural Development Bank, Nepal
B.C.	-	Before Christ
B.S.	-	Bikram Sambat
CBS	-	Central Bureau of Statistics
C.V.	-	Coefficient of Variation
GDP	-	Gross Domestic Product
GNDI	-	Gross National Domestic Income
HDI	-	Human Development Index
Hec.	-	Hectare
HH	-	Household
MT	-	Metric Ton
S.D.	–	Standard Deviation
VDC	-	Village Development Committee
HH	-	House Hold

CHAPTER ONE
INTRODUCTION

1.1 Background

Nepal is a small landlocked country situated between India and China. It is surrounded by India in the east, south and west and China lies to the north. It is roughly rectangular in shape extending over a length of 885 km from the east to west. It is situated between 26^0 22' and 30^0 27' north latitude and between 80^0 4' and 88^0 12' east longitude. It covers an area of 1,47,181 square kilometers. Out of the total land of Nepal, only 18% is cultivable. (Taplejung Chamber of Commerce and Industry 2069)

Nepal is divided into three regions - Mountains, Hills and Terai - based on the physical features. The Mountain region lies in the northern part of the country. This region ranges from 3300 meters to 8848 meters from the sea level. This region includes some of the world's famous peaks like Mt. Everest, Mt. Kanchenjunga, Mt. Manaslu, Mt. Makalu, Mt. Annapurna, and Mt. Dhaulagiri and so on. This region is the origin of most of the big and perennial rivers of Nepal. The Hilly region lies in the mid part, between the Mountains and the Terai. It ranges from the height of 600 meters to 3300 meters. The region is estimated to occupy 68% of the total land area of the country. Some important valleys like Kathmandu, Pokhara, and Dang lie in this region. This region is important from economic point of view. About 60% of the cultivated land of the country lies in this region. The Terai is like a narrow belt in the south of the country. It is about 25 km wide and extends from the east to the west. The region has fertile land and comfortable topology. This region is the granary of the country. So it is densely populated.

In Nepal, rainfall occurs out of south eastern monsoon. The rain mainly occurs during the summer season. But the distribution of rainfall in Nepal is quite uneven. The eastern part receives almost double of the rainfall as compared to the western part of the country in summer. Due to the variety of topographical condition, there is diversity in weather and climate. The country experiences tropical, thermal, micro thermal, taiya and tundra types of climate. For the purpose of sound administration and balanced development of the country, it is divided into five development regions, fourteen zones, seventy five districts, 3915 VDCs and 58 municipalities. However, after the declaration of federal republic in 2008, the country is now planning to go forward in federal system.

According to the latest census 2068 the total population of the country is 2, 64, 94, 504 which consists of the male population 1, 28, 49,041 and female population 1, 36, 45,463 (Census survey 2068).

Nepal is a land locked hilly and agricultural country. Thus, the development of the national economy depends on the development of agriculture. Agricultural development is envisaged either by increasing the productivity of the existing crops by applying new technology or by adopting new and more profitable crops by the farmers. Expansion of area of fruits, vegetables and spices is supposed to be adoption of high value crops by the farmers to increase their income. Cultivation of large cardamom in the eastern hilly districts of Nepal is such an endeavor. Large Cardamom is one of the oldest spices known to mankind. It was known to Greeks and Romans as Amomum and was recorded by Theophrastus, the Greek philosopher as early as the 4^{th} century B.C. In botanical classification, large cardamom belongs to zingeberaceae family. Its scientific name is Amomum subulatum Rox. Its Nepali name is Alainchi. It is different from the small cardamom (Ellattaria cardamom), which is cultivated mostly in south India, Srilanka and Guatemala. Both of them are used as spices.

The large cardamom plants are grown between the altitudes of 500 and 1800 meters above the sea level in the slopes of the hills where plenty of well drainable water is available, preferable in the north slopes or under the shade of trees. Seventeen different kinds of shading trees are known in use but very common with better performance is uttis (Alder, Alnus Nepalensis). Cardamom plants are grown in slopy marginal land, not suitable for other crops. It is also seen to protecting soil erosion and landslide.

Large cardamom is an aromatic crop. Dried ripe fruits give a strong flavoured spice. Its seeds are dark brown in colour or oval in shape and 3-4 mm in diameter. The seeds give volatile oil. The oil content is 2.043%. The seeds are useful in promoting appetite and function of stomach. It is also used in the cure of nerve pain. The oil from large cardamom is aromatic, stimulant and appetizer and is applied to eyelids to allay inflammation and it is also used an ancient spic, medicinal preparation and cosmetic product.

Large cardamom plants flower at March and fruits are matured during the humid summer monsoon period August and September. The colour of the seeds inside the fruits determines the harvesting time. The seeds are white when immature and gradually brown to black when fully matured. The fruits are harvested in bunches, which contain 20-24 fruit capsules. The cardamom bunches are cured for 7-10 days by spreading bunches in dry room. During that period, the cardamom capsules are loosened from the bunch and separated manually. If curing is done improperly, bunches will be attacked by mould and the capsules get black in colour. Immediately after removing form bunches, the capsules are dried otherwise the fruits are also attacked by mould. The raw cardamom capsules are bright purple in colour having a thick 3 mm peel and have 80 percent moisture. The moisture is mainly concentrated on the peel. Dried cardamom is black, brown to purple colored large almond sized fruit containing a sweet pulp and some 40-50 camphor's seeds. The colour of the dried product largely depends on the drying process and sweet pulp contained depends upon the maturity the fruits.

The large cardamom looks like black capsule, in average 2.25cm long (minimum 2.2cm and maximum 2.3cm), which contains 28 to 58 hard black-brown angular seeds per capsule. Its pod is triangular. The color of its pod seems dark reddish brown. The plants grow in cluster. The pods are developed on the base of the plant. The plant requires mild sub-tropical climate in the hilly area. The temperature and rainfall requirements of the plant are 10 to 25 degrees and 1500 cm to 6200 cm annual rainfall. The growing season and harvesting time is August to September.

Cardamom is harvested immediately after monsoon period. Cardamom drying and processing is a big problem for the growers because the self-life of the harvested cardamom is only two weeks if it is kept spread in dry room. The season itself is very humid and wet and fuel wood availability is also minimum in that period. The depletion of the forest and the lack of its conservation had prevailed the scarcity of the fuel-wood for cardamom drying in non-efficient conventional bhatti, discouraging the cardamom growers. The requirement of fuel wood for drying large cardamom is very high - almost one and a half times its weight to dry fuel wood, purchased fire wood by the cardamom growers has increased the cost and added the burden of management in the absence of effective electrical driers.

Trees used for shading in the cardamom field play a significant role to meet the fuel wood requirement for drying cardamom. There are about seventeen species of shading trees known to use in cardamom field. Among them, uttis is found to be better performing and fast growing.

Large cardamom cultivation is comparatively new enterprise and is being taken by the farmers from the eastern hills of Nepal. Technical support from the government is slowly coming through the extension service. Processing of large cardamom for adding the value or organized marketing to increase the bargaining power of the farmers is a distant activity. The contribution of large cardamom in the income of the farmers and foreign currency earning of the country is increasing due to which attention is being drawn by this crop over the year.

1.1.1 Significance of Large Cardamom in Nepalese Economy

Cardamom is an important cash crop in Nepal with an annual total production of 6026 metric tons in the year 2068/069. Almost the entire production is sold outside the country, nearly 90% to India. According to Central Office of Cardamom Development centre Taplejung district has largest amount of cardamom production where 1755 metric tons were produced in 2068/69. Whereas Ilam district has 694 metric tons, Sangkhuwasava district has 1036 metric tons, panther district has 630 metric tons, Khotang district has 600 metric tons, Terathum district has 303 metric tons, Bhojpur district has 222 metric tons, Dhankuta district has 186 metric tons, Morang district has 91 metric tons Dolakha district has 70 metric tons, Gorkha district has 60 metric tons, Okhaldhunga district has 80 metric tons and Solukhumbu district has 32 metric tons of cardamom production. From the current year district of mid-west region has also started to produce large cardamom. Such as Ramechhap district has 30 metric tons, Dailekh district has annual production of 11 metric tons and Rukum district has

annual production of 10 metric tons. Cardamom is cultivated in around 39 districts of Nepal occupying an area of 14206 hectares which was decreased by 572 hectors but because of increased in productivity the total production of large cardamom has been increased by 509 metric tons in compare to last year's. (Central office of cardamom development centres Fikkal Ilam). In case of taplejung district has export cardamom to India in a range of 1755 to 2967 metric tons annually between the year 2063 to 2070 (District Office of Agriculture Taplejung).

Two species of cardamoms are being cultivated in different countries. They are - large cardamom (Amomoum Sublatum) and small cardamom (Elettaria Cardamom).

The cultivation of large cardamom began in Nepal about 760 years ago or so on. In the past, people from the eastern districts used to go to Sikkim, India during cardamom harvesting season in search of job and income opportunities. Cardamom is an important cash crop in Nepal. Out of 18 major export items, 5 are from agriculture sector. Of these, cardamom is the second largest contributor in generating foreign currency, contributing to Rs 205,212,000 (US $ 2.85 million) in the year 2011/2012.

Taplejung district of is the leader district in terms of area and production quantity of cardamom, occupying 29% of the total land area with 29.12% of the total national production in the year 2068/69. Productivity is also the highest in Taplejung with 590 kg per hectare. The average national production rate is 540 kg per hectare. Taplejung ranks first in terms of area, production and yield. Nearly 9900 households are involved in cardamom farming in Taplejung district. More than 70% of their income is yielded from cardamom farming. (District profile of Taplejung) Global product of large cardamom is around 17,100 metric tons with major contributions coming from Nepal, India, Bhutan and Indonesia. Nepal is in the lead among the cardamom producing countries. Cardamom is cultivated in marginal and degraded slopes and does not compete with other food crops. In fact, it helps in rehabilitation of degraded land. As shade loving plant, cardamom is planted under the trees and contributes to climate change.

1.1.2 Opportunities and Constraints of Large Cardamom Farming

In production of large cardamom, there are many opportunities and constraints. They are as follows:

a. Inadequate knowledge on plant protection and agronomy.
b. Inadequate knowledge and sincere adoption of best practices of cultivation system, quality improvement and post harvest treatments.
c. Lack of appropriate technology and storage facility has resulted in low quality products.

d. Farmers lack grading and packaging knowledge for standardization of the products.
e. Lack of quality dryers meeting specification to international demand and standards has hindered the price of Nepalese cardamom to the competition with Bhutanese and Indian.
f. Difficulty of small farmers to access credit and finances from formal financing institutions.
g. There is lack of financial institution floating appropriate credit facilities to the traders.
h. Limited information of international market price and prices are fluctuating and in declining manner.
i. Lack of access to market and other information is felt at all levels i.e. from traders down to the farmer's level.
j. Regional traders and exporters dictate and influence prices.
k. Lack of capability of existing co-operatives on managing cardamom business.
l. Lack of collection centers at farmers' level.
m. Lack of storage facility at farmers' and traders' level has decreased the bargaining power of the respective actors.
n. Lack of capability of support organization to provide timely and quality business services.
o. Lack of conductive policy environment for export trading.

1.1.3 Issues and Challenges

According to the farmers, about 30% of the cardamom is affected by pests and diseases locally referred as 'Chhirke' and 'Phurke'. But the government agencies have not paid attention to solve these problems. Regular fluctuation of market prices has made it difficult to determine the premium price for the improvement of quality product. Dependency in Indian market and minimum local market based marketing has become another challenging issue. Investors and banks are not

available at local level for bigger size loan. (Source: Nepalese Large Cardamom Production and Market Promotion, January 16, 2012, Kathmandu)

There are many problems associated with cardamom cultivation in Nepal. Some of the major problems are:

a. Compulsion to expand cereal product to the place which is suitable for cardamom cultivation.
b. Lack of the proper management of irrigation.
c. Lack of the protection of forest resources.
d. Lack of knowledge for share of cardamom income in the total cash income.
e. Lack of technical knowledge etc.

These are some of the vital issues; we should adopt suitable strategies for the production of large cardamom.

1.2 Statement of the Problem

The Cardamom is identified as one of the major exportable cash crops in Nepal, which has played a vital role for the economic growth and prosperity of the country because cardamom has becoming one of the major cash crops for earning foreign currency.

The cultivation of Cardamom is increasing year by year to a considerable extent in eastern hills of Nepal. But its cultivation is still limited to very few hilly districts of eastern Nepal. Nepal is the second major producer of large Cardamom after India. With the increase in demand and subsequent price of the cardamom, farmers have started more plantation of cardamom from few years.

India is the major market to export for Nepalese cardamom. More than 90% of the Nepalese cardamom is exported to India and rest is used within the country. It is reported that most of the cardamom exported to India is re-exported after certain value addition in India to Pakistan and Gulf countries. Cleaning, sorting, drying, quality grading and standard packaging are some of the major value addition activities undertaken in India. Oil is also extracted from cardamom and sold for food flavors' and fragrances. In Nepal, however, there has been neither enterprising institution to maintain Alainchi Kheti like in India nor process for value addition. Cardamom is marketed by individual farmers. Only few merchants collect the cardamom to augment the volume of business by employing agents on commission basis. No direct overseas export is tried in Nepal.

Foreign currency can play an important role for the economic prosperity. The government of Nepal has stressed on the privatization and liberal market economy for the progress of trade, commerce, and industries. This privatization and liberalized economic policy may be able to promote cardamom

export. Increased export of cardamom will help to balance the trade deficit up to certain extent if proper attention is paid to it.

It is necessary to increase the production of cardamom to increase its export. Farmers are going to increase production of cardamoms more profitable than other crops or it is a supplementary product from wasteland. More farmers can be encouraged to cultivate the cardamom if we know about the economic status of the cardamom cultivating farmers, which can be demonstrated to would be cultivators.

The historical evidences show that the advanced countries built sound economic definition by concentrating on the processing of raw materials for exports. In Nepal, large cardamom is recognized as a major exportable item to earn foreign currency. By realizing this in the eastern hilly region, first, Cardamom Development Project was established in Fikal of Ilam district to extend technical knowledge of the cardamom cultivation. Other various institutions like Agriculture Development Bank, Commercial banks, Co-operatives etc are helping farmers to take benefit by providing loan for the cultivation of the cardamom. It is also hoped that large cardamom, as an exportable item, will provide a sound base for the growth of our agriculture sector. Finally, the life standard of each Nepalese hilly farmer will be improved.

Agricultural production can be increased not only by providing suitable technical surroundings but also by providing the suitable condition for financial returns. The financial contribution of a particular crop can be assessed only after the study of the farm enterprise as a whole along with the study of the particular crop enterprise in question. We know that large cardamom is an important cash crop for the farmers in eastern hills of Nepal. But we do not know how important it is in terms of its cultivation as well as its contribution in the cash income of the farmers.

1. What percentage of total land owned and operated by the farmers is occupied by large cardamom plantation?
2. Is the area under it increasing or decreasing?
3. How much cash income is received by the farmers from cardamom?
4. What is the share of large cardamom income in the total cash income?
5. What are the main obstacles in increasing large cardamom plantation?

These are some of the vital issues, which help in the adoption of suitable strategies towards large cardamom production. This study seeks to find the answers to the above questions through the data collected from Dokhu Village Development Committee of Taplejung district in Nepal.

1.3 Objectives of the Study

The broad objective of this study is to find out the economic contribution made by the large cardamom to the farmers in eastern Nepal. The specific objectives of the study are as follows.

a. To examine the extent of the large cardamom cultivation in Dokhu VDC.
b. To indentify the contributions made by cardamom in the annual income of farmers.
c. To examine the trend in the expansion of cultivation and production of large cardamom in Doku VDC.
d. To assess the problems associated with production of cardamom in Dokhu VDC.

1.4 Importance of the Study

Cardamom cultivation is considered as an extra source of income to the farmers because the land utilized for its cultivation is marginal and not suitable for any food crops. Cardamom starts fruit bearing after 3-4 years of plantation. During that period, the farmers are not required to do anything except to manage good drainage and planting shed trees. This practice helps in the protection of soil from soil erosion. Hilly country with highly readable soil needs protection measures for soil erosion. At present, cardamom cultivation is done in eight districts of Nepal; Ilam, Panchthar, Taplejung, Terhathum, Dhankuta, Sankhuwasabha, Khotang, Bjojpur etc.

Nepal is basically a hilly country, having only a small portion of the plains the Terai. So, to improve the economy of the country, it is very essential to develop the hilly regions. According to climatic conditions of the region under study, it is suitable for large cardamom cultivation, even through is still dominated by food grain cropping pattern, which partly satisfies the basic needs of people and also the main sources of their livelihood. Therefore, it is necessary to know the situation of large cardamom farming for the performance of the study area as well as hilly region of Nepal. The main importance of this study can be stated as follows.

a. This study will be helpful for improvement and betterment of the existing economic condition of large cardamom growers who are facing different types of problem.
b. This study will be helpful to improve the cash earning of farmers who are living in the study area.
c. This study will check the shortcomings of the traditional farmers.

d. The research work will be helpful to the important plan and policies for the government and will be the knowledge base for the future researchers and others.
e. This study will be helpful to further researchers.
f. This study will be helpful to generate employment opportunities
g. This study will be helpful for protecting environment.

1.5 Limitations of the Study

The following are the limitations of the study.

a. This study covers only cardamom production of one VDC of only one district, which may not fully represent the whole large cardamom growing areas.
b. This study will not explain overall aspects of large cardamom but simply tries to show the existing production and marketing position concentrating on Dokhu VDC.

CHAPTER TWO

REVIEW OF LITERATURE

This chapter, reviews literature is related on the production, marketing, price and others factors in relation to cultivation of large cardamom in Nepal. Being new and emerging cash and export crop, sufficient literature is not available about the large cardamom farming. Available literature is limited to project papers, evaluation reports, technical studies about the cultivation and economic studies-basically thesis and reports. Some general type literature also focuses on large cardamom cultivation.

2.1. Introduction to Large Cardamom

The large cardamom is one of the oldest spices known to mankind. It was known to Greeks and Romans and was recorded by Theophrastus, the Greek philosopher as early as 4th century B. C. In botanical classification, the large cardamom belongs to zingeberaceae family. Its scientific name is Amomoum Subolatum Rox. Its Nepali name is Alaichi. It is different from small cardamom.

The large cardamom plants are grown between 500 and 1800 meters above the sea level in the slopes of the hills where plenty of drainable water is available, preferable in the north facing slopes or under the trees. Large cardamom is an aromatic crop. Its seeds are dark brown in colour, less round in shape and 3 - 4 mm in diameter. The seeds give volatile oil. Large cardamom flower in March and the fruits are matured during the humid summer monsoon period of August and September. The fruits are harvested in bunches, which contains 20 - 24 fruit capsules. The large cardamom looks like black capsule, in average 2.25 cm long (minimum 2.2 cm and maximum 2.3 cm). The temperature and rainfall requirements of the plants are 10 to 15 degrees and 1500 cm to 6200 cm annual rainfall.

Different species of large cardamom can be planted in different climatic conditions and geographical structures. There are 7 different species of large cardamom commonly found among the farmers.

a. Ramsahi
b. Golsahi
c. Dambersahi
d. Sawaney
e. Chibe
f. Jangu Golsahi

g. Varlange

Large cardamom was introduced in Ilam (Nepal) in 1865 A. D. Large cardamom, ecologically adopted to farming one sloping lands, has helped forestry system and the plants to maintain permanent green cover on forest floor since its cultivation began in Ilam district around 150 years ago. Now it has been domesticated and appreciated as low volume and high value cash crop. Cardamom farming ensures ecological stability in fragile mountain slopes by requiring farmers to maintain a good forest cover of nitrogen fixing alder trees. The establishment of Cardamom Development Centre, Pandam, Fikkal (Ilam) in 1975 paved the way for the development efforts of the government towards this crop.

2.2 Economic Contribution of Large Cardamom

Now, 37 districts grow cardamom in Nepal but more than 97% is grown in seven hilly districts of Eastern Development Region. Estimated number of farm families involved is over 33,000 and large number of population is depended directly or indirectly on cardamom farming. In the fiscal year 2069/070, total production of large cardamom is 1755 metric tons. It is generating employment for minimum of 200 to 240 days per hectors (around 2.2 to 2.64 million man days/year) farmers fetch the prices of Rs 1200 to 1300 per kg of dry cardamom. Four major districts, Taplejung, Panchthar, Illam and Sankhuwasabha grow more than 80% of the total cardamom production of Nepal.

2.4 Review of Related Literature

Agricultural Development Bank Nepal (ADB/N) 1978), a project to encourage the livestock and large cardamom farming in Ilam district, has the additional purpose for encouraging large cardamom was to help the people to utilize uncultivated land for large cardamom farming and thereby to increase the level of income of the farmers. The project found a good prospect of large cardamom cultivation due to the availability of suitable soil and good weather conditions. The project expected that the price of large cardamom was not going to be constant. In the early harvesting period, price was generally low and it sharply increased after 4 to 5 months of harvesting.

Limbu, (1996) has studied large cardamom production and marketing condition in Morang district. The purpose of the study was to explain marketing problems of the study area. He has found that the market of large cardamom of the district is not organized. Almost all the buying and selling processes take place within the district. There are transportation problems. Human porters are the main means of transportation and it takes two days to reach the market from the production area. The existence of moneylenders as dahadani system is the main source of financing in the district. It reduces the income of the farmers significantly. About one third sample households have been influenced by dahadani system. However, ADB/N and other financial institutions have started to provide loan for large cardamom farming. Because of the delay in decision making of the bank administration, farmers have to wait for long time and are compelled to take loans from moneylenders at higher rate of interest.

Mishra, (1999) has studied large cardamom farming of some selected VDCs of Dhankuta district. The purpose of the study was to find out the problems of the study area. The large cardamom marketing was similar to that of Subedi (1982). The study concluded that when ADB/N started to distribute loan in the large cardamom farming in 1985, the large cardamom production rapidly increased and people increased their confidence with in that study area.

Manandhar, (1981) has studied large cardamom farming, diseases and prevention and cure. The main purpose of his study was to provide knowledge about large cardamom cultivation, diseases and their prevention and cure as well as economic, social and environmental importance of large cardamom. He found different types of large cardamom species, which could grow in different altitudes. Large cardamom was affected by some diseases such as chhirke, Phurke, clump rot etc. Nepalese marketing system was not satisfactory. Actually, large cardamom farmers were not getting fair price. Only the traders were benefitted from it. There were many problems in large cardamom cultivation, processing and marketing.

Trade Promotion Centre, Nepal (1975) published a commodity profile on the occasion of "Export Promotion Workshop" organized in collaboration with International Trade Center, Geneva. The profile contains various problems and drawbacks for the promotion of large cardamom cultivation and its production could not increase speedily in spite of growing demand of the world market. Irrigation facilities and disease free plants were critically required to increase the large cardamom production. Packaging and storage related problems needed attention to increase export. Mid-term loan provided by the bank to the growers were supposed to promote production by improving financing system.

Bhattarai, (1978) has studied farming technology, extension of farming and marketing system of large cardamom in Nepal. He examined large cardamom farming and found large cardamom as an important cash crop in the study area. Large cardamom cultivation was started from Ilam district and extended to other districts respectively in Nepal. In the beginning, large cardamom was used by the people only as spices. Later on it established itself as a exportable cash crop and its farming has become popular among the farmers. He found that large cardamom farmers were unable to get fair price because of the land locked situation of the country.

Sharma and Purohit (1995) studied the dry matter production and nutrient cycling in agro-forestry system of large cardamom grown under Utis (Alnus Nepalese's) and natural forest. Their main objectives are that biomass, net productivity and agronomic yield in cardamom based agro-forestry system increase under the influence of alnus. They have found that farmers themselves cure the capsules of cardamom after the harvest and this process requires 70-80 kg of fuel-wood for 100 kg of cardamom curing. The higher rate of tree biomass accumulation and net primary of alnus can meet fuel-wood demand from the agro-forestry itself. However, there is no information on the management and plantation cycle of alnus as an associate species with cardamom and this warrants immediate research attention. The agro-forestry system under the influence of alnus was more productive having faster rates of nutrient cycling.

Ghimire, (1985) studied the growing condition of alnus trees over large cardamom farming in Ilam district. The main purpose of this study was to provide knowledge about the relationship between large cardamom plantation and alnus trees as the shading agent for the crop. He has found that most of the areas previously economically unproductive were planted with large cardamom and also had a positive effect in the correction of environment pollution, increasing greenery. As it became one of the important means of cash earning, even cultivated lands with low economic return gradually turned over to large cardamom cultivation. The system of large cardamom farming is extensive and its productivity and returns are valuable. The production depends on the natural factors such as quality of land, water availability, tree cover etc. The growing alnus trees have a dual role for the farmers. They provide the shade necessary for the large cardamom plants and also help earn through the sale of timber. Alnus is one of the fast growing plants and can be matured within a short period of time.

Hartkamp, (1993) studied large cardamom farming in the eastern hills of Nepal. The purpose of this study was to explain about problems of farmers and land. He has found some problems of farmers and land. Low cash income or inadequate supplies of food, fodder and firewood are amongst the most of common challenges faced by farmers especially in Nepal and other densely populated highland regions. Other constraints include shortage of shelter, water, and raw materials for cottage industry and equity or saving. On farms, trees provide firewood; reduce labor demand for wood gathering; provide livestock fodder and other economic benefits. Standing tree biomass functions as equity which can be the source of regular income. It is found that the problems of land where soil erosion, fertility decline and pasture and adjacent natural forest degradation are negative effects resulting from land use system that inadequately meet basic criteria for sustainability. Large cardamom cultivation needs the production of existing trees and plantations of new trees for shade increasing the supply of boomer for use by the farmers.

Available literature indicates that knowledge related to large cardamom cultivation, processing and marketing is still scanty in Nepal. Study undertaken by organized sector completing all aspects has not been undertaken yet. It may be due to large cardamom being competitively a new crop as well as a crop cultivated only in few districts of Nepal. As the production goes on increasing, its importance in national economy may go up and further studies by the organized sector will be undertaken to fulfill the gap in the knowledge.

Dahal, (2011) carried out a study entitled to Contribution of large cardamom farming for economic growth of framer has found more than 70% families were engaged on large cardamom farming. The large cardamom farming is providing large contribution for the survival to the villagers and it is the most important and direct source of income. However the production of large cardamom is decreasing due to various diseases. Around 30% of the crop is damaged by the diseases called chhire and phurke, Beside that he also found that there are many problems in cardamom farming like fluctuating price of large cardamom, poor knowledge about grading and packaging. He has found large cardamom is an important cash crop for the farmer. It is providing significance amount of cash

income. Its promotion in cultivation may be a key item in increasing rural income and hence alleviating rural poverty. He has recommended to the stakeholder to give attention to solve the problem of large cardamom farming. The government should make appropriate policy about the market of large cardamom.

2.5 Research Gap

Since being as emerging business, sufficient literature is not available about the large cardamom farming. Available literature is limited to project papers, evaluation reports, and technical aspect about the cultivation of large cardamom and economic studies basically thesis and reports. Very few research reports can be found about the contribution of large cardamom for economic growth of the Nepalese people. Being as a major agriculture product it has significance role for earning foreign currencies even though there is not any scientific study related to large cardamom. There are some academic research reports but most of them have followed the same trend and presentation as previous thesis. They are not sufficient to fulfill the gap of time and its changing impact of large cardamom to the total income of the Nepalese people. There has been a gap of time which differentiates the research before and after. Till the date, numbers of research have been done even though this thesis has been carried out in order to get exact outcomes of the today's scenario.

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Design

Research design is the conceptual structure within which research is conducted. It contributes the blueprint for the collection, measurement and qualities of data. (C.R. Kothari)

In every research activity, research design is necessary, which fulfills the objective of the study. Generally research design means, definite procedure and technique which guide to study and propounds ways for research viability. The main objective of the study is to present and analyze contribution of large cardamom and identify the problems associated in cardamom farming for economic growth of farmer. For that purpose of the research this study is designed under descriptive and analytical method.

3.2 Sources of Data

The study is based mainly on primary data collected from the household respondents of Dokhu VDC. There are two types of primary data, the first one is obtained from the household respondents and the second is obtained from field observation. The data related to cultivation, price, production and marketing aspect are collected from household respondents in the field. In the same way the data related with environmental aspect, distribution aspect, and assistance aspect are collected by observation from the field.

Necessary secondary data have also been used in this study. Specially, secondary data are used to understand about overall situation of large cardamom farming in Nepal. They are collected from different books, statistical records, research reports and papers published by different offices and institutions. Tribhuvan University Central Library, Trade Promotion center, Center for Economic Development and Administration and Agricultural Project Service Center are other sources of secondary data.

3.3 Selection of Sample

The entire farmers who cultivate large cardamom in Nepal are considered as the population of the study. To make the study more meaningful, only those cardamom cultivators who have one ropani or more land are considered in the population. Since the population is very large, Dokhu VDC is taken as the sample for this study. There are around 665 households in the VDC who have more than one ropani of cardamom cultivated land. Out of them only 55 farmers are taken as sample respondent of this study. The brief description of sample according to ward number are given in the table 3.1 as below,

Table 3.1

Sample Households in Different Wards

Ward no.	No of sample respondents	Percentage
1	5	9.09
2	4	7.27
3	8	14.55
4	7	12.73
5	6	10.91
6	8	14.55
7	7	12.73
8	6	10.91
9	4	7.27
Total	**55**	**100**

3.4 Methods of Data Collection

A. Primary Data Collection

Primary data has been collected by administrating well structured, pre-tested questionnaires to the head of sample households. Interviewing has been done by the researcher himself. The questionnaire contained questions on cultivation, marketing, production, price, disease and problems faced by the farmers while producing large cardamom. Other questions asked to the farmers included the area and production of other cereal crops, the income from various agricultural sources and the expectations of the farmers from government agencies for large cardamom cultivation. A questionnaire is attached in Appendix 1. Due to the lack of education as well as unavailability of written records the responses made by the farmers were based on their memory recollection.

B. Secondary Data Collection

Current available literature and the reports of various studies which highlight some aspects of large cardamom farming in Nepal include.

1. Published Books
2. Articles

3. Official document
4. Unpublished reports, Various journal
5. District Agricultural Development office, Taplejung
6. District Forest office, Taplejung
7. Library
8. Central Bureau of Statistics (CBS), Nepal

3.5 Statistical Tools

Various statistical tools are used to analyze the data obtained. The analysis is mainly focused on the production income and costs of large cardamom have been collected for two years and cost and returns form alternative crops (paddy, maize, millet wheat/barley, potato) are collected for two years. The statistical Measures such as pie diagram, measures of central tendency, dispersion are used. The following are the specific statistical tools that have been utilized in the analysis.

A. Arithmetic Mean

Arithmetic mean or simply mean of the set of observations is the sum of all the observations divided by the number of observations. In case of individual series, using direct Method, the following formula is used.

$$\text{Mean } \overline{X} = \frac{\Sigma X}{N}$$

Where, $\overline{X}$ stands for arithmetic mean of simply mean.

N stands for total number of observations.

X stands for variables.

In case of discrete and continuous series, the arithmetic mean can be calculated using the following formula.

$$\text{Mean } \overline{X} = \frac{\Sigma fm}{N}$$

Where, m = mid value of continuous series

f = frequency

$$\text{or, Mean } \overline{X} = A + \frac{\Sigma fd^1}{N}$$

Where A= Assumed mean,

$d^1 = X - \overline{X}$

$$\text{or, Mean } \overline{X} = A + \frac{\Sigma fd^1}{N} \times i$$

Where $d^1 = \frac{X-A}{i}$ and

i = class interval

B. Standard Deviation

Standard Deviation (S.D.) is defined as the positive square root of the mean of the squares of the deviations taken from the arithmetic mean. It is generally denoted by sigma (σ).

Thus, for individual series, $\sigma = \sqrt{\frac{\Sigma(X-\overline{X})^2}{N}}$

Where, N = number of observations

For discrete and continuous series, $\sigma = \sqrt{\frac{\Sigma f(X-\overline{X})^2}{N}}$

or, $\sigma = \sqrt{\frac{\Sigma fd'^2}{N} - \left(\frac{\Sigma fd'}{N}\right)^2} \times i$

Where f = frequency

N = total frequency

X = mid value of classes for continuous series

$d' = \frac{X-\overline{X}}{i}$

i = width of the class

$\overline{X}$ = mean

The relative measure of dispersion based on the standard deviation is known as the co-efficient of standard deviation.

Therefore, co-efficient of standard deviation = $\frac{S.D.}{Mean} = \frac{\sigma}{\overline{X}}$

The co-efficient of standard deviation multiplied by 100 gives co-efficient of variation (C.V.)

$C.V. = \frac{S.D.}{Mean} \times 100$

Two or more distributions can be compared better with the help of C.V. for their variability. Smaller the C.V., more will be the uniformity and consistency and greater the C.V. less will be the uniformity and consistency.

C. Range

Range is defined as the difference between the largest item and the smallest item in the set of observations. So, in the set of observations, if L is the largest item and S is the smallest item, the range is defined by Range = L - S.

In a group frequency distribution, range is the difference between the upper limit of the largest class and the lower limit of the smallest class.

Co-efficient of Range = $\frac{L-S}{L+S}$

D. Bar Diagram

Bar diagrams are one of the most commonly used and the easiest methods of presenting the data. Bar diagrams consist of a set of rectangles one for each set of data in which the magnitudes of values are presented by the length (height).

The various types of bar diagrams are as follows.

a. Simple bar diagram
b. Sub-divided or component bar diagram
c. Percentage bar diagram
d. Multiple bar diagram

E. Multiple Bar-Diagram

It is one dimensional bar diagram. When two or more variables are to be compared at the same time, we draw multiple bar diagram. In a multiple bar diagram, two or more sets of interrelated data are presented. In a multiple bar diagram, a set of adjacent bars is drawn. In order to differentiate bars, different colours or shades are used. A proper index must be given.

F. Pie Diagram

Pie diagram is a diagram in the form of a circle whose area represents the total value. The diagram divided into different sectors by radial lines such that the area of each of the sectors represents the comment value of total value is called pie diagram. As in case of a sub- divided bar diagram, pie diagram is used to show the relation between the components with one another and also to be total. In pie diagram, the areas are compared. So, pie diagram is a two dimensional diagram. It is also known as pie chart or angular diagram.

G. Trend Line

Trend line is used to analyse the time series data. The most objective method to analyse the time series is to use the least square method to estimate the trend.

The trend line between independent variable y (year), and the dependent variable x (production, productivity) is given by y=a + bx ……..(i) where a is the y-intercept and b is the rate of growth.

The values of a and b can be estimated by solving the following normal equations,

$\Sigma y = na + bx$ …… (ii)

$\Sigma xy = a\Sigma x + b\Sigma x^2$ …….(iii) where n refers to number of years.

CHAPTER IV

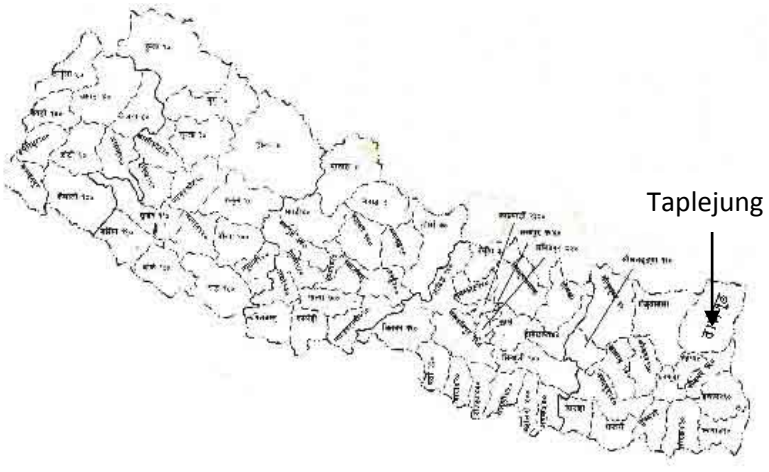
DATA PRESENTATION AND ANALYSIS

This is the main chapter of any research work. Into this, data are collected and managed for research purpose. They are analyzed and interpreted with the help of appropriate tools and techniques as per research nature and need and as described into chapter third. The concern is given into presentation and analysis part in detail. As data presentation and analysis is crucial part of any research, purpose is to organize collected data to assure an easy and understandable presentation. So, for each and every research work the important of this chapter is most. Because on the basis of this analysis made on chapter findings are obtained. Based on those findings recommendations have been derived and future guidelines are got. It is so obvious that the presentation of the data and its analysis help us to draw valid conclusion.

4.1 Presentation of secondary data

4.1.1 Profile of Taplejung District

The study has been conducted in Dokhu VDC of Taplejung district. This district is located in northeastern part of the country.



Taplejung district is located at 80^0 32' to 88^0 15' east longitude and 10^0 15' to 27^0 56' north latitude. The altitude of this district varies from 777 meters to 8598 metres above the sea level. The highest peak of this district is Kanchenjunga, which is the 3rd highest peak in the world. The district is also famous because of the Tiptala Falls and Phungphunge Falls, which are the pearls of the eyes of the tourists. The district is surrounded by Tibet in the north, Sikkim of India in the east, Sankhuwasabha and Terhathum districts in the west and Panchthar

district in the south. The total area of Taplejung district is 3,63,700 hectares. Out of the total area, 1,55,019 hectares of land is covered with forests, 35,384 hectares is pasture land and cultivated land is about 27,551 hectares. 1,52,836 hectares of land is in miscellaneous use.

According to the national census 2068 the total population of this district is 1 27461. The distribution of population is given below in the table.

Table 4.1

Sex Wise Distribution of Population of Taplejung District

Description	Population	Percentage
Male	60552	47.50%
Female	66909	52.50%
Total	127461	100%

Source: CBS, 2068

Table 4.1 shows, total population of Taplejung district is 127461 which consists of 60552 male populations and 66909 female populations. In Taplejung district Limbu is the dominant caste in this district. Limbu, Brahmin, Chhetri, Tamang, Kami, Damai, Gurung have been settled in the middle and low land areas of the districts. In the high Himalayan range the settlement of Sherpas is predominant.

4.1.2 Popular Places of Taplejung District

A. Pathivara

Pathivara temple is a religious place situated in the north-east of the district. It lies between Lingkhim VDC and Phawa Khola VDC. It is about 20 km north of the district headquarters, Phungling bazaar. It is situated at the summit of a mountain at the height of 3794 meters from the sea level. The summit looks like a 'pathi', traditional measuring pot, which is filled with grain. So it is called Pathivara. The temple is on the lap of Mt. Kanchanjungha. The temple has a great religious value and pilgrims from different parts of Nepal and India visit the temple. The top of the hill is covered with snow during the winter. It is also an attraction of the nature lovers because the scenery while the sun shines is charming. Mountain Kanchanjungha and Kumbhakarna can be viewed as if as far as a stone's throw. The access to Pathivara is easy. One can have a trek from Fungling Bazar for about 6 hours or land at Suketar airport and go on foot for about 5 hours. A nice foot trail is built that leads to Pathivara temple. On the way huts and shelters are made for night haultage. It is believed that one's desires are fulfilled after the pilgrimage to Pathivara.

B. Olangchung Gola

Olangchung Gola is one of the main places of northern Nepal. It is at the height of 3240 metres from the sea level. It is a small high land market on the bank of Tamor River. It is about 40 kilometres from

the district headquarters of Taplejung. Nearly 60 families, mainly Sherpas, live in this area. Most of the families raise sheep and yaks. They produce carpets, chhurpi (a product of dried whey) etc. The village lies on the route that goes cross country, to Tibet of china. It is about two day's trek from Olangchung to reach Riu, a small market in the Chinese territory.

C. Phungling Bazar

Phungling Bazar is the district headquarters of Taplejung district. It is also a commercial centre of the area. Every Saturdayand Tuesday, there is a haat bazaar and people from the distant villages of the district come to Phungling for shopping. Local products like potatoes, vegetables, fruits etc are sold and people purchase clothes, salt, kerosene and other goods of daily use.

4.1.3 Physical Facilities

A. Transportation

Mechi Highway from Charali (Jhapa distirct) reaches to the district headquarters through Ilam and Pachather district. The road is black topped from Jhapa to Taplejung. It is about 8 hour's drive from Birtamode, the commercial centre of Eastern Nepal, to reach Taplejung.

B. Communication

Taplejung district is facilitated with different means of communication. In this regard, the availability of telephone service and postal service are remarkable. Nepal Telecom has provided PSTN, GSM and CDMA service to the customers. These services cover the total areas of the district. NCELL of Spice Nepal has also extended its mobile services in the district. Almost in every VDC, there are post offices and people can easily have an access to the postal service.

4.1.3 Climatic Condition of Taplejung District

The climate varies from sub-tropical to temperate. The vegetation of the district is diverse and varies along with the climate. The average annual rainfall and temperature of the district headquarters is given in the table.

Table 4.2

Average monthly rainfall and temperature of Phungling Taplejung 2068/69

Month	Maximum Temperature (^{0}C)	Minimum Temperature (^{0}C)	Rainfall (mm)
January	16.7	5.0	0.0
February	19.5	9.6	7.5
March	21.0	9.3	35.0
April	23.3	12.0	18.0

May	24.9	15.6	123.0
June	25.0	17.6	240.1
July	25.6	18.0	307.6
August	26.3	18.3	333.6
September	26.2	17.3	206.8
October	22.1	12.8	37.8
November	19.5	5.1	0.4
December	16.8	5.0	1.5

Source: District Climate Department, Taplejung, 2068/69

Table 4.2 shows that, most of the rainfall occurs in monsoon seasons in the month of June, July and August. The temperature is lower in the month of December and January. Otherwise the temperature distribution is mild. This rainfall and temperature is suitable for the cultivation so large cardamom.

4.1.2 Profile of Dokhu VDC

Dokhu VDC is located in the Eastern part of the district. Dokhu is surrounded by Phungling in the north, Nangkholing VDC in the east, Teringe VDC in the west and Tamber river in south. The temperature and rainfall of Doku VDC is similar to the temperature and rainfall of Phungling district headquarters.

4.1.2.1

Vegetation

The natural vegetation of a locality depends on climate, soil, topography etc. Dokhu VDC is a typical hilly VDC in eastern Nepal. The altitude of Dokhu VDC varies from 300 to 10253 feet from the sea level. The climate is sub-tropical and as a hilly area, it is gently sloped area with streams and gullies. The deciduous type of natural vegetation is the dominant factor. Land is terraced for the purpose of cultivation.

4.1.2.2 Land use

The use of the land depends on the type of the land available as well the different uses under which the available land needs to be distributed. The available land type of Dokhu VDC is given in the table.

Table 4.3

The Land Use Type of the Sample Households in Dokhu

Land use type	Area (Ropani)	Percent
Khet (low land)	525	55.73
Bari (upland)	315	33.43
Pasture land	70	7.43
Wetland	32	3.39

Total	942	100

Source: Field Survey, 2013

The table 4.3 shows that Khet is the most dominant land type. It is comparatively more fertile and irrigated land suitable for cultivation of paddy and wheat. Bari or upland is second most important type which is un-irrigated and used for cultivation of maize and millets. Pasture land is generality Bari but not suitable for crop production. Pasture and wetland are marginal lands. Large cardamom is suitably grown in the marginal land and expanded to other prime land as the income from large cardamom increases.

4.1.2.3 Socio-economic Settings of the Study Area

The total number of household and total population in Dokhu VDC is given as follows.

Table 4.4

Population and Households of Dokhu VDC, 2068

House holds	Population		
	Total	Male	Female
665	3808	1903	1905

Source: National Population Census, 2068

As per the table 4.4, the total population of 3,808 is distributed in 665 households in Dokhu VDC. The average size of family is 5.73 and about 50.03 percent of the family members are female.

4.1.2.4 Occupational Structure

Agriculture is the dominant occupation in this area. Agriculture is supplemented by other occupations such as business, government services and non-government service. The occupations of the sample households are as follows:

Table 4.5

Occupational Structure of the Sample Households

Occupation	Number	Percent
Agriculture	55	100
Agriculture aided by government services	29	52.73
Agriculture aided by NGO service	8	14.54
Agriculture aided by business	13	23.64
Others	5	9.09

Source: Field Survey, 2013

According to the table 4.5, about 100 percent households are engaged in agriculture. These households produce different products such as paddy, maize, millet, large cardamom and vegetables. Some are engaged in livestock farming produce meat, milk, and honey and so on. At about 65percent of sample households some members of the family are engaged in government and

non-government services and supplement their family income by salary services. About 23.64 percent have engaged in some short of patty business to supplement their family income.

4.1.2.5 Size of Land Holding

Farmers in this locality hold different types of land. The prime land in the low land (irrigated land) also known as khet is use for cultivation of rice. Up land as known as Bari and it is used for upland crops such as maize mustard potato millet etc. Plantation crops such as tea, sugarcane, fruits and vegetables are also planted in upland. Cardamom is primarily cultivated in the wasteland, which is near the streams, covered by fodder and fuel wood trees. For the purpose of this study the farmers were separately asked to provide area of land under their occupancy and operation summation of all the area believing to the farmer as Khet (low land) Bari (up land), charan (pasture) and sim (waste and marshy or muddy land) gives the total area of the size holding of the farmer. No distinction was made for owned or rented land.

4.1.2.6 Annual Cash Income

Farmer receives income by taking different enterprises. The sources of agricultural income of the farmers were divided into two different sources adopted in this study. First production of main cereal crops such as rice, maize, potato, wheat and millet were obtained by asking the farmers in local units. It was multiplied by local prevailing price to obtain income from crops. The annual income from livestock raising and fruit and vegetable productions was asked separately income from large cardamom production was asked. Total income of the farmer is calculated by adding all the income. Farmers do not include home consumed items to calculate cash income. So, moderation was not given to total population but only to the produce which was converted into cash.

4.1.3 Export of Large Cardamom

Large cardamom is an important exportable cash crop in Nepal with an annual production in a range of 2967 to 1755 metric tons per year. Almost entire production is exported, about 90% to India. The export of large cardamom to India in different years is given below in the table 4.6.

Table 4.6

Export of Large Cardamom

Year	Quantity (MT)	Value (Rs Million)
2063-064	2967	3560.4
2064-065	1992	2390.4
2065-066	2021	2425.2
2066-067	1755	2106
2067-068	1755	2106
2068-069	1901	2281.2

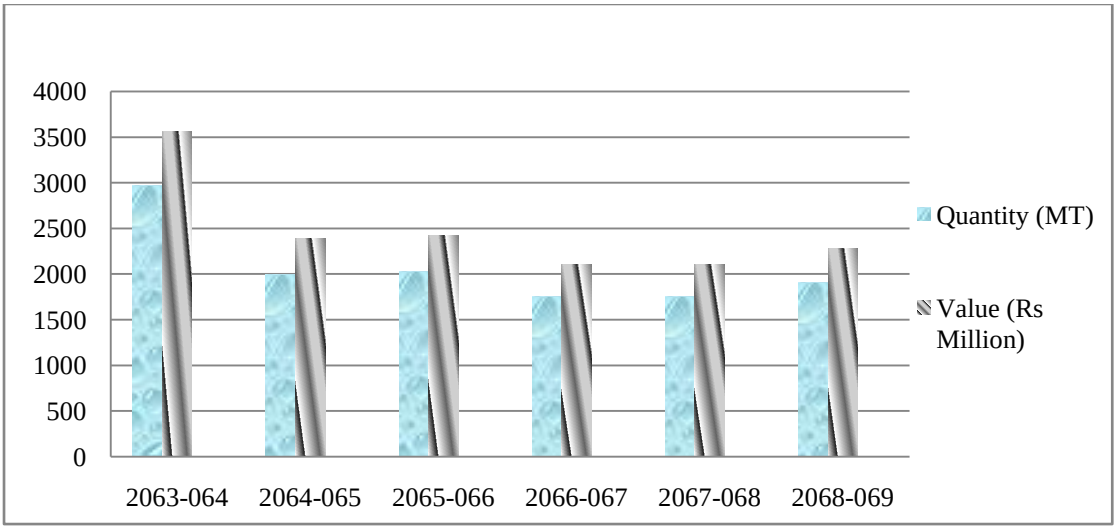
2069-070	1755	2106
Average	2020.86	2425.03

Source: Taplejung Chamber of Commerce and Industry (2070)

The table 4.6 shows that the quantity exports of large cardamom. In year 2063/04 total export of large cardamom is 2967 metric tons. Similarly in the year 2064/06, 2065/066, 25066/067, 2067/068, 2068/069 and 2069/70 are 1992, 2021, 1755, 1755, 1901 and 1755. Similarly values of those cardamoms are 3560.4, 2390.4, 2425.2, 2106, 2106, 2281.2 and 2106 in the year 2063-064, 2064-065, 2065-066, 2066-067, 2067-068, 2068-069 and 2069-070 respectively. The average production of large cardamom is 2020.86 metric tons and average value of the total production is Rs 2425.03 This data is further presented in the figure as below,

Figure 4.1

Export of Large Cardamom



4.1.4 Area under Large Cardamom Cultivation

Large cardamom as explained above is cultivated in the marginal land near the streams and under the shaded trees. Farmers were asked to estimate the total area of large cardamom plantation. They reported it in ropani (5329 sq. fit). The area estimated is quite accurate because the farmers know the number of large cardamom planted by them and the number of plants that can be landed in one ropani.

The extent of large cardamom cultivation in terms of the types of land available, first marginal land will be selected for large cardamom cultivation. All land occupied by the farmer may not be suited for cardamom cultivation. The return from cardamom cultivation is higher than other crops; farmers will try to expand area under cardamom. Finally the extent of large cardamom cultivation can also be accessed through the percentage of income contributed by cardamom in the total income of the farmers. Both of these issues i.e. land area, as well income will be analyzed.

4.1.5 Production Large Cardamom Cultivation

Level of production of large cardamom by the farmers is given in man, a local unit of measurement equaling 40 kilograms for practical purpose. Raw cardamom, when cured and packed for marketing is weighted in man and sold. Thus farmer knows their production

Trend analysis refers to increase/decrease in the area or the income of the farmers. Increase or decrease depends on several factors related to cultivation of the crop including weather, diseases and availability of inputs as well as the price of large cardamom. It is not the scope of the study to compare these factors. Simply changes in the area will be compared in two different years to indicate the trend. The contribution made by large cardamom in total income can also vary in different years. The variation may occur because of increase or decrease of area or the price of the large cardamom received by the farmers. The change in the price is not the scope of the study. Only changes in total income in two different years will be compared. The total production of large cardamom in different VDCs of Taplejung district is given below in the table 4.7.

Table 4.7

Production of Large Cardamom in Taplejung District in 2069/070

S.N.	V.D.C.	Area of Production (hec)	Production (MT)
1	Sadewa	90	47.18
2	Kalikhola	75	39.31
3	Surumkhim	410	214.91
4	Mehele	194	101.69
5	Tellok	258	135.24
6	Sikaicha	248	130
7	Ambegudin	78	40.88
8	Angkhop	32	16.77
9	Limbudin	128	67.09
10	Sablakhu	68	35.64
11	Sinam	15	7.86
12	Thumbedin	10	5.24
13	Dumbrise	25	13.1
14	Thechambu	25	13.1
15	Nangkholyang	45	23.59
16	Tiringe	50	26.21
17	Phurumbu	35	18.35
18	Limgkhim	53	27.78
19	Tapethok	25	13.1
20	Lelep	35	18.35
21	Ikhabu	90	47.18
22	Khejenim	210	110.08
23	Khokling	10	5.24
24	Chaksibote	7	3.67

25	Phawakhola	33	17.3
26	Libang	82	42.98
27	Lingtep	18	9.44
28	Thukimba	53	27.78
29	Sanwa	95	49.8
30	Papung	20	10.48
31	Nalbu	56	29.35
32	Thinglabu	20	10.48
33	Santhakra	15	7.86
34	Khamlung	6	3.15
35	Dhunge Sanghu	55	28.83
36	Change	15	7.6
37	Hangpang	65	34.07
38	Phulbari	48	25.16
39	Niguradin	22	11.53
40	Phakumba	145	76
41	Sanghu	78	40.88
42	Khewang	201	105.36
43	Yamphudin	88	46.13
44	Mamankhe	194	101.69
45	Pedang	42	22.02
46	Phungling	75	39.31
47	Hangdewa	48	25.16
48	Dokhu	25	13.1
49	Sawadin	85	44.56
50	Olangchung Gola	0	0
	Total	3800	1991.6

Source: District Agriculture Office, Taplejung, Annual Agricultural Report, 2069/070

The table 4.7 shows that the total area covered by large cardamom is 3800 hectares. The total production of large cardamom is 1991.6 metric tons which shows the productivity of 0.69. Large cardamom is cultivated almost in the VDCs of this district except Olangchung Gola. The highest production in the district is in Surumkhim and the lowest production is in Khamlung. The greatest cultivation area is in Surumkhim and the smallest cultivation area is in Khamlung. The main large cardamom producing VDCs are Surunkhim, Mehele, Tellok, Sikaicha, Limbudin, Khejenim, Pakumba, Khewang and Mamangkhe.

4.1.6 Production of Large Cardamom Cultivation in Taplejung District

Taplejung is most popular for large cardamom cultivation. In compare to other district of Nepal production of large cardamom is highest in Teplejung district. With regard to area and production of large cardamom cultivation, table 4.8 shows the area of land and production of large cardamom of last five different years as following.

Table 4.8

Area of Land and Cardamom Production in Taplejung District (2065/66 - 2069/70)

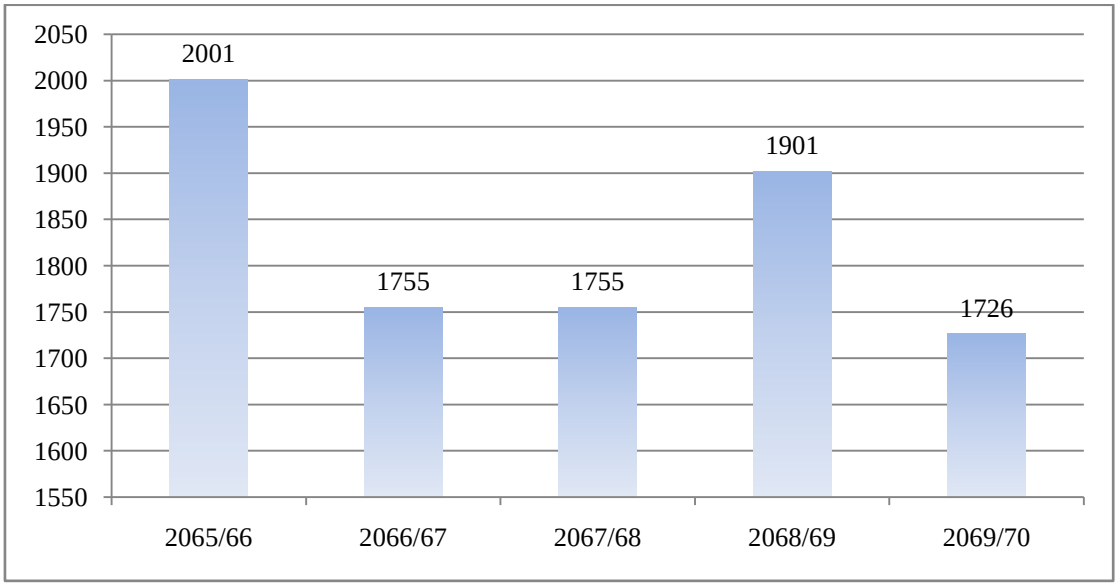
Year	2065/66	2066/67	2067/68	2068/69	2069/70
Area of Land (Hectares)	3500	3550	3900	3900	3900
Production (MT)	2021	1755	1755	1901	1726
Productivity (Mt/Hec)	0.57	0.49	0.45	0.48	0.44

Source: District Agriculture Office, Taplejung (2013)

Table 4.8 shows that, area of land is increasing in trend in three years of period but it is stable in last three year, whereas production of large cardamom is in fluctuating trend. In the year 2065/66, total production of large cardamom is 2021 MT but it is decreased to 1755 MT in the year 2066/67. Same quantity of production was in the year 2067/68 but it is increased to 1901 MT in the year 2068/69. Again in the year 2069/70 total production of large cardamom is decreased to 1726 MT. This data is further presented in the figure as below

Figure 4.2

Cardamom Production in Taplejung District



4.1.7 Production of Large Cardamom in the Study Area

The data showing the production of large cardamom in the study area in the last five years has been presented in the table below.

Table 4.9

Production of Large Cardamom in the Study Area

Year	2065/66	2066/67	2067/68	2068/69	2069/70
Production Area (hectare)	30	30	30	30	30
Production (MT)	15.54	13.5	15.54	15.94	25.98
Productivity (MT/hec)	0.518	0.45	0.518	0.531	0.866

Source: District Agriculture Office, Taplejung, 2013

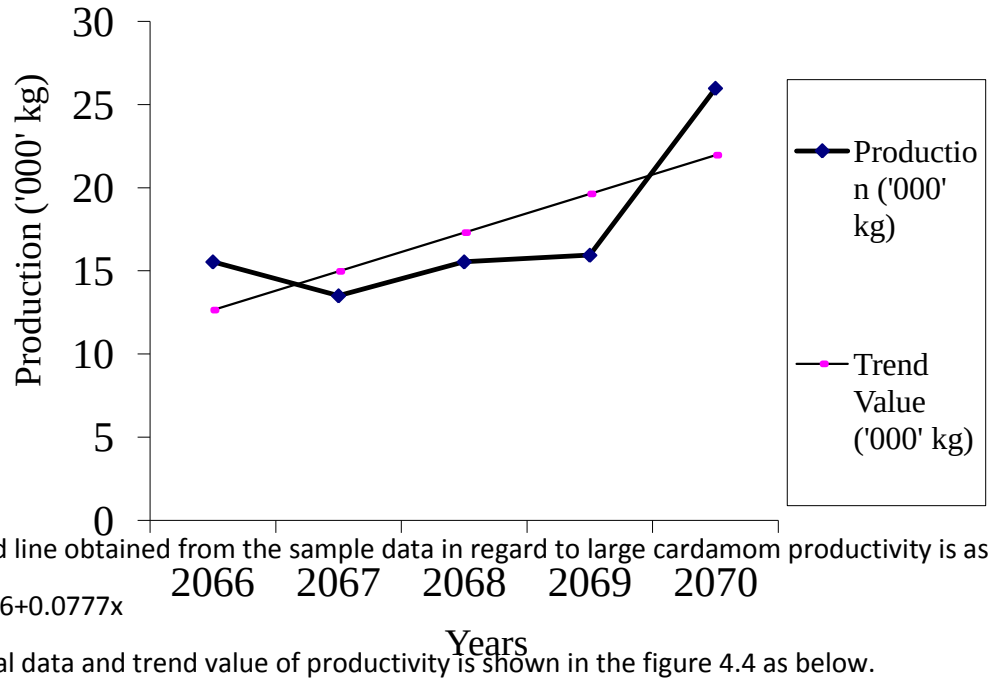
The table 4.9 shows that, area for cultivation of large cardamom stable during the years 2065/66, 2066/67, 2067/68, 2068/2069 and 2069/207. Whereas productions of large cardamom are 15.54, 13.5, 15.54, 15.94 and 15.98 metric tons in the year 2065/66, 2066/67, 2067/68, 2068/2069 and 2069/207 respectively. It shows the productivity of large cardamom is fluctuating. The productivity of large cardamom is 0.518, 0.45, 0.518, 0.531 and 0.866 in the year 2065/66, 2066/67, 2067/68, 2068/2069 and 2069/207 respectively. The trend line obtained from the sample data in regard to large cardamom production is as follows:

y = 17.3 + 2.332x

The actual data and trend value of production is shown in the figure 4.3

Figure 4.3

Trend of Large Cardamom Production in Dokhu VDC



The trend line obtained from the sample data in regard to large cardamom productivity is as follows:

y =0 .5766+0.0777x

The actual data and trend value of productivity is shown in the figure 4.4 as below.

Figure 4.4

Trend of Productivity of Large Cardamom in DOKHU VDC

4.2 Presentation of Primary Data

4.2.1 Income Received from Large Cardamom by the sample respondents Households

In order to find out the average income received from large cardamom by the sample households, 55 sample household respondents were asked to provide information for recent 2 years. Their responses and the frequencies distribution, average and measures for dispersion are given below.

Table 4.10

Frequency distribution average and standard deviation

Income in Rs (000)	No of respondents	
	2069	2070
0 – 20	14	12
20 – 40	9	10
40 – 60	12	11
60 – 80	5	7
80 – 100	6	5
100 – 120	3	4
120 – 140	3	3
140 – 160	2	1
160 – 180	1	2
Total	55	55
Mean	56.18	58.72
S.D	43.54	43.1
C.V	77.5%	73.39%

Source: Field survey, 2013

Formula used

$\overline{X} = A + \frac{\Sigma fd^1}{N} \times i$

S.D. = $\sqrt{\frac{\Sigma fd'^2}{N} - \left(\frac{\Sigma fd'}{N}\right)^2} \times i$

C.V. = $\frac{\sigma}{\bar{X}} \times 100\%$

Table 4.10 shows, average incomes received from large cardamom are Rs 56.18 in 2069 B.S. and Rs 58.72 thousands in 2070. The standard deviation of the sample households in the year 2069B.S is 43.54 and 43.1 thousands in 2070 B.S. The co-efficient of variation are 77.5% and 73.39% for the respective years.

4.2.2 Quality and Quantity of Land of Sample Respondents Farmers

To assess the quality and quantity of land held by the sample farmers, they are asked to provide the information related to quantity of land held under different categories. Type of land gives the quality of land and area of land area in ropani gives the quality of land. The analysis of the data obtained is given in the following table.

Table 4.11

Different Quality and Quantity of Land Held by Sample Farmers in DOKHU

Types of land	Land		
	Area (ropani)	Percentage	Degree
Low land (Khet)	525	55.74	200.6
Upland (Bari)	315	33.44	120.4
Pasture land	70	7.43	26.8
Wet land	32	3.39	12.2
Total	942	100	360.0

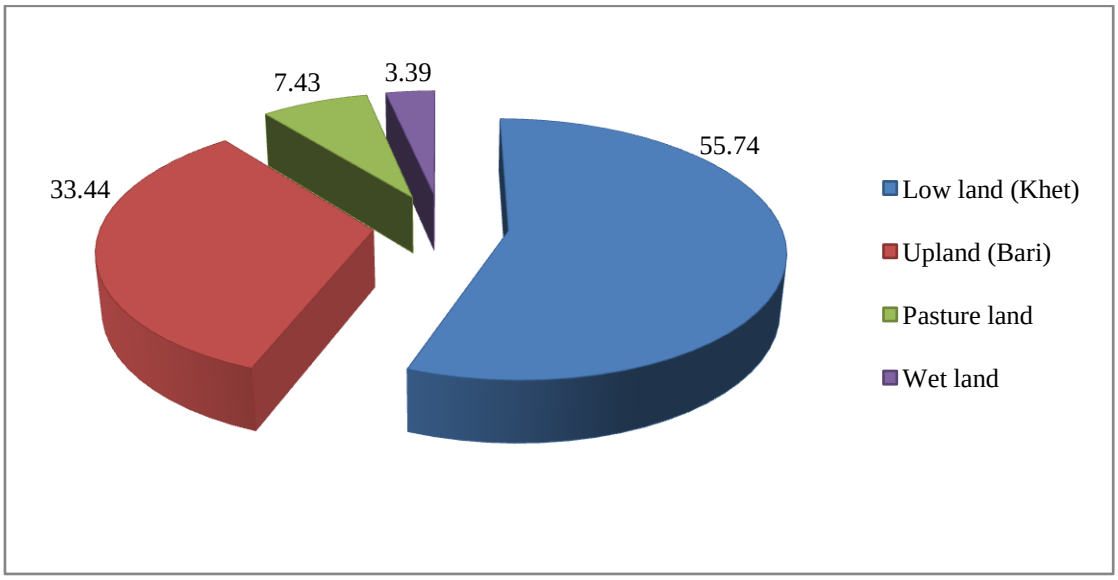
Source: Field Survey, 2013

According to the table 4.11, total land held by sample farmers was 942 ropani. If concerted into average size of holding it comes to 17.12 ropani per simple farmer. The dominant type of land type was low land (55.73%). This type of land is used for the cultivation of paddy prime agricultural product. Upland was next to it with 33.43 percent of total area. Pasture wetland was about 7.43 percent of total. Large cardamom is generally cultivated in marginal land, which includes upland,

pasture, wetland etc. Lowland, which is prime land, is planted with cardamom only at last. This data can be further presented in a pie diagram as follows

Figure 4.5

Different Quality and Quantity of Land Held by Sample Farmers in Dokhu



4.2.3 Area of Cardamom Cultivation of Sample Respondents

The area of land under large cardamom in two different years is given in the following table.

Table 4.12

Area of Cardamom cultivation by Sample Households in two Different Production Years in Dokhu

Year	Qty of land ropani	Percentage of total land
2069	296.5	31.48
2070	315	33.43

Source: DOKHU VDC Office, Field Survey, 2013

Table 4.12 shows that, in Dokhu VDC large cardamom cultivated in 296.5 ropanies in the year 2069 and which increased to 315.0 ropanies in the year 2070. Out of total land (942 ropanies) land hold by the sample households are 31.48 and 33.43 percent of the total land. The increased planted area of large cardamom is 18.5 ropanies, which indicates 18.5 percent growth rate. It shows that the growth in production is very fast.

4.2.4 Average Production of Large Cardamom of Sample Respondents

The production of large cardamom differs in different years. The production of large cardamom for large and small farmers is also different. To estimate the production pattern of different farmers, the farmers are classified into four different categories. Small farmers are those who has total land less than 10 ropanies. Large farmers are those who own more than 40 ropanies of land. Other two groups are in between. Average planted area, average production of different group of farmers in two different production years are given in the following table 4.13 as below.

Table 4.13

Land Holding and Cardamom Cultivation Production of Different Kinds of Farmers in DOKHU VDC

Total Land Hold by sample respondents	Cardamom Cultivation				
	No. of HH	2069		2070	
		Average cardamom planted area (Ropani)	Average production (kg)	Average cardamom planted (Ropani)	Average Production (kg)
<10 ropani	12	5.27	178.75	5.38	216.67
10 - 20	27	6.39	145.43	7.12	168.46
20 - 40	13	7.27	165.65	7.5	135.35
>40 ropani	3	12.5	340.00	13.5	280.00
Average	-	6.4	182.67	7.3	192.84

Source: Field Survey, 2013

According to the table 4.13, farmers holding less than 10 ropanis of land have average cardamom planted area are 5.27 ropanies and average production is 178.75 kg in the year 2069 but it is increased to 5.38 ropani and 216 kgs in the year 2070. Similarly in the year 2069, farmers holding total land of 10-20 ropanis have average 6.39 ropani cardamom planted area and 145.43 kgs of large cardamom production but it is increased to average land of 7.12 ropani and 168.46 kgs of production. Similarly in the year 2069, farmers holding total of 20-40 ropani land area have average 13 ropani of lagre cardamom cultivated land and 165.65 kgs of production. Total large cardamom cultivated land is increased to 7.5 ropani in the year 2070 on the contrary production of large cardamom is decreased to 135.35 kgs in the year. It show productivity of land is decreased. Similarly in the year 2069, farmers holding more than 40 ropani have 12.5 ropani of large cardamom cultivated land whereas they have produced 340 kgs of large cardamom. But in the year 2070 it is increased to 13.5 ropani on the contrary production level is decreased to 280 kgs.

4.2.5 Production of the Other Different Crops of Sample respondents

The main crops of the sample farmer of Dokhu VDC are; paddy, maize, millet and wheat. Paddy is the main crop which is grown in low land. The production of the other crops (except large cardamom) in two different years is presented in the table 4.14.

Table 4.14

Production of Different Crops by Sample Farmers in Different Years DOKHU VDC

Type of Production	Production in (40kgs)	
	2069	2070
Paddy	545	563
Maize	162	184
Millet	1182	1205
Wheat/Barley	68	72
Potato	260	273
Others	-	-
Total	2217	2297

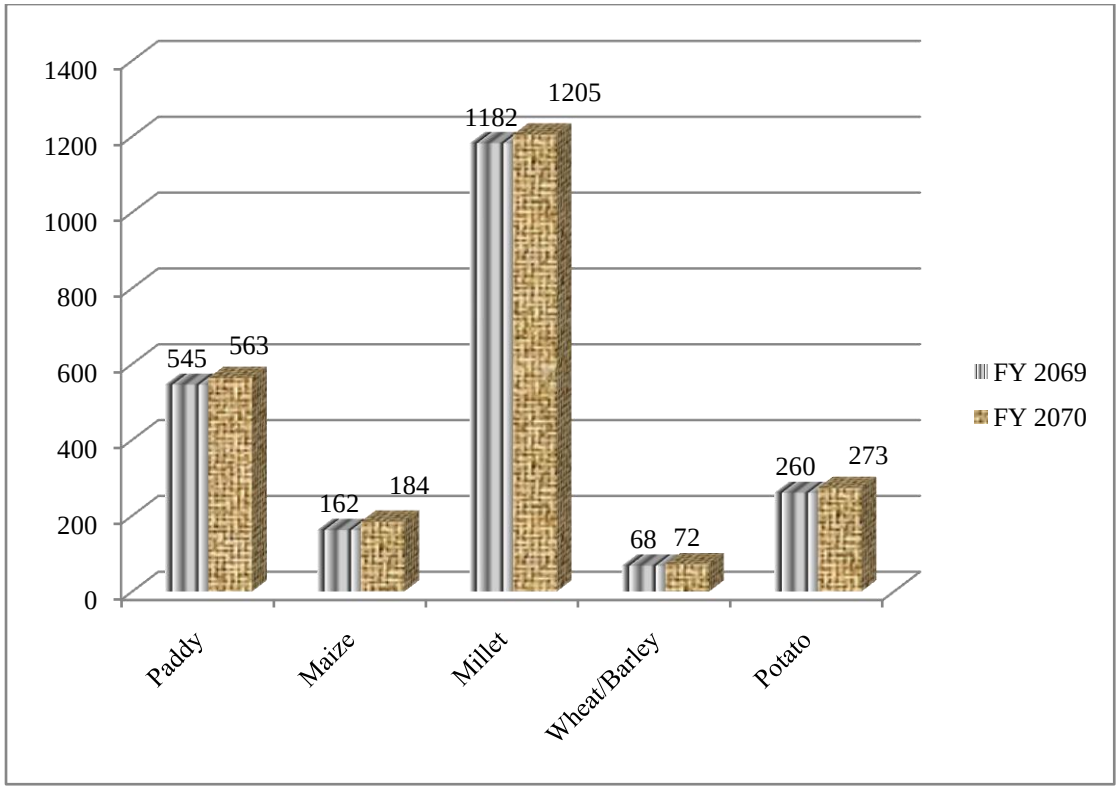
Source: Field Survey, 2013

Table 4.14 shows that, the highest amount of production is millet and the lowest amount of production is wheat/ barley. The production of main crop was increased in the year 2070 in compare with the previous year. Majority of the cereal crops produced by the sample household is consumed within the household. Only a very small fraction of crops is sold and converted into cash to meet the cash requirement of the family.

This data can be presented in a multiple bar diagram as follows.

Figure 4.6

Production of Different Crops by Sample Farmers



The figure 4.6 shows that majority of the farmers grow millet as their main crop. Paddy is grown in only the lands lying in low altitude and especially on the river banks. The production of cereals has not increased significantly in the year 2070 in comparison to 2069. It might be due to deteriorating land productivity and traditional farming methods applied in farming.

4.2.6 Cash Income from Different Sources of Respondents

The sources of cash income of the farmers in study area are cereal crops, fruits and vegetables, livestock and cardamom. Some people are operating some small business, and some of them are working in civil service so salary is another source of income and remittances is also another main source of income. The large cardamom is the dominant source of the cash income in comparison of the other sources. The sources of cash income are shown in the following table.

Table 4.15

Average Cash Income Received by Sample Households from Different Sources

Sources	2069		2070	
	Amount (in RS)	Percentage	Amount (in RS)	Percentage
Agricultural Crops	15384.44	17.69	16085.67	17.18
Fruit and Vegetable	18262.24	20.99	19752.60	21.09
Livestock	14652.78	16.84	14953.45	15.97
Cardamom	38688.84	44.48	42864.63	45.76

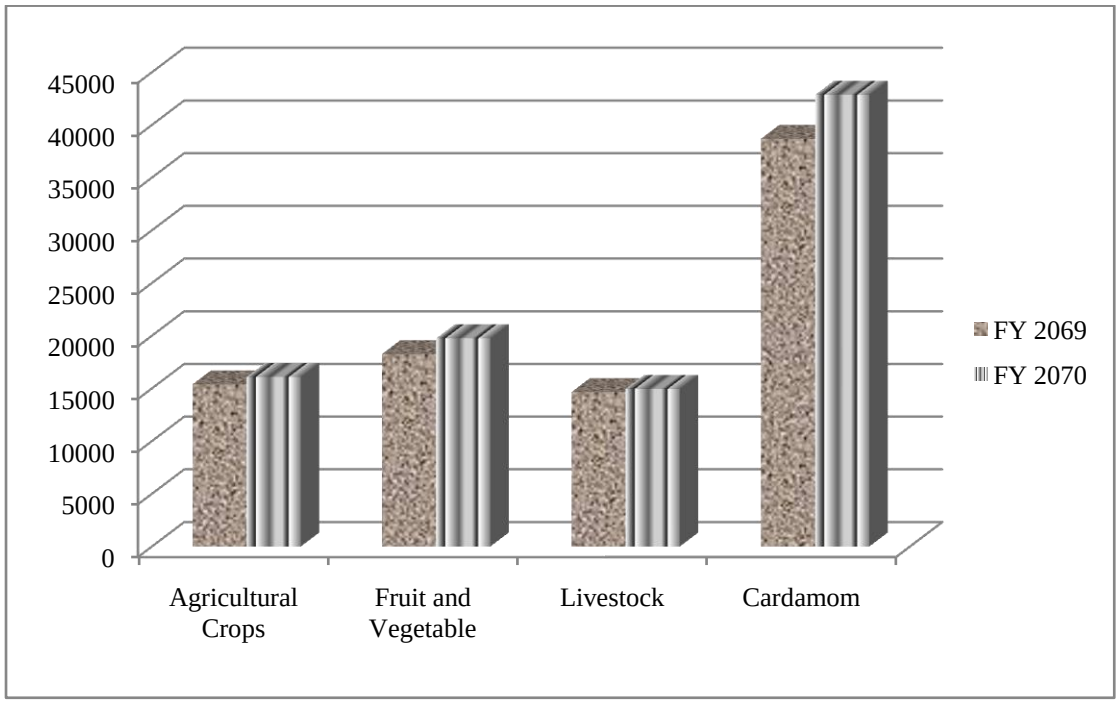
Total	86988.3	100	93656.35	100

Source: Field Survey, 2013

According to the table 4.15, as much as 44.48 percent of the total income is received from cardamom in the year 2069 which is increased to 45.76 percent in the year 2070 that indicates that the main source for cash income of the sample households is cardamom in comparison with other agricultural sources. Cereal grains provide 17.69 percent in the year 2069 whereas it is decreased to 17.18 percent in the year 2070. Similarly fruit and vegetable has contribute 20.99 percent in the year 2069 and 21.09 percent in the year 2070. Likely livestock has contributed 16.84 percent of total income in the year 2069 which is decreased to 15.97 in the year 2070. The data above can be presented in pie diagrams as follows.

Fig. 4.7

Average Cash Income Received by Sample Households in 2068



Studying the figure 4.7, it can be concluded that the main source of income to the farmers in the study area is large cardamom. Cereals production is not sufficient for them for consuming their annual demand of cereals crops so they have to purchase food varieties after the sale of cardamom they produce. In both the years, the sample households have received more than 44% of their annual income from large cardamom.

4.2.7 Income from Large Cardamom Production

The large cardamom is the main sources of income to the farmers of the study area. The large cardamom cultivation in different years is different as a result the income is also different in different years. With regard to income from large cardamom, sample respondents were asked to disclose their income from large cardamom. Their responses and frequencies obtained from the respondents are presented in the table 4.16.

Table 4.16

Income from Cardamom

Total Land hold by the respondents	No. of HH	Average Income	
		2069	2070
Less than 10 ropani	12	44856.25	40083.95
10 - 20 ropani	27	26904.55	29480.50
20 - 40 ropani	13	28988.75	22332.75
Above 40 ropani	3	52700.00	40600.00
Average	-	32720.94	30711.00

Source: Field Survey, 2013

Table 4.16 shows that farmers holding different sizes of land have different levels of income. Smaller the size lower the income and larger the size higher the income. Figure presented in the table shows that, farmers holding less than 10 ropanis of land have average income of Rs 44856.25 in the year 2069 whereas it is decreased to Rs 40083.95 in the year 2070. Similarly farmers who have total land of 10-20 ropani earned Rs 26904.55 and 29480.50 in the year 2069 and 2070 respectively. Likely farmers holding 20-40 ropanis of land earned Rs 28988.75 and Rs 22332.75 in the year 2069 and 2070 respectively. Likely farmers holding more than 40 ropanis of land received Rs 52700 and Rs 40600 in the year 2069 and 70 respectively. Data presented shows that income received from large cardamom in decreased in the year 2070 in compare to 2069 except farmers holding 10-20 ropanis of land, it is due decrease in price level. In the case of farmers holding 10-20 ropanis of land have increased their income. It is found that those farmers waited for good price for their product.

4.2.8 Price of Cardamom

There is no fixed price of the large cardamom. Due to fluctuation of the market situation, farmers sell their product in different prices. The sample respondent farmers repotting different price levels are shown in the following table 4.17.

Table 4.17

Different Price Levels Received by Different Number of Sample Farmers in Different Years

Price level Rs./kg	Households Selling Cardamom	
	2069 B.S.	2070 B.S.

	HH	Percentage	HH	Percentage
Below 800	12	21.82	12	21.82
800 – 900	27	49.09	24	43.64
900 - 1000	13	23.64	17	30.90
Above 1000	3	5.45	2	3.64
Total	55	100	55	100

Source: Field Survey, 2013

According to the table 4.17, there is high variation in price of large cardamom in both the production years. It varies in a range of Rs. 800 per kg to more than Rs 1000 per kg. All the farmers cannot sell their product at the highest price. Majority of the farmers seem selling at low price but only about 5.45 percent of the total farmers are able to receive highest price levels. About one third of the producers are selling their product below the average price prevailing in the market. Inability of the farmers to fetch higher prices might be related to quality of the product, financial agency felt by the farmer or fear of the farmer that the product may not sell in the particular there because of reaming purchasers.

The data can be presented in figure as below.

Figure 4.8

Price Levels of large cardamom

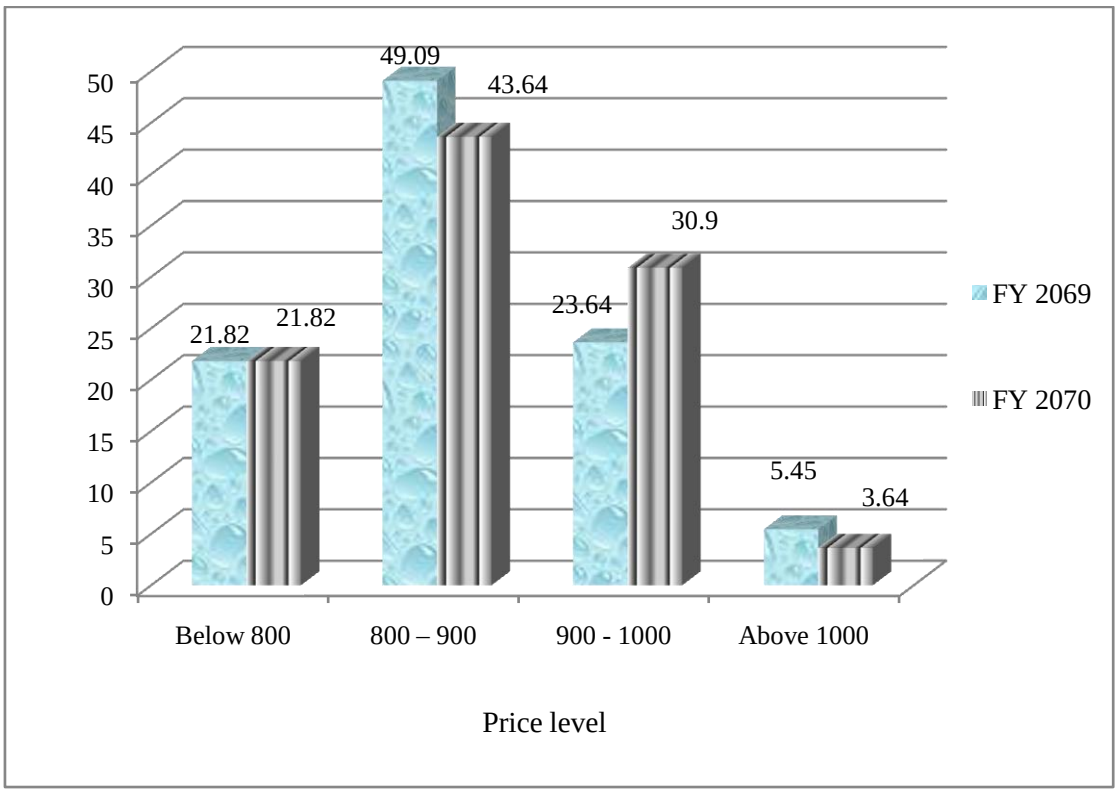


Figure 4.8 shows that, majority of the farmers are not able to receive good price by selling large cardamom. They are forced to sell the product in a low price. In 2069, almost 27 (49.09%) sampled households sold their product at Rs 800 - 900 per kg but in the year 2070 it is decreased to 24 (43.64%). Similarly 13 sample respondents received price for large cardamom at 900-1000 in the year 2069 which is increased to 17 (30.90%) in the year 2070. Only 3 (5.45%) respondents have sold large cardamom at price of above 1000 which decreased to 2 (3.64%) in the year 2070.

4.2.9 Willingness to Expand the Large Cardamom Cultivation of Sample Respondents HH

All the farmers are willing to explain the large cardamom cultivation due to the higher return as cash income. But there are several inciting factor that inhibit to expand it. The farmers were asked to identify the limiting factors. The responses given are summarized in the following table.

Table 4.18

Perceived Limiting Factors for Increasing Cardamom Production and Response of Farmers in Doku VDC

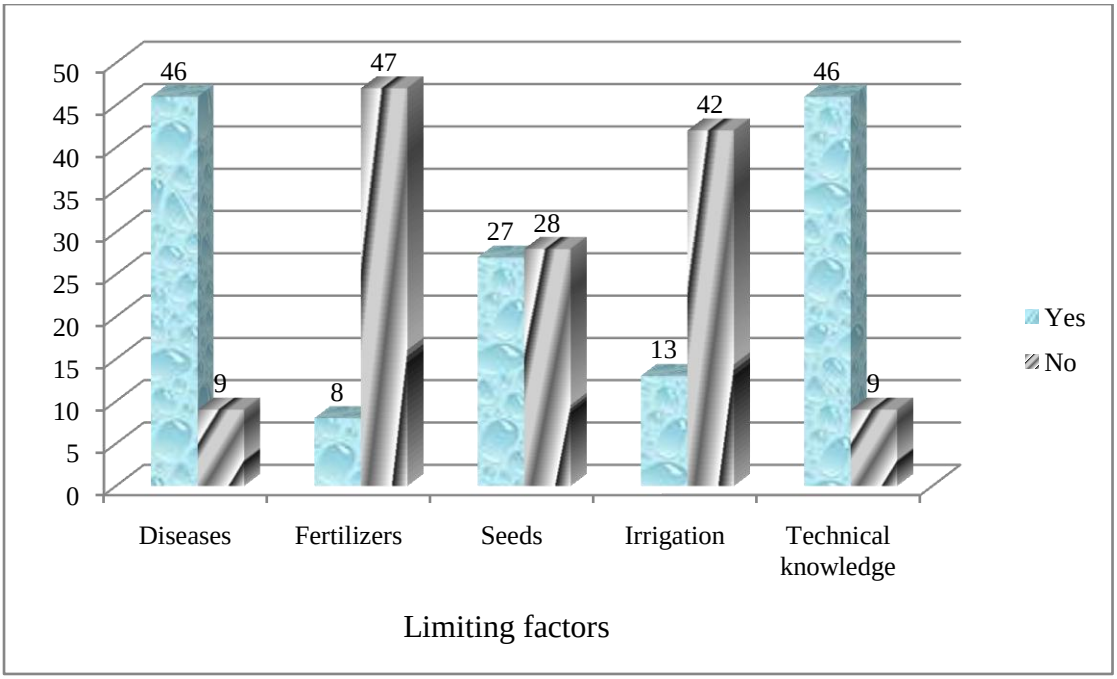
Perceived limiting factors	No. of farmers responding				Total
	Yes	%	No	%	
Diseases	46	83.64	9	16.36	55
Fertilizers	8	14.55	47	85.45	55
Seeds	27	49.09	28	50.91	55
Irrigation	13	23.64	42	76.36	55
Technical knowledge	46	83.64	9	16.36	55

Source: Field Survey, 2013

According to the table 4.18, irrigation, water, diseases, seeds and fertilizers used considered to be limiting factors. 46 % of the respondents respond as problem to diseases on the contrary 16.36 % of the respondents respond as no. likewise only 14.55 % of the respondents react as problem to fertilizers whereas 85.45 % of respondents do not respond as problem to fertilizers. Similarly 49.09 %, 23.64 % and 83.64 % of the respondents react as limiting factor to seeds, irrigation and technical knowledge respectively whereas 50.91%, 76.36% and 16.36% of the respondents do not react as limiting factor to seeds, irrigation and technical knowledge respectively. This data is further presented in the figure as below,

Figure 4.9

Limiting factor for expansion of large cardamom cultivation



4.2.10 Different Comments of Cardamom Cultivators

All the farmers are increasing the cardamom planting in every year. They are facing different kind of problems. They have several expectations from the government so that their capacity of production will increase. The response given by the farmers asking for government help are summarized in the given table.

Table 4.19

Farmers' Expectation for Help

Expectation	No. of farmers responding				Total
	Yes	%	No	%	
Economic help	47	85.45	8	14.55	55
Proper land availability	22	40.00	33	60.00	55
Cardamom research and extension	27	49.09	28	50.91	55
Seeds and fertilizer availability	38	69.09	17	30.91	55
Market and transportation	16	29.09	39	70.91	55

Source: Field Survey, 2013

As per the table 4.19, all the farmers expect the government policy and to take from cardamom development and develop marketing and transportation facilities for the expectation of large cardamom cultivation. Economic help in the lime of some short of subsidy, marking public land available for cardamom cultivation, supply of seeds and fertilizer are some other expectation made by farmers.

Some cardamom high value of export crop which can help to case the balance of payment problems government needs to consider this need of the farmers.

4.3 Major Findings

1. The total area of Taplejung district is 3,63,700 hectares. Out of the total area, 1,55,019 hectares of land is covered with forests, 35,384 hectares is pasture land and cultivated land is about 27,551 hectares. 1,52,836 hectares of land is in miscellaneous use.
2. In the DokhuVDC, there is 942 Ropani total cultivated land. Out of total land 55.73 % consists khet (low land), 33.43 % consists bari (upland), 7.43 % consists of pasture land and 3.395% consists of wetland.
3. In the fiscal year 2069/70, total area of large cardamom cultivated land in Teplejing district is 1551 hector whereas total cardamom production is 813 metric tons.
4. In sample VDC, total area of large cardamom cultivated land is 30 hectors and total production of large cardamom is 25.98 metric tons in the fiscal year 2069/70.
5. In the year 2069 average income received from large cardamom by 55 sample respondents were Rs. 56.18 thousands whereas in the year 2070 it is increased to Rs. 58.72 thousands.
6. 296.5 Ropani land which is 31.48 % of total land of Dokhu VDC was cultivated large cardamom by the sample respondents in the year 2069 whereas it is increased to 315 Ropani which is 33.43 % of total land in the year 2070.
7. Contribution of large cardamom to total income of sample respondents was 44.48 % in the year 2069 whereas in the year 2070 it is increased to 45.76 %.
8. The trend line obtained from the sample data in regard to large cardamom production is as follows:

y = 21454 + 1790x. The co-efficient of x being positive, it shows positive growth in the production of large cardamom.

9. The trend line obtained from the sample data in regard to large cardamom productivity is as follows:

y = 517.9 + 1.824x. The co-efficient of x being positive, it shows positive growth in the productivity of large cardamom.

10. Area occupied by large cardamom is increasing every year but in compare production is not increasing due to many diseases and improper irrigation. But in the study area production also increasing.
11. In the course of informal interaction with the sample respondents it is found that sample respondents are not getting reasonable price for their product due to illegal carteling in pricing between exporters of large cardamom.
12. Farmers are suffering from many diseases in large cardamom farming but stake holders are not giving their proper attention to solve those problems.
13. There is lack of technical knowledge among the farmers especially in storage and processing raw cardamom.
14. Large cardamom is cultivated in marginal and degraded slopes. Its cultivation is the utilization of the land which would otherwise go fallow. So, it does not compete with other food crops for land. In fact it helps in the rehabilitation of degraded lands.
15. Large cardamom is an important cash crop for the farmers. It is providing significant amount of cash income. Its promotion in cultivation may be a key item in increasing rural income and hence alleviating rural poverty.
16. Taplejung ranks first in terms of area, production and yield of large cardamom. The annual production is around 4000 metric tons. Nearly 9900 households are involved in its cultivation and more than 70% of the income is generated from large cardamom.

17. Global production of large cardamom is around 17100 metric tons with major contributions from Nepal, India, Indonesia and Bhutan. Nepal is the leading country among them.
18. There is the lack of financial institution floating appropriate credit facilities for the farmers of Taplejung district.
19. There is the lack of basic facilities like collection centers, transportation, storage etc and it has hindered the mobility of trade and transaction concerning large cardamom.
20. Multiple taxation, lack of conductive policy and lack of export environment are the problems of traders.
21. There is lack of appropriate combating against pests and fungi that attack large cardamom. Around 30% of the crop is damaged by the diseases called 'chhirke' and 'phurke'.
22. The farmers are willing to increase to production of large cardamom. Adequate irrigation practices, suitable varieties of cardamom and research and extension activities probably through large cardamom development programme are needs of the time.
23. Dependency of the export trade to India only and the regular fluctuation of market price in international market is a problem of large cardamom.
24. The farmers lack the proper knowledge of grading and packaging. As a result standardization of the product looks low and cannot receive high prices.
25. Large cardamom has marketing problem. The price variation is very high. Being an export oriented crop, distant market is out of the reach of the farmers. Limited information about international market price and price fluctuation has discouraged the farmers in the cultivation of large cardamom.
26. Large cardamom has not received due attention from organized sector for its research and development. The literature available is scarcity.

CHAPTER - FIVE

SUMMARY, CONCLUSION AND RECONMANDATIONS

5.1 Summary

This study has been conducted in Dokhu VDC of Taplejung district in eastern Nepal. All together 55 farmers are selected randomly from all nine wards of the Dokhu VDC provided necessary information for the study. The information is collected by administering a pre-tested questionnaire by the researcher himself.

The objectives of the study are to find out; the extent of the large cardamom cultivation in Doku VDC, contribution made by the cardamom in annual income of the farmers, the trend of expansion of cultivation of cardamom, the problems associated with production of cardamom and to suggest necessary policy measures.

The analysis of the data is done mainly by using descriptive statistics.

Sample farmers own different type of land. Out of total land of 942.00 ropani, lowland is 525.00 ropani, upland is 315.00 ropani, pasture land is 70.00 ropani and wetland is 32.00 ropani. Out of total 942.00 ropani, large cardamom is planted in 315.00 ropani of land in 2065 B.S., which is 33.43 percent of total land. It is about 6.23 percent more area than the previous year. The average area planted with large cardamom by the sample farmers in the year 2064 is 6.4 ropani and the average production is 182.67 kg. Similarly the average area in the year 2065 is 7.3 ropani and average production is 192.84 kg per farmer.

The area and production of large cardamom varies with land holding. As the land holding increases area and production of large cardamom increases. However the productivity of small farmer seems to be higher but it is inconclusive. Along with cardamom, farmers are still producing the traditional cereal crops. Paddy is still the most important and dominant crop. To meet the cash requirements of a farm family, products saved from home consumption are sold by traditional farmers and converted into 2069 is to Rs 86988.30 and 2070 it is 93656.35 annually.

The average cash income received by sample farmers only from large cardamom is Rs 38688.84 in the year 2064 which has increased to Rs 42864.63 in 2065. In both the years more than 45 percent of the cash income of the sample farmers is derived from large cardamom. Cereal crops, fruit and vegetable and livestock contribute less than 55 percent of total agricultural cash income.

The average cash income large cardamom is increasing over the years in a sizable manner for small and medium farmers. The average cash income of the big farmer has decreased in a particular year but it might be due to marketing delays. There is a wide variation in the price of large cardamom verging from less than Rs 200 to more than Rs 350 per kg. It shows marketing problems. Farmers are willing to increase the production of large cardamom. The limiting factors perceived by the farmers are irrigation, disease control and quality seeds. The farmers' expectations from the government for the expansion of cardamom cultivation are dominated by development of market and transport facility and establishment of government research and extension program.

5.2 Conclusions

Large cardamom is major exportable goods of Nepal. It has major role for earning foreign currencies and improving economic condition of Nepalese people. In the course of study, it is found that large cardamom has contribution of more than 70 percent to their total income of the people from study area. Only 30 percent of their total income has contribution of others sources. It shows, large cardamom has important role for generating income for sample respondents of study area.

Farmers of large cardamom are not getting reasonable price for their production. They are forced to sell their product in low price. It is due to different association like Federation of large cardamom entrepreneurs. Usually they fixed less price of large cardamom in compare to market price and they have informal carteling system in pricing of large cardamom so farmers are forced to sell their product in predetermine price of trader. There is no role of farmers to pricing of large cardamom. There is no any specific policy and rules and regulation regarding pricing and marketing of large cardamom.

Even being as major exportable product of Nepal, values add and value chain analysis is totally neglected by the stakeholder. There is no any system for value addition for the product. Storing large cardamom technically in highly modernized godown till good price, labeling by cutting and sorting, policing can increase value of large cardamom. But there is no any such as activity by the stake holders.

If government provides technical knowledge and financial support, farmers can increase their production, which facilitates to increase national income and reduce trade imbalance of Nepal. Especially modern dryer can improve the quality of the product so they need support in that sector. Large cardamom farming is suffering from different diseases so to solve those problems government must conduct special program in the field of R and D.

5.3 Recommendations

1. Large cardamom cultivation in suitable places should be promoted by the government. Increase in production will not only be a means to increases farmers' income but also export earnings. It also increases the use of marginal land.
2. Research and extension regarding large cardamom cultivation is a need to increase the production. So government organizations like national agricultural research council and department of agriculture should emphasize on the research and development of large cardamom.

3. Researches and investigations should be made to control pests and diseases in large cardamom. Meanwhile species with high resistance should be developed.
4. Financial assistance like loan should be made available at the local level and the loan procedure should be simplified.
5. Marketing of large cardamom should be promoted by the government. Marketing agency, market information's are urgently need.
6. Farmers should be trained on quality maintenance, storage, grading and packaging so as to yield good brand of product.
7. Export promotion of large cardamom may increase the demand in the domestic market. It is needed not only to increase price but also to assure foreign earnings.
8. The socio economic studies related to large cardamom cultivation needs to be done besides the cultivation related technical studies. Both of these studies should be done.

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APPENDIX II

CALCULATION OF MEAN, S.D. AND C.V.

Production kg	Mid Value	No of HH	$d' = \frac{X - A}{i}$	fd'	fd'^2
0 - 50	25	13	-4	-52	208
50 - 100	75	10	-3	-30	90
100 - 150	125	11	-2	-22	44
150 - 200	175	6	-1	-6	6
200 - 250	225	5	0	0	0
250 - 300	275	4	1	4	4
300 - 350	325	2	2	4	8
350 - 400	375	3	3	9	27
400 - 450	425	1	4	4	16
		N = 55		Σfd' = -89	$\Sigma fd'^2 = 403$

$$\bar{X} = A + \frac{\Sigma f d'}{N} \times i$$

$$= 225 + \frac{(-89)}{55} \times 50$$

$$= 144.09$$

$$\text{S.D.} = \sqrt{\frac{\Sigma f d'^2}{N} - \left(\frac{\Sigma f d'}{N}\right)^2} \times i$$

$$= \sqrt{\frac{403}{55} - \left(\frac{-89}{55}\right)^2} \times 50$$

$$= 108.5$$

$$\text{C.V.} = \frac{\sigma}{\bar{X}} \times 100\%$$

$$= \frac{108.5}{144.09} \times 100\%$$

$$= 75.29$$

APPENDIX III

CALCULATION OF AVERAGE INCOME, S.D. AND C.V.

Income from Large Cardamom (Rs 000)	Mid Value	No. of HH	$d' = \frac{X - A}{i}$	fd'	fd'^2
0 - 20	10	12	-4	-48	192
20 - 40	30	10	-3	-30	90
40 - 60	50	11	-2	-22	44
60 - 80	70	7	-1	-7	7
80 - 100	90	5	0	0	0
100 - 120	110	4	1	4	4
120 - 140	130	3	2	6	12
140 - 160	150	1	3	3	9
160 - 180	170	2	4	8	32
		N = 55		Σfd' = -86	$\Sigma fd'^2 = 390$

$$\bar{X} = A + \frac{\Sigma f d'}{N} \times i$$

$$= 90 + \frac{(-86)}{55} \times 20$$

$$= 58.72$$

$$\text{S.D.} = \sqrt{\frac{\Sigma f d'^2}{N} - \left(\frac{\Sigma f d'}{N}\right)^2} \times i$$

$$= \sqrt{\frac{390}{55} - \left(\frac{-86}{55}\right)^2} \times 50$$

$$= 43.10$$

$$\text{C.V.} = \frac{\sigma}{\bar{X}} \times 100\%$$

$$= \frac{43.10}{58.72} \times 100\%$$

$$= 73.39\%$$

APPENDIX IV

TREND LINE OF PRODUCTION

Fitting the Trend Line by Least Square Method

Year	Production in kg (y)	x = X - 2063	x^2	xy	Trend Value
	19240	-2	4	-38480	17874
2062	18780	-1	1	-18780	19664
2068	19250	0	0	0	21454
2069	24840	1	1	24840	23244
2070	25160	2	4	50320	25034
	$\Sigma y = 107270$	$\Sigma x = 0$	$\Sigma x^2 = 10$	$\Sigma xy = 17900$	

$\Sigma x = 0$, $\Sigma y = 107270$, $\Sigma x^2 = 10$ and $\Sigma xy = 17900$

So, $a = \frac{\Sigma y}{N} = \frac{107270}{5} = 21454$

$b = \frac{\Sigma xy}{x^2} = \frac{17900}{10} = 1790$

Let the straight line trend be

$y = a + bx$ - - - - - - (i)

Substituting the values of a & b in eq^n (i) of the trend line

$y = 21454 + 1790x$

APPENDIX V

TREND LINE OF PRODUCTIVITY

Year	Productivity 00 kg (y)	x = X - 2063	x^2	xy	Value of Trend
2061	520	-2	4	-1040	514.25
2062	507.57	-1	1	-507.57	516.08
2063	520.27	0	0	0	517.9
2064	517.5	1	1	517.5	519.72
2065	524.17	2	4	1048.34	521.55
	$\Sigma y = 2589.51$	$\Sigma x = 0$	$\Sigma x^2 = 10$	$\Sigma xy = 18.24$	

$\Sigma x = 0, \quad \Sigma x^2 = 10, \; \Sigma xy = 18.24$

So, $a = \frac{\Sigma y}{N}$

$= \frac{2589.51}{5}$

$= 517.9$

$b = \frac{\Sigma xy}{x^2}$

$= \frac{18.24}{10}$

$= 1.824$

Let the straight line of trend be

$y = a + bx$

$y = 517.9 + .1824$

APPENDIX I

QUESTIONNAIRE

I would be grateful if you supply correct information which is given below. Information gathered through these questionnaires will be kept strictly confidential and will be used only for academic purpose.

Economic status of large cardamom cultivators of Dokhu VDC, 2013

A. Personal Description

1. Farmers Name .....

a) VDC:..... ....

b) Ward No:..... .....

c) VDC Name: .....

d) Age:.....

e) Family Number:.....

f) Sex

i) Male..... ii) Female:.....

2. Education Level of Household Head

a) Illiterate.....

b) Up to class 10 .....

c) Above class 10 .....

3. Kind of family

i) Nucleus .....

ii) Joint .....

4. How much land do you operate?

Land	Ropani	Anna
Khet		
Bari		
Pasture land		
Wetland		
Others		
Total		

5. How much of the following crop did you produce in the previous years? (in kg)

Crops	2069	20670
Paddy		
Maize		
Potato		
Millet		
Others		

6. What is your main source of income?

a) Agriculture .....

b) Job.....

c) Others .....

7. Before how many years did you start the large cardamom cultivation?

a) One Year .....

b) Two Years .....

c) Three years .....

d) Others .....

8. Which are the sources of agricultural income in your family?

a) Cardamom Farming .....

b) Paddy Farming .....

c) Maize Farming .....

d) Potato Farming .....

e) Fruits and livestock .....

f) Others .....

9. What was the cash income from different sources in given two years?

Product crops	2069	2070
Fruits and vegetable		
Livestock		
Large cardamom		

10. How much large cardamom did you plant and produce in last two years?

Year	Area	Production
2069		
2070		

11. How much cardamom did you sell?

Cardamom	2069	2070

12. Do you know about prevailing the diseases and their control for cardamom?

a) Yes .....

b) No.....

13. Are there any problems to sell cardamom?

a) Yes.....

b) No.....

14. Do you get the proper market and price to sell the large cardamom?

a) Yes .....

b) No.....

15. Do you have difficulty to get following inputs in productions of large cardamom?

Items	Yes	No
Seeds		
Fertilizer		
Compost		
Pesticides and insecticides		
Labour		

16. Is there any change in the selling price of the large cardamom?

a) Yes.....

b) No.....

If yes, what is the price in last two years.

Cardamom	2064	2065
Price per kg		

17. Are you going to expand the production of large cardamom in future?

a) Yes.....

b) No.................

18. What are main problems to expand of production of large cardamom? (Please tick them)

Subject	Problems	
Economy	Yes	No
Better land	Yes	No
Government policy	Yes	No
Labor	Yes	No
Seeds and fertilizer	Yes	No
Marketing facility	yes	No

19. What should government should do for the production of large cardamom? Give your opinion.

. . . …
… …
… … … … … … … … … .. .. … … .. ..

Date…../……/…….

Signature