Economics of Production and Marketing of Large Cardamom Cultivation: A Comparative Analysis of North and West Sikkim Districts

A Dissertation Submitted

To

Sikkim University



In Partial Fulfillment of the Requirement for the **Degree of Master of Philosophy**

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DECLARATION

I, Anil Rai, hereby declare that the research work embodied in the dissertation entitled "Economics of Production and Marketing of Large Cardamom Cultivation: A Comparative Analysis of North and West Sikkim Districts" submitted to Sikkim University in partial fulfillment of the requirement for the degree of Master of Philosophy, is my original work. This dissertation has not been submitted for any other degree of this University or any other University.

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CERTIFICATE

This is to certify that the dissertation entitled "Economics of Production and Marketing of Large Cardamom Cultivation: A Comparative Analysis of North and West Sikkim Districts" submitted to Sikkim University in partial fulfillment of the requirement for the degree of Master of Philosophy in Economics, embodies the result of bonafide research work carried out by Mr. Anil Rai under my guidance and supervision.

It is also being certified that the research work brings to light the results of an original investigation made by Mr. Anil Rai and no part of the dissertation has been submitted for any degree.

All the assistance and help during the course of the investigation have been duly acknowledged by him.

We recommended that the dissertation be placed before the examiner for evaluation.

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"Economics of Production and Marketing of Large Cardamom Cultivation: A

Comparative Analysis of North and West Sikkim Districts"

Submitted by Anil Rai, under the supervision of Dr. Ruma Kundu, Assistant Professor, Department of Economics, School of Social Science, Sikkim University, Gangtok.

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ACKNOWLEDGEMENT

First and foremost, praises and thanks to God, the Almighty, for His showers of blessings throughout my research work to complete the research successfully.

I would like to express my deep and sincere gratitude to my research supervisor, Dr. Ruma Kundu for her guidance and support. She has been a very kind, patient, and approachable guide throughout my dissertation time. I feel extremely obliged and feel lucky to have her as my guide.

I would also like to thank all the faculty members of the Department of Economics as their suggestions were valuable for my dissertation.

I would also like to thank all my senior scholars for helping me during the time of my dissertation. I also would like to extend special thanks to Dr. Narsiruddin Molla, Dr. Kul Bdr. Chettri, Mandeep Dhamala, Rinchen Lepha, Reshma Subba, Yougal Subba, and Lalita Thatal for helping me during the time of my dissertation work.

I would also like to thank Sikkim University Central Library and all my friends who supported me during the course of my dissertation work.

Lastly, I will ever remain indebted and grateful to my family for supporting me in all my endeavors so far.

I attribute all the remaining errors and omissions in the thesis to myself I thank all for their support, guidance, constant prayers, and good wishes.

Anil Rai

DEDICATION

I would like to dedicate this dissertation to my parents for their love, prayers, caring, and sacrifices for educating and preparing me for my future. Their effort and struggle have allowed me to have a key to unlock the mysteries of our world, and beyond.

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Acronyms and Abbreviations

US\$ United States Dollar

Viz. Which

DGCI&S Director General of Commercial Intelligence and Statistics

Rs. Rupees

UK United Kingdom

USA United States of America

ICIMOD International Centre for Integrated Mountain Development

STs Scheduled Tribes

SCs Scheduled Castes

MW Megawatt

FPOs Farmer Producer Organisations

Km² Square Kilometer

Km. Kilometer

HAS Homestay Association of Sikkim

MSL Mean Sea Level

Ft. Feet

Kg. Kilograms

MT Metric Tons

MGNEGRA Mahatma Gandhi National Rural Employment Guarantee Act 2005

DESME Department of Economics, Statistics, Monitoring and Evaluation

Mtrs. Meters

Ha. Hectare

NABARD National Bank for Agriculture and Rural Development

OBC Other Backward Class

SWOT Strengths, Weaknesses, Opportunities, and Threats analysis

HMNEH Horticulture Mission for North East and Himalayan States

SHGs Self Help Groups

APMC Agricultural Produce Market Committee

RICVY Rashtriya Krishi Vikas Yojana

NFSM National Food Security Mission

ATMA Agricultural Technology Management Agency

M Meter

CHAPTER 1

AN OVERVIEW OF THE LARGE CARDAMOM IN SIKKIM

1.1 Introduction

Sikkim is one of the smallest and least populated states in India, bordering Tibet, Bhutan, and Nepal, located to the north of the state of West Bengal. Being situated in the inner mountain ranges of the eastern Himalayas, there is a relatively limited scope of agricultural production. One of the major crops grown in the state has been large cardamom. India is now the second largest producer and the largest exporter of large cardamom, contributing about 37% of the world's production (Sharma et al., 2009; Singh and Pothula, 2013; Subedi et al., 2014). Sikkim contributes up to 88% of India's production of large cardamom. The cash income earned from this crop in Sikkim increased from US\$ 1.9 million in 1975 to US\$ 13.8 million in 2005 and as high as US\$ 50 million in 2010 (Sharma et al., 2009; Sharma and Acharya, 2013; Partap et al., 2014). Sikkim is also fast becoming known in India for its organic farming, and organic large cardamom has a potentially strong international market.

A proper assessment of the economics of any production activity requires the analysis of three necessary concepts, viz. – cost, return, and profitability (Varghese, 2007). According to the Spice Board, the area under production, quantity produced, and productivity of large cardamom in Sikkim were 23312 hectares, 4970 tons, and 0.213 tons per hectare, respectively. As per the estimates of the DGCI&S for 2021, the quantity and value of large cardamom exported from Sikkim were 1325 metric tons and Rs.9126.25 lakhs, respectively; the per unit price was Rs.688.77. The corresponding quantity and value figures for 1920 were 1310 metric tons and Rs.7090.17 lakhs, respectively. In the case of 1921, the figures for the area under production and the quantity produced were 23312 ha. and 4779 tons, respectively

while the productivity value is 0.205 tons per hectare. Per unit price for 2019-20 was Rs. 541.23. Some of the major export centers for India with regard to cardamom are the UAE, Afghanistan, UK, USA, and Pakistan. However, the export figures are always in a state of flux. For example, in the case of the largest exporter Pakistan, the figures are 370.02 (2015-16), 619.41 (2017-18), 470.75 (2019-20), and an estimated 18.63 (2020-21). The UK and UAE are next in terms of the volume of exports.

Studies conducted by ICIMOD showed that the cardamom crop is significant from an ecological and economic point of view. Its contribution to the household income was estimated to be 45% in the case of small farmers, who owned up to two hectares of land, and 54% for large farmers, who had more than two hectares (Sharma, 1997). Another study (Sharma et al., 2000) revealed that about 17000 households were involved in the cultivation of large cardamom on about 23,500 hectares of land in the Sikkim Himalayas. The contribution of large cardamom to the total household income was found to be about 38%.

For over a decade (since 2004), more than 60% of the cardamom plantations in Sikkim have been barely productive, resulting in a tremendous decline in the cultivated area as well as total production in the state. The income of marginal and cardamom-dependent growers in the eastern Himalayan region has dramatically declined, jeopardizing their livelihoods (Srinivasa, 2006; Sharma et al., 2009; Singh and Pothula, 2013). This decline is an example of the long-term environmental and ecological implications of farming that relies on a single cash crop, the impact on growers' livelihoods, and the unprecedented challenges of sustaining and improving production capacity.

The large cardamom agro-forestry system is also susceptible to the ecological conditions of the region with the provision of high income from the cash crop. The cultivation of perennial large cardamom is a good example of fulfilling mountain specificities and needs. The soil for the crop is continually maintained through nutrient cycling from the natural tree cover. An ecological product having long keeping quality, marginality by growing in marginal land by poor and indigenous proper, fragility by providing forest covers and perennial agriculture cash crop sustainability is even greater with cardamom when the Himalayan alder is used as the shade trees, as this tree regenerates naturally on sites affected by landslides. Cardamom agro-forestry also helps conserve soil and water as is obvious from the data available from the different farming systems in Sikkim, well adapted to the local soil conditions. This agro-forestry system is self-sufficient and does not depend on external inputs. It is less labor intensive and a low-volume (about 250-300 kg. ha.) crop, with a long-keeping quality (non-perishable) which is a great advantage in mountain areas where accessibility and transportation are limited. The marketability and opportunities for increased income result from cardamom being a niche cash crop. A major portion of household income comes from selling cardamom, which is a high-value crop compared to other farm-produced crops. The cardamom system is self-reliant with no external input in the form of chemical fertilizers or manures. The nutrients are available from the accelerated nutrient cycling through litter decomposition from the shade trees. Large cardamom is a less labor-intensive cash crop that requires one-time weeding and harvesting as a management practice but often requires periodic monitoring of disease and pests.

However, there are problems in large cardamom farming in Sikkim. Constant declination in the production of large cardamom in recent years has caused a negative

impact on the trade in India (Sharma et al., 2009). Improved curing methods need to be popularised because of their better-quality capsule; however, the constraint lies in the high installment cost for the growers. Improper grading due to the lack of grading machines has also caused growers to obtain lesser prices in the market. Unorganised marketing channels for selling quality capsules have also become a limitation. As per data, in the last fifteen years, only the production area and the number of growers have been increasing in Nepalese cardamom farming. But compared to that, production remains fluctuating; in fact, it has been showing a decreasing trend for the last three years. Consequently, production yield which measures the total production quantity per hectare has gone down from 0.61 to 0.45. The selling price of large cardamom has gone down from IRs 1,350 per kg. to 650 per kg. in the last year few years.

1.2 Statement of the Problem

Large cardamom has always been in high demand in the market and thus the majority of the growers find this an attractive farming option in Sikkim. But in previous years from 2006-07 to 2013-14, the production of large cardamom had declined and market price also fluctuated due to diseases like "*Chirkey* and *Furkey*". During that period the uncertainty of price fluctuation at the time of auction is also mostly affected cardamom farming in Sikkim. Even though there is wide fluctuation in cardamom production again its production has increased or moved in a positive direction from 2014-15 to 2020-21.

There have been various schemes and policies for the uplift of poor growers but the implementation of those policies at the ground level has been minimal during the periods 2006-07 to 2013-14. But certain schemes which are provided by the Spices Board of India are highly beneficial to the farmers belonging to scheduled tribes (STs)

and scheduled castes (SCs). In spite of the various initiatives by the government, farmers are unable to maximise their production and earnings. After all the hardships growers until now have to rely on traditional methods for processing large cardamom through the local *Bhatti*¹. Generally, traditional dryers produce poor quality charred and smoky capsules; otherwise, it deteriorates the quality of the large cardamom. Low cost modern dryers produce smoke-free and at least better products compared to the local electric dryers which produce high-quality dried capsules where growers get a better price than other produce seeds. In the Mangan District and Yuksam-Tashiding constituency of Gyalshing district, the government had not made any electric dyers even though the state had 22 hydropower projects and produced 4654 MW (Kharel and Bhutia, Gazetteer of Sikkim, 2013). Therefore, the government should frame policies for electric dyers for helping the agriculture sector.

Farmer's producers' organizations (FPOs) have set up farmer organisations in different districts by promoting specialisation and better branding, marketing, processing, and export. They also provide farmers with training and handholding on cluster-based business organisations. On the other hand, farmers are not able to bring in new practices. This may lead to a decline in production and prevent proper price discovery for cardamom.

The present study is focused on examining the economics of large cardamom cultivation in different parts of Mangan and Gyalshing districts of Sikkim. The state has six districts, of which the Mangan and Gyalshing districts produce a high amount of cardamom as compared to other districts. The districts are mainly agricultural, with a major part of the population residing in rural areas. While Mangan district produces different varieties of cardamom as compared to the Gyalshing district; for example,

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¹ Bhatti is a Nepali word which generally acts as Oven to dry cardamom through traditional way.

'Bharlang' was developed by a farmer in Yaksum-Tashiding while Dzongu is mainly used to cultivate 'Seremna'. In the grading system, growers from Mangan District used to cultivate larger-sized cardamom compared to the Gyalshing district growers, who cultivated smaller-sized cardamom. The price difference with the larger size cardamoms is higher in the market compared to the smaller size ones. Hence it is hoped that the present work shall be able to offer some interesting socio-economic insights with regard to cardamom cultivation in the Himalayan state. In addition to the livelihood aspect, as cardamom cultivation is influenced by the ecology, and as the environment is a substantial issue in a Himalayan state like Sikkim, the perception of the people regarding such cultivation vis-à-vis the environment is also expected to be a major component of the present work. Unlike most other studies in this area, it also undertakes a comparison of cardamom cultivation in the Mangan and Gyalshing districts in terms of its socio-economic impact; in that sense as well, this can be an important addition to the existing literature.

1.3 Research Gap and Justification of the Study

There have been extensive studies related to different aspects of large cardamom across the country. But there are very few studies on different aspects of large cardamom farming including production, value chains, cost marketing, management, contribution to livelihood, and decline of production in Sikkim. Since there have been few such comprehensive studies in the context of Sikkim, it is felt that this work shall serve as a significant addition to the existing literature on the topic.

The majority of the literature in Sikkim only focuses on the Mangan district of the state. There are very few studies related to the economics of large cardamom in Gyalshing district, which is the second highest producer of large cardamom after the Mangan district.

For example, Bhattarai et al. (2013), examined the study of livelihood improvement through sustainable large cardamom cultivation in North Sikkim. Similarly, Sharma et al., (2015), explore the pattern of the large cardamom production system in the Sikkim Himalayas. Agriculture is the main source of livelihood for many rural farmers with large cardamom being considered an important source of earning for the people from many villages in Mangan and Gyalshing districts. Hence it is important to study the various problems faced by large cardamom farmers. Various studies have focused on the production and export related issues, but based on an extensive review of the literature, it has been found that the common problems relating to marketing and the modern tools and technique for farming have been neglected.

The present study intends to unearth the potential for and constraints to large cardamom production in Mangan and Gyalshing districts of Sikkim from the grower's perspective. Since the majority of the literature has not highlighted the issues regarding the pricing and marketing system, this study also tries to provide an impetus towards helping farmers get better prices along with marketing system intervention. Proper knowledge and a scientific approach toward farming lead to higher production, which can ensure an attractive and profitable livelihood. The study also provides feedback to growers, policymakers, line department officials, and researchers for planning the future course of actions for sustainable farming of large cardamom, particularly in Mangan and Gyalshing districts of Sikkim and also in other regions of the state.

The major problem in the study area is low productivity and low market price due to which the majority of the farmers are leaving large cardamom farming. The study has been carried out for exploring and identifying the ground-level problems faced by growers. This study intends to provide a means for determining the sustainability and

contribution of large cardamom to the livelihood of farmers in the selected rural areas of Mangan and Gyalshing district of Sikkim. Therefore, the findings of the study help in providing a solution for the farmers along with suggestions for policy makers and extension officers for formulating sustainability and knowing the current problems in the production of large cardamom. It also aims to provide insights into cardamom farming with regard to profitability and decline of production.

There have been extensive studies related to different aspects of large cardamom across the country. But there are very few studies on different aspects of large cardamom farming including production, value chains, cost marketing, management, contribution to livelihood, and decline of production in Sikkim.

Since there have been few such comprehensive studies in the context of Sikkim, it is felt that this work shall serve as a significant addition to the existing literature on the topic.

1.4 Research Questions

- 1. What is the trend of cardamom production over the last 20 years in Sikkim?
- 2. What is the socio-economic characteristics of the cardamom growers in Mangan and Gyalshing districts of Sikkim?
- 3. What is the status of productivity, profitability and marketing efficiency of cardamom cultivation by farm households of both the districts?
- 4. What is the role of institutions in cardamom production?
- 5. What are the policy implications for the large cardamom growers in Mangan and Gyalshing districts?

1.5 Research Objectives

The study attempts to understand the economics of production and marketing of large cardamom farming in Mangan and Gyalshing districts.

The specific objectives of the study are to:

- 1. Determine the trend of cardamom production over the last 20 years.
- Analyse the socio-economic characteristics of the cardamom growers in Mangan and Gyalshing districts of Sikkim.
- 3. Analyse the differences in the status of the productivity, profitability, and marketing efficiency of cardamom cultivation by farm households of both the districts.
- 4. Examine the tangible ways in which the institutions are helping the growers.
- 5. Examine the policy implications for the large cardamom growers in Mangan and Gyalshing districts.

1.6 Research Hypothesis

The following hypotheses are proposed for the present study:

- 1. There is a significant difference between the productivity, profitability, and marketing efficiency of both the districts.
- 2. There exists an income inequality between the large cardamom growers of Mangan and Gyalshing districts of Sikkim.
- Government policy has a significant impact on the large cardamom growers in Mangan and Gyalshing districts.

1.7 A Description of the State (Sikkim)

Sikkim is a state in the Northeastern part of India with a total area of 7,096 km² which constitutes 0.22 percent of the total geographical area of India. The state is one of the micro-regions of the Northeastern Himalayan ranges between 27°04′46″ to 28°07′48″ North latitude and 80°00′58″ to 88°55′25″ East longitude, and it has elevations ranging from 300 to 7000 meters above Mean Sea Level (Gazetteer of Sikkim, 2013).

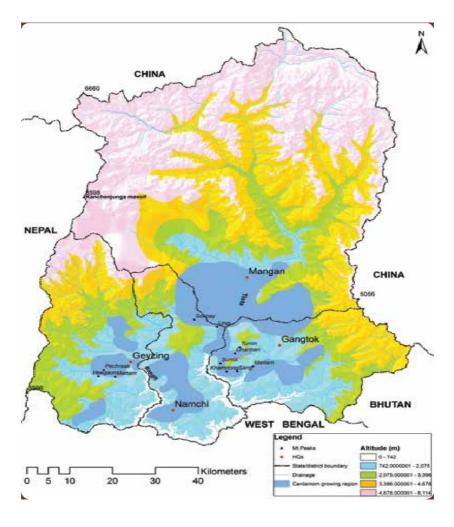


Figure 1.1: Map of Sikkim

Source: ICIMOD, Large cardamom farming in changing climate and socio economic conditions in the Sikkim Himalayas.

Previously state has four administrative districts viz: North, East South, and West districts but recently the state government has demarcated its boundaries and further added two more districts. The present six districts of Sikkim are Gangtok, Pakyong, Mangan, Namchi, Gyalshing, and Soreng districts. During the data collection period, we have considered North and West districts but recently they have named these Mangan and Gyalshing districts respectively.

1.7.1 Description of the Study Area in Mangan District

Mangan is the capital of the North district located at 27°30′00″ North latitude and 88°32′30″ East longitude at an elevation of 3998 ft. above sea level. The Mangan district is the least populated and largest district among the other districts with a population of 43,4354, and an area of 4226 km. respectively (Census, 2011). The Mangan district has a sex ratio of 769 females for every 1000 males and a literacy rate of 77.39 %. Mangan is situated 65 km. from Gangtok which is the main town of the Mangan district with a total population of 4648 (Census, 2011). Due to its geographical outreach, it is difficult to achieve rapid urbanisation resulting in a small market established in the 20th century that caters to the entire population of the North. Later it became a place for storing large cardamom which was exported to West Bengal and other parts of the country via Singtam. The climate and land of Mangan-North Sikkim are suited for the cultivation of a large variety of large cardamom thus the district is also known as the cardamom capital of the world (Gazetteer of Sikkim, 2013). Due to the time constraints of the present study and other geographical factors, it was not possible to cover the entire district, thus in the present study, data has been collected from three villages viz. Upper Lingdong, Manging, and Lower Barfok from Dzongu constituency which has been described briefly in another section.

1.7.2 Dzongu

Dzongu is situated at an altitude of 800 meters to 6000 meters above mean sea level. In 1960 Dzongu was declared a Lepcha reserve at the time kingdom ruled (Charisma K. Lepcha, 2013). The Supreme Court acknowledged Lepchas were the original indigenous inhabitants, so the State Government has also granted the status of a Primitive Tribe Group in November 2006 (Gazetteer of Sikkim, 2013). It is a restricted zone for everyone and even Sikkimese citizens are required to obtain a special permit to visit the place. The population is mainly comprised of the Lepcha community which practices Buddhism. Dzongu has three sub-tropical zones which are sub-tropical, temperate, and alpine. It receives high rainfall between June and September and has a dense forest. We visited three villages under Passingdang Ward viz.-Manging, Upper Lingdong, and Lower Barfok.



Figure 1.2: Dzongu Eco-Tourism Map

Source: Google, http://www.mayallyang.com

Table 1.1: Village-Wise Households and Population Size of Dzongu

Village	Total households	Total population
Manging	48	209
Upper Lingdong	53	238
Lower Barfok	56	196

Source: Ward Panchayat Data, North Sikkim

Managing village comprises 48 households with a population of 209; Upper Lingdong comprises 53 households with a population of 238; Lower Barfok comprises 56 households with a population of 196. The primary source of income for the villager is agriculture; agricultural products like cardamom, ginger, and paddy, etc. support their livelihoods. The main income-generating crops are vegetables, large cardamom, ginger, orange, paddy and maize, tomato, 'nakima' (vegetable), and broom grass. Crops like large cardamom, ginger, and oranges gain much importance because of their comparatively greater price in the market followed by broom grass cultivation. The other vegetables like potato, local tomato, cabbage, and local round chilli (Dallekhursaini), etc. are cultivated for self-consumption, and surplus is sold in the local market. The indigenous variety of large cardamom of the Dzongu, locally known as 'Golsay', maintains high quality and better price in the market while in recent years production has declined due to a disease like 'Chirkey and Furkey', (Nepali term for the disease that mainly occurs in cardamom plant) due to which the cardamom plant becomes unproductive over a period. Recently villagers have started the plantation of a new variety of large cardamom 'Seremna' which also maintains high quality and better price in the market as compared to other varieties.

Though the agricultural practice has become beneficial to many farmers and acts as a prime source of livelihood for them but slowly farming has been declining due to low production mainly due to increasing pest infestation (mainly red ants), poor soil

quality, human-wildlife conflicts, labor shortage, storage problems, poor market linkages, shortage of organic manure, unavailability of seeds in the sowing period, and climate change, etc. Apart from agriculture, some villagers' homestays have become a secondary source or means of multiplying their income. Peoples of Dzongu in collaboration with the Homestay Association of Sikkim (HAS) celebrates the 'DzoTyuim' festival in November where local pilgrims and tourists visit the place. The festival is aimed at promoting tourism in Dzongu and creating a sustainable economy for the local community. In Dzongu there are many tourist spots like hot springs, waterfalls and picnic spots, etc. Most of the villagers are also engaged in a secondary source of occupation where they are government employees, private employees, and seasonal workers in large cardamom fields, paddy fields, etc. Some farmers are gradually moving towards activities other than cultivation as a source of income due to environmental and other associated problems in farming. For other purposes, villagers own a private forest where they extract non-timber products like fodder for cattle, fuel wood, bamboo, and timber for constructive purposes. Villagers use bamboo for fencing, construction of sheds for the domestic animals, weaving of baskets and making flag poles, etc.

1.7.3 Description of the Study Area in Gyalshing District

Gyalshing district is the second-largest district among the districts, Gyalshing itself has been declared as a district. It has a total population of 1, 36,299 (Census, 2011) and a 10.58% growth rate in the population. It has a sex ratio of 941 females for every 1000 males and a literacy rate of 78.69 %. The total area of the district is 1166 km² it shares an international border with Nepal and state border with west Bengal. Gyalshing is located at a distance of 112 km. from Gangtok and it is situated at an elevation of 4831 ft. MSL and lies at 27°17′41″ North latitude and 88°15′15″ East

longitude. The district capital Gyalshing or Geyzing is the main town and market for the people of the West district which is connected with the State capital Gangtok and West Bengal towns Siliguri, Darjeeling, and Kalimpong via Jorethang. The district is comprised of the Nepali population and the Nepali language is the most predominant language. It is the oldest market in the West district (called *hart* in Nepali), once a week people from neighboring villages gather to sell vegetables, local food products, agricultural products, poultry, and livestock. Other important towns in the district which attract tourists are Pelling, Darap, Yuksam, Tashiding, Soreng, Rinchenpong, Uttarey, and Nambu, etc. where people are engaged in operating hotels, homestays, and trekking routes to Mt. Khanchendzonga, Nepal border, and Barsey Rhododendron Sanctuary, etc.

1.7.4 Khechuperi (Khecheopalri)

Khecheopalri is the name of the lake where the surrounding villages are also known as Khechuperi (Khecheopalri). It is situated at an altitude of 1700 m (5,600 ft.) having a surface area of about 3.79 ha. (9.4 acres). It is the sacred lake in Sikkim Himalayas located under Yuksam-Tashiding constituencies, 147 km. from Gangtok and 43 km. from the Gyalshing, West Sikkim.

Large numbers of local pilgrims and tourists visit the lake. The main source of primary income for villagers near the lake is from tourist lodges, homestays, and fast food restaurants, which have good income potential. We have visited three villages under Khechuperi ward viz. Lamathang, Simichen, and Pakruk.

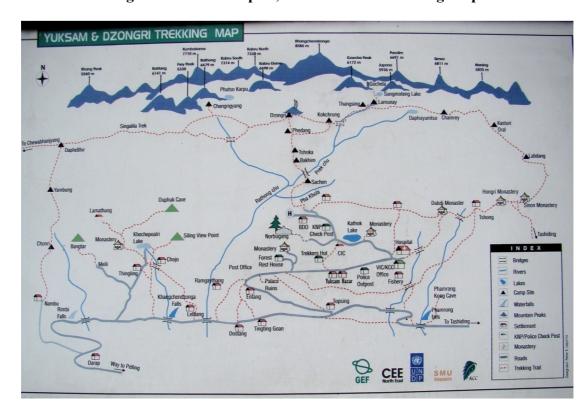


Figure 1.3: Khechuperi, and Yuksam-Tashiding Map

Source: Google, https://en.wikipedia.org/w/index.php?title=Yuksom&oldid=109007410

Table 1.2: Village-Wise Households and Population Size of Khechuperi

Village	Total households	Total population
Lamathang	53	183
Simichen	53	220
Samtek	49	196

Source: Primary Survey, 2021

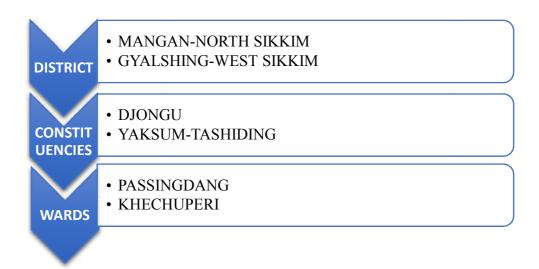
The Lamathang village comprises 53 households with a population of 183; Simichen comprises 53 households with a population of 220; Samtek comprises 49 households with a population of 196. These villages are far from Khecheopalri Lake where villagers do not benefit from businesses like tourist lodges, homestays, and fast food restaurants. The main state highway connects the Simichen villages but in Lamathang and Samtek villages there is no road that connects with the state highway. The people of Lamathang and Samtek villages are facing problems in their day-to-day life. In

these three villages, most of the people are farmers and they mostly depend on large cardamom and livestock (dairy farming); the least number of people are engaged in other activities like government services, sub-contractor, and drivers. In addition, large numbers of small and medium farmers work as seasonal workers in large cardamom fields, mostly through MGNREGA in the off-season. Large cardamom is the main cash crop in the villages and the climate is suitable for a variety of the large cardamom called 'Bharlang'.

1.8 Study Area, Sampling, and Data Collection

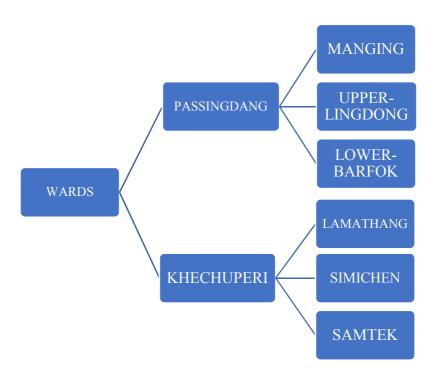
The study is based on both primary and secondary sources. The secondary data and information have been collected from different secondary sources such as the Spices Board of India, Directorate of Economics, Statistics and Monitoring and Evaluation (DESME) Sikkim, Director General of Commercial Intelligence and Statistics (DGCI&S), etc. A part from this various published books, statistical handbooks, and annual reports released by both State and Central governments along with statistical abstracts, and reports studied by various research organisations have also been referred to in the study. In addition, various kinds of literature have been surveyed in order to access the indigenous traditional knowledge in large cardamom cultivation. Since secondary data may not be sufficient for the present study, primary data has also been collected in order to understand and justify the objectives stated above on the basis of the pre-structured questionnaire from large cardamom farmers, processors, and traders of the Mangan-North district, and Gyalshing-West district of Sikkim

Figure 1.4: Sampling Design for the Purposed Study



For the proposed study we have chosen the Mangan-North district and Gyalshing-West districts as to account for the largest number of cardamom producers in the state. In addition to large cardamom, agro-climatic conditions and attitudinal variations of these areas are most suitable for the production of large cardamom. First, we have chosen Mangan-North and Gyalshing-West as the study area; from these districts, six different villages viz., -Lamathang, Simichen, Samtek, Manging, Upper Lingdong, and Lower Barfok have been chosen purposively from two different wards Khechuperi (1700 Mtrs.) and Passingdang (2438 Mtrs.) under two different wards of two districts which are shown in figure no. 2.

Figure 1.5: Selection of Villages from two Wards



Thus, the study undertakes a primary study among large cardamom producers, processors, and traders for gathering information regarding the socio-economic, demographic, and topographical setting of the sites in order to prepare a questionnaire. Information on various aspects of the household economy, such as demographic features, literacy, community composition, education level, occupational structure, landholding, cropping pattern, crop yield, income and livelihood sources, marketing, and prices of the product have also been collected from six locations in large cardamom growing areas using a structured questionnaire. In relation to climate change, the value of farmers' perceptions has been recognised as a key source of information along with the adaption strategies taken by them to revive the system.

A sample of 170 large cardamom growers has been selected for the study by using the purposive sampling method of which 60 samples will be selected from the villages of Passingdang ward and the remaining 60 samples from the villages of Khechuperi ward. Additionally, 20 samples from each ward have been collected from the

processors in order to get a better idea of the traditional tools and techniques for processing large cardamom. Besides, 5 samples from each district have also been collected from the traders for a better understanding of the market structure. FPOs, agriculture and horticulture officers, Spice Board of India, NABARD, and gram Panchayat members will also be interviewed from each ward in order to understand their perspectives on the farmers' activities.

1.9 Methodology

In general descriptive statistics like frequency count, percentages, tables, and graphs have been used to analyse the findings from both primary as well as secondary data. Apart from descriptive statistics, other analytical tools have been used which are described in detail below:

1. The trend of large cardamom production over the period 2001-2020 has been analysed with the help of a simple regression model as

$$Y_t = \alpha + \beta X_t + \mu_t$$

Where, Y_t = cardamom production for period t

 X_t = time period

 α = intercept terms

 μ_t = random disturbance term

 β = slope coefficient

2. (a) Assessment of the socio-economic conditions of the large cardamom farmers and the role of large cardamom in the rural economy of Mangan and Gyalshing districts has been examined through descriptive statistics such as frequency distribution tables, percentages, and charts of averages etc.

- (b) The extent of income inequalities among the large cardamom farmers of each district is assessed by Gini Coefficient. Income inequalities that arise from income from large cardamom have been calculated. We have also compared the income inequalities of large cardamom farmers of each district.
- (c) We have used logit analysis to explain perceptions of the large cardamom farmers regarding improvement or non-improvement in living conditions. We have considered a qualitative dependent variable represented by 1 in case of perceived improvement and 0 in case of no improvement or even deterioration in living standards. It has been regressed on explanatory variables like per capita family monthly income, the number of family members, age of the respondent, type of house, and the number of members with above primary education relative to the total number of family members. The following regression model is used for this purpose:

$$L_i = \ln(\frac{Pi}{1-Pi}) = \beta_1 + \beta_2 PCMI_i + \beta_3 NFM_i + \beta_4 AGE_i + \beta_5 HT_i + \beta_6 RPETM_i + \mu_i$$

Where $P_i=1$ if there is an improvement in the perceived socio-economic conditions of the large cardamom farmers, 0 otherwise. PCMI represents per capita family monthly income from large cardamom, NFM represents the number of family members in the family, AGE is the age of the respondent, HT means a type of house where HT=1, if the respondents have a pucca house, 0 otherwise, RPETM represents the ratio of above primary education to total members of the family, and μ_i is the error term. We have applied a non-linear estimation procedure viz. method of maximum likelihood because the dependent variable is a binary outcome that may not give an appropriate result by the OLS or Weighted Least Square (WLS).

3. (a) The average production and productivity of large cardamom cultivation in both districts have been calculated with the help of the following formulae:

Average Production =
$$\frac{\text{Total Production}}{\text{Total number of Farmers}}$$

Productivity =
$$\frac{\text{Total Production (kg.)}}{\text{Total Landholding (Acre)}}$$

(b) Profitability of large cardamom cultivation in both districts has been calculated by using the concept of benefit-cost ratio. Gross return from cardamom and total cost of cardamom production has been used to analyze the benefit-cost ratio analysis. The benefit-cost ratio has been calculated by using the formula:

Benefit Cost Ratio (BCR) =
$$\frac{Gross Return}{Total Cost}$$

Where,

Gross Return (Rs.) = Price of Cardamom (Rs. per Kg.) x Total Quantity Produced (Kg.)

Total Cost = The summation of Fixed Cost and Variable Cost.

If the benefit-cost ratio is greater than 1, the investment in cardamom cultivation is profitable.

(c) Along with this Gross Profit Margin has also been calculated to measure the profitability of large cardamom. Gross margin is the total profit or "return over variable cost". For the Gross Margin analysis, we have considered the specific variable cost, which varies approximately in the proportion to the size of the enterprise.

Gross Profit Margin = Gross Return – Total Variable cost

(d) To know whether an increase in the efficiency of the marketing system is in favor of producers and vice versa, we have calculated the producer's share. The producer's share is the price received by the farmers of large cardamom expressed as a percentage of the retail price i.e. the price paid by the consumers. We have calculated the Producer's share by using the formula:

$$P_S = (Pf) / (Pr)$$

Where: Ps = producer's share (%)

Pf = Producer's price (Rs.)

Pr = Retailer' Price (Rs.)

(e) We have calculated the marketing efficiency to know whether the marketing system is in favor of producers or not. From the marketing efficiency, we can know whether the farmers are better off from the market price or not. We have used Acharaya's Method to calculate marketing efficiency:

$$MME = FP / (MC + MM)$$

Where: MME = Modified measure of an index of marketing efficiency,

FP = Price received by a farmer,

MM = Marketing margin,

MC = total marketing cost.

(f) To estimate income from large cardamom production we have considered the Cobb-Douglas production function model. The model is based on its theoretical fitness to agriculture and its computational manageability while the production studies in the agricultural sector have used this function.

$$GR = \beta_{1.} \operatorname{IIi}^{\beta}_{2.} \operatorname{NCi}^{\beta}_{3.} \operatorname{VLC}^{\beta}_{4.} e^{\operatorname{Ui}}$$

$$lnGR = ln\beta 1 + \beta_{2} ln \operatorname{IIi} + \beta_{3} ln \operatorname{NCi} + \beta_{4} ln \operatorname{VLCi} + \operatorname{Ui}$$

Where, GR = Gross Return,

II = Initial Investment,

NC = Nutrient Cost,

VLC = Variable Labour Cost,

Ui = Error Term.

 β_2 = Elasticity of gross return with respect to the initial investment, that it measures the percent change in gross return for say a 1 percent change in initial investment, holding the other inputs constant.

Similarly, β_3 = partial elasticity of gross return with respect to the nutrient cost, holding other inputs constant.

Similarly, β_4 = partial elasticity of gross return with respect to the variable labour cost, holding other inputs constant.

The sum of β_2 , β_3 , and β_4 gives us information about returns to scale. Through the returns to scale we were able to know the output to a proportionate change in inputs. If returns to scale is less than 1 where it means doubling the input will be less than double the output. If returns to scale are greater than 1 it means doubling the input will more than double the output. If the sum of β_2 , β_3 , and β_4 is equal to 1 it means a constant return to scale where doubling the inputs will double the output.

- (g) SWOT (Strength, Weakness, Opportunities, and Threats) analysis has been used for analysing the efficiency of large cardamom farming.
- 4. The theoretical analysis has been carried out for examining the role of institutions like the agriculture and horticulture offices, Spice Board of India, and gram panchayats in the development of cardamom cultivation in Sikkim. The policy

implications for the large cardamom farmers in Mangan and Gyalshing districts have been considered.

1.10 Chapterisation

Chapter 1: An Overview of the Large Cardamom in Sikkim

The first chapter deals with the background of the study, statement of the problem, research gap and justification of the study, research questions, objectives of the study, hypotheses of the study, data, and methodology.

Chapter 2: Theoretical Background and Review of Literature

The second chapter provides the theoretical background, empirical reviews in India and North-East India in general and Sikkim in particular.

Chapter 3: Socio-Economic Characteristics of the Cardamom Growers in Mangan and Gyalshing Districts of Sikkim

The third chapter deals with the role of cardamom cultivation for the development of the socio-economic status of the people of the study area.

Chapter 4: Economics of Large Cardamom with an Overview of Production Organisation: A Comparative Analysis between Mangan and Gyalshing Districts

The fourth chapter analyses the results related to productivity, profitability and marketing efficiency of large cardamom farming and it also analyses the differences in performances between the two districts in terms of those components

Chapter 5: Concluding Observations and Policy Recommendations

The last chapter deals with summary and policy recommendations, scope, and limitations of the study.

CHAPTER 2

THEORETICAL BACKGROUND AND REVIEW OF LITERATURE

2.1 Review of Literature

There has been substantial literature with regard to Sikkim and the North East. Some of the significant works which provided a foundation for the present effort are highlighted hereafter.

2.2 Theoretical Literature

The Production is affected by factors we will discuss Classical Theory of Production and the Neo-Classical Theory of Production viewpoint and Production Function.

2.2.1 Classical Theory of Production

Smith (1776) has put forward Production as the main Theory. The Theory assumes that a single Production Function represents the efficient technique available to the Firm. Capital, Labor, and Land are the factors of Production. He had said that Labor is the most determining factor and Land is the least important than Labor.

The Theory has three major stages increasing return to scale, Diminishing return to scale, and Constant return to scale. The real Cost of Production will be decreased according with time. As the existence of internal and external of Economics occurring. Technology Development/upgradation is the most necessary for increasing productivity with sufficient availability of Capital.

Similarly, Ricardian production function, also assume the same factor Land, Labor, and Capital. He said that diminishing marginal utility is restricted due to the perfectly inelastic of Land. He believed that the factor of Production is the Economic

Development. Marginal Productivity of factor declines with the increase in Cultivation.

2.2.2 Neoclassical Theory of Production

The Neo-Classical Theory of Production is the input Demand and output Supply function established on the Theory of Profit maximization subject to a Production Function.

The theory argues that technology is a major influencing factor that increases the productivity and output capability of labor. The production function for measuring the growth and equilibrium of the economy is written as:

$$Y=AF(K, L)$$

Y= denotes an Economy (GDP)

K= represent it share Capital

L= represent amount of unskilled Labor in an Economy

A= represent determinant level of Technology

From (K, L, A) if any input increases it shows the effect on GDP and the Equilibrium level of an Economy, in case if the factor of Neo-Classical Growth Theory is not all equal, the return unskilled Labor and Capital on the Economy diminish.

Cobb & Douglas (1928) was considered to determine what relationship existed between the three factors of labour, capital and product. A functional to relate estimates they had calculated for workers and capital. In their work covering the subject approach of producers' theory. The theory measures the change in the amount of labour and capital, which have been used to turn out the volume of goods. The factors of production employed to determine production function.

Model: $Q = AK^{\alpha}L^{\beta}$, where

Q is output.

A is efficiency parameter >0

K is capital, & L is Labor

 α , $\beta > 0$ is output elasticity of labor and capital.

Output elasticity positively measures output to a change either by labour or capital used in the process of production. The theory has also explained return to scale as a proportional change in input increases by a constant factor; output will also change proportionally, and there is a constant return to scale (CRTS). Sometimes referred to simply as a return to scale. If output increases by less than proportional change, there is decreasing return to scale. If output increases by more than that proportion, there are increasing returns to scale (IRS).

2.3 Empirical Literature

Bhattarai et al. (2013) has carried out a study of livelihood improvement through sustainable large cardamom cultivation in north Sikkim. They have described that a large section of farmers in North Sikkim and most parts of Sikkim are engaged in large cardamom cultivation. For years cardamom, has been the single most crucial cash crop to these stakeholders. They have shown a steep decline in land holdings, as well as productivity under large cardamom. Although not evident apparently, it has drastically affected the livelihood of a large section of the rural population. The project has been able to experience and identify certain aspects which need closer attention and evaluation if large cardamom as a cash crop is to be cultivated in the State of Sikkim toward a sustainable source of livelihood.

Bisht et al. (2010) had carried out introduction and advancement in cultivation of large cardamom (Amomum Subulatum Roxb.) in Uttarakhand, India. Large cardamom is an important spice that suits mountain and hill climate. The crop is found growing sporadically in different parts of Uttarakhand, the extension trials were taken up on large cardamom, particularly with relation to germination and yield performance of three high yielding varieties. The average seed germination was recorded for different cultivars. Seedlings were maintained for one year in the nursery and thereafter transplanted in the farmers' fields. Pandit et al. (2013) had carried out the evaluation of large cardamom cultivars for seed germination and yield performance at different altitudes in the Darjeeling Himalayas region of West Bengal. They have described the crop growing up to 1.0-3.0 meter in height mainly between an altitude of 600-2350 m under tree shade, especially in Sikkim and Darjeeling district of West Bengal. Though the crop is found growing sporadically in different parts of Darjeeling district, because of its economic importance they described the results of extension trials taken up for studying yield performance of high yielding cultivars of large cardamom. Among all the cultivars 'Bharlang' is the best performer and considering the yield and market rate this cultivar might provide an additional source of income to the farmers.

Partap et al. (2014) has carried out large cardamom farming in changing climatic and socio-economic conditions in the Sikkim Himalayas. They have described the current contribution of large cardamom to livelihood in Sikkim, document changes in cardamom-based farming system over the past decade, analysed the challenges emerging from different drivers of change in particular ecological and climate change.

Subba J.R has written a book on agriculture in the hills of Sikkim. It mainly deals with the history of agriculture in Sikkim. He also mentions that large cardamom was a

native plant of Sikkim, supporting his statement by mentioning the presence of the wild species of large cardamom which is locally known as 'Churumpa', such as Amomum Aromaticum, A. Kingir etc. He also describes about the varieties and their origins; however, the book does not discuss about the social and economic aspects of the cardamom plantation.

Singh and Pothula (2018) had carried out studies on post-harvest processing of large cardamom in the eastern Himalayas. They describe about the high-value, low-volume spices crop grown in this region. Decline of large cardamom production and improved management will be one way to help ensure the sustainability of this niche crop.

Sharma et al. (2015) have carried out the study of large cardamom production system in the Sikkim Himalayas. They have described Sikkim, India as the focus of production which peaked early in the 21st century, making India the largest producer in the world, but dropped sharply after 2004; Nepal is now the largest producer. This crop is an important part of the local economy, contributing an average 29.2% of the income of households participating in the study. The farmers and extension agencies have worked to reserve its decline since 2007, and thus there is a steady increase in production and production area.

Shrestha et al. (2018) have carried out the study of large cardamom in Nepal: Production practice and economics, processing and marketing, they describes the large cardamom as main cash crops in Nepal, area production and productivity, cultivation practices, intercultural practices, management shade field, nursery management, propagation, drying technology, varieties of cardamom, problems, biotic and abiotic stress and their management, and marketing the large cardamom products which are exported to India, Bangladesh etc.

Subba (2018) has carried out the Potentials and Constraints of Large Cardamom (*Amomum Subulatum*) Cultivation in Sikkim. She had described the measure based on area, production and productivity including cumulative annual exponential growth rate (CAEGR) over a time period from 2003-2015. The study revealed positive growth of the area under large cardamom crop. The production showed a negative growth rate that may be attributed to some viral disease complex, nutritional deficiencies and inadequate management. Productivity of large cardamom depicted a positive growth rate.

Suvita (2013) has carried out the cardamom cultivation, its effect in rural livelihood and its importance in the international market. She describes the status of cardamom cultivation, the status of biodiversity in cardamom cultivation and impact on rural livelihood in area of Nepal. Compare the cardamom cultivation with other income generating alternative in terms of comparative benefits.

Varghese (2007) has carried out the Economics of Cardamom Cultivation in Kerala. He describes small cardamom in area from Kerala, analyses cost, return, and relative profitability through primary sources. The relative profitability has been calculated using cost benefit analysis, net present value and internal rate of return. The study followed the cross-section samples of different age groups and organizes to represent the life cycle, for the estimation of the cost of cultivation of perennial crop, cardamom. The study revealed cost of cultivation is significantly high in Kerala with regard to these major spices. If the rental value of land they added to cost structure, the small and marginal farmers are at a losing ground and becomes unprofitable. The small size farmers are cultivating this spice and sticking because of survival.

Negi et al. (2018) their study was status of large cardamom (*Amomum Subulatum Roxb*.) farming systems in the changing scenario of modern economics of Sikkim, Himalaya. They have described Sikkim constitutes 84% of large cardamom in India. There is a gradual decline in production due to influence of multiple factors. The rural livelihood and economy, cost benefits, export and they have done import analysis. The study revealed that country is expending more on import than earning. The various factors have been identified affecting production and approach to farmers with to address various constraint influencing the cultivation and production of large cardamom.

Reyes et al. (2006) their study was small cardamom- precious for people and harmful for forests in the East Usambaras, Tanzania. They described the effects of small cardamom cultivation on African natural mountain rainforests where it seeks to identify the possibilities for sustainable and profitable cultivation using agro-forestry method. The study revealed cardamom being produced in natural primary forest is not suitable in the long run.

Kandel (2019) has carried out the study Economics of production and Marketing of organic large cardamom in Panchthar district of Nepal where a sample of 65 households was taken from Ekteen and Sidin village. They described that 95.38% were dependent on agriculture and 50% cultivated cardamom. The market price of cardamom is fluctuating throughout the year due to the Indian market influence and quality of cardamom. Reoccurrence of disease and pest and the lack of price information are major problems faced by farmers. Likewise, monopoly of traders on price fixation and rapid price fluctuation are the major problems for traders. The study revealed higher benefit cost ratio and higher gross margin indicates the cardamom production highly profitable leading to the upliftment of socio-economic conditions.

Giri (2012) has carried out the study exploring the innovation in agriculture of developing country (a case study of Nepalese cardamom). He has described to enhance the quality of large cardamom. Qualitative research method conducted where data collected from the primary and secondary sources. The study revealed huge possibilities to improve the economy of the country through exporting the large cardamom in to international market, boost the living standard of Nepalese farmer and the quality of large cardamom should increase up to the market standard. Requirement of improved technology, advance skills and knowledge, and research and development are highly needed in large cardamom sector.

Gudade et al. (2014) have carried out eco-friendly practices of large cardamom cultivation in Sikkim and Darjeeling region. They described the importance of sustainable agriculture of farming systems that are environmentally sound, profitable production and maintain the social fabric of the rural community. The study revealed to establish and enhance rural environment and about 85% of large cardamom is being produced annually from these regions, which are rising as Indian organic large cardamom hub. Most of the farmers living in remote places adopting traditional methods of cardamom farming which are eco-friendly, less expensive and utilization of local labor.

Matthew and James (2017) have carried out the study problems and prospects of cardamom (small) cultivation in Idukki district from Kerala. They described Kerala is known for its variety of spices. South India and Sri Lanka are considered as origin of this spice. The study revealed that differential cultivation patterns make Indian cardamom unique in the international market and has a significant export orientation. Over dependence on borrowed funds and fertilizer consumption are the problems faced by the farmers. Insufficient institutional assistance and awareness also affects

the farmers. The problem of irrigation facility and unfavorable weather conditions lead to low productivity.

Sachdeva et al. (2012) their study was cultivating cardamom culture, economy and social structure in Sikkim. They described the family power structure, ethnicity, market relations and cultural significance of land and cardamom cultivation in the state of Sikkim. The revealed traditional knowledge system and the various culture practice in relation to cardamom cultivation. The socio cultural on economic significant on cardamom, influence of social structure based on gender, caste and ethnicity in cultivation and decision-making process, market, social structure and community linkage.

CHAPTER 3

SOCIO-ECONOMIC CHARACTERISTICS OF THE CARDAMOM GROWERS IN MANGAN AND GYALSHING DISTRICTS OF SIKKIM

3.1 Introduction

"Socio-economic is also known as social economics". Social science studies how economic activity affects and is shaped by social processes (Kumari, 2021). In this chapter, the socio-economic characteristics of the respondents from both in Mangan and Gyalshing districts have been highlighted. The information provided by a respondent sample has been categorised in various ways on the basis of community, age, gender, etc.

3.2 Demographic Profile of the Respondents

The analysis has been done on many types of demographic characteristics of the respondents. It provides information about respondents like age, marital status, and educational level. The characteristic of the table is explained in the sequence below.

Table 3.1: Demographic Profile of the Respondents of Mangan and Gyalshing Districts

Sl.	Demographic	Classification	No. of Respondents	
No.	Characteristics		Mangan	Gyalshing
		18-35	21 (26.25)	31(38.75)
1	Age	36-50	41 (51.25)	43 (53.75)
		51 & above	18 (22.5)	6 (7.5)
2	Marital status	Married	56 (70)	66 (82.5)
2		Unmarried	24 (30)	14 (17.5)
		Illiterate	11 (13.8)	3 (3.75)
		Primary Level	24 (30)	17 (21.25)
3	Education Level	Middle level	26 (32.6)	38 (23.75)
		High School &	19(23.7)	22 (27.5)
		above		22 (21.3)

Source: Field Survey

(Figures in Parenthesis refer to Percentage)

3.2.1 Age-Wise Distribution of the Respondents

Age is considered an important characteristic of a sample. The working capability of the respondents depends on age. In the present study, the age profile of the sample was divided into three broad age groups, viz., - 18-35 years, 36-50 years, and 51 years & above. The average age of the respondents in Mangan district is 34 years while it is 35 years in Gyalshing district. Respondents in the age group of 36-50 years are mostly engaged in cultivation in each district: 51.25 percent of respondents from Mangan district, 53.75 percent of respondents from Gyalshing district, 26.25 percent of the respondents from Mangan district, and 38.75 percent of the respondents from Gyalshing district belong to the age group of 18-35 years. 22.5 percent of the respondents from Mangan and 7.5 percent from Gyalshing district fall in the age group 51 and above. They have rarely engaged in cardamom farming because the older age is physically weaker. So, they hire labour for cultivation in order to obtain their livelihood. However, those in the age group of 36-50 years actively participate in such cultivation.

3.2.2 Marital Status of the Respondents

The marital status of the respondents is also an important demographic. It is a universal fact that household expenditure increases with the increase in the number of family members. Hence most married respondents have to depend upon an alternative source of income.

On the basis of marital status, the sample has been divided into two categories, viz.,-married and unmarried. As per table 3.1, both districts have a majority of married respondents. 70 percent of respondents from Mangan district were married along with 82.5 percent of those from Gyalshing district.

3.2.3 Educational Level of the Respondents

The education level of the respondents refers to the knowledge and skills that they have developed in any aspect. The sample characteristics with regard to education were divided into four categories, viz.,-illiterate (0 years), primary (01 to 05 years), middle school (06 to 10 years), and high school (11 to 12 years). The result presented in table 3.1 reveals that 23.7 percent of the respondents from the Mangan district and 27.5 percent of those from Gyalshing district have completed high school; 32.6 percent of respondents from Mangan district and 23.75 percent of those from Gyalshing district have completed the middle level; 17 percent of respondents from Gyalshing district and 24 percent of those from Mangan district have attended the primary level while 13.8 percent from Mangan district and 3.75 from Gyalshing district are illiterate in the sense that they have never attended school. If we compare the two districts the minimum education level of the respondents in Mangan district is up to the third standard while in the case of Gyalshing district it is the fifth standard. Similarly, the maximum level of education in Mangan district is at the graduate level while for Gyalshing district is the twelfth standard. Illiteracy is high in the Mangan district compared to the Gyalshing district. Geographical features and lack of awareness about education is the main reason behind the low literacy rate in Mangan district. Due to a lack of education and skills development respondents are not able to get suitable opportunities. As a result, practicing agriculture (mostly cardamom cultivation) becomes a compulsion. Hence people approach formal financial institutions and try to obtain benefits from government schemes.

3.3 Social Profile of the Respondents

This section deals with the caste and religious profile of the respondents. These have been considered as both women and men admit that social and cultural factors play a major role in their experiences, responses, and behaviors.

Table 3.2: Social Profile of the Respondents (Mangan & Gyalshing Districts)

Sl.	Social Characteristic	Classification	No. of Re	spondents
No.	Social Characteristic	Ciassification	Mangan	Gyalshing
		Hindu	0	50
		пшаи	U	(62.5)
1	Religion	D., 141.1.4	80	14
1		Buddhist	(100)	(17.5)
		Christian	0	16
				(20)
		Schedule Tribe	80	2
2	Caste	Schedule 1110e	(100)	(2.5)
	Caste	General & OBC	0	78
				(97.5)

Source: Field Survey

(Figures in Parenthesis refer to Percentage)

3.3.1 Religion-Wise Distribution of the Respondents

In the present sample, we have categorised religions as Buddhism, Hinduism, and Christianity. According to table 3.2, all the respondents in Mangan district follow the Buddhist religion. This is because the tribal population mainly follows Buddhism. Interestingly major tribal populations (Lepchas and Bhutias) from other districts are being converted to Christianity. In Gyalshing district, 62.5 percent of the respondents are Hindus, 17.5 percent are Buddhists, and 20 percent follow Christianity.

3.3.2 Caste-Wise Distribution of the Respondents

Caste is considered to be an important factor that affects the choice of occupation and proprietorship of skills in different rural activities (Singh, 2003). The caste distribution of the respondents has been divided into two categories - schedule tribe

(consisting of Lepcha, Bhutia, and Subba) and another category formed by merging General and OBC categories into a single grouping. From the sample, it is clear that all the respondents in Mangan district belong to the scheduled tribes, which mostly comprises of Lepchas. In contrast, Gyalshing district has a low proportion via. - 2.5 percent of the scheduled tribes, while 97.5 percent are general candidates and OBCs. Thus we found a vast difference between the two districts when we looked into cultural aspects such as religion and caste. Individual freedom and livelihood are the positive aspects in which respondents and their family members actively participate in large cardamom cultivation in both districts. Surprisingly, not a single scheduled caste household is practicing cardamom farming in both districts.

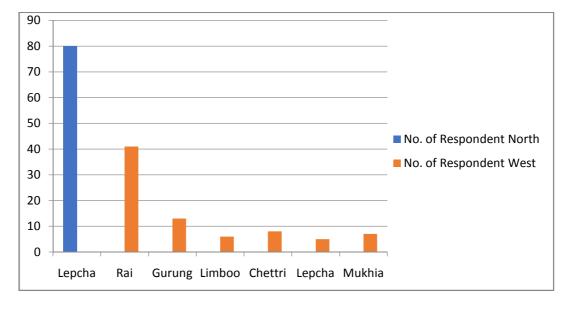


Figure 3.1: Community-Wise Categorisation of the Respondents

Source: Field Survey

The results presented in figure 3.1 reveal that all the respondents in Mangan district belong to the Lepcha community. In other words, the Mangan district is almost dominated by the Lepcha community. On the other hand, in Gyalshing district 51.25 percent, 11.25 percent, 10 percent, 8.75 percent, 7.5 percent, and 6.25 percent belonged to Rai, Gurung, Chhetri, Mukhia, Limbo, and Lepcha communities

respectively. Thus in this district, the Rai community dominates the other communities.

Table 3.3: Profile of the Households

Sl.	Household	Classification	No. of Re	espondent
No.	Characteristics	Ciassification	Mangan	Gyalshing
	Type of Household	Male Headed	52	74
1			(65)	(92.5)
1		Female Headed	28	6
			(35)	(7.5)
	Monthly	Less than	25	29
2	household	10,000	(31.25)	(36.25)
	Income from	10,000 & above	55	51
	Large Cardamom		(68.25)	(63.75)

Source: Field Survey

(Figures in Parenthesis refer to Percentage)

3.4 Types of the Households

In India and several other countries, the head of the household would be male, with females playing a secondary role. There was no change in the age and income of the male. The head of the household bears the responsibility of the members in terms of providing them with daily necessities while also making major decisions for the household. The constitution has given equal rights to females and males. Nowadays females are also playing a leading role where they bear the responsibility of the household members and make decisions (Meenu, 2021).

In the sample, there are two types of households-male-headed households (MHH) and female-headed households (FHH). In the Mangan district, 65 percent of the households are led by males, while 35 percent of the households are led by a female. In the case of Gyalshing district, 92.5 percent of the households are led by males and 7.5 percent by females. In both the districts females are dominated by males; however Gyalshing district demonstrates less female domination.

3.4.1 Monthly Income of the Households

The monthly household income is the gross income of the family members above a specified age. The income of household members gives a reflection of the economic status of the family. In the case of the sample from Mangan district, 31.25 percent of the large cardamom growers fall in the income group of less than Rs. 10,000 while 68.75 percent are in the income group of Rs. 10,000 & above. In Gyalshing district, 36.25 percent of the large cardamom growers fall in the income group of less than Rs.10, 000, while 63.75 percent of the growers have an income of Rs. 10,000 & above. The average monthly income of the growers in Mangan district is Rs. 11,220 while in Gyalshing district it is Rs. 12,130. The minimum wage of labour in Mangan district is Rs. 350 while in Gyalshing district it is Rs. 200. Conversely the maximum wage of labour in Mangan district is Rs. 500 while in Gyalshing district it is Rs. 350.

3.5 Types of Occupation

Large cardamom cultivation by its nature is an occupation in which the respondents work throughout the year as seasonal workers. Most people cultivate at their location using traditional farming techniques; in case of any problems, they try to solve them on their own using traditional means. As per the sample, people from both districts have alternative occupations other than large cardamom cultivation. There are reasons behind the adoption of large cardamom cultivation as a primary occupation. Without jobs in the formal sector, most of them practice cultivation as it has been a traditional family occupation; some are influenced in this choice by other growers.

Table 3.4: Occupational Profile of the Respondents (Mangan& Gyalshing Districts)

Sl.	Occupation	No. of Respondents	
No.		Mangan	Gyalshing
1.	Farmer	50	28
		(62.5)	(35)
2.	Carpenter	1	9
		(1.25)	(11.25)
3.	Sub-Contactor	1	6
		(1.25)	(7.5)
4.	Driving	3	12
		(3.75)	(15)
5.	Govt. Employees	14	16
		(17.5)	(20)
6.	Others	11	9
	(House Wife & Student)	(13.75)	(11.25)

Source: Field Survey (Figures in Parenthesis refer to Percentage)

In Mangan district 62.5 percent of the households are growers; 17.5 percent of households of the respondents are government employed; 3.75 percent, .25 percent, and 11 percent of households are carpenters, sub-contractors, houses wife, and students, respectively. Similarly in Gyalshing district, 35 percent of households are growers; 20 percent are government employed; 15 percent, 11 percent, 7.5 percent, and 11.25 percent of households of the respondents are drivers, carpenters, sub-contractors, homemakers, and students, respectively.

3.6 Reasons for Choosing the Large Cardamom Cultivation as an Occupation

The growers started with an initial investment of a minimum amount in a certain portion of land. After a few years, they start increasing the transplanting of seedlings in other portions of land. In this way, the growers increase their large cardamom cultivation. An obvious reason for choosing large cardamom as an occupation in the

study area is that several growers do not need training as they use traditional methods for the cultivation of large cardamom.

Table 3.5: Choice of Large Cardamom as an Occupation (Mangan& Gyalshing Districts)

Sl.	Characteristics		No. of Respondent	
No			Mangan	Gyalshing
1	Low initial Investment (Below 15000/year Amount in Rs.)		39 (48.75)	51 (63.27)
2.	Does not need training		23 (28.27)	20 (25)
3.	Members of a family involved in Large	Male	67 (83.75)	71 (88.75)
3.	Cardamom Cultivation	Female	54 (67.5)	58 (72.5)

Source: Field Survey (Figures in Parenthesis refer to Percentage)

The women and students on holidays are employed in a field where they receive the same amount of wages as trained labour. Households of respondents need new methods of training in order to take care of diseases and field management. We have set Rs. 15,000 per year as a low initial investment. In Mangan district, 48.75 percent of the respondents fall in the low initial investment group. 28.75 percent of the respondents do not need training in cultivation. Among the family members, 83.75 percent of the males and 67.5 percent of the female respondents are involved in cultivation.

Similarly in Gyalshing district 63.27 percent of the respondents fall in the low initial investment group; 25 percent of the respondents do not need training; 88.75 percent were male while 72.5 percent were family members of the respondents involved in cultivation.

3.7 Land Holdings

The great importance of land in determining man's economic and cultural progress is due largely to the diversification, relative scarcity, and localisation of its resource (Renne Ronald R). Land is the most important natural resource. With regard to the sample land is categorised into dry land and wetlands. The result presented in table 3.6 reveals that in Mangan district 51.25 percent of the respondents hold dry land. In contrast, 48.75 percent of respondents hold both dry and wet land.

Table 3.6: Land Profile of the Respondents (Gyalshing & Mangan Districts)

Sl.	Characteristics	Classification	No. of Ro	espondents
No.			Mangan	Gyalshing
		Dry land	41	19
			(51.25)	(23.75)
1	Type of Land	Both Dry + Wet	39	61
			(48.75)	(76.25)
		Own Land	60	35
			(75)	(43.75)
2	Tenure Status	Both Own &	20	45
		Leased Land	(25)	(56.25)
		Small farmer	34	7
			(42.5)	(8.75)
		Medium farmer	38	38
3	Type of Farmer		(47.5)	(47.5)
		Large farmer	8	35
			(10)	(43.75)
		Fragmented	73	80
4	Land		(93.75	(100)
	Fragmentation	Non-Fragmented	7	0
			(6.25)	(0)
		Total land (In	584.8	513.4
		Acres)		
		Total cultivated	412.1	449.9
5.	Land Holding	land (In Acres)		
		Area under	301	325
		Cardamom land (In		
		Acres)		

Source: Field Survey (Figures in Parenthesis refer to Percentage)

Similarly in Gyalshing district, 23.75 percent and 76.25 percent of the respondents hold dry land, and both dry and wetlands respectively. Due to the fragmentation of land, growers have less portion of the land; so the respondents have to take land on lease.

Among the respondents from Mangan district, 93.75 percent have fragmented land ownership among family members, while 6.25 percent of respondents do not have such land. On the other hand, in the case of Gyalshing district, all the respondents have fragmented land ownership among family members.

In the sample, tenure status was divided into own land and leased land. In Mangan district 75 percent of the respondents cultivate large cardamom on their own land while 25 percent of them have carried out cultivation on both own and leased land. In the case of Gyalshing district, the corresponding figures are 43.75 percent and 56.25 percent respectively.

There are three types of growers in Mangan district. 42.5 percent of the respondents were small growers with 2-3 acres of land; 47.5 were medium growers with 4-5 acres of land, and 10 percent of the respondents were large growers with 6 acres and above of land. Similarly, in Gyalshing district the corresponding figures are 8.75 percent, 47.5 percent, and 43.75 percent respectively.

The total landholding households among the respondents of Mangan District are 584.8 acres. The total cultivated land of the respondents is 412.2 acres whereas the area under large cardamom cultivation land is 301 acres. The average landholding of the respondents is 7.31 acres. In the case of Gyalshing district, these figures are 513.4 acres, 449.9 acres, and 325 acres respectively. The average landholding of the respondents is 6.41 acres.

3.8 Irrigation Status of the Respondents

In the case of large cardamom cultivation, growers generally irrigate the field during the dry season from the month of mid-November to mid-April. For irrigation purposes, growers have access to water from streams, rivers, as well as tap water. There is a direct flow of water to the fields from streams and rivers. The government has facilitated water supply for the respondents by providing reservoir tanks, canals, and water taps in the village.

Table 3.7: Irrigation Status of the Cardamom Cultivation of Gyalshing & Mangan Districts

Sl.	Characteristic	Classification	No. of Re	spondents
No.	Characteristic	Ciassification	Mangan	Gyalshing
		Irrigated	31	30
		Irrigated	(38.75)	(37.5)
		Non-Irrigated	23	24
1.	Irrigation Status	Non-inigated	(28.75)	(30)
		Dortly Irrigated	26	25
		Partly Irrigated	(32.5)	(31.25)
		Both Streams +	42	50
		River	(52.5)	(62.5)
2.	Source of Water	Both Streams +	38	30
		Tap Water	(47.5)	(37.5)
		Own	25	15
		Own	(31.25)	(18.75)
		0 +1: 1	11	19
3.	Supply of Water	Own + hired	(13.75)	(23.75)
		Own +	44	46
		Government	(55)	(57.5)

Source: Field Survey (Figures in Parenthesis refer to Percentage)

Large cardamom is a horticultural crop. Hence the horticulture department takes responsibility for the cardamom growers and provides benefits of irrigation and plantation schemes of the department. In the case of the present sample irrigation

status has been categorised as irrigated, partly irrigated, and non-irrigated. In Mangan district, 38.75 percent of the respondents irrigate their farms regularly; 28.75 percent go for partial irrigation; 32.5 percent of respondents do not irrigate their fields. With regard to Gyalshing district, the respective figures are 37.5 percent, 30 percent, and 31.25 percent.

The source of irrigation is most important for respondents. In Mangan district, 52.5 percent of the respondents use streams and river water for irrigation, while 47.5 percent utilize streams & tap water. On the other hand, in Gyalshing district, the respective figures are 62.5 percent and 37.5 percent.

As far as water sources in Mangan district are concerned, the respondents make use of their own, hired, and government connections. 31.25 percent of the respondents have obtained water connections on their own; 13.75 percent have a hired water connection, and 55 percent have used water connections done through their own as well as a government connection. In the case of Gyalshing District, 18.75 percent of the respondents have their own water connection, 23.75 percent of the respondents possess a hired water connection, and 57.5 percent of the respondents have used water connection done on their own & through the government.

3.9 Gini Measure of Income Inequality across the Large Cardamom Growers of Mangan and Gyalshing Districts

In this section, income equalities across the Mangan district and the Gyalshing district have been evaluated. The table depicts the Gini measure of income inequalities calculated for large cardamom-led income.

Table 3.8: Gini Measure of Income Inequality for Large Cardamom Growers

District	Gini Coefficient Calculated from Large Cardamom-Led Income
Mangan	0.145
Gyalshing	0.253

Source: Computed by Author based on Primary Data

The Gini coefficient value lies between 0 to 1 where 0 indicates no income inequality and 1 indicates strong income inequality. A moderate value of 0.5 indicates that there are income inequalities or strong income inequalities among the large cardamom growers. The Gini coefficient value for Mangan and Gyalshing districts is 0.145 and 0.253 respectively. There are no strong and severe income inequalities among the growers of Mangan district as well as Gyalshing district. But if we compare these two results it can be said that income inequalities are a little higher among the large cardamom growers of Gyalshing district as compared to Mangan district. This is because the proportion of land holding and level of production in Gyalshing district widely varies among the growers. Even though income inequality is slightly greater in Gyalshing district but the result suggests a relative uniformity in status among the growers of the two districts along with uniformity in decision making, common interests, and no difficulty in management decisions.

Table 3.9: Parameter Estimates of the Logit Model in Mangan District

Explanatory	Coefficients	Standard Error	Z-Statistics
Variable			
PCMI _i	0.000349**	1.13E-04	3.09526
NFMi	-0.1445	0.137237	-1.05291
AGEi	-0.00542	0.024063	-0.22533
SEXi	0.113898	0.627274	0.181577
HTi	2.030136**	0.638885	3.177625
RPETM _i	5.569346*	3.287134	1.694286
Constant	-6.7747	2.622928	-2.58288
No. of Obs. = 80 ,	LR statistic = 34.458	81 Prob.(LR statis	stic) = 0.000005
Pseudo R2 = 0.31775	59	Log like	lihood =-36.9914
No. of correct pr	rediction = 62	Cou	unt R2 =0.77

Source: Estimated by Author based on Primary Data

Note: ***, **, * represent the significant level at 1%, 5%, and 10% level of significance.

The coefficient of PCMI (per capita family monthly income) is statistically significant at a 5% level suggesting a positive relationship between the per capita income and the perceived socio-economic condition of the households in Mangan district. PCMI is an important variable that influences the perceived socio-economic condition of large cardamom growers. Therefore an increase in the per capita income of the households increases the estimated perceived socio-economic condition of the cardamom growers of Mangan district.

Likewise, the type of house (HT) also determines the socio-economic conditions of the growers. This factor refers to whether the growers have good housing conditions or not. It is found that house type is statistically significant at a 5% level suggesting a positive relationship with the perceived view regarding the better socio-economic status of growers. The result suggests that better condition enhances the estimated perceived view regarding the better socio-economic conditions of the large cardamom

growers in Mangan district. In addition to these, the ratio of the above primary education to total family members (RPETM) is also significant at a 10% level showing a positive relationship with the dependent variable and this would imply that an increase in the educational level among the family members improves the estimated perceived socio-economic status of the large cardamom growers in Mangan district.

The number of correct predictions is 62 with the value of count R² of 0.49 implying 49% of the cases found marginal probabilities supporting the actual perceptions. The significant value of count R² indicates that the considered socio-economic variables adequately influence the perception of the living conditions of the large cardamom growers. The LR statistic is 34.4581 with a p-value of about 0.000003, which is very small. It indicates that together all the regressors have a significant impact on the perceived socio-economic conditions of the cardamom growers in Mangan district.

Table 3.10: Marginal Effects of the Explanatory Variables in Mangan District

Explanatory Variables	dy/dx	P>z
PCMI _i	5.27E-05	0
NFMi	-0.02184	0.283
AGEi	-0.00082	0.822
SEX _i	0.017234	0.856
HTi	0.362382	0.001
RPETM _i	0.841662	0.075

As the model assume a non-linear relationship between the dependent and independent variables, the marginal effects of each of the independent variables are also reported in table 3.10. These marginal effects can be interpreted as the increment in the probability of cardamom growers' perception about their betterment in the

living conditions due to an increase in any of the independent variables by 1%. The statistical results in the table 3.10 explain that the variables PCMI and HT have a significant marginal contribution to the dependent variable.

Table 3.11: Parameter Estimates of the Logit Model in Gyalshing District

Explanatory Variable	Coefficients	Standard Error	Z-Statistics		
PCMI _i	2.14E-04*	1.11E-04	1.915967		
NFM _i	0.16104	0.220844	0.729201		
AGEi	0.002476	0.024261	0.102048		
SEXi	-0.58132	0.613684	-0.94726		
HTi	1.200199**	0.590484	2.032566		
RPETM _i	1.252719	2.103217	0.59562		
Constant	-3.50936	2.328217	-1.50732		
No. of Obs. = 80, LR statistic = 17.58659, Prob.(LR statistic) = 0.007353					
Pseudo R2 =0.166146					
No. of correct prediction = 39 Count R2 = 0.49					

Source: Estimated by Author based on Primary Data.

Note: ***, **, * represent the significant level at 1%, 5%, and 10% level of significance.

The coefficient of PCMI (per capita family monthly income) is statistically significant at a 10% level suggesting a positive relationship between the per capita income and the perceived socio-economic condition of the households in Gyalshing district. Similarly, the type of house (HT) determines the socio-economic conditions of the growers; it suggests whether the growers have good housing conditions or not. It is also observed that house type is statistically significant at a 5% level indicating a positive relationship with the perceived view regarding better socio-economic status. The number of correct predictions is 39 with an account R² value of 0.49. The

implication is that in 49% of the cases the marginal probabilities support the actual perceptions. The significant value of count R² indicates that the considered socioeconomic variables adequately influence the perception of the living conditions of the large cardamom growers. The LR statistic is 17.58659 whose p-value is about 0.007353; this is a very small value. It indicates that together all the regressors have a significant impact on the perceived socio-economic conditions of the cardamom growers in Gyalshing district.

Table 3.12: Marginal Effects of the Logit Model in Gyalshing District

Explanatory Variable	dy/dx	P>z
PCMI _i	3.97E-05	0.038
NFMi	0.02992	0.461
AGEi	0.00046	0.919
SEX _i	-0.10618	0.327
HTi	0.250231	0.047
RPETM _i	0.232745	0.549

The marginal effects in the Gyalshing districts are also reported in table 3.12. The statistical results in the Table 3.12 explain that the variables PCI and HT have a significant marginal contribution to the dependent variable in the Gyalshing district also.

3.10 Conclusion

The primary survey has been performed on six villages of Mangan and Gyalshing districts (3 villages each) where 80 respondents from each district have been chosen. These villages have been chosen according to their cultivation and production of large cardamom. In Mangan and Gyalshing districts households are dominated by male members. The majority of large cardamom growers in both districts are married. 34 years and 35 years is the respective average age of the respondents in the two districts. The Lepcha community dominates in Mangan district while the Rai community is the largest in Gyalshing district. Respondents in the age group of 18 to 35 years are engaged in large cardamom cultivation in both districts.

The primary occupation of the respondents in both districts is large cardamom farming. Some growers are engaged in alternative occupations like government and private jobs and businesses. The reason behind choosing large cardamom as an occupation is the low initial investment. The average landholding of respondents in the Mangan district is 5 acres while in the Gyalshing district it is 4 acres. In both the districts there are no strong and severe income inequalities among the large cardamom growers. Explanatory variables like per capita family monthly income, house type, and above primary education to total family members (RPETM) have a significant impact on the perceived socio-economic conditions of the large cardamom growers in Mangan district. Similarly, in Gyalshing district explanatory variables like per capita family monthly income and house type have a significant impact on the perceived socio-economic conditions of the large cardamom growers. This would suggest that governments — both at the policy level of the state government, as well as the implementation by the local governments — need to focus more on the economic aspects in terms of delivery mechanisms and well being of citizens.

CHAPTER 4

ECONOMICS OF LARGE CARDAMOM WITH AN OVERVIEW OF PRODUCTION ORGANISATION: A COMPARATIVE ANALYSIS BETWEEN MANGAN AND GYALSHING DISTRICTS

4.1 Introduction

This chapter looks into an overview of the organisation of production and the economics of production of large cardamom in terms of trend analysis, productivity and profitability, the benefit-cost ratio, gross margin analysis, producer share, and marketing efficiency. It also applies SWOT analysis. The Cobb-Douglas production function has been used to estimate the factor share to the total output production. Besides these, it also considers the problems faced by household respondents and traders of Mangan and Gyalshing districts.

Large cardamom is also known as the "Queen of spices" and is the most prominent cash crop attracting high revenues across the globe (Kandel, 2019). For the hilly regions, large cardamom is one of those crops which gives a high economic return on investment and contributes significantly to poverty alleviation.

4.2 An Overview of the Production Organisation

A production organisation is another name for a business commonly referred to as a producer. This type of firm involves in occupational activities related to the production of products and equipment. Production is the functional area responsible for turning inputs into finished outputs through a series of production processes. Production is organised by combining land, labour, physical capital, and human capital which are known as the factors of production. Production organisation is simply the method in which one organises the process of production of goods or services in the business.

Table 4.1: Previous Year's Production and Current Year Production in Mangan & Gyalshing Districts

Year	Production (Kg.)		Average Price Rs./Kg.		
	Mangan	Gyalshing	Mangan	Gyalshing	
2019	15,492	16,316	527.31	500	
2020	14,166	14,489	500	475	
2021	17,154	20,366	573.481	533.467	

Source: Author's Calculation

The result presented in Table 4.1 shows the total production of Mangan and Gyalshing districts with regard to large cardamom along with the average price received by the growers in the years 2019, 2020, and 2021. In Mangan district, the grower's total production is 15, 492 kg, 14,166 kg, and17, 154 kg, while the average price received by them is Rs.527.31, Rs.500, and Rs.573.481 in those years, respectively. Similarly, in the case of Gyalshing district, the total production of large cardamom is 16,316 kg, 14,489 kg, and 20,366 kg, while the average price received by the growers is Rs.500, Rs.475, and Rs. 533.467 in the same periods.

In comparison, growers of Gyalshing district are producing more large cardamom than those from Mangan district as the former practice better management of large cardamom cultivation fields leading to higher production. The growers in Mangan district are getting a better price in the market and cultivating a good variety of large cardamom 'Seremna' whose price is higher than that for the other variety 'Bharlang' grown in Gyalshing district. Both districts have found that a decrease in price and frequent price fluctuation of cardamom is a major problem in marketing.

Table 4.2: Average Cost of Large Cardamom (Rs./Kg.) in Mangan & Gyalshing
Districts

Types of growers	No. of Respondents		Total Cost of Production (Rs.)		The Average Cost of Production (Rs./kg.)	
growers	Mangan	Gyalshing	Mangan	Gyalshing	Mangan	Gyalshing
Small (1-3 acers)	37	7	539,580	77,760	80.82	74.6
Medium (3- 5 acres)	36	37	633,765	457,650	74.727	68.38
Large (5 acers and above)	7	36	137,620	550,820	70	56.89

Source: Author's Calculation

In the above Table 4.2, we have categorised growers of both districts into small, medium, and large. In Mangan district, the average cost of production per kg. is Rs.80.82 for small growers, Rs.74.727 for medium growers, and Rs.70 for large growers. Similarly, in Gyalshing district, the corresponding figures are Rs.74.6, Rs. 68.48, and Rs. 56.89, respectively.

In comparison, small, medium, and large growers in Gyalshing district have to bear a low average cost of production per kg. as compared to the growers in Mangan district. Overall, in both districts, the small and medium growers have to bear the higher cost of production compared to the large growers due to the lack of finance for purchasing large cardamom seedlings, and irrigation equipment, and the inability to pay labour wages on time. The large growers are financially stable; they purchase the bulk of large cardamom seedlings and equipment for irrigation and can pay labour wages at a time. They can access abundant labour; by purchasing in bulk, they can minimize the cost of cultivation.

Table 4.3: Average Returns from Large Cardamom (Rs./Kg.) in Mangan & Gyalshing Districts

Types of growers	No. of Respondents		Total Return from Cultivation (Rs.)		The Average Return from Production (Rs./Kg.)	
growers	Mangan	Gyalshing	Mangan	Gyalshing	Mangan	Gyalshing
Small (1-3 acres)	37	7	4,262,975	627,700	638.45	601.82
Medium (3- 5 acres)	36	37	5,268,200	3,922,240	621.176	586.10
Large (above 5 acers)	7	36	1,241,050	5,607,190	621.77	574.19

Source: Author's Calculation

The Table 4.3 suggests that in Mangan district the average return from production per kg is Rs.638.45 for small growers, Rs.621.176 for medium growers, and Rs.621.77 for large growers. Similarly, in Gyalshing district, the corresponding figures are Rs.601.82, Rs.586.10, and Rs.574.19, respectively.

In comparison, the small, medium, and large growers of Mangan district have a high average return from large cardamom production as compared to Gyalshing district, while the growers in Mangan district get a better price for the product in the market. The small growers in Gyalshing district have a high average return from large cardamom as compared to medium, and large growers because they can manage their fields properly and produce a better quality of products so they get high prices; hence the average return from large cardamom is high. In Mangan district, the average return of small growers is high.

4.2.1 Post-Harvest Handling of Cardamom

After harvesting large cardamom, it is collected and transported to the store. Freshly harvested large cardamom contains around 70-80% moisture which must be reduced to 10% (maximum) to store it properly without rotting (Kandel, 2019). In September-October, large cardamom is harvested in Mangan district while it is October-November in Gyalshing district.

Table 4.4: Type of Dyer used by the Growers in Mangan & Gyalshing Districts

Tyma of Dwyon usad	No. of Respondents		
Type of Dryer used	Mangan	Gyalshing	
Traditional	80	60	
Traditional	(100)	(75)	
Improved double drum		20	
Improved double drum	0	(25)	

Source: Field Survey, 2021 (Figures in Parenthesis refer to Percentage)

The producer dries large cardamom in a local dyer (traditional dyer) or modified dyer (improved double drum). Almost 100 percent of the growers used local dyers in Mangan district while in Gyalshing district 25 percent of growers used modified dyers and 75 percent use local dyers, which is shown in Table 4.4. Cardamom which is dried in a double drum maintains the colour and quality; it consumes less amount of wood. Electrical dyers have not made their way to both districts; these devices can maintain the product with better quality and colour, and solve the problems with other dyers in terms of being less labour intensive and time consuming. Growers in both the districts do not follow the grading system.

Table 4.5: Problems in the Production of Large Cardamom in Mangan &

Gyalshing Districts

Problems	No. of Respondents		
1 Toblems	Mangan	Gyalshing	
Conling / Transplanting	37/80	45/80	
Sapling / Transplanting	(46.25)	(56.25)	
Diseases and Pest	60/80	40/80	
Diseases and Fest	(75)	(50)	
Look of irrigation	39/80	44/80	
Lack of irrigation	(48.75)	(55)	
Field Management	53/80	35/80	
	(66.25)	(43.75)	

Source: Field Survey, 2021 (Figures in Parenthesis refer to Percentage)

The results presented in Table 4.5 reveal the major problems faced by the growers in the production of large cardamom. In Gyalshing district, 56.25 percent of respondents are facing problems with sapling/transplanting due to the unavailability of *Seremna* varieties while in Mangan district, 46.25 percent of growers face problems because of the high cost of saplings. In Mangan district, 75 percent of the growers have to deal with the issue of how to protect plants from diseases since the government has banned the use of chemical pesticides; in Gyalshing district 50 percent of growers are facing problems; growers also use alternative methods where they eliminate the plants from a field so that the diseases do not spread to others plants. In both the districts growers are irrigating their fields with low technology equipment; in the study area, there is a lack of new technology equipment for irrigation. In Mangan district, 66.25 percent of growers face problems with field management due to the high wage and low population size, while 43.75 percent of the growers in Gyalshing district face problems caused by the lack of field equipment like power tillers, etc.

4.2.2 SWOT Analysis of Large Cardamom Production in Mangan and Gyalshing Districts

SWOT analysis is a tool used for identifying and analysing an organisation's strengths, weaknesses, opportunities, and threats. Here the use is related to large cardamom in Mangan and Gyalshing districts which were analysed on the basis of focus group discussions, interviews, and key informants surveys. The most important goal of SWOT analysis is to increase consciousness of the factors that go into making a business decision or establishing a business strategy and to analyse the efficiency.

Table 4.6: SWOT Analysis

Strength	Weakness
 Senior members of the family have cultivated large cardamom for a long time. Large cardamom cultivation is labour intensive which generates employment opportunities. It can be cultivated in steep marginal land. It is one of the high-valued cash crops. 	 The practice of traditional methods for the cultivation of large cardamom. Lack of improved smokeless dyers for processing. Due to the price fluctuation growers do not get better prices.
Opportunities	Threats
 Other cash crops cultivating growers are also influenced by large cardamom cultivation. Hence they show willingness towards growing large cardamom. Practicing traditional ways of cultivation and processing means that there is a scope for adapting a new cultivation method and improved technology for processing. 	 The monopoly of traders regarding price fixation Decrease in the soil fertility Diseases that result in a decrease in production and productivity.

Source: Field Survey, 2021

4.3 Economics of Production of Large Cardamom of Gyalshing and Mangan Districts

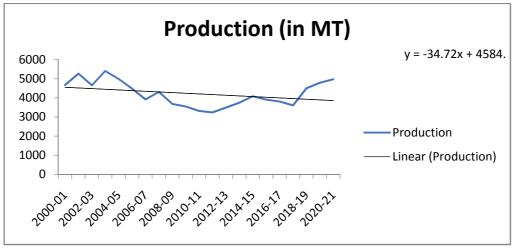
The application of principles and methods of economics to study the problems of agriculture to get maximum output and profits from the use of resources that are limited for the well-being of society in general and the farming industry in particular (Professor Thomas Nixon Carve, 1903).

To effectively apply economic principles to agriculture, the economist must understand the biological nature of agricultural production. Thus, agricultural economics involves a unique combination. The economics of the production of large cardamom has been analysed in the following sections.

4.3.1 Trend Analysis

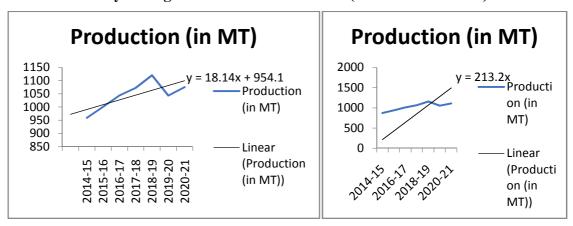
In order to have a clear picture of the long-term trend in the production of large cardamom, we have collected the production data of large cardamom from the whole of Sikkim as well as Gyalshing and Mangan districts for the period 2000-01 to 2020-21.

Figure 4.1: Trend Analysis of Large Cardamom Production for Sikkim from the Period (2000-01 to 2020-21)



Source: Spice Board of India, 2021

Figure 4.2: Trend Analysis of Large Cardamom Production for Mangan & Gyalshing Districts from the Period (2000-01 to 2020-21)



Source: Spice Board of India, 2021

The figure 4.1 shows the trend analysis for large cardamom production in Sikkim from the period 2000-01 to 2020-21. The above figure clearly indicates that the large cardamom production had increased from 2000-01 to 2005-06. However, from 2006-07 to 2013-14 large cardamom production declined in Sikkim. Conversely from 2014-15 to 2020-21, its production had increased in Sikkim. This indicates that there is a fluctuation in cardamom production in Sikkim. But the trend analysis shows that the trend of large cardamom production in Sikkim has been declining over the period.

The figure 4.2 shows the trend analysis of large cardamom production for Mangan and Gyalshing districts from the period 2014-15 to 2021. The above figure clearly shows that in both districts large cardamom production had risen from 2014-15 to 2020-21. The production had been increasing with fluctuations. However, trend analysis shows that the trend of large cardamom production in Mangan and Gyalshing districts had been increasing over the period.

From 2006-07 to 2013-14, the production of large cardamom had declined due to diseases like *Phulangay, Chirkey, and Furkey,* and variations in climate which completely spread and eliminate the cardamom plants like *Sawaney, Golsai,* and

Ramsai all over Sikkim. The production of large cardamom was low during that period. In order to increase the production of large cardamom, both the central and state government organisations and departments such as the Spice Board of India, Horticulture Department etc. had introduced many schemes and programmes to boost the cultivation of large cardamom. There are many schemes introduced by the Spices Board of India such as:

- Large cardamom-certified Nursery: This was created to promote farmers to produce quality and disease-free planting materials in their own fields for taking up replanting.
- 2. Large cardamom replanting /new planting (Ha.): This scheme was started to motivate growers to adopt replanting in a systematic way to increase production using high-yielding disease-free planting materials.
- 3. Large cardamom irrigation land development programme: Under this programme, irrigation/water storage structure facilities were provided to motivate the growers to bring more area under irrigation by constructing water storage structures and rain water harvesting. Irrigation equipments and rainwater harvesting were provided to motivate the growers to bring more area under irrigation by constructing water storage structures, rain water harvesting facilities, and installation of irrigation types of equipment for increasing productivity and improving the quality of the large cardamom.
- 4. The Horticulture department provides financial support to large cardamom growers, but the growers have to manage good fields and plantation of good varieties of large cardamom. The department gives financial support to the growers according to their new planting area along with their willingness for

- cardamom production. Growers have started to cultivate new large cardamom plants like *Bharlang, Seremna, Okheray*, etc.
- 5. The government had implemented these programmes and became very successful in Sikkim. The growers were actively interested and took an active part in cardamom cultivation. In addition, an institution such as NABARD and FPOs provided technical and financial support to the growers and also help in arranging marketing channels.

As a result, the production of large cardamom had increased from 2014-15 to 2020-21. The growers also took the initiative of cultivating large cardamom and availed benefits from government policies and schemes which have resulted in an increase in cardamom production.

Table 4.7: Area, Production, and Productivity of Large Cardamom in Sikkim

Year	Area	Production	Productivity
	(in Ha.)	(in MT)	(Kg./Ha.)
2000-01	23484	4665	198.645
2001-02	26734	5257	196.640
2002-03	26734	4650	173.935
2003-04	26734	5401	202.027
2004-05	26734	4980	186.279
2005-06	26734	4477	167.464
2006-07	26734	3910	146.255
2007-08	26734	4305	161.030
2008-09	23729	3675	154.873
2009-10	23729	3540	149.184
2010-11	23679	3310	139.786
2011-12	23155	3234	139.667
2012-13	22755	3483	153.065
2013-14	22755	3744	164.535
2014-15	23082	4075	176.544
2015-16	23082	4466	193.484
2016-17	23312	4632.95	198.736
2017-18	23312	4862	208.562
2018-19	23312	5030	215.768
2019-20	23312	4779	205.00
2020-21	23312	4970	213.194

Source: Spices Board of India, 2021

Table 4.7 shows the area, production, and productivity of large cardamom in Sikkim. The production and productivity had increased from the period 2000-01 to 2005-06, but from 2006-07 to 2013-14 large cardamom production and productivity declined in Sikkim. Conversely from 2014-15 to 2020-21, its production and productivity increased in Sikkim. The area under large cardamom cultivation had remained unchanged from 2000-01 to 2006-07, though the cultivated area declined from 2007-08 to 2013-14. From 2014-15 to 2020-21 the area under large cardamom increased, but not in the earlier proportion as growers have adopted other sources of occupation like dairy farming, ginger and vegetables cultivation, etc. Large cardamom growers are also being employed in services of the state government and the private sector. Due to this number of growers had declined during the period, which has resulted in a reduction in the area under cultivation.

Table 4.8: Area, Production, and Productivity of Large Cardamom in both

Districts

Year	Area	Area (in Ha.)		n (in MT)	Productivi	ty (Kg./Ha.)
	Mangan	Gyalshing	Mangan	Gyalshing	Mangan	Gyalshing
2014-15	3830	3480	959	870	250.39	250
2015-16	3850	3531.4	1001	937.233	260.1	265.4
2016-17	4050	3641.7	1044	1008.022	258	276.8
2017-18	4095	3645.2	1072	1061	262	291.068
2018-19	4030	3666	1120	1154.79	278	315
2019-20	3780	3346.2	1043	1053.923	276	314.98
2020-21	3853	7181.3	1075	2171.7	279	302.41

Source: Spices Board of India, 2021

Table 4.8 shows the area, production, and productivity of large cardamom in Mangan and Gyalshing districts. From the period 2014-15 to 2020-21 production and

productivity have increased in both districts. In comparison, the area under large cardamom was higher in Mangan district compared to Gyalshing district. But in the year 2020-21, the area of large cardamom rapidly increased in Gyalshing district because during that period more people adopted large cardamom farming as their primary occupation; they received all kinds of financial and technical help from the government. Along with this people were seen to be more interested and enthusiastic in cardamom cultivation, especially in Gyalshing district, because of wide awareness programmes conducted by different institutions.

4.3.2 Production and Productivity of Large Cardamom

Production is a process of value addition, wherein at each level, some value is added to the product; productivity is a measure of efficiency. Production exhibits the number of units produced by the firm in a given period whereas productivity highlights the ratio of output to input consumed.

Table 4.9: Production and Productivity of Mangan & Gyalshing Districts

District	Fiscal Year	Total Production (Kg.)	Total Landholding (Acres)	Average Production (Kg.)	Productivity (Kg./Acre)
Mangan	2020-2021	17,154	301	214.425	56.99
Gyalshing	2020-2021	20,366	325	254.575	62.664

Source: Author's Calculation

The results presented in Table 4.9 reveal that in Mangan district the total production of large cardamom is 17,154 kg in cultivatable land (301acres) with the average production being 214.425 kg, while the productivity of large cardamom is 56.99 kg. /acre.

Similarly, in the case of Gyalshing district, the total production of large cardamom was 20,366 kg, while the total cultivable land is 325 acres, with the average

production being 254.575 kg. and the productivity of large cardamom is 62.664 kg. /acre.

In comparison, the total production and productivity level of large cardamom are higher in Gyalshing district than in Mangan district because the growers apply recommended manure (cow dung), irrigate their fields regularly in the dry season, and manage fields better than in Mangan district.

4.3.3 Cost of Production and Return from Large Cardamom

Cultivation of cardamom includes various costs like sapling costs, manure costs, labour costs for planting, weeding, harvesting, field management, irrigation equipment, woods, processing, etc. The cost of production and return are the most important factors which influence the profitability and efficiency of inputs used.

Table 4.10: Benefit-Cost Ratio of Mangan & Gyalshing Districts

	Mangan	Gyalshing
Particular	Amount (Rs.)	Amount (Rs.)
Gross Return	10,772,225	11,642,130
Total Cost	4,191,465	3,346,230
Benefit-Cost Ratio	2.75	3.48

Source: Author's Calculation

The result in Table 4.10 shows that in Mangan district the gross return and total cost were Rs.10,772,225 and Rs. 4,191,465, respectively. The benefit-cost ratio in Mangan district was found to be greater than unity (2.75). This shows that large cardamom cultivation was profitable in Mangan district and therefore growers can continue the cultivation of large cardamom in the future.

Similarly, in Gyalshing district respondents' gross returns and total costs were Rs.11, 642,130 and Rs.3, 346,230 respectively. The estimated benefit-cost ratio in Gyalshing district was found to be greater than unity (3.48). This shows that large cardamom cultivation was profitable in Gyalshing district and growers can continue the cultivation of large cardamom in the future.

Thus, it is profitable for growers of both districts to go for large cardamom cultivation as the benefit-cost ratio in both the study sites is greater than 1. However, the benefit-cost ratio for Gyalshing district was higher because the total cost of cultivation is less than that of Mangan district.

From the field visit, it has been found that labour cost is higher in Mangan district and the majority of respondents are involved in the service sector, while in Gyalshing district the unemployment rate is high, which leads to low wages and therefore comparatively low cost of production.

4.3.4 Gross Margin Analysis

Gross margin analysis (GMA) is a simple and reliable tool for assessing the financial performance of an enterprise. It helps growers to calculate the productivity of their farms and compare the performance of different technologies and practices they have applied, leading to better management of their farms.

Table 4.11: Gross Margin Analysis of Mangan & Gyalshing Districts

District	Total Revenue (Rs.)	Variable Cost (Rs.)	Gross Margin (Rs.)	Gross Margin (Rs./Kg.)
Mangan	10,772,225	942,265	9,829,960	573.0418
Gyalshing	11,642,130	777,530	10,864,600	533.467

Source: Author's Calculation

The results presented in Table 4.11 reveal the gross margin analysis for both districts. The gross margin per acre (Rs.) and gross margin (Rs/Kg.) of Mangan district respondents are Rs.98, 29,960 and Rs. 573.0418 respectively. The corresponding figures for respondents in Gyalshing district are Rs.1, 08, 64,600, and Rs. 533.467, respectively.

In comparison, in Gyalshing district, the gross margin is Rs. 1,034,640 more than in Mangan district. The gross margin can demonstrate a higher difference, but varieties grown in Gyalshing district have lower market prices compared to those grown in Mangan district. Even though the cultivated land and production of large cardamom is lower in Mangan district compared to Gyalshing district; due to the price difference in varieties, the gross margin (Rs./Kg.) for Mangan district is more than that of Gyalshing district. The 'Bharlang' variety is cultivated in Gyalshing district while the 'Seremna' variety is cultivated in Mangan district; the price of 'Seremna, in the market is higher than the 'Bharlang, with a difference of Rs. 2000-4000 per 40 kg.

4.3.5 Contribution of Large Cardamom to Household Income

The result presented in Table 4.12 suggests that the contribution of large cardamom to total annual household income was 27.45 percent in Mangan district, with the service sector accounting for 67.68 percent. The contributions from vegetables and others (orange farming, paddy cultivation, ginger farming, etc.) are 2.17 and 2.7 percent respectively, as shown in figure 4.3.

Similarly, the contribution of large cardamom to the total annual household income was 31.89 percent in Gyalshing district, while in the case of the service sector it is 45.75 percent. Vegetables and others (dairy farming, seasonal work, etc.) provide 1.75 and 20.61 percent, respectively, as shown in figure 4.4.

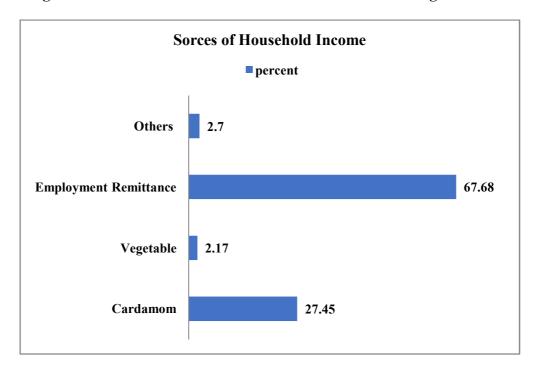
Table 4.12: Contribution of Large Cardamom to Household Income in Mangan & Gyalshing District

Total Income Income sources Rs. per year		Average Income Rs. per year		Percent		
	Mangan	Gyalshing	Mangan	Gyalshing	Mangan	Gyalshing
Cardamom	10,772,225	11,642,130	134,652.81	145,526.6	27.45	31.89
Vegetable	851,400	639,360	10,642.5	7,992	2.17	1.75
Service Sector	26,557,680	6,706,400	331,971	208,830	67.68	45.75
Others	1,059,750	7,525,000	13,246.87	94,062.5	2.7	20.61

Source: Author's Calculation

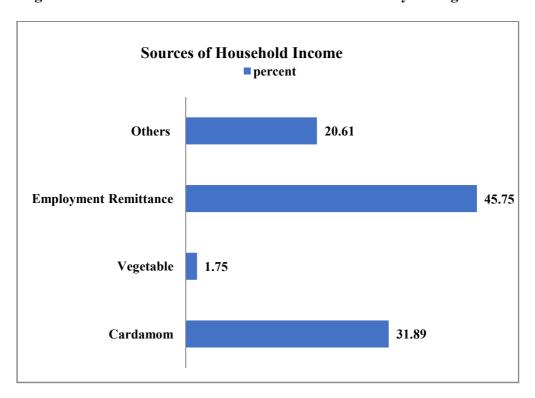
The contribution of large cardamom to household income was higher in Gyalshing district because the majority of the growers in Gyalshing district depend more on cardamom cultivation compared to other sources of livelihood. In Mangan district contribution of the service sector is much higher because of the lower population size which makes it relatively easier to enter formal employment. Apart from the market facilities in Mangan district, the contribution from vegetables is high compared to Gyalshing district. In Gyalshing district contribution from other occupations is high because the people are involved in dairy farming, seasonal jobs, etc. From the above table, it is clear that the proportion of the population in the service sector in Gyalshing district is low. As large cardamom provides seasonal income that is not sufficient for meeting needs throughout the year, their monthly expenditure depends on income from dairy farming and other seasonal jobs.

Figure 4.3: Different Sources of Household Income in Mangan District



Source: Field Survey, 2021

Figure 4.4: Different Sources of Household Income in Gyalshing District



Source: Field Survey, 2021.

4.3.6 Marketing System of Large Cardamom

Cardamom marketing includes all business activities involved in moving dried cardamom from widely scattered producers to the export market and ultimately to the consumer (Kandel, 2019). Cardamom growers are the producers who directly sell their products to traders and they are the main actors in the marketing system.

Mangan District

Producers

Producers

District Traders

Village Traders

Siliguri Traders

(West Bengal)

Siliguri Traders

(West Bengal)

Figure 4.5: Flow Chart showing Marketing Channels in both Districts of the State

Through the field survey, it has been seen that producers/cardamom growers in the large cardamom marketing system sell products to the village trader/collector, and the village trader/collector in turn sells them to the district level traders. District level traders finally dispatch it to other state markets like Siliguri, Kolkata, Gujarat, Bihar, Rajasthan, etc. according to the demand for the products. Growers are the decision

makers deciding whether to sell the products to village traders or those in the districts. It is found that the growers of Mangan district directly sell their products to the district traders whereas the growers of Gyalshing district sell their products to village traders and the village traders in turn sell to the district traders. Traders from Mangan and Gyalshing districts sell/supply large cardamom products to Siliguri traders (West Bengal). Both traders own marketing margins and bear marketing costs which leads to the growers receiving a low value for the product as shown in figure 4.5.

4.3.7 Producer's Share, Marketing Margin, and Marketing Efficiency

The producer's share of the retail price is higher than the marketing margin; this ensures the efficiency of the marketing system. Large cardamom weighing, packaging, loading, GST (Goods and Service Tax), transportation cost, and associated tax are included in the marketing cost. Marketing channels include higher transportation costs due to the lack of transportation facilities, lack of exact price information, and lack of nearby markets for dispatch in both districts.

Table 4.13: Producer's Share, Marketing Margin, and Marketing Efficiency in Mangan & Gyalshing Districts

	Marketing Channel		
Particulars (per Kg of Cardamom	Mangan District	Gyalshing District	
Net price received by growers	Rs.574/Kg.	Rs.534/Kg.	
Total marketing cost	Rs.35/Kg.	Rs.40/Kg.	
Marketing margin	Rs.20/Kg.	Rs.30/Kg.	
Retailer's Sale Price	Rs.629/Kg.	Rs.604/Kg.	
Value-added	Rs.55/Kg.	Rs.70/Kg.	
Producer's Share	91.25%	88.41%	
Index of Marketing Efficiency	10.43	7.60	

Source: Author's Calculation

Note * Due to the fluctuation in price the net price received by growers is taken as the average price received by growers in both districts. The average price is different because large cardamom prices differ based on varieties of cardamom and the entry of middlemen.

** District-level traders are the exporters in both districts so the supply price of the district-level traders is taken as the retailer's sale price.

The result presented in Table 4.13 indicates that in Mangan district the producer's share is 91.25 percent. Rs. 35, Rs.20, and Rs.55 are total marketing cost, total marketing margin, and value-added respectively. The index of marketing efficiency is found to be 10.43 where the market is efficient. Similarly, in Gyalshing district producer's share is 88.41 percent. Rs.40, Rs.30, and Rs.70 are the total marketing

cost, the total marketing margin, and the value added, respectively. The index of marketing efficiency is 7.60 where the market is efficient.

Comparing producer's share and index of marketing, efficiency is higher in Mangan district compared to Gyalshing district. Growers directly sell the products to district-level traders so as to get a better price for the product while in Gyalshing district there are village traders who act as middlemen. The difference in producer's share and the index of marketing efficiency is 2.48 percent and 2.83 respectively. Growers have to bear higher marketing costs in Gyalshing district compared to Mangan district due to a lack of transportation facilities. In Gyalshing district growers sell their product to both district-level traders and village-level traders, for which the district-level trader's marketing margin is rs.20/kg. and village level trader's marketing margin is rs.10/kg., whereas in Mangan district growers sell their product to district level traders with the trader's marketing margin being Rs.20/kg.

Table 4.14: Cobb Douglas Production Function showing the Factor Share to the

Total Output Production in Mangan District

Variable	Coefficient& t-Statistic
In II (Initial Investment)	0.163369*** (3.121179)
In FMC(Farmyard Manure Cost)	0.102012 (1.36234)
In VLC (Variable Labour Cost)	0.379393*** (3.083473)
C (constant)	2.51763 (5.48348)
Number of Observations	80
Dependent Variable	Gross Return
F value	12.73507
Probability>F	0.000001
\mathbb{R}^2	0.334531
Adjusted R ²	0.308263
Return to Scale	0.64

Source: Author's Calculation

Note: ***, **, and * indicates the significance at 1%, 5%, and 10% level respectively.

The figure within the brackets represents the t-statistics.

From the results presented in Table 4.14, it is clear that the coefficient of initial investment is found to be statistically significant at a 1% level with a positive sign, indicating that 1% increase in the initial investment will increase the income from large cardamom by 0.163%. In other words, it measures the elasticity of gross return with respect to initial investment is 0.163, holding the other factors constant. Similarly, the coefficient of variable labour cost is 0.37 and its coefficient was found to be statistically significant at a 1% level with its expected sign. It implies that a 1% increase in variable labour cost while keeping other factors constant would lead to an increase in gross returns by 0.37%. The regression coefficient of the farmyard manure cost is found to be 0.10 with a positive sign but its coefficient was found to be insignificant. The coefficient of R² was 0.33, which implies that 33% of the variation of the gross return is explained by the explanatory variables in the model. The F-value is 12.73 and its probability value is 0.000001; in other words, the estimated production was significant at a 1 percent level. It suggests a good fit for the model and that the explanatory variables included in the model were important for exploring the variation in large cardamom production. The summation of all the regression coefficients of the estimated production function of large cardamom was 0.64, which provides the value of the return to scale. From this, it is evident that the production function exhibits decreasing returns to scale. If all the variables specified in the production function were increased by 1%, the gross return on an average increases by less than 1%.

Table 4.15: Cobb Douglas Production Function showing the Factor Share to the

Total Output Production in Gyalshing District

Variable	Coefficient& t-Statistic		
In II (Initial Investment)	0.192684*** (1.894272)		
In FMC (Farmyard Manure Cost)	0.261951** (2.130061)		
In VLC (Variable Labour Cost)	0.33143** (1.956866)		
C (constant)	2.180184 3.806138		
Number of Observations	80		
Dependent Variable	Gross Return		
F value	10.35823		
Probability>F	0.000009		
\mathbb{R}^2	0.290215		
Adjusted R ²	0.262197		
Return to Scale	0.78		

Source: Author's Calculation

Note: ***, **, and * indicates the significance at 1%, 5%, and 10% level respectively.

The figure within the brackets represents the t-statistics

From the Table 4.15, it is clear that the coefficient of initial investment is 0.19 with a positive sign. It is significant at a 1% level which indicates that if a 1% increase in initial investment keeping other factors constant would lead to an increase in gross return by 0.19%. The coefficient of variable labour cost is 0.33 with a positive sign which implies that a 1% increase in variable labour cost while keeping other factors constant would lead to an increase in gross return by 0.33%; the coefficient is significant at 5% level. The regression coefficient of the farmyard manure cost was found to be 0.26 with a positive sign which implies that a 1% increase in farmyard manure cost while keeping other factors constant would lead to an increase in gross return by 0.26%; the coefficient was found to be significant at 5% level. The

coefficient of R² is 0.29 implying that 29% of the variation of the gross return is accounted for through the explanatory variable in the model. The F-value is 10.35 with a probability of 0.000009; hence the estimated production is significant at 1% level. Overall it can be said that the explanatory variables are significant which indicates a good fit for the model. Thus the variables included in the model were important for exploring the variation of large cardamom production. The summation of all the regression coefficients of the estimated production function of large cardamom is 0.78 which indicates that the production function exhibits decreasing return to scale. If all the variables specified in the production are increased by 1% the gross return on an average would increase by less than 1%.

Table 4.16: Problems in the Marketing of Large Cardamom in Mangan &

Gyalshing Districts

Problems	No. of Respondents		
Troblems	Mangan	Gyalshing	
Fraguent price fluctuation	72/80	64/80	
Frequent price fluctuation	(70)	(80)	
The monarchy of price after processing	18/80	15/80	
The monopoly of price after processing	(22.5)	(18.75)	
Transportation problem	32/80	50/80	
Transportation problem	(40)	(62.5)	

Source: Field Survey, 2021 (Figures in Parenthesis refer to Percentage)

Table 4.16 reveals that 90 percent of the growers in Mangan district and 80 percent of those in Gyalshing district faced a major problem in the form of frequent price fluctuations. These fluctuations occur due to misbalances in the international market, government policies, etc. Other factors impacting such fluctuations include lack of accurate information on price, variation in production, changes in climatic conditions, occurrence of natural disasters, and misbalances in the demand and supply of the product. The price of cardamom increases when there is a decrease in production,

which leads to a decrease in supply and vice versa. 22.5 percent of the respondents in the Mangan district and 18.75 percent of those in Gyalshing district faced problems with the monopoly of price after processing. This is because the traders confirm the price by checking the quality of the products. In Mangan district, 40 percent dealt with transportation problems due to the bad condition of roads; they had to bear high transportation costs, while 62.5 percent faced problems due to the lack of road connectivity.

4.4 Conclusion

We have utilised trend analysis of large cardamom for estimating the production of the last 20 years and to get an idea about the future production of the crop. The total production is higher in Gyalshing district because the cultivated area for cardamom is large, with good management of the field, and use of recommended manure input, while in Mangan district total production is slightly different. The gross return and gross margin in Gyalshing district are higher than in Mangan district while the gross return per kg. for Mangan district is higher than that for Gyalshing district. This is because growers in Gyalshing cultivate 'Seremna' varieties whose quality is good; it also gets a better price in the markets. The benefit-cost ratio for Gyalshing district is higher because the cost of production of large cardamom is less compared to Mangan district. Due to the unemployment rate being high in Gyalshing district growers have to depend on large cardamom; as a result, the contribution of large cardamom to a household's income in Gyalshing district is higher than in Mangan district. Growers are the producers whose share is higher in Mangan district due to low transportation costs as compared to Gyalshing district. The market facilitates the sale of products directly to the district traders where growers get a better price. Producer's share in Gyalshing district is less because growers sell their products to village traders with

high transportation costs as compared to Mangan district. In Mangan district, all the growers used traditional dyers for processing while only 25 percent of growers used improved smokeless dyers in Gyalshing district. In both the districts growers face various problems in production, like lack of good quality saplings, diseases, pest management, and lack of field management. Similarly, growers are also facing problems in marketing, such as frequent price fluctuation, monopoly of price by traders, and transporting of products where they had to bear high costs. In order to estimate the income from large cardamom production, we have used the Cobb-Douglas production function. SWOT analysis has also been done to know the efficiency of large cardamom production.

CHAPTER 5

CONCLUDING OBSERVATIONS AND POLICY RECOMMENDATIONS

5.1 Conclusive Observations

India is the second largest producer and the largest exporter of large cardamom, contributing about 37% of the world's production. Sikkim contributes up to 88% of India's production of large cardamom. The cash income earned from this crop in Sikkim increased from US\$ 1.9 million in 1975 to US\$ 13.8 million in 2005 and was as high as US\$ 50 million in 2010. Sikkim is also fast becoming known in India for its organic farming, and organic large cardamom has a potentially strong international market. As per the estimates of the DGCI&S for 2021, the quantity and value of large cardamom exported from Sikkim were 1325 metric tons and Rs. 9126.25 lakhs, respectively; the per unit price was Rs. 688.77.

It has been observed from chapter 3 that the households in Mangan and Gyalshing districts are dominated by male members. The maximum number of large cardamom growers in both districts is married. The average age of the respondents in the two districts is 34 years and 35 years respectively. The Lepcha community dominates in Mangan district while Rai community is the largest in Gyalshing district. Respondents in the age group of 18 to 35 years in both districts are engaged in large cardamom cultivation. This is the main occupation of the respondents in both districts. Some growers are engaged in alternative occupations like government, private jobs, and business. The average landholding of respondents in Mangan district is 5 acres while in Gyalshing district it is 4 acres. In both districts, there are no strong and severe income inequalities among the large cardamom growers. The factors like per capita family monthly income, house type, and above primary education to total family

members (RPETM) have a significant impact on the perceived socio-economic conditions of the large cardamom growers in Mangan district. Similarly, in Gyalshing district factors like per capita family monthly income and house type have a significant impact on the perceived socio-economic conditions of the large cardamom growers.

In chapter 4 trend analysis revealed that the large cardamom production had increased from 2000-01 to 2005-06. But from the year 2006-07 to 2013-14, large cardamom production declined in Sikkim. Conversely from the year 2014-15 to 2020-21, its production had an increase in Sikkim. This indicates that there is a fluctuation in cardamom production in Sikkim. But the trend analysis shows that the trend of large cardamom production in Sikkim has been declining over the period. In both the districts, large cardamom production declined from 2006-07 to 2013-14 but increased from 2014-15 to 2020-21.

Total production of large cardamom is higher in Gyalshing district while in Mangan district total production is slightly lower with 3,212 kg. in total production. The gross return and gross margin in Gyalshing district are higher than in Mangan district while the gross return per kg. for Mangan district is higher than in Gyalshing district. The benefit-cost ratio for Gyalshing district is 3.48 which is higher as compared to Mangan district (2.75). Producer's share in Gyalshing district is less because growers sell their products to village traders with high transportation costs as compared to Mangan district. In Mangan district, all the growers use traditional dyers for processing while only 25 percent of growers used improved smokeless dyers in Gyalshing district. In both the districts, growers are cultivating large cardamom where they are facing various problems in production, viz., - lack of good quality sapling,

diseases, pest management, and lack of field management. Similarly, growers are also facing problems in marketing, such as frequent price fluctuation, monopoly of price by traders, and transporting of products where they have to bear the high cost. In Mangan district, the result of the Cobb Douglas production function revealed that the coefficient of initial investment and variable labour cost are significant factors that affect the gross return of cardamom production while farmyard manure cost was found to be insignificant. The return to scale is found to be 0.79 which indicates that the production function exhibits decreasing returns to scale.

Similarly, in Gyalshing district, all the factors such as initial investment, variable labour cost, and farmyard manure are found to be significant factors that affect the gross return of cardamom production. The return to scale is found to be 0.78 which indicates that the production function exhibits decreasing returns to scale.

5.2 Institutional Aspect of Large Cardamom Product

5.2.1 Spices Board of India

Spices Board of India was established in 1987. It also develops, promotes, and regulates the export of 52 spices and spice products that fall under its purview. It also engages in the promotion of production, processing, domestic marketing, and export of both large and small cardamom.

From the Spices Board of India, large cardamom growers are benefited from various policy and schemes to promote growers of Mangan and Gyalshing districts. The Policy and Schemes are as follows:

Large cardamom certified nursery (Unit): To promote growers to produce good quality and disease-free planting material in their own field for taking up replanting.

- Large cardamom replanting/new planting (Ha): To motivate the growers to adopt replanting in a systematic way to increase productivity by using high yielding, disease-free planting materials.
- Large cardamom driers (nos): To motivate the cultivation community to adopt scientific curing methods for improving the quality of large cardamom.

5.2.2 Horticulture Department

Horticultural Department in the State comprises activities that aim at promoting the production of fruits, vegetables, cucurbits, and spice crops, etc. The significance of horticulture in improving land use, promoting crop diversification, generating employment, and providing nutritional security to people has been recognized by and large by the common man, general public, framers, and programme implementers. The features are an important area in the overall policy framework for development in the State. Departmental interventions comprising of scientific technology with inputs in the form of re-plantation, rejuvenation, gap filling and scientific management with support under HMNEH has started to show tangible impacts. In addition to old existing plantations, new areas have been developed to bring about large non-traditional cardamom areas under new clusters.

Table 5.1: Beneficiary from the Horticulture Department during 2017-18 to 2020-21 in Gyalshing District

Sl. No	Year	Area/Ha.	Rate/Ha.	Amount/Lakh	No. of Beneficiary
1	2017-18	206	10000	2060000	315
2	2018-19	343	10000	3430000	603
3	2019-20	400	10000	4000000	1107
4	2020-21	316	10000	3160000	816
Total		1265		12650000	2841

Secondary Data: Gyalshing District Horticulture Department, 2021

The horticulture department supports financially to large cardamom growers but the growers have to manage good fields and plantations of good varieties of large cardamom. The department supports the growers according to plantation areas and their willingness in cardamom production. In Gyalshing district from 2017-18 to 2020-21, were 2841 hectares of large cardamom plantations done by 2841 growers while the department had support finical aids of Rs. 12650000.

Table 5.2: Beneficiary from Horticulture Department during 2017-18 to 2020-21 in Mangan District

Sl.No	Year	Area	Rate/Ha.	Rate/Ha. Amount No. of Bene	
1	2017-18	150	10000	1500000	132
2	2018-19	149.72	10000	1500000	150
3	2019-20	300	10000	3000000	319
4	2020-21	200	10000	2300000	190
Total		799.72		8300000	791

Secondary Data: Mangan District Horticulture Department, 2021

The Table 5.2 shows the beneficiary from the horticulture department during 2017-18 to 2020-21in Mangan district. The department had supported finical aids of Rs. 8300000 to 791 beneficiaries in 799.72 hectares of large cardamom plantations.

5.2.3 Farmers Producers Organisations (FPOs)

In Mangan and Gyalshing districts, the farmers producers organizations (FPOs) has been facilitated the cooperatives registered under the relevant State legislation and self-help groups/federations are as follows:

FPOs make provisions for easy issue of licenses to SHG groups/federations to trade in inputs (seed, fertilizer, farm machinery, pesticides, etc.) for use of

their members as well as routing the supply of agricultural inputs through FPOs.

- ➤ The SHG groups/federation used FPOs as producers of certified seed, saplings, and other planting materials and extended production and marketing subsidies.
- FPOs at the farm gate, through FPO owned procurement and marketing centre's and for facilitating contract farming arrangements between FPOs and bulk buyers.
- ➤ By using FPOs as implementing agencies for various agricultural development programmes, especially RKVY, NFSM, ATMA, etc., and extending the benefits of central and State funded programmes in agriculture to members of FPOs on a special basis.
- The FPOs also link SHG groups/federations to financial institutions like cooperative banks, State Financial Corporations, etc. for working capital, storage, and processing infrastructure and other investments.
- FPOs also promote state level policies to support and strengthen SHG groups/federation to make them vibrant, sustainable, and self-governing bodies.

5.3 Policy Recommendation

- In both districts, the growers are facing problems with good quality and varieties of large cardamom saplings. Therefore, the government institution should provide good quality varieties of large cardamom saplings in order to increase cardamom production.
- 2. In both the districts, growers are still practicing traditional methods for the cultivation of large cardamom. The government institution should provide the growers with essential training facilities including modern technical aids.
- 3. In the study area, the major communities that are involved in cardamom production are Lepchas and Rais. People from other communities should also be involved in this activity because it yields better earnings and helps to enhance the economic conditions of the people.
- 4. Males dominate large cardamom cultivation in both districts; therefore, it is suggested that more female members should take an active part in this activity so that they can increase their earnings and enhance their households conditions.
- 5. In Mangan district, growers are facing problems with field management due to high labour wages and low population size; as a result, they have to deal with the high cost of producing large cardamom. Therefore, it is suggested that such problems should be resolved for better field management and production.
- 6. The growers are facing problems like a lack of irrigation and transportation facilities in both districts. The provision of better irrigation and transportation facilities will encourage the growers to strive better and also encourage other

farmers to start large cardamom cultivation. It would help the growers to increase the production and productivity of the crop. Therefore, the government institution should provide more modern irrigation facilities and better transportation facilities to increase cardamom production in the study area with modern technology.

- 7. In both districts, most cardamom growers are using the traditional methods of drying the capsules over the fire. When the crop is dried over the fire, the spice loses some of its flavour, and hence the quality is lowered. Very few farmers are using improved double drum dyers. Therefore, it is necessary that modern 'Bhattis' or other improved dryers such as electric dyers be constructed or installed in the villages and the villagers be taught to use them to their advantage in order to increase the value and quality of capsules.
- 8. Farmers need to be trained in post-harvest handling of produce, like sorting, grading, and curing to avoid post-harvest losses and also to gain better value and price.
- 9. In both districts, growers are facing problems in marketing large cardamom due to frequent price fluctuation and the monopoly of price. Therefore, the government institution should strictly monitor such matters.
- 10. Dissemination of product and market information on radios, television, and online social media such as Facebook, Instagram, YouTube, etc. is an essential step in raising awareness about the value of the product and the up-to-date market information among the growers.

5.4 Limitations and Scope of the Study

Mangan and Gyalshing districts of the state have been selected for the study area based on the production status of the large cardamom and the working culture of the respondents. In addition to these, the researcher himself was born and brought up in the Gyalshing district of Sikkim, which also has the large cardamom growers. Therefore it was very convenient to interact with the large cardamom growers and collect information from them in a local language. In this regard, there may be some research bias from another point of view. Due to time and financial constraints, the study could take a sample size of only 160 large cardamom growers. To analyse the economic performance with regard to large cardamom we have used simple descriptive statistics and applied an econometric model. Thus it has been observed that there are a lot of scopes for exploring research in these particular areas in the future.

No research work can ever claim to be complete on its own; there will always be scope for more work to be done in the relevant area. The same is applicable for the present effort. As already mentioned the present effort was limited to two particular districts of Sikkim. Future efforts can try to expand the study to other parts of the state. Researchers may also carry out comparative studies based on observations in different parts of the country. This work utilised techniques like income estimation and SWOT analysis; there is obviously scope for using other methods.

References

Bhattarai, N. K., Deka, T. N., Chhetri, P., Gudade, B. A., & Gupta, U. (2013). Establishment of large cardamom clone multiplication units. *Global journal of biology, agriculture and health science*, 2(4), 1-3.

Bisht, V. K., Purohit, V., Negi, J. S., & Bhandari, A. K. (2010). Introduction and advancement in cultivation of large cardamom (Amomum Subulatum Roxb.) in Uttarakhand, India. *Res. J. Agri. Sci*, *1*(3), 205-208.

Bhasin, V. (2011). Settlements and land-use patterns in the Lepcha Reserve-Dzongu zone in the Sikkim Himalaya, India. *Journal of Biodiversity*, 2(1), 41-66.

Google, http://www.mayallyang.com

Google, https://en.wikipedia.org/w/index.php?title=Yuksom&oldid=109007410

Gadtaula, M. (2019). A Study on The Production of Cardamom Farming of Ilam District, Nepal (Doctoral dissertation, Department of Economics).

Gudade, B. A., Chhetri, U. G., Bhattrai, N. K., Deka, T. N., & Vijayan, A. K. Darjeeling region.

Pandit, T. K., Sarkar, R. K., Mukherjee, D. M., & Patra, P. (2013). Evaluation of large cardamom (Amomum subulatum) cultivars for seed germination and yield performance under different altitude of Darjeeling Himalayan regions of West Bengal. *Indian Agriculturist*, *57*(3), 151-156.

https://www.darjeeling-tourism.com/darj 00020e.htm

 $\underline{https://www.outlookindia.com/outlooktraveller/explore/story/71300/things-to-see-and-do-in-dzongu}$

https://www.taleof2backpackers.com/tinvong-dzongu-sikkim/

ICIMOD, Large cardamom farming in changing climate and socio economic conditions in the Sikkim Himalayas.

Kandel, S. (2019) Economics of Production and Marketing of Organic Large Cardamom in Panchthar District of Nepal. Acta Scientific Agriculture, 3.8 (2019): 133-144.

Kharel S. & Bhutia J.W (2013) Gazetteer of Sikkim.

Mathew, L., & James, P. (2017). Problems and Prospects of Cardamom Cultivation in Idukki District. *International Journal of Economics and Management Studies*, 4(6), 38-46.

Negi, B. K., Joshi, R. K., & Pandey, A. (2018). Status of large cardamom (Amomum subulatum roxb.) Farming systems in the changing scenario of modern economics of Sikkim, Himalaya. *Global Journal of Bioscience and Biotechnology*, 7, 189-199.

Pradhan, B. K., & Badola, H. K. (2008). Ethnomedicinal plant use by Lepcha tribe of Dzongu valley, bordering Khangchendzonga Biosphere Reserve, in north Sikkim, India. *Journal of Ethnobiology and Ethnomedicine*, 4(1), 1-18.

Pratap, U., Śarmā, G., Gurung, M. B., Chettri, N., & Sharma, E. (2014). *Large cardamom farming in changing climatic and socioeconomic conditions in the Sikkim Himalayas*.

Reyes, T., Luukkanen, O., & Quiroz, R. (2006). Small cardamom—precious for people, harmful for mountain forests. *Mountain Research and Development*, 26(2), 131-137.

Subba, J. R. (1996). Agriculture in the hills of Sikkim.

Singh, A. I., & Pothula, A. K. (2013). Postharvest processing of large cardamom in the eastern Himalaya. *Mountain Research and Development*, 33(4), 453-462.

Sharma, G., Partap, U., Dahal, D. R., Sharma, D. P., & Sharma, E. (2016). Declining large-cardamom production systems in the Sikkim Himalayas: climate change impacts, agroeconomic potential, and revival strategies. *Mountain Research and Development*, 36(3), 286-298.

Sharma, E., Sharma, R., Singh, K. K., & Sharma, G. (2000). A boon for mountain populations. *Mountain Research and Development*, 20(2), 108-111.

Shrestha, J., Prasai, H. K., Timsina, K. P., Shrestha, K. P., Pokhrel, D., Poudel, K., & Yadav, M. (2018). Large cardamom in Nepal: Production practice and economics, processing and marketing.

Subba, S. (2018). Potentials and Constraints of Large Cardamom Amomum subulatum Cultivation in Sikkim.

Sachdeva, S. A., Giri, D. K., & Jena, S. S. (2012). *Cultivating Cardamom: Culture, Economy & Social Structure in Sikkim*. Germany: Lap Lambert.

Shukla, G., Kumar, A., Pala, N. A., & Chakravarty, S. (2016). Farmers perception and awareness of climate change: a case study from Kanchandzonga Biosphere Reserve, India. *Environment, development and sustainability*, *18*(4), 1167-1176.

Varghese, P. K. (2004). Trend analysis in area, production, productivity and price behaviour of cardamom in Kerala. *Indian Journal of Agricultural Economics*, 59(4), 798.

Varghese, P. K. (2007). Economics of cardamom cultivation in Kerala. *Indian Journal of Agricultural Economics*, 62(902-2016-67383).

Yadav, S. (2013). Cardamom cultivation, its effect in rural livelihoods and its importance in international market (Master's thesis, Universiteteti Nordland).

Appendix (A) Photography of Field Survey



Large Cardamom Field of Gyalshing and Mangan Districts

Field Visit conducted during 2020-2021 in Gyalshing and Mangan Districts













Appendix (B)

Household Survey Questionnaire on Large Cardamom Cultivation as a Part of M.Phil. Dissertation

(Department of Economics, Sikkim University 2021)

Place of Interview
A: Respondent Profile
1. Respondent Name
2. Age in Years.
3. Age group: <25y 25-35y 35-45y 45-55y 55-65y
4. Religion: Hindu/Buddhist/Christian/Others ()
5. Community
6. Gender M/F
7. Marital Status unmarried/Married/Divorced/Widowed
8. Personal Education:
Highest-Educational level of Family Males: >cl5-8, cl8-cl10, cl10-12, cl12+
Highest-Educational level of Family Females: >c15-8, c18-c110, c110-12, c112+ Illiterate ()
9. Full-time Occupation:
10. Monthly Family Income:
11. Income from Agriculture Activities:
12. Other Sources:

13. Family-Si	ze:			
Adult:	M	F		
Elderly:	M	F		
Children	: M	F		
14. Family M	embers involved: in cult	ivation:		
M	F			
In Others:	M	F		
B. Landholdi	ing & Asset Profile			
1. a) Total La	ndholding of Family (in	Acers)		
b) Fragmen	ntation of land, (yes/no)	if yes		
2. Total Land	Cultivated (in Acers)			
3. Area under	Cardamom (in Acers)			
4. Types of La	and Cultivated (in Acers)		
5. Tenure Stat	tus			
6. Purpose of	Production			
7. Cardamom	Land prepared by			
8. Type of Far	rmer			
Tenure st 1 = Own 2 = Lease 3 = Share 4 = Both	land 1 = Dry land 2 ed land 2 = Wet land 2 e crop 3 = Others (specify) 3 =	Purpose 1 = Self consumption 2 = Commercial = Both 1 and 2	Type of farmer: 1 = Large 2 = Medium 3 = Small 4 = Marginal	Land prepared by 1=Power tiller/Tractor 2=Animal power 3= Man power
C. Irrigation				
1. Irrigation S	tatus			
2. Total Irriga	ted Area under Cardamo	om (in Acers)		
3. Source of In	rrigation			

4. Number of Times Irrigated							
5. Supply of	5. Supply of Water Source						
6. Irrigation l	Facilities prov	ided Agricultu	re & Horticulture Department				
Irrigation status sou	arce of irrigation supp	ply of water facilitie	s provided by department				
2= non irrigated	1= irrigated 1= streams 1= own 1= water tank 2= non irrigated 2= river 2= hired 2= pipe 3= partly irrigated 3= tap water 3= government 3= water pump						
D. Sapling D	Details						
1. Types of S	Saplings Cultiv	ated					
2. Sapling Purchased from							
3. Price per Sapling							
4. Quantity of Sapling used per acers/ Total Land Cultivated							
5. Fertilizer used							
E. Details About Cost of Production							

 Variable cost 	Hired			Family/imputed/owned		
a) Human labor	No. of days	Wage/rent per day	No. of person	No. of days	Wage/rent per day	No. of person
Transplanting						
Weeding						
Harvesting						
Processing (used of wood)						
Farmyard manure	Hired			Owned		
	Qty used in (dhoko)	Cost per (dhoko)	Qty used in (dhoko)	Cost per (dhoko)
Irrigation cost (pipe & labor)						
Leased in land						
(Rent per annum)						
Leased out land						
2. fixed cost Land tax						
Water tax						
Infrastructure cost (Bhatti &smoke less wood combustor						
Repair and maintenance (Bhatti &smoke less wood combustor						

F. Details about Output	Produced Per A	cers	
1. Besides large cardamo	m farming what a	re the other major cr	op
2. Are cultivating (crop cardamom (yes/no) if y			ds) jointly with large
3.			
Types of cardamom	Area (in Acers)	Production (in kg)	Yield(kg/acers)
G. Production session a	nd seasonal work	xers	
1. Month of Sowing/Tran			
_			
2. Month of Weeding			
3. Month of Harvesting .			
4. Occupation of family r	nember who hired	l labor	
5. Number of days family	who hired labor		
6. Total expenditure/ wag	ge paid to worker		
7. Occupation of family farmer (from which pl			
8. Number of day family	member who wer	e employed	
9. Total earning from sea	sonal work		
10. Accept cardamom cu	ltivation which ty	pe of seasonal work	you were employed
H. Financial Assistant			
1. Do you have access to (Yes/No)	credit facility or o	did you have taken a	ny loan for agriculture?

2. If yes, then who provide credit facilities

3. Amount of credit taken for agriculture?
4. What is the rate of interest charged?
5. What was amount of loan being spent for cardamom farming?
6. If no, why did not you take loan/credit?
I. Source of Extension Service
1. Are you part of FPO'S members If yes/no
2. Are you aware of (Spice Board, NABARD, SIMPED, NERMAC, FPO'S, Agriculture and Horticulture)
3. Did you get any training facilities about cultivation, production, branding, marketing from (FPO'S Spice Board, NABARD, SIMPED, NERMAC, Agriculture & horticulture department
 4. Did you get any financial support from (Spice Board, NABARD, SIMPED, NERMAC, FPO'S, Agriculture and Horticulture) if yes, then 5. Do you know village level extension worker (VLEW)/Gram sevak of your locality?
Yes/No
6. If yes, then did you consult him/her during last year? (yes/no)
7. If yes, did you follow the advice? (yes/no)
8. If yes, was the advice useful? (yes/no)
9. Did the extension officer visit your village during the last six months? (yes/no)
10. Spices Board of India through the schemes how many cardamom farmers are benefited in Sikkim (Caste Wise & District Wise)?
11. Agriculture and Horticulture Department of Sikkim through the policy how many farmers are benefited irrigation facilities?

12. How Gram Panchayat are providing materials/fund maintenance for land (like

terracing of land, water tank, HYV seed, cardamom seedling) to farmers?

J. Marketing
1. Do you have any market facilities in your locality (yes/no) if yes,
2 How far is the nearest market available
3 Transportation cost of the nearest market
4. Transportation cost is charged (high/low) if high, then
5. Did you get the same price of cardamom as compared to other market (yes/no) if no, what is the difference
6. Q no.5 if no, then where you have to sell the product to get good price (place/km)
7. Transportation cost to get better price as same to other market
8. Did you get help for marketing (FPO'S, NERMAC, SIMPED, NABARD)
9. Q no.8 how they are helping you
10. Due to pricing fluctuation do you get low price/high price
11. Market price will be depended upon quality of product (yes/no)
12. While processing how to make better quality of product?
13. From which mode you will pay producers? (Net Banking, Cash)
14 Did you pay producer's intensive provided by government?
15 Did you pay same market value of product as compared to other market (yes/no) if no, difference

k. Constraint and Perception

Aspects of	Seed/Transplanting	Pest	Field	Marketing	Infrastructure
Constraint		Management	Management		
Constraint					

16. What is the price/per kg you are paying to Producer's?