Large Cardamom Value Chain in India: A Study of Sikkim

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By

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Declaration

I, Yaman Ghatani, hereby declare that the issues and matters raised in this dissertation entitled "**Large Cardamom Value Chain In India: A Study of Sikkim**" are the records of my own effort, that the contents of this dissertation did not appear for the award of any previous degree to me as well as to anybody else to my best knowledge, and no part of this dissertation has been submitted by me for any degree in any other educational institutions.

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Large Cardamom Value Chain in India: A Study of Sikkim

Submitted by **Mr. Yaman Ghatani** under the supervision of **Dr. Manesh Choubey** of the Department of Economics,
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This is certified that the dissertation entitled "**Large Cardamom Value Chain in India: A Study of Sikkim**" submitted to Sikkim University in partial fulfillment of the requirement for degree of **Master of Philosophy in Economics** is the result of research work that is carried out by **Mr. Yaman Ghatani** under my supervision. No part of this dissertation has been submitted for any other degree.

He acknowledges assistance and helps those he received during the course of this research.

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- **Yaman Ghatani**

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Abbreviations

MT – Million Tonnes

US – United States

NERAMAC - North Eastern Regional Agricultural Marketing Corporation Limited

SWOT: Strengths, Weaknesses, Opportunities and Threats

UNIDO - United Nations Industrial Development Organization

PRA's- Participatory Rural Appraisal

M4P- Making Markets Work for the Poor Project

DFID - Department for International Development, UK

R&D – Research and Development

NAIP - National Agricultural Innovation Programme

FAO- Food and Agricultural Organization

MoAD - Ministry of Agricultural Development

MoAF - Ministry of Agricultural and Forests

CAGR- Compound Annual Growth Rate

ST – Scheduled Tribe

OBC – Other Backward Classes

CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Introduction

The Value chain is a concept which can be simply described as the entire range of activities required to bring a product from the initial input-supply stage through various phases of production to its final market destination. The product stages entails a combination of physical transformation and the participation of various producers and services and the chain includes the product's disposal after use. Contrary to the supply chain, the concept stresses the importance of value addition at each stage, thereby treating production as just one of the several value-adding components of the chain.(UNIDO,2009). The value chains in the mountains are different from those in the plains areas and require a different interpretation .Mountain value chains are influenced by a set of mountain specificities such as availability of unique and niche products and services, limited accessibility, fragility, diversity and marginality.(Hoermann et al 2010)

Large Cardamom (*Amomum Subulatum Roxb.)* is one of the most valuable cash crops of India which belongs to the family of *Zingiberaceae.* It is cultivated in the Eastern Himalayan region covering Sikkim, West Bengal (Darjeeling Hills) and Arunachal Pradesh. It is grown at an altitude from 600 to 2000 meters above sea level and requires temperature of 5 – 30 degree Celsius with rainfall of 2000-3500 mm. The crop requires well drained sandy loams having pH range of 5.0 and 6.0 and 30-50% of shade. It has varieties such as *Ramsey, Golsey, Seremna, Varlangay and Sawney.* India is one of the largest producer and exports 1000 (million tonnes) capsules valued at Rs.12 crores in the world. Total acreage of large cardamom in India is 30,000

hectares and total production is 5000 million tonnes with productivity of 175 kg per hectare. (http://www.kiran.nic.in/sikkim_pride.html)

Large cardamom is an important spice of every Indian household. It is used as an important spice in preparing a number of dishes such as *Biryani* , *Pulao,* Vegetables *etc* .

Sikkim's producers hardly benefit from the exports as most of the produce goes through a series of middlemen to the large markets of Delhi, Amritsar and Mumbai, to be further exported to Pakistan .(The Sikkim Human Development Report,2008).

Cardamom plants take about three years to bear fruit and are commercially productive for four to six years before yields decline. The pods, which grow spaced at intervals along the panicle, contain brown or black seeds so tiny that it takes four pods to fill a quarter-teaspoon, making it one of the worlds' most expensive spices. Guatemala is the largest exporter with 67.1% world share in the total value in year 2012. India, Indonesia, Singapore are other major exporters. France, India, Indonesia are gaining the market in terms of quantity and value. Nepal is losing its market as well as the value of Cardamom. France ($ 39923/ton), Sweden ($34241/ton), Germany ($13,652/ton), Netherland ($13493/ton) are charging very high price to their Cardamom than world average ($6901/ton). Nepal is getting a little less ($6624/ton) than the world average. (Avasthe et al 2011)

Table 1 : List of Exporters of large cardamom :

Value exported in 2012 (USD thousand)	Quantity exported in 2012	Unit value (USD/unit)
World	370058	53626
Guatemala	248490	35711
India	68032	6018
Indonesia	16977	8151

Singapore	9451	1141
Netherlands	6328	469
Nepal	3968	599
Germany	3058	224
Sweden	1986	58
France	1557	39

Sources: ITC calculations based on UN COMTRADE statistics.

There are a number of studies on large cardamom cultivation in Sikkim mostly with reference to the diseases management but there is a huge gap in the literature about the economics of large cardamom cultivation in Sikkim. Thus, we look into one such mountain specificities which is large cardamom a commercial-niche product of the Himalayan Region of Sikkim. This high-valued niche product is an important livelihood option for the people in the Sikkim Himalayan Region as it fetches them huge returns.

Initially, at the grower's level the only factor that contributes to the growth of large cardamom is labour input. The final product is sold to the middlemen or sent to NERAMAC for auction. In spite of its monopoly as an exporter of large cardamom Sikkim has not been able to come out of the shackles of the "buyer dominated market" of large cardamom rather than "seller dominated market ".The establishment of Spices Parks in terms of processing , the availability of air conditioned warehouses of cardamom available in the Spices Park has been a fruitful indicator for maintaining the quality of the product for a longer period in Kerala (Hameedu 2014) which has yet to be established in Sikkim.

Thus, giving rise to the importance of Value Chain Analysis for large cardamom production in Sikkim which is examining its strengths, weaknesses , opportunities and threats in producing cardamom in Sikkim has to be identified along with studies

focussing on employment opportunities through the production of cardamom cultivation.

1.2 Research Gap

The available literature looks into the disease management of large cardamom. The economics of large cardamom comprising of details on cost, price, production and distribution of large cardamom are yet to be analysed also looking into the institutions supporting large cardamom in Sikkim. Thus, there is a need to study the Value chain analysis of large cardamom in Sikkim that involves the entire functioning of large cardamom starting from the grower's level to buyer's level. This also involves the linkages of farmers to institutions such as Spices Board and NERAMAC (North Eastern Regional Agricultural Marketing Corporation Limited).

1.3 Research Questions

1) Who are the value chain actors in the large cardamom cultivation in Sikkim?

2) How far has the institutions supported large cardamom?

3) What are the cost of production and marketing cost?

4) What are the problems of large cardamom cultivation in Sikkim?

1.4 Objectives

1) To examine the value chain of large cardamom cultivation in India and Sikkim

2) To study the cost of cultivation and profitability of large cardamom cultivation

3) To study the marketing costs and marketing margins of large cardamom

4)To study the problems of large cardamom cultivation in Sikkim and suggest suitable policy measures for better chain.

1.5 Scope of Study

The scope of the study is to show the importance of this agricultural activity which proves to be a farmer centric livelihood in the age of lessening interest for farming among the new generation. This large cardamom cultivation makes the horticulture industry as a hopeful sector for the future growth.

1.6 Limitation of Study

This study is based on some secondary and primary information which is collected from 120 farmers from West and East district of Sikkim only and farmers from South and North District of Sikkim have been excluded looking at their low rate of participation in the auction held at Gangtok.

1.7 Chapter Plan

Chapter 1 consists of the Introduction to large cardamom value chain with introduction of the study area, research gap, research questions, and objectives of the study, scope and limitation of the study and chapter plan.

Chapter 2 is devoted to theoretical background on value chain

Chapter 3 consists of review of literature on studies related to the issue.

Chapter 4 consists of research design and methodology

Chapter 5 throws light on Global scenario of large cardamom

Chapter 6 reveals the value chain of large cardamom

Chapter 7 consists of results and discussions of the study

Chapter 8 consists of Summary, Recommendations and Conclusions

CHAPTER 2

THEORITICAL BACKGROUND

2.1 Theoretical Background

The Value chains are a range of activities that are required to bring a product from conception, through the different phases of production and transformation. Chains are generally composed in the process of interaction for the companies and individuals in supplying goods and services which are referred to as production chains, value chains, marketing chains, supply chain or distribution chains .Chains of agricultural products such as fruits and vegetables ,grains and oils, textiles and cosmetics stretch from the producers to the consumers as on the one end are producers –basically the farmers who grow crops and raise the animals and on the other end consumers who drink and wear these products. Emana (2010)

Bammann (2007) has talked about three levels of Value Chain.

- Value chain actors**:** The chain of actors who directly deal with the products, i.e. produce, process, trade and own them.
- Value chain supporters: The services provided by various actors who never directly deal with the product, but whose services add value to the product.
- Value chain influencers*:* The regulatory framework, policies, infrastructures, etc.

The value chain concept entails the addition of value as the product progresses from input suppliers to producers and consumers. It includes productive transformation and value addition at each stage of the value chain. At each stage in the value chain, the

product changes hands through chain actors, transaction costs are incurred, and generally, some form of value is added Woldesenbet (2013).

There may be the use of the concept of supply chain and value chain interchangeably but there are differences. The supply chain model – which came first – focuses on activities that get raw materials and subassemblies into a manufacturing operation smoothly and economically. The value-chain notion has a different focus and a larger scope. A supply chain is simply a transfer of a commodity from one stakeholder to another in a chained manner. The value chain is the value addition at different stages of transfer. In different stages of value chain, different stakeholders add value to the product Reddy (2013).

The chains can be simple when producers directly sell to the consumers but long and complex when the other actors play role in buying, processing, transporting and selling to the end user, the consumer. Farmers need to understand the players in the chain and the requirements of the different branches so that they can supply the product which that branch requires which will increase their bargaining power in the chain and improve the price they get for their product (Emana 2010). Globalization has provided the ever growing population of the world with several opportunities that have helped to achieve significant gains in terms of higher income, availability of diverse products and quality goods. The developed nation's demands for a variety of organic products from the developing countries have encouraged the government, investors and also the farmers from the developing world to expand agro-industrial activities linkages to export markets as a means of increasing local food production, employment, business development and international trade. But, along with these gains it also faces challenges such as pressure for higher productivity with its shrinking land for agriculture and efficiency to maintain market share, governance by

international supermarkets retailers and buyers affecting access to markets and international consumers demanding high quality organic produce with the lack of better technology for post-harvesting of the produce. Hence, there is an urgent need for a comprehensive approach to value chain development. United Nations Industrial Development Organization (2009).

2.2 What are value chains?

The value chain is a concept which can be simply described as the entire range of activities required to bring a product from the initial supply stage, through various phases of production to its final market destination. The production stages entail a combination of physical transformation and participation of various producers and services, and the chain includes the products disposal after use. The concept stresses the importance of value addition at each stage, thereby treating production as just one of the several value-adding components of the chain. In reality, the value chains tend to be more complex to involve numerous interlinked activities and industries with multiple types of firms operating from the different regions of one or different countries around the globe. For instance, agro-food value chains encompass activities that take place at the farm as well as in rural and urban areas. United Nations Industrial Development Organization (2009)

There are two types of value chain namely "producer driven" and "buyer driven". In the former usually transnational, manufacturers play the central roles in coordinating production networks which is typical of capital and technology intensive industries. While the latter are those in which large retailers, marketers and brand manufacturers play pivotal roles in setting up decentralized production networks in a variety of exporting countries, typically developing countries . The difference between the two

are that the producer driven chains get its profit from scale ,volume and technological advances whereas the buyer driven chains yield profits from combinations of high-value research ,design, marketing and financial services. United Nations Industrial Development Organization (2009)

2.3 Why value chain analysis?

The major purpose of value chains are to better target their support and investments in various areas such as trade capacity, enterprise competitiveness, income distribution and equity among value chain participants. It is the process of breaking a chain into its constituent parts in order to markets stage and knowing their functions and relationships, deciding the chain governance and identifying value adding activities in the chain and assigning costs and added value to each of those activities. These features help to identify problems and discover opportunities to improve the contribution of specific actors and the overall performance of the chain which helps to find the dynamic linkages in the value chain. This dynamic links helps to find out how gains and risks are distributed to poor producers and poor countries that are seeking to enter global markets for ensuring a sustainable income growth. The developing countries are always at a disadvantage for processing due to lack of modern technology for post-harvesting of the produce leading to post-production losses. United Nations Industrial Development Organization (2009)

Comparative data on processing of agricultural products in industrialized and developing countries depict that the percentage of agricultural products that are processed in industrialized countries is 98 whereas it is only 38 in the case of developing countries. Similarly, value added agricultural processed in (US$/tonne) is 185 for industrialized countries and only 40 for developing countries and most

importantly there are post harvest losses of 40 % in developing countries and minimum for Industrialized countries. United Nations Industrial Development Organization (2009)

In a narrow sense, a value chain includes the range of activities performed within a farm to produce a certain output. This might include the conception and design stage, the process of acquisition of input, the production, the marketing and distribution activities and the performance of after sales. All these activities constitute the chain; which links producers to consumers and each activity adds 'value' to the final product. For example, in agri-business enterprises an appropriate system of storing fresh raw materials (fruits) positively impacts on the quality of the final product and consequently increases its value. The board approach of defining a value chain looks at the complex range of activities implemented by various actors (primary producers, processors and traders and also service providers) to bring a raw material through a chain to the sale of the final product. The 'board' value chain starts from the production system of the raw materials and will move along the linkages with other enterprises engaged in trading, assembling, processing etc. M4P (2008)

Conducting a value chain analysis requires a thorough investigation of what is going on between the actors in the chain and what keeps these actors together. When we look into the agricultural value chains they are critically dependent on environmental resources and are characterized by prevalence of traditional social norms. Finally, due to high incidence of the poor in the agricultural sector the value chain framework can be used to draw conclusion on the potential impact of value chain development on poverty reduction. Advantages of value chain is that it forces the analyst to consider both micro and macro aspects of production and exchange activities. At the most

basic level a value chain analysis systematically maps the actors in the production, distribution, marketing and sales of a particular product. (M4P, 2008)

2.4 Major Concepts of Value Chain

The three main research streams in the value chain literature are:-

Fili`ere - Fili`ere means a thread or a chain .This approach was initially used to analyze the agricultural system of developing countries under the French colonial system. It was a tool to study the ways in which the agricultural production systems (including Rubber, Coffee, Cotton and Cocoa) were organized in the context of developing countries and also showed how local production systems were linked to processing industry, trade, export and final consumption. M4P (2008)

Porter's Framework – is based on work of Porter (1985) on competitive advantages. This framework was used to assess how a firm should position itself in market and in the relationship with suppliers, buyers and competitors. It posed questions such as how can a firm provide customers with a product or service of equivalent value compared with competitors, but at a lower cost (strategy of cost reduction)? How can an enterprise produce a product that customers are willing to pay higher price for (strategy of differentiation)? Porter argued that competitive advantage cannot be detected by looking at the firm as a whole instead separately into series of activities and competitive advantage found in (one or more such activities).Porter distinguishes between primary activities (Inbound logistics, Operation, Outbound logistics, marketing and sales and service) which directly contribute to add value to the production of the product and support activities (firm infrastructure, Human resource management, technology development and procurement)which have an indirect effect on the final value of the product. M4P (2008)

The Global approach –A value chain analysis is the most accurate way of understanding the distribution of earnings. Its analysis shows how firms, regions and countries are linked to the global economy. In the value chain framework, international trade relations are considered part of networks of producers, exporters, importers and retailers, whereby knowledge and relationships are developed to gain access to markets and suppliers. In this context, the success of developing countries and market actors in the developing countries lies in the ability of accessing these networks to the maximum possible. M4P (2008)

At the most basic level, a value chain analysis systematically maps the actors in the production, distribution, marketing and sales of a particular product. This mapping assesses the characteristics of actors, profit and cost structures, and flow of goods throughout the chain, employment characteristics and destination and volumes of domestic and foreign sales Kaplinsky and Morris (2001). In order to gather information on Value chain functioning we can use combination of primary survey work, focus groups, participatory rural appraisal (PRA's) informal interviews and secondary data. The value chain analysis can play a key role in identifying the distribution of benefits of actors in the chain through margins and profits within the chain and makes it possible to determine who benefits from participation in the chain which could benefit from increased support from organization. M4P (2008)

Thirdly, the value chain analyses examine the role of upgrading within the chain. Upgrading improvements in quality, product design and allowing producers to gain higher value. Finally, value chain analysis highlights the role of governance on how it is organized. The internal governance is a board concept which basically ensures that interactions between chain participants are organized, rather than being simply random whereas the external governance is important from a policy perspective by

identifying the institutional arrangements that may need to be targeted to improve capabilities in the value chain. M4P (2008)

2.5 General Tools for Value chain analysis M4P (2008)

While doing a value chain analysis it is necessary to decide which sub-sectors, products or commodities should be prioritized for analysis which has objectives such as :-

- to involve value chain actor's in the beginning process and select a limited number of value chains to be analyzed
- participants should have a common understanding of value chain's development in the region basically to ensure they have relevant knowledge and adequate representation on the value chains
- follow the steps for prioritizing

2.5.1 Steps for prioritizing

Step 1: Determine criteria and build understanding of priorities- It talks about the present integration of the poor in the market like what they are producing, selling, employment etc. basically looking into the market potential which is the strong domestic and international demand for the product.

Step 2: Weighting of criteria - involves the ranking of the most important criteria for greater role in decision making process.

Step 3: Identifying a list of potential products/ activities - looks into identifying the products that are already produced in the market which are technically feasible to produce in the area and products that have a good market (local, regional, national and international market)

Step 4: Ranking Products/ activities for its importance

What should be known after analysis is complete? After these four steps one should have a thorough understanding of the potential value chain development in the region and which value chains addition have a high pro-poor potential and market demand.

2.6 Mapping the Value chain M4P (2008)

After the initial selection of the value chain is complete. The next step is to map the value chain which is a vital step in guiding the analysis of selected value chains.

Mapping a value chain has a number of objectives:-

- Gain a basic overview of the value chain to guide the full value chain analysis to be undertaken
- Identify constraints and possible solution's at different levels in the value chain
- Visualize networks to get a better understanding of connections between actors and processes
- Demonstrate interdependency between actors and processes in the value chain
- Create awareness of actors to look beyond their own involvement in the value chain

Key Questions:-

Note: There is no such thing as a comprehensive, all encompassing value chain map.

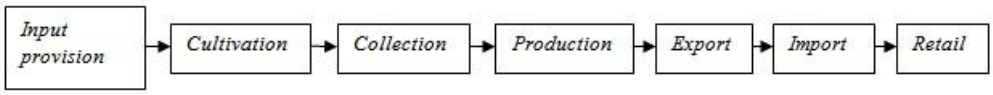
Step1: Mapping the core processes in the value chain

The first step is to find the core processes in your value chain. (Map the processes) As a rough guide try to distinguish a maximum of six or seven processes that the raw

material goes through before it reaches the final consumption stage including the provision of inputs to produce raw materials.

Step 2: Identifying and mapping the major actors involved in the processes

Figure 1: Identifying and mapping the major actors



Actors	*Cooperative* *Private* *Input suppliers*	*Sedge farmers*	*Collectors*	*Production* *Enterprise*	*Exporter*	*Importer*	*Retailers*
Activities		*Growing* *Harvesting* *Cutting* *Drying* *Splitting*	*Collect* *Categorize* *Store* *Transport*	*Categorize* *Dry* *Weave* *Mould* *Prevention* *Storage*	*Collect* *Quality* *control* *Storage* *Transport*	*Quality* *control* *Storage* *Transport*	*Storage* *Selling* *to* *final* *consumers*

Source: M4P, Making Value Chains Work Better for the Poor: A Toolbook for Practitioners of Value Chain Analysis, Version 3, Making Markets Work for the Poor (M4P) Project, UK Department for International Development (DFID), Agricultural Development International: Phnom Penh, Cambodia, 2008.

Step 3: Mapping flow of products

Identifying product flows at each stage of the processes is important as they are transformed to final products. Mapping these flows creates a clear picture of what forms of products are handled, transformed and transported at each stage of the value chain.

Step 4: Mapping knowledge and flows of information

Intangible qualities of value chains, such as information and knowledge are generally more difficult to capture in a visual map. Be aware that these flows are often going both directions.

Step 5: Mapping the volume of products number and jobs

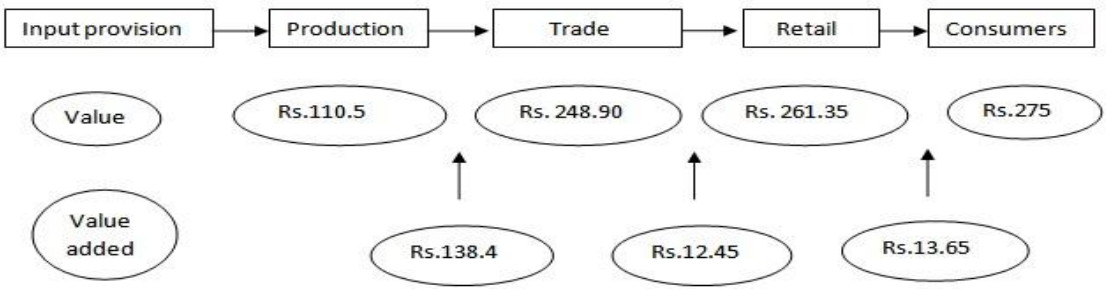
This step collects information on what is the volume of products, number of actors and jobs.

Step 6: Mapping the geographical flow of product or service

The mapping of the geographical flow of the product is carried out in order to identify where each of the processes in the value chain are physically located starting with the place of origin (where it is cultivated) and map how the product travels from intermediary trader to wholesaler, retailer and to final consumer.

Step 7: Mapping the value at different levels of value chain which is to map the monetary value throughout the chain.

Figure 2: Mapping the monetary value throughout the chain



Source: Padmanand and Patel as mentioned in M4P, *Making Value Chains Work Better for the Poor: A Toolbook for Practitioners of Value Chain Analysis*, Version 3, Making Markets Work for the Poor (M4P) Project, UK Department for International Development (DFID), Agricultural Development International: Phnom Penh, Cambodia, 2008.

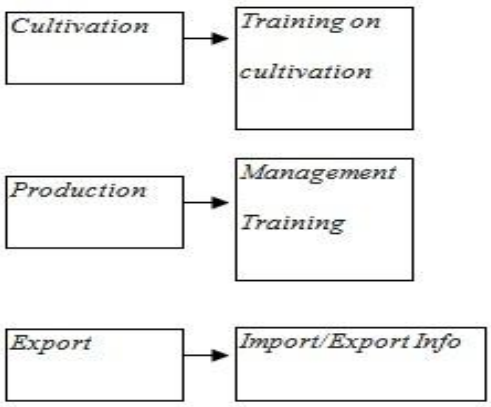
Step 8: Mapping relationships and linkages between value chain actors

Analyze what kind of relationships actors have with each other such as spot market relations 'on the spot' actors make transactions negotiations on price, volume and other requirements.

Step 9: Mapping services that feed in the value chain

What are the types of services feeding into the value chain?

Figure 3: Mapping the services feed in the chain



Source :(SNV 2005) as mentioned in M4P, Making Value Chains Work Better for the Poor: A Toolbook for Practitioners of Value Chain Analysis, Version 3, Making Markets Work for the Poor (M4P) Project, UK Department for International Development (DFID), Agricultural Development International: Phnom Penh, Cambodia, 2008.

Step 10: Mapping constraints and potential solutions

It includes mapping constraints regarding upgrading, supply of inputs, diseases, post-harvest management etc.

Step 11: Making a value chain map matrix

CHAPTER 3

REVIEW OF LITREATURE

Literature published both at the national and international level were reviewed comprising of studies on Global Value Chains, Value chains of developing countries and studies on the large cardamom cultivation in Sikkim. The literatures were reviewed under the following heads.

3.1 Studies on Global Value Chains and Rural Livelihoods

3.2 Studies on Value Chain Analysis of Developing Countries

3.3 Studies on the large cardamom cultivation in Sikkim

3.1 Studies on Global Value Chains and Rural Livelihoods

In their paper by Challies and Murray (2011) the interaction between Global Value Chains and Rural livelihoods in the case of smallholder Raspberry growers in Chile with an attempt of integrating global value chain and sustainable rural livelihoods by understanding the impacts of integration in a better manner stressing the need for local rural development and poverty reduction. The framework for the livelihoods analysis has been divided into six parts namely livelihood patterns such as natural, physical, human, financial and social capital followed by social relations like gender, class, age, ethnicity, religious beliefs along with the rules and customs, land tenure and markets in practice in the context of emerging trends such as population, migration, technological, relative prices, macro policy and national and international trends supplemented by shocks (Droughts, Floods, Pests, Diseases). All these results as livelihood strategies which are based on Natural resource-based activities (collection, cultivation, livestock and non-farm natural resources based on rural trade

and manufacture along with remittances, other transfers and other services ultimately leading to livelihood security such as income level, income stability, seasonality, degrees of risk along with environmental sustainability (soils and land quality, water, rangeland, forests and biodiversity. This paper finds the upgrading in the governance to uplift the smallholder growers along with their competitors such as private retailers which means that just by including the smallholder growers into the value chain is not enough but they also must be supported in terms of up gradation and access into the markets with market standards and requirements.

The paper by Fillippi (2014) elaborates the use of "territory" as an important economic tool in the French co-operatives where localization constraints are transformed into territorial advantages. The co-operatives help to develop economic performance and ensure social values. With the introduction of territory into economic analysis it helps to contribute towards the regional development process. the paper finds that territory has now become a commonly accepted economic tool helping to achieve better product valorization and remuneration for farmers also promoting commitment and improved decision making."Territorialization" is a dynamic process building, keeping this in mind the French agricultural co-operatives initially aimed to re launch an abandoned bean production system in order to develop quality production on a local basis. In 1985 it started with only 4 hectares and by 2010 it had 200 hectares and 68 producers with prices increasing proportionally. This shows that the co-operatives can produce an added value irrespective of the small size of their cooperatives and these cooperatives could be employed into producing high quality products promoting local products at international level.

In the paper by Treinekens (2011) has done an extensive review on the Agricultural Value Chains in Developing countries. The value addition, horizontal and vertical

chain-network structure and value chain governance mechanisms are the key components that the paper has emphasized. With globalization, there has been the expansion of international markets therefore there is a need for the producers to have better control on production, trade and distribution. The paper stresses the need to provide the small-scale producers who are at a disadvantage as they lack capital to invest in international markets through the improvements in the value chains focusing on agriculture as most of the developing countries have the largest sector in it. Talking about the market access and market orientation in the developing countries the paper provides significant aspects wherein leaning on different market channels namely local, national and international. There have been three key distinctions between three sub-systems such as system A where producers are generally small with traditional production systems. These chains deliver to local markets and also to low-end markets having longer distances for transportation. The B system is characterized as the local middle to high income chain mostly as small/medium size producers, co-operatives. The value generated by B system has larger value addition as they have access to national and sometimes to international markets. Lastly, the C-system is the export chain completely focused on exports and also focuses on increasing the economies of scale. In the C- system there are low volume but have more value addition.

The paper by Maertens et al (2012) draws attention of the stakeholders and policymakers through welfare effects of horticulture exports chains in sub-Saharan Africa on the rural households. The paper focuses the need to combine the increasing high-value exports and modernization of export supply chains for bringing positive welfare effects such as labour –market effects, direct and indirect effects in order to analyze the income mobility and poverty reduction in rural areas. The paper focuses

on the modernization in the horticulture export chains in the face of existing inequalities and failure to create direct gains for the rural poor. The paper finds that the rural households can be benefitted by the emergence of high-value export supply chains in terms of production and marketing the produce for exports, the emergence and growth of modern supply chains in terms of increasing employment in rural areas hence uplifting the rural areas which can include the post-harvest handling and processing, including labour –intensive activities such as sorting, grading, washing and labeling. The welfare implications depend on the gains rural households can derive by participating in the high value export chains in terms of improved productivity, increased household incomes reducing food insecurity and poverty.

3.2 Studies on Value Chain of Developing Countries

In this paper Hameedu (2014) identifies the key players in the supply chain of cardamom through interview of key chain players that help to identify the supply chain participants and their role in marketing of the product. The strengths, weaknesses, opportunities and threats in producing cardamom in Kerala has been identified and studied focusing on the employment opportunities through the production of cardamom cultivation .The key objectives of the study are to understand the functioning and dynamics of the supply chain of cardamom, to identify the key players in the supply chain and to identify the cost of production of cardamom in Kerala. The methodology has been divided into three parts namely identification and mapping of the commodity supply chain, the constraints and bottlenecks of the supply chain and lastly to identify constraints for improving the performance of the supply chain. The paper finds the importance of spices park in the supply chain as it helps to enhance the marketing process but the participation of farmers in the E-auction is very low which is an important indicator for the development of the farmers. In terms of

processing the air conditioned warehouses for cardamom available in the spices park have been a fruitful indicator for maintaining the quality of the product for a longer period. The study finds that the farmers are not conscious of the quality of the product and they sell their product without sorting and drying. The absence of grading system at the producer's level is the main problem of cardamom cultivation in Kerala. There is lack of market information at the marginal framers and traders level.

The paper by Hoerman et al (2010) revisits the mountains of the Hindukush Himalayan and mentions about the varieties of high value products. The paper focuses on the insufficient knowledge of market chains lack of processing facilities and inadequate quality control which has lead to low share of returns to the primary producers and collectors of the products. Hence, stressing on the scope to generate new livelihood options and add value to the high value products and services. The high degree of fragility, marginality, limited accessibility has lead to the underdevelopment of mountain people in spite of the high potential of the high product mountain resources. Therefore, the Value chain approach model has been suggested for the improvement of the mountain people that would better enable the mountain people to adequately benefit from the products or services they provide. The paper mentions the drawbacks in the form of markets being often secretive and disorganized leading to lower margins for their products as they lack capacity to actively interact and negotiate with more experienced downstream market actors. Their products are unprocessed and they do not add value as collectors and producers of the value chain. The upstream and downstream value chain actors have been identified in this study wherein the upstream value chain actors are the small producers of the niche product whereas the downstream actors are the ones who are mostly larger traders and processors who are closer to the end market. The study finds

that the downstream actors are often marginalized with very little involvement or knowledge of distant market mechanisms. The chains are mostly "buyer-driven" therefore in order to tackle this issue the study recommends improving the connecting links in the chain basically to increase prices through better or improved quality of the niche products, to tap the untapped market to reduce the monopoly of the single market.

In the paper by Bhattarai and Leduc (2009) the involvement of women in the value chain development has been focused which is integrating gender while mapping the steps for value chain development has been stressed upon in order to ensure appropriate representation of women and men in formal and informal institutions of value chain development. Generally, the men are the main recipients of the capacity building initiatives and financial support in the mountain regions. Thus, capacity-building programmes that address the need of both men and women mostly the women producers in order to address gender issues in value chain development. The focus for women empowerment along with poverty reduction is the primary agenda of this paper because of social barriers the women in the mountain areas do not have proper access to opportunities to financial services, market information etc. The paper stresses on the advantages of engendering the value chain would be in the favour of the enhancement of the local live hoods following the generation of employment opportunities to the mountain rural people in general.

The paper by Humphrey and Aleman (2010) examines the casual models underlying the value chain interventions to see the poverty alleviation by concentrating on 30 donor- lead value chains. There is the assessment of two types of projects one with and another without lead firm wherein the latter concept consists of value chain linkage projects. According to the paper the targeting of the poor seems more

effective in the value chain linkage projects where the benefits are derived by the suppliers' as well as the distributors of the chain. Following the drawbacks of the assessment in poverty alleviation effects of individual interventions which proved to be costly and challenging this paper looks into designing and managing the value chain interventions mostly private-sector approaches like "Making markets work for the poor". The interventions in the value chain has been given prime importance addressing three issues namely the basic idea and operations of value chain , the interventions of the private enterprises in the value chain and the challenges to be addressed using the value chain approach towards poverty reduction. Their main focus is on the linkages between firms (maybe farmers, production cooperatives or other organizations) and market through targeted interventions making value chains work from theory to policy developing the capacities and capabilities for enhancing the productivity of the poor, identifying missing links in the value chain, maximizing flow of knowledge and resources by improving the flow between firms in the value chain and finding and creating new links.

The paper by Lafleur and Turner (2009) accesses the rural livelihoods and global value chains of the Hmong cultivators of Vietnam in the cultivation of large cardamom. It has been found from the study that there are two types of cultivators for the cultivation of large cardamom in Vietnam wherein some are embracing new market opportunities while others are maintaining their centuries old agricultural methods. With the rising demand of the high value product the paper concludes that there is a need to examine the cultivation, marketing and consumption in the context of global market economy basically because trade is bringing the multiple linkages among the local, regional and global scales especially with reference to Vietnams marketed oriented economy since mid-1980s.

The paper by Humphrey and Schmitz (2002) argues that clusters are inserted into global value chains in different ways and this in turn has prospects of enabling or disabling local-level upgrading effects. The paper finds that there is a need for paying particular attention to the position of developing country firms selling to large and global buyers. With the entrance of the low-cost producers entering global markets leading to competition in the markets and more demand for labour. The question here lies is that how will these challenges be faced by developing countries in the face of both labour and capital engaging in trade. The paper suggests that the upgrading of the clusters and the value chains could be the solution. The upgrading of the clusters through the local innovation centers plays an important role. However, key challenges are gaining access to chains and developing linkages with major customers.

In the paper by Pathak (2013) the value chain analysis of large cardamom has been done in seven districts of Eastern Development Region, Nepal. The objectives of the paper is to look into the value chain analysis of large cardamom (Alainchi) in terms of market and social benefit evaluation and also to determine the constraints of large cardamom (Alainchi) cultivation and further investigate the market barriers for large cardamom. The findings of the paper reveal the supply chain map and the value chain map of large cardamom (Alaichi). These maps are the major basis for the Value Chain Analysis and it helps to identify the working of the major actors (farmers, village level traders, district level traders, regional level traders) and enablers (the regulating and facilitating agencies) who are the main force behind the production ,processing and marketing of Alainchi (Large cardamom) in Eastern Development Region of Nepal. The study also fulfills the need for the identification of the various constraints that hinders the marketing of Alaichi (large cardamom) and finds the poor infrastructure in the hilly regions as the main drawbacks for marketing Alaichi (large

cardamom). It suggests the need for establishing the processing centre in and around the cultivation area so that more employment opportunities are created for the rural poor. Lastly, the paper suggests the need for the search for new markets for Alaichi (large cardamom) in order to curb the monopoly of the single buyer of Alaichi (large cardamom).

The paper by Bhattarai et al (2015) studies the performance of the supply chains for ginger and large cardamom aiming to identify factors that constraints marketing choices of small holders. The findings of the paper reveal the asymmetric information in the form of "dyads" or "Dahadani" existed in Nepal for quite a long period of time wherein the cardamom chain was dominated in the form of relational contracting in cardamom chain. After the collapse of such a system farmers switched to informal market trading which offered better terms. According to the paper the farmers nowadays sell their produce to certain buyers who are a small number of exporters who have better information and keep new entrants out of the market. These buyers on the other hand, claimed that their prices reflected supply and demand.

This paper by Schipmann and Qaim (2010) analyzes how smallholder farmers in the developing countries can benefit from modern supply chains. The paper argues that available studies have not focused on the export markets and fail to capture spillover effects that modern supply chains have on local markets. The findings of the paper reveal that the cultivation of the sweet pepper significantly contributes to higher household incomes although there are certain constraints of the cultivation such as missing land titles, weak infrastructure conditions and limited access to information suggesting the immediate need to look into these constraints for better accessing and deriving benefits from changing market conditions. The analysis has used the OLS through which it has been found that among the adopters and non-adopters of sweet

pepper cultivation the adopters of the sweet pepper have had a positive impact on the household income hence cultivating sweet pepper increases the annual income by 112,000 Baht (US $ 3,397). The mean annual income of sweet pepper in the sample (308 farmers) in the Mae Sa in Northern Thailand is 261,980 Baht so the adoption of sweet pepper cultivation has lead to an increase by 43 percent.

Devi et al (2014) carries out a study on cost, returns and constraints of Fish production in Imphal – West District of Manipur. The objectives of the paper are to estimate the cost structures of fish production in accordance with farm size, to identify important input factors in fish production, to find returns of inland fish production and to identify constraints faced by fish farmers in production of fish. Primary data was collected from Imphal – West District of Manipur which was selected purposively and 12 fish farming villages were selected from two blocks of the district using simple random sampling. Structural questionnaires were selected for the primary survey .The farmers were categorized into two groups <1 ha. And >1 ha. The cost were calculated based on cost concepts including Cost A_1 (value of hired labor(permanent and casual), value of hired machinery (Rs),value of manures (Rs) value of fingerlings(Rs),value of lime(Rs),value of fertilizers(Rs), Depreciation on farm equipments , Interest on working capital ,land revenue and other expenses), Cost A_2 which includes Cost A_1 + Rent paid for leased-in- land and Cost B which includes Cost A_2 + Imputes rental value of owned land + Imputed interest on fixed capital. The average cost of fish production was Rs. 99107 (90.09%) of variable cost and 9.9 % of fixed cost .The proportion of variable cost to total cost was higher in category I farm (large farms) which was (92.73%) followed by category II (88.33%). The fish production was higher in category I farm. As there was no leased- in – land the value of Cost A_2 was

same with Cost A_1. The average total cost (ha^{-1}) was found higher on category I (Rs.109902.32) than category II (Rs.93036.04).

Sashimatsung and Giribabu (2015) looks into the surplus, cost, margin and price spread of Chilli production and marketing in *Longsa* Village in Nagaland from 50 Chilli growers, 12 retailers and 8 wholesalers in *Mokokchung* district of Nagaland in the crop year 2012-13 through per-tested questionnaire. The study finds that after holding 9.5% of Chilli for domestic purposes about 90.5% is the marketable surplus and loss of spoilage is 4.17%. The area and production have been found to be the most important determinants of marketed surplus for Chilli having positive impact on marketed surplus at 1 % level of significance. A majority farmer-producer (52.3%) sells their produce to retailers in channel II. The net price received by the producers in consumer's rupee in channel I (97.63%), channel II (82.43) and channel III (61.9%). The 93% of Chilli is traded in market by way of retailers and wholesalers and only 7 % within the village.

3.3 Studies on Large Cardamom Cultivation in Sikkim

In the paper by Mande et al (1999) it has been found that the productivity of large cardamom is highest in the North District of Sikkim mostly due to favorable shade, humid environment and organic matter in the soils mentioning that more than 50 % of large cardamom is from the North District. During the 1980's there was a tenfold increase in the volume of exports of large cardamom with three- fold increase in unit price making large cardamom the most important cash crop of Sikkim. The study also finds cardamom farming to be a small-farming business and more than 85% of the plantations have a cultivation area of less than 2 hectares. Most of the management is done manually and labour is the single largest input. The paper finds

that every hectare requires 110-130 labour days per annum to carry out the various operations. The significant findings of the paper is that there is the wastage of 20,000 tonnes of fuel wood for curing cardamom in traditional curing chambers known as "bhattis".

The major findings of the paper by Uma et al (2014) reveal that labour scarcity has become another serious problem for cardamom cultivation. According to this working paper by ICIMOD (International Centre for Integrated Mountain Development) it has been found that the age of the respondents involved in the cultivation of cardamom cultivation ranged between 25–80 years. The highest numbers (41%) of respondents were from the oldest age group (61–80 years), 33% were from the middle age group (41–60 years), and 26% were from the youngest age group (20–40 years). So the study mostly tries to look into the problem of labour scarcity in the cardamom production in Sikkim. Cardamom farming is managed by older or middle-aged family members as the majority of young people are either government employees or students. This also indicates that, in future, cardamom farming in Sikkim could see a reduction in the number of growers due to off-farm employment opportunities.

The major findings of the paper by Sharma et al (2000) reveal that the causes of decline in Large Cardamom production are the old plantations and the viral diseases. Due to which the Spices Board is now popularizing seed-raised planting material to the popular split rhizome suckers in order to control the viral diseases. The paper suggests the old plantations should be replaced by the newer ones as large cardamom starts producing cardamom in the third year of planting and the yield declines with the age of the cash crop. The paper also looks into the brief economic history of Large cardamom cultivation in Sikkim which have helped to improve the socio-economic status of the farmers of Sikkim owes its success to Sikkim's merger with India in

1975 because after this period the cropping pattern changed significantly and cereal-dominated subsistence agriculture was slowly transformed into high value cash crop-based commercial agriculture. The paper mentions the most worrying factor in large cardamom farming to be the decrease in yield per hectare recorded in recent years by Sikkim's Department of Agriculture. The paper also finds that most of the plantations about 10,000 ha are very old and they produce less than 100 kg/hectare. Thus, a rotational cycle is suggested from the study for the cardamom plantations in Sikkim.

In order to know the productivity, energetic and efficiencies in Alnus Cardamom plantations in Sikkim Sharma et al (2002) has studied the growth of cardamom along with Alnus trees in three areas Kabi from North District, Thekabong and Sumik from East District. It finds that there is no rotation length as such for large cardamom plants in the traditional practice and many old plantations are the least productive as cardamom is a shade loving plant and Alnus is best suited as a shade for the cultivation of these crops. The significance of this study is the estimation of the agronomic yield that increased from 110 kg ha per year in the 5 year old stand to reach a peak of 360 Kg ha per year in the 20 year old stand declining to 40 kg ha per year in the 40 year old stand which concluded that the agronomic yield of large cardamom varied significantly with stand age. The study also showed a highly negative relationship in the production efficiency with the age of the plantation for both Alnus trees and large cardamom as the efficiency curve almost flattened with plantation age especially in the case of Alnus even as productivity doubled under the influence of Alnus in the 15 year old stand. The major findings of the study revealed the absence of rotational length in the traditional practice of cultivating large cardamom in Sikkim which is a must for the sustainable production of the crop. The threat of old plantations becoming least productive are also discussed along with the

decrease in the agronomic yield of the cash crop with stand age cultivated along with Alnus trees.

The study by Sharma et al (2009 a.) finds there is no traditional rotational length for cardamom agro-forestry as old plantations are less productive. The increase in acidity with stand age may be related to accumulation of acidic SOM (Soil Organic Matter) and increased water percolation due to high rainfall which in turn leads to accelerated leaching losses of large quantities of base cations and nitrates which means the soil ph that measures the alkalinity of the soil decreases with the plantation of N^2 fixing trees in an ecosystem leading to increase in the soil organic matter which is good for the cultivation of large cardamom as it helps to fix the nitrogen content in the soil . The study finds that there is low nitrogen content in 30-40 year old stand in N2 fixing trees which indicates lower nitrogen content in these agro-forestry stands. The recommendation of the study was the adoption of 20 year re-plantation for both Alder trees and large cardamom for sustainable production of large cardamom along with Alder trees that would provide high economic return and reclaim soil nutrient levels with the new plantations. In terms of sustainable production the younger stands are sustainable until 20 years and older stands tend to show a nutrient depleted system showing a sharp decline in N transformation rates.

The study by Sharma et al (2009 b.) finds that the area for cultivation of large cardamom increased by 2.3 times in the past 20 years has now declined by almost 30 % in the recent years even when gap filling and re-plantation is a regular management practice. The paper mentions the value addition to large cardamom at the grower's level and there is lack of institutionalization, market intelligence and market chain and it recommends the support form R&D institutions such as Spices Board and the State line departments to work on these lines. The paper also mentions about the curing of

cardamom in traditional curing chambers with poor quality fuel wood resulting in fetching a low price for the produce. The paper also reveals that the farmers store their products for one or more years and release when the market rate for the product increases. Thus, there is serious lack of channelization of markets, risk assessment and information system. Looking in the cost effectiveness of the large cardamom in the first year the plantation of around 25,000 ($538) per ha is required for planting material and labour and the refilling of gaps requires Rs 3,500 ($75) per ha in the second year. The paper also mentions that there are other problems for cardamom plantation apart from viral diseases such as natural calamities (draught, hailstorm, snowfall) in plantation areas.

In the paper by Gudabe et al (2013) mentions the urgent need to increase the area under its cultivation for increasing the productivity of this crop as large cardamom is a spice crop of significant economic importance used for industrial, medicinal, nutritional and culinary uses. It recommends the monitoring of the plantation to be done every month especially during rainy season and carefully identify the diseased plants. Weeding is also another important measure so that important nutrients do not hamper productivity. In terms of shade management it is very important in loping the branches of the shade trees before the onset of the monsoons so that crops do not get damaged.

The paper by Bhattarai et al (2013) mentions as to how in the recent times there has been a steep decline in the land holdings as well as productivity under large cardamom. According to the paper this has drastically affected the livelihood of a large section of rural population in Sikkim mostly in Dzonghu, North Sikkim due to which the Indian cardamom research institute in collaboration with Indian Council Agricultural Research launched the NAIP (National Agricultural Innovation

Programme) component (III) from 2007. Thus the paper analyses the effectiveness of the programme. In the programme the implementation of Silapaulin lined water storage tank were constructed during dry season which helped the farmers to produce additional crop like citrus, ginger, radish, pea, raisag that was grown near silapaulin lined water. The Indian Cardamom Research Institute helped for the better colour, aroma and flavor that were able to fetch a price of 50-100 Rs /kg which was more price than traditional curing methods.

Singh and Pothula (2013) talk about the post harvest management processing methods quality issues and their impacts on the value chain and trade patterns. The major findings of the paper reveal that dried capsules produced in the traditional way fail to meet some of the contemporary market requirements resulting in lower prices to farmers. The Spices Board controls the spice trade in India and the paper analyses the value chain of cardamom production wherein the local dealers or wholesalers collect dried large cardamom capsules from the farmers in this system. Thus, the price is fixed between the farmer and local dealer wherein the farmers are usually paid less than the average market produce. The paper also mentions about the setting up of the NERAMAC (North Eastern Regional Agricultural Cooperation) helping the cardamom growers to sell their products by auction so that they can fetch a better price.

The paper by Sharma et al. (2009 c) elaborates on the importance, threats and challenges of the Sikkim Himalayan – Agriculture most of which are traditionally managed agricultural systems of global significance recognized by the FAO as Globally Important Agricultural Heritage Systems such as traditional agro-forestry namely alder-cardamom and farm based-systems . The paper finds that there are ample numbers of opportunities in the region but due to the constraints such as

persistent poverty and lack of access to markets the region is fragile economically and ecologically. Therefore, there is a need to recognize the social adaptations and knowledge base of these traditional institutions to support the GIAHS proposal of wider recognition of these institutions in the local, national, regional and also at the global level which would in turn help to improve the livelihoods of the marginal communities to ensure sustainable development. The paper finds various dimensions of threat and challenges in the resource management in the Traditional Agricultural Systems thus presenting the cause and effect which are mostly related to Socio-economic, Environmental, Ecological and Policies. From the socio-economic analysis it has been found that the developmental activities have made a large number of small-holder families become landless in the developmental activities in Rangpo-Singtam along the Teesta river and also along the Rangit river to Jorethang leading to biggest problems like agri-refugees causing migration and the most important issue is that one time incentives are not enough for agricultural-lands as they provide incentives for generations to come. Ban on grazing since (2000) it has impacted in socio-economic weakening therefore a sufficient number are Dokpas are declining along with their livestock forcing them work away from their traditional agriculture to searching for short-term off farm employment.

During the last decade there has been about 50 % reduction in the yield and area of cardamom in Sikkim according to (Vijayan) 2014. The study also mentions that there are changes in the rainfall and temperature along with human activities that have resulted in the reduction in the yield of the cardamom in the state. According to this study there have been visible changes in the form of developmental activities (construction of roads and buildings), changes in the water stream due to construction purposes, increased number of vehicle. The major findings of the paper reveal the

extinction of large cardamom cultivation wherein the high productive eco-type of Sawney cultivator is not found in Richo Village, Phodong, and North Sikkim. Rato (Red) Varlangey having capsule (35 capsules spike) yield is not available at South Regu and Talkatra village of Rongli, East Sikkim.

The preliminary study revealed that two allied genera of large cardamom locally called as Churumpa was extinct from Sikkim during the last decade. The study also reveals that there has been the postponement of the flowering of large cardamom due to temperature rise, the shortening of the life span of large cardamom from 15 years to 7-8 years. However, negligence on the part of both the farmers and officials has lead to the minor pests like leaf caterpillar to become a major pest. The major disease of Ginger has become a major disease of large cardamom. Lastly, developmental works disrupts the ground making tunnel where bumble bee one of the primary pollinators of large cardamom flowers make their nests and habitat.

CHAPTER 4

METHODOLOGY

4.1 Research Design

Sikkim was chosen for the study purpose. The primary reason behind selecting Sikkim was the lack of academic research in the field of economics of large cardamom and secondly the large cardamom is the most important source of livelihood for a large section of farmers and unemployed youth. Sikkim is a state where thousands of cultivators cultivate large cardamom in all the four regions of Sikkim but for the study we have chosen East and West Sikkim. To collect detailed information on the major areas of large cardamom growers in Sikkim the researcher has collected preliminary information from the North Eastern Regional Agricultural Corporation Limited (NERAMAC), Spices Board and State Horticulture Department, Government of Sikkim which was followed by a pilot visit to some areas. The villages in which the pilot survey was carried out were *Dentham, Hee bazaar, Hee Kangbari, Hee Yangthang, Hee Patal, Hee Pechrek* from West Sikkim *Lungchok, Pamgaon, Reulat, Rongli* and *Talkharga* from East Sikkim.

4.2 Description of the Study Area

Sikkim is a hilly state in the Eastern Himalayas. It is located between 27 ° 04’ 46’’ and 28° 07’ 48’’ North latitude and 88° 00’ 58’’ and 88 ° 55’ 25’’ East longitude in the North Eastern Himalayan region covering an area of 7096 km. It stretches 112 kms form North to South and 64 Kms from East to West. *(www.censusindia.gov.in/2011census)* Sikkim is the second smallest state in India. According to the census of 2011, the population of Sikkim is the least in all of India

which is a mere population of 6 lakhs, and has grown around by one lakhs since last census. The growth rate of population of Sikkim has reduced to just above 10% whereas the percentage of literates has increased by about 20% considered a vast bound towards progress. The gender ratio shows 800 females for every 1000 males which are quite alarming. Like most of the North-Eastern states in India the land has not been developed for the most part. Only 20% of the population of Sikkim lives in cities and population growth in the urban and rural areas depict contrast picture. As the urban population is growing at an alarming rate of above 150% but the rural population is not growing at all. The capital of Sikkim which is Gangtok is the largest city. *Nepali, Bhutia, Lepcha, Limbu, Newari, Kulung, Gurung, Mangar, Sherpa, Tamang* and *Sunwar* are the languages spoken in Sikkim and *Nepali* is the lingua franca. (www.sikenvis.nic.in).

Agriculture is the primary occupation of the people of Sikkim. The agricultural production varies due to varying altitudes and agro-climatic conditions which is entirely mountainous and operates under many constraints resulting in low productivity area for most of the crops mainly characterized by two important constraints which are land holding size and socio-economic condition of the farmers. Therefore, the majority of the farming communities of the state fall in the small and marginal farmers. (www.censusindia.gov.in/2011census)

Sikkim Population 2011 - According to the census 2011, the state of Sikkim has a population of 6.07 Lakh comprising 321,661 males and 286,027 females whereas in 2001 the total population was 540,851 comprising of 288,484 males and 252,367 were females as depicted in Table 2.

Table 2: The population of Sikkim for the 2001 and 2011

Year	Male	Female	Total
2001	288,484	252,367	5,40,851
2011	321,661	286,027	6,07,688

Source: Compiled by author based on 2011 census data provided in www.sikenvis.nic.in.

Population Growth Rate of Sikkim- The total population growth in Sikkim during this decade was 12.36 percent whereas in the preceding decade it was 32.98 percent. The population of Sikkim forms 0.05 percent on India in 2011.In 2011, the figure was 0.05 percent. (www.sikenvis.nic.in.)

Sikkim Literacy Rate 2011 - The literacy rate has seen a growing trend which is 82.98 percent as per 2011 population census out of which male literacy stand 87.29 percent and 76.43 percent for females .As per 2001, the literacy rate of Sikkim stood at 68.81 percent out of which male was 77.38 and females 59.63 percent correspondingly. (www.sikenvis.nic.in)

Sikkim Density 2011 – Census of 2001 revealed that the density of Sikkim was 76 per sq km whereas the nation average was 324 per sq km. The total area of Sikkim is 7,096 sq km. The density as per 2011 census is 86 per sq km much lower than the national average of 382 per sq km. (www.sikenvis.nic.in)

Sikkim Sex Ratio - The sex ratio in Sikkim is 889 for each 1000 male much below the national average of 940 as per census of 2011. In 2001, the sex ratio of female was 875 per 1000 males in Sikkim.

Table 3: Sikkim Urban and Rural Population 2011

	Males	Females	Total
Urban population	79539	72,187	151,726
Rural population	242,122	213840	455,962

Source: Compiled by author based on 2011 census data provided in www.sikenvis.nic.in

The state of Sikkim has been divided into four Districts namely North District, East District, West District and South District. The North district is the largest (4,226 sq.km) in area but is smallest in terms of population (43709) and (78.01) percent of literacy rate at the third rank in the district level census, 2011. The West district is the second largest (1166 sq.km) in area but in terms of population it is the third largest (1, 36,435) with (77.39) percent of literacy rate at the fourth in the district level census, 2011. The South district is the least (70 sq.km.) in area but in terms of population and literacy rate positioned the second highest with (146850) and (81.64) per cent in the District level census, 2011.The East District is the third largest (954 sq.km) in area but in terms of population and literacy rate has reflected the highest positioned with (283583) and (83.85) per cent in the District level census, 2011.

Table 4: Revenue Block (Village), Forest Blocks, Statutory Towns and Census Town in Sikkim

State/District/Sub-Division	No. of (Revenue Block)Village	No. of Forest Blocks	No. of Towns
Sikkim	400	51	9
1.North District	45	10	1
(i) Chungthang Sub-Division	5	4	-
(ii) Mangan Sub-Division	40	6	1
2.West District	112	13	2
(i)Gyalshing Sub-Division	65	8	1

(ii)Soreng Sub-Division	47	5	1
3.South District	136	12	2
(i)Namchi Sub-Division	91	7	2
(ii)Ravong Sub-Division	45	5	-
4.East District	107	16	4
(i)Gangtok Sub-Division	65	10	3
(ii)Pakyong Sub-Division	26	3	-
(iii) Rongli Sub-Divison	16	3	1

Source: .www.censusindia.gov.in/2011 census

Table 5: Description of study area from East District and Sub-District (Rongli)

	East District			Sub-District Rongli		
	Total	Rural	Urban	Total	Rural	Urban
No of Households	61567	32876	28691	6054	4785	1269
Total Population Person	283583	161096	122487	27741	21858	5883
Total Population Male	151432	87147	64285	14408	11234	3174
Total Population Female	132151	73949	58202	13333	10624	2709
Literates Population Person	214329	115891	98438	19727	15137	4590
Illiterate Persons	69254	45205	24049	8014	6721	1293
Total Worker Population Person	139678	86948	52730	12334	9889	2445
Main Working Population Person	31747	19414	12333	8510	6395	2115
Main Cultivator Population Person	9190	9069	121	2335	2205	130
Main Agricultural Labourers Population Person	5127	4822	305	590	481	109
Marginal Cultivator Population Person	22325	21987	338	1226	1091	135
Marginal Agriculture Labourers Population Person	5127	4822	305	590	481	109

Source: .www.censusindia.gov.in/2011 census

Table 6: Description of sample villages from East District

Sample Villages from East District	South Rhegoh	Rongli Forest Block	Chujachen
	Rural	Rural	Rural
No of Households	258	7	1094
Total Population Person	1308	20	4781
Total Population Male	691	13	2492
Total Population Female	617	7	2289
Literates Population Person	620	19	3571
Illiterate Persons	688	1	1210
Total Worker Population Person	609	11	1537
Main Working Population Person	112	8	1204
Main Cultivator Population Person	44	0	117
Main Agricultural Labourers Population Person	0	0	31
Marginal Cultivator Population Person	407	0	94
Marginal Agriculture Labourers Population Person	11	0	72

Source: .www.censusindia.gov.in/2011 census

Table 7: Description of study area from West District and Sub-District (Gyalshing)

	West District				Gyalshing		
	Total	Rural	Urban	Total	Rural	Urban	Total
No of Households	136435	131187	5248	71675	67662	4013	64760
Total Population Person	70238	67528	2710	37177	35123	2054	33061
Total Population Male	66197	63659	2538	34498	32539	1959	31699
Total Population Female	15706	15167	539	8773	8370	403	6933
Literates Population Person	51988	49711	2277	27321	25594	1727	24667
Illiterate Persons	18250	17817	433	9856	9529	327	8394
Total Worker Population Person	40772	39340	1432	21876	20805	1071	18896
Main Working Population Person	33254	31904	1350	18360	17357	1003	14894
Main Cultivator Population Person	18509	18498	11	10772	10761	11	7737
Main Agricultural Labourers Population Person	2503	2486	17	1222	1205	17	1281
Marginal Cultivator Population Person	3644	3643	1	1774	1774	0	1870
Marginal Agriculture Labourers Population Person	1574	1566	8	714	706	8	860

Source: .www.censusindia.gov.in/2011 census

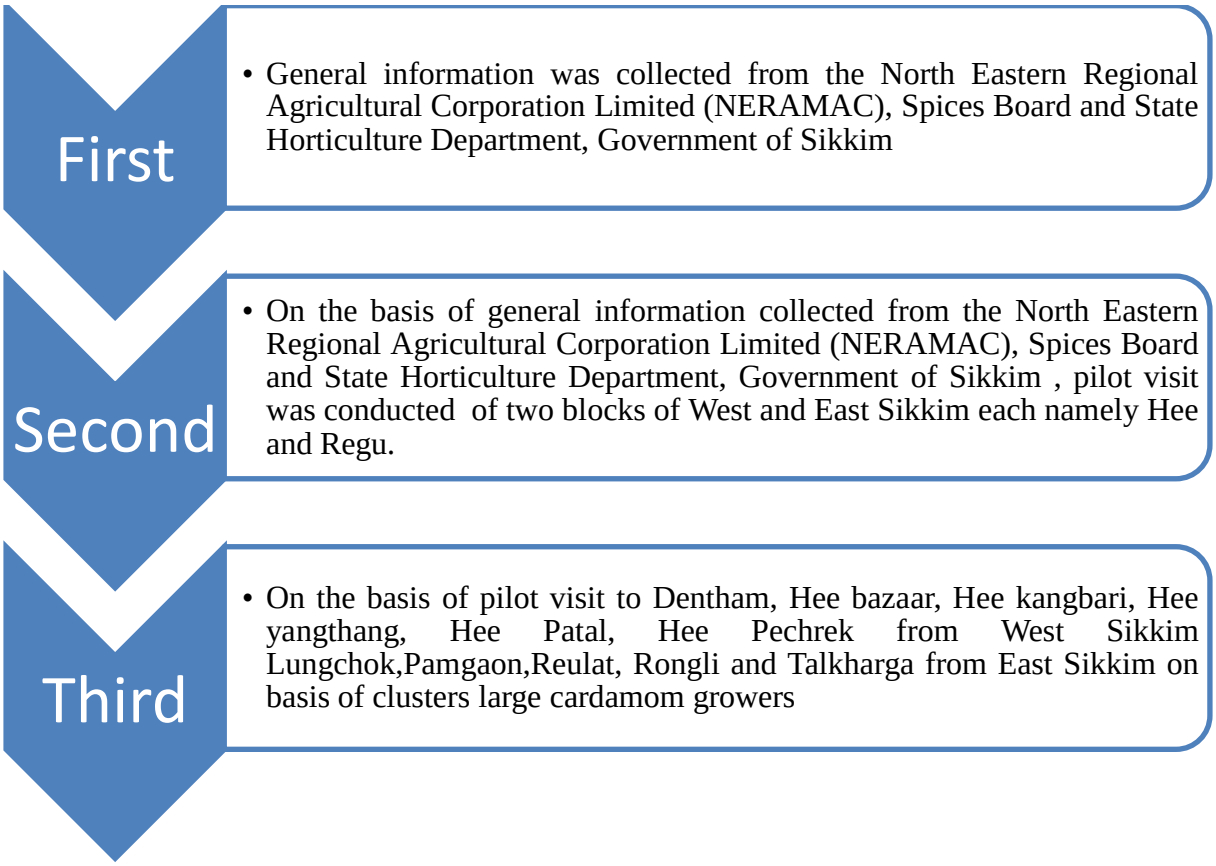
Table 8: Description of sample villages from Hee- West District

	Yangthang	Dentam	Hee-Bazar	Hee-Patal	Hee-Pecherek	Hee-Kangbari
Area	614	139	509	89	167	94
No of Households	2931	749	2514	505	804	500
Total Population Person	1506	408	1277	263	400	261
Total Population Male	1425	341	1237	242	404	239
Total Population Female	340	66	304	72	95	81
Literates Population Person	1135	334	966	178	292	41
Illiterate Persons	371	74	311	85	108	0
Total Worker Population Person	799	240	708	147	321	224
Main Working Population Person	591	225	635	142	200	183
Main Cultivator Population Person	157	38	381	95	127	78
Main Agricultural Labourers Population Person	24	2	25	20	17	131
Marginal Cultivator Population Person	111	6	59	2	115	0
Marginal Agriculture Labourers Population Person	23	2	12	1	2	18

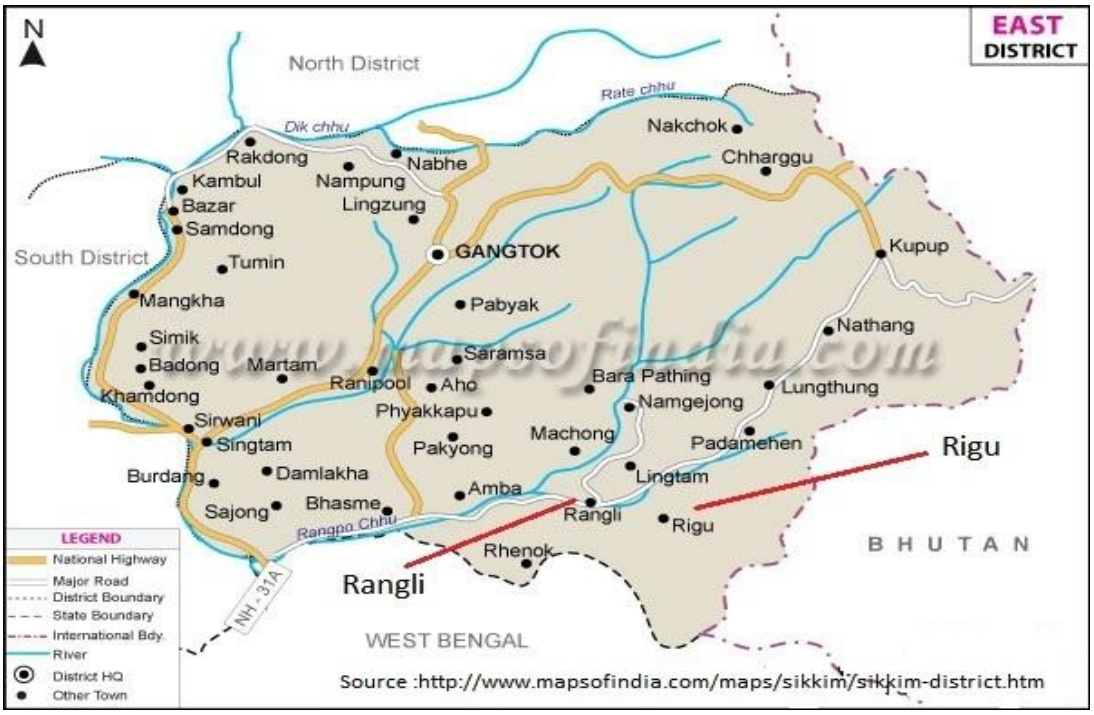
Source: .www.censusindia.gov.in/2011 census

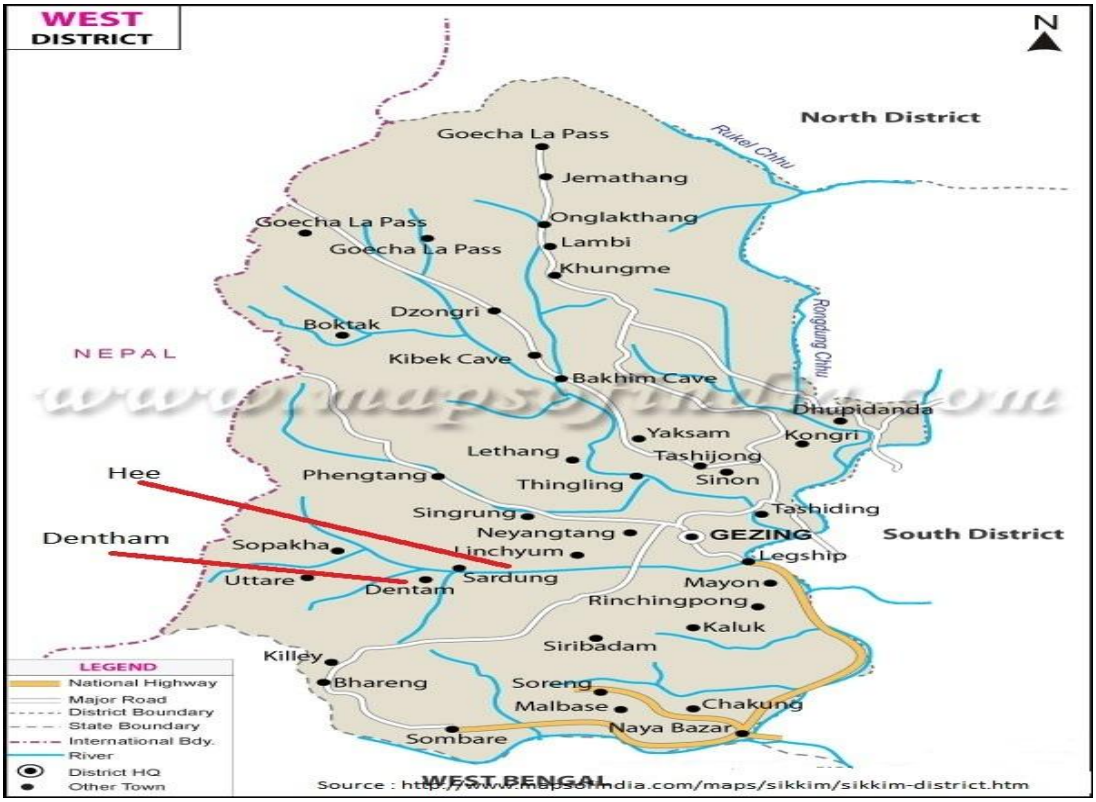
From some of the villages sample per grower as per cluster was selected purposively to capture the objectives of the study. Along with this, primary and secondary information was collected from different reliable sources to depict the macro level scenario of large cardamom. Collected information was analyzed by using mixed method of research, which is both qualitative as well as quantitative information, to authenticate the inferences by using both aspect in the form of supporting quantitative information by qualitative sense and qualitative information by quantitative elements.

4.3 Sample collection Design



4.4 Map of the Study Area





4.5 Data Source

Both Primary and Secondary sources of information was used to generate the substantiate inferences

4.5.1 Secondary

The secondary data was collected from the North Eastern Regional Agricultural Corporation Limited (NERAMAC), Spices Board and State Horticulture Department, Government of Sikkim.

4.5.2 Primary

To understand the ground reality of large cardamom cultivation in Sikkim, the researcher visited the cultivators for personal interview to collect required information with a structured questionnaire. A sample of 120 large cardamom growers was selected for the study out of which 60 from *Hee* Block of West Sikkim and 60 from *Regu* Block of East Sikkim.

4.6 Data Analysis Technique

Collected data were used for different forms of estimation to justify the objective of study. In this study we have used the tables, figures and mean to get an average value of estimation from mean, median and Standard deviation etc (descriptive analysis) and other techniques which were relevant for study to get proper inferences.

4.7 Marketing and Auction Details

The Marketing and auction details were collected mainly from the North Eastern Regional Agricultural Corporation Limited (NERAMAC), Gangtok and the researcher attended the auction proceedings.

4.8 Cost of Cultivation

The cost were calculated based on cost concepts including Cost A_1 (value of hired labor(permanent and casual), value of hired machinery (Rs),value of manures (Rs) value of fingerlings(Rs),value of lime(Rs),value of fertilizers(Rs), Depreciation on farm equipments , Interest on working capital ,land revenue and other expenses), Cost A_2 which includes Cost A_1 + Rent paid for leased-in- land and Cost B which includes Cost A_2 + Imputes rental value of owned land + Imputed interest on fixed capital.

4.9 Marketing Cost

Marketing cost means the cost incurred for the marketing of product. It includes the cost of transportation, labour, sorting and packaging, miscellaneous cost (fuel wood, electricity, water, etc).

4.10 Marketing Margin

It is defined as the margin of retain by sellers after selling the product. Formula for analyzing marketing margin is

Marketing Margin = SP – FP – MC

Where, SP: Selling Price or Retail price
FP: Farm gate price.

MC: Marketing Cost

4.11 Export Details

Details regarding exports of large cardamom at the Global level and All India Level were collected in order to provide a brief background of large cardamom exports and major large cardamom exporting countries of the world.

4.12 Garrett Ranking Technique

For finding the problems of large cardamom cultivation.

CHAPTER 5

GLOBAL SCENARIO OF CARDAMOM PRODUCTION

5.1 Global Scenario

Cardamom is commonly produced in the tropical regions of the world of which Guatemala and India are the two major cardamom growing regions of the world. There are two varieties of cardamom namely small cardamom and large cardamom. In Guatemala, only small cardamom is grown whereas in India both the varieties of cardamom are grown. The small cardamom is grown in the south Indian states of Kerala, Karnataka and Tamil Nadu and large cardamom is grown in the eastern Himalayan region of Sikkim and hills of West Bengal out of which Sikkim produces the largest amount of large cardamom. India used to be the largest producer of cardamom (small) until 2000 after which Guatemala increased its pace and started producing approximately 35,000 (MT) annually compared to the Indian production of 18,000 (MT) in the year 2014-15 as per the provisional estimates provided by the Spices Board of India whereas India continues to enjoy its monopoly in producing large cardamom.

Table 9: Area for cardamom production of Guatemala and India (2000-2013)

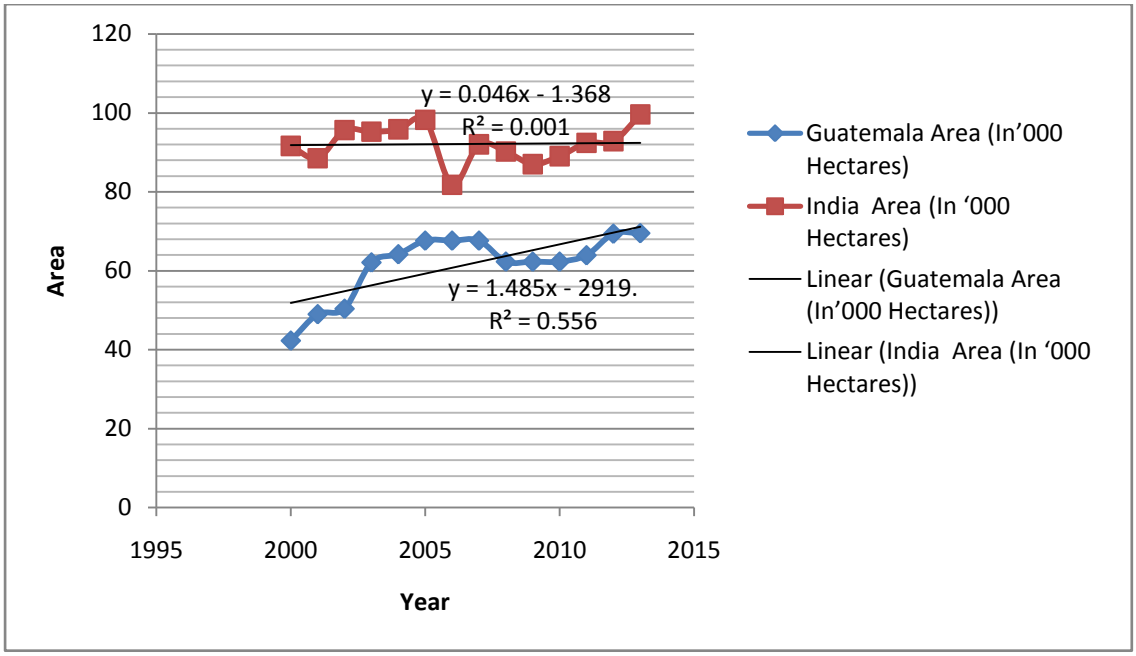
Year	Guatemala Area (In ' 000 Hectares)	India Area (In ' 000 Hectares)
2000	42.29	91.6
2001	48.99	88.5
2002	50.37	95.6
2003	62.1	95.2
2004	64.17	95.8
2005	67.62	98.2
2006	67.62	81.8
2007	67.62	92
2008	62.3	90.2

2009	62.3	87
2010	62.3	89.01
2011	63.91	92.39
2012	69.37	92.84
2013	69.51	99.56
Mean	61.46	92.12
S.D.	8.33	4.7
CAGR	-0.88	-0.92

Source: Milian, L.S. (2014) and Spices Board of India, 2016

It is understandable from Table 9 above that the cardamom producing area of Guatemala has been increasing from 42.29 in the year 2000 to 69.51 in 2013 whereas for India the area has been increasing at a decreasing rate but is larger than that of Guatemala. Even with more area India has not been able to produce more cardamom as compared to Guatemala. The Mean area for Guatemala is 61.46 and Standard Deviation is 8.33 and the mean area for India is 92.12 and Standard deviation is 4.7.The Compound Annual Growth Rate for the cardamom production area of Guatemala is -0.88 and for India is -0.92.

Figure 4: Area for cardamom production of Guatemala and India (2000-2013)



Source: Milian, L.S. (2014) and Spices Board of India, 2016

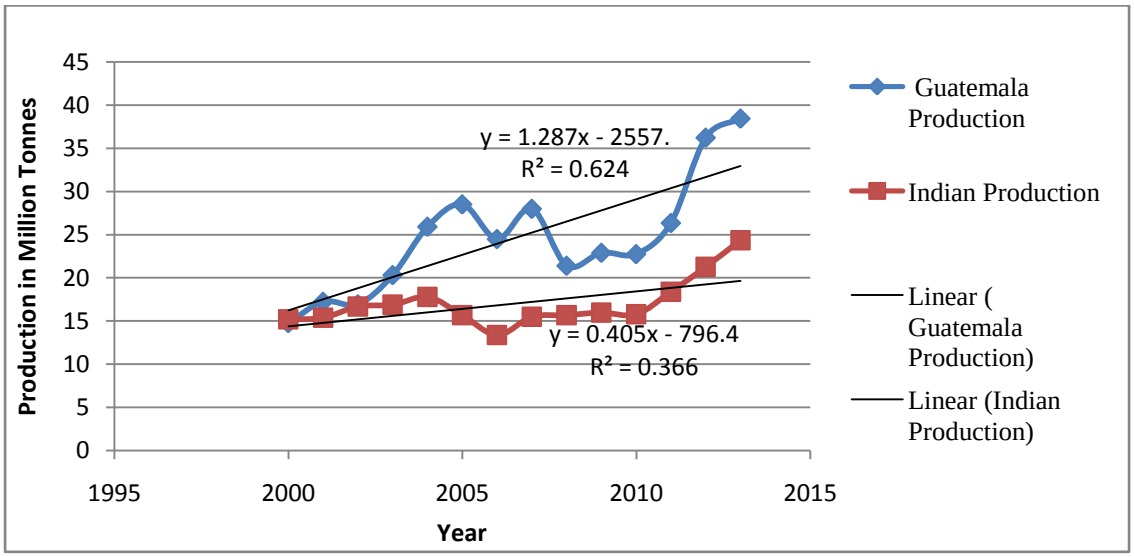
Table 10 : Production of Cardamom of Guatemala and India

Year	Guatemala Production	Indian production
2000	14.78	15.20
2001	17.24	15.40
2002	16.94	16.70
2003	20.33	16.90
2004	25.93	17.80
2005	28.52	15.70
2006	24.50	13.40
2007	28.00	15.50
2008	21.41	15.70
2009	22.91	16.00
2010	22.76	15.80
2011	26.36	18.40
2012	36.24	21.28
2013	38.45	24.36
Mean	24.59	17.01
S.D.	6.81	2.08
CAGR	-98.92	-98.96

Source: Milian, L.S. (2014) and Spices Board of India, 2016

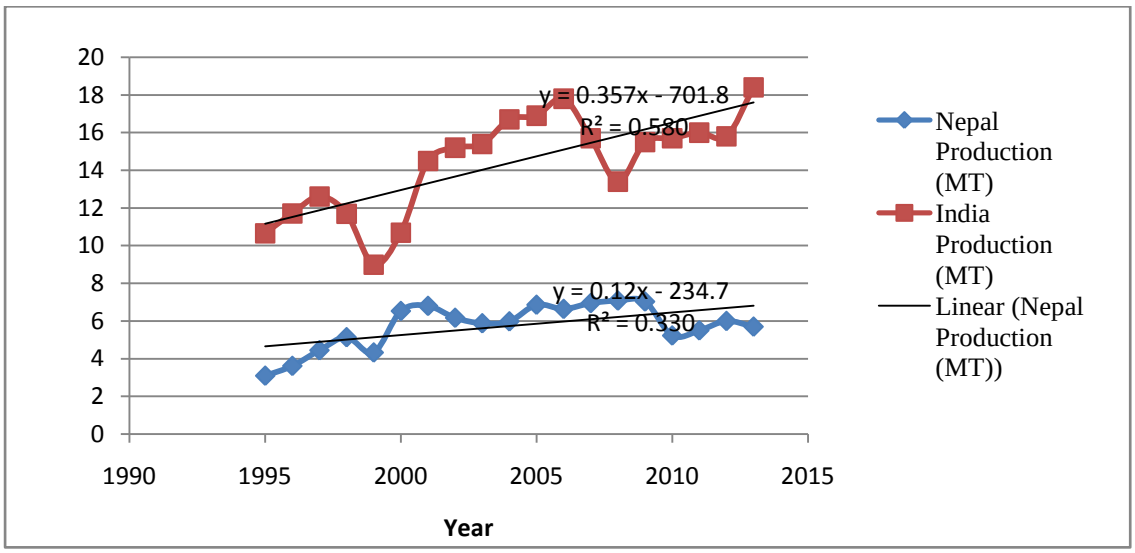
From Table 10 we can infer that the production of cardamom has been more for Guatemala as compared to Indian production. The Guatemalan production was 14.78 in 2000 which has increased to 38.45 in the year 2013 whereas for India it has not been satisfying it was 15.20 in 2000 and was 24.36 in the year 2013. India has a larger area for producing cardamom as compared to Guatemala but from the above table we can infer that Guatemala has been the leading producer of cardamom since the year 2000. The mean production of Guatemala is 24.59 and standard deviation is 6.81 and the mean production of India is 2.08.The Compound Annual Growth Rate is -98.92 for Guatemalan production of cardamom and -98.96 for Indian production.

Figure 5: Trend line for Guatemalan and Indian production of cardamom



Source: Milian, L.S. (2014) and Spices Board of India, 2016

Figure 6: Trend for production (In '000 million Tonnes) of large cardamom of India and Nepal



Source: Spices Board of India, 2016 and MoAD, Nepal 2015

Large cardamom is produced in the Eastern Himalayan region of India namely Sikkim and the Hills of Darjeeling District of West Bengal. However, it is also being

produced in North-Eastern states like Nagaland, Arunachal Pradesh etc. Although, these parts of India enjoy a certain monopoly in producing large cardamom but it also faces competition in from its neighbouring countries like Nepal and Bhutan in terms of better quality.

Table 11 : Production (In '000 Million tonnes (MT)) of large cardamom of India, Bhutan and Nepal

Year	India (MT)	Bhutan (MT)	Nepal (MT)
2004	46.16	8.17	5.98
2005	53	1.19	6.86
2006	61.54	3.47	6.64
2007	57.73	2.12	6.95
2008	51.85	2.02	7.08
2009	43.03	4.33	7.03
2010	45.3	5.43	5.23
2011	51.9	6.4	5.5
2012	44.2	6.43	6
2013	49.7	1.16	5.7
Mean	50.44	4.07	6.29
S.D.	6.01	2.46	0.69
CAGR	-98.99	-99.17	-99.04

Source: Spice Board of India-2016, MoAF, Bhutan 2014, MoAD, Nepal 2015.

The above Table 11 shows the production of large cardamom of India, Bhutan and Nepal since the year 2004 to 2013.The mean production for 50.44 for India, 4.07 for Bhutan and 6.29 for Nepal with standard deviation of 6.01, 2.46 and 0.69 respectively. The Compound Annual Growth Rate for production of large cardamom is -98.99 for India, -99.17 for Bhutan and -99.04 for Nepal.

5.2 Indian Scenario of Production of Cardamom

As mentioned earlier there are two types of Cardamom that are grown in India namely Small Cardamom (*Elettaria cardamomum)* and Large Cardamom (*Amomum subulatum Roxb).* The small cardamom also known as *chotta elaichi* is a native to the

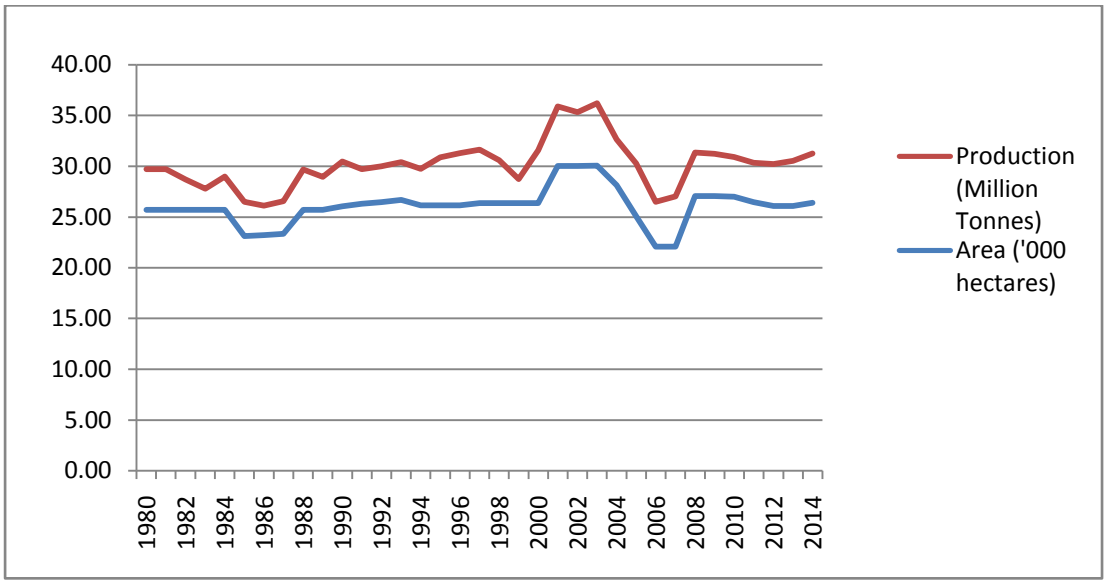
states of southern parts of India namely Kerala , Karnataka and Tamil Nadu whereas the large cardamom or *bara elaichi* is grown in the north-eastern states like Sikkim, Arunachal Pradesh and Nagaland and also in the hills of North Bengal i.e Darjeeling District. The Table 12 shows the Area and production of the two different types of cardamom in India for 2013-14 to 2014-15 out of which Kerela and Sikkim proves to be the largest producer of small and large cardamom respectively. With a total area of 39.7 hectares, the southern state of Kerela produced 16 million tonnes of small cardamom in the year 2014-15 followed by Karnataka and Tamil Nadu. Among the North-eastern States and West Bengal, Sikkim produced 4.08 million tonnes of large cardamom in the year 2014-15 followed by Nagaland and West Bengal respectively.

Table 12: Selected State-wise Area, Production and Yield of Cardamom in India 2013-2014 and 2014-15

States	Area (In ‘ 000 Hectare)		Production (In ‘ 000 MT)	
	2013-14	2014-15	2013-14	2014-15
Karnataka	18.68	25.08	1.51	1.05
Kerala	39.73	39.73	12.91	16
Nagaland	3.2	3.2	1.5	1.5
Sikkim	22.76	23.08	3.69	4.08
Tamil Nadu	5.16	5.16	0.95	0.95
West Bengal	3.31	3.31	0.72	0.78
India	92.84	99.56	21.28	24.36

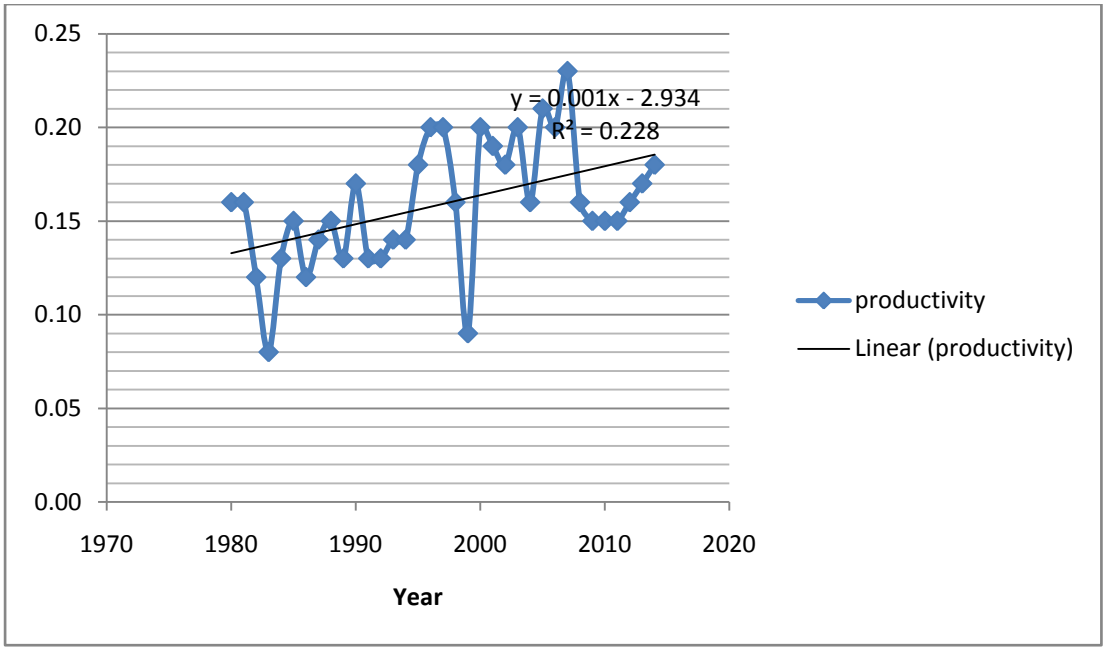
Source: Spice Board of India, 2016

Figure 7: Area and Production of large cardamom in India (1980-2014)



Source: Spices Board of India, 2016

Figure 8: Trend line of productivity of large cardamom in Sikkim



Source : Spices Board of India,2016.

As shown in figure 7 during the period 1996 to 1999 the production of large cardamom had considerably reduced which could be due to the lack of institutions supporting large cardamom production like the North Eastern Regional Agricultural Cooperation and schemes like Nursery plantation by the Spice board of India. But, the production has kept its pace since 2000 the year in which the Nursery scheme of large cardamom had started. The productivity as shown in Figure 8 has been increasing since 2009-10 and continues till 2014. Since 2010, onwards the North Eastern Regional Agricultural Corporation Limited had started the large cardamom auction in Sikkim collaborating with Spices Board of India, Gangtok Region. The Nursery Programme of large cardamom started since 2000 could also have helped in the increase in the productivity of large cardamom and achieving self-sufficiency in large cardamom production.

Table 13: The District wise area and production of large cardamom and CAGR

Year		2010-11	2011-12	2012-13	2013-14	2014-15	CAGR
North Sikkim	Area	4.78	4.96	5.09	5.26	5.41	-98.97
	Production	1.04	1.09	1.14	1.14	1.26	-98.96
East Sikkim	Area	4.33	4.49	4.61	4.76	4.885	-98.98
	Production	1.05	1.11	1.15	1.16	1.13	-98.99
South Sikkim	Area	2.98	3.09	3.17	3.27	3.37	-98.97
	Production	0.7	0.74	0.74	0.77	0.79	-98.98
West Sikkim	Area	2.925	3.038	3.12	3.219	3.344	-98.97
	Production	0.701	0.736	0.77	0.733	0.782	-98.98
Total	Area	15.02	15.6	16.01	18.62	17.02	-98.97
	Production	3.51	3.681	3.842	3.86	3.973	-98.97

Source: State Horticulture Board, Government of Sikkim.

Even though the data in table 13 reveals to us that North Sikkim produces the highest amount of large cardamom. North Sikkim has produced 1.26 million tonnes of large

cardamom in the year 2014-15as compared to other Districts of Sikkim. But, it has a very minimal participation in the large cardamom auction held at Gangtok and a very limited number of registered members to the large cardamom auction. The highest registered members to the large cardamom auction centre are from East and West District of Sikkim.

Table 14 : Year wise area, production and average yield of large cardamom in Sikkim

Year	Area ('000 Ha.)	Production('000 MT)	Avg. Yield (Kgs/Ha.)
2004-05	24.8	3.74	151
2005-06	19.97	3.16	158
2006-07	12.5	2.75	219
2007-08	12.84	2.88	224
2008-09	13.2	2.97	225
2009-10	14.52	3.39	234
2010-11	15.02	3.51	233
2011-12	15.6	3.68	235
2012-13	16.01	3.84	240
2013-14	16.52	3.86	233

Source: State Horticulture Development Board, Government of Sikkim, 2016

The above Table 14 shows the year wise area, production and average yield of large cardamom for the state of Sikkim from the year 2004-05 to 2013-14. Initially, the area for the production of large cardamom in Sikkim had declined and the same goes with production. But, production has been increasing since 2009-10 and in the recent years it has shown quite an increase to the tune of 3.86 million tonnes in the year 2013-14 with an average yield of 233 Kgs per hectare. Therefore, it would be quite interesting to look into the factors that are responsible for the increase in the production of large cardamom in Sikkim.

This study tries to look into the factors that have helped the large cardamom production in Sikkim to increase in the recent years for which secondary data on auction of large cardamom from North Eastern Regional Agricultural Marketing Corporation Limited - Gangtok, East Sikkim and primary data was collected from two major large cardamom growing areas of East and West Sikkim in order to know the role of Spices Board whether it has been the major factor for increasing the large cardamom yield in Sikkim and of NERAMAC as to how much it has been able to limit the role of middlemen in Sikkim.

5.3 Export of Small and Large Cardamom from India

Table 15 : Major Item/Country-wise Export of Spices from India (Qty. in Million Tonnes; Value in Rs. L a k h s)

Year	2011-12		2012-13		2013-14		2014-15	
Cardamom (Small)	Qty	Value	Qty	Value	Qty	Value	Qty	Value
Saudi Arabia	3097	23828	1777	16082	2500	19183	2800	23745
U.A.E	555	4349	148	1380	444	3773	422	3930
Kuwait	116	910	112	1038	148	1107	86	762
Canada	16	222	18	163	17	159	59	511
Japan	46	525	8.2	76	40	460	36	407
Year	2011-12		2012-13		2013-14		2014-15	
Cardamom (large)	Qty	Value	Qty	Value	Qty	Value	Qty	Value
Pakistan	719	4859	905	4489	967	7471	471	5633
U.S.A	30	286	69	425	9.54	133	6.73	105

Source: Spices Board of India

Saudi Arabia is the largest importer of cardamom (small) from India in comparison with other countries. From Table 15 we infer that in the year 2014-15, India exported 2800 million tonnes of cardamom (small) with a value of 23745 lakhs. U.A.E follows second in terms of importing cardamom (small) from India to the tune of 422 million tonnes. Large cardamom is exported to Pakistan and U.S.A wherein Pakistan is the

highest importer of large cardamom from India importing about 471 million tonnes with a value of 5633 lakhs.

Table 16: Export of cardamom from India (Qty. in Million Tonnes; Value in Rs. L a k h s)

Year		Cardamom (small)	Cardamom (large)
2011-12	Qty	4650	935
	Value	36322	6830
2012-13	Qty	2372	1217
	Value	21215	6254
2013-14	Qty	3600	1110
	Value	28380	7961
2014-15	Qty	3795	665
	Value	32346	8403
2015-16	Qty	5500	600
	Value	44982	7332

Source: Spice Board of India, 2016

The Indian cardamom exports have shown massive gains in its value which had reduced in the year 2012-13 but increased its pace since 2014-15 and have recorded a highest value of 44982 lakhs in terms of small cardamom whereas the value for large cardamom exports have reduced as it was 7332 lakhs in the year 2015-16 compared to the highest of 8403 in the previous year. In terms of quantity the exports of small cardamom has been increasing over the years which has increased from 4650 million tonnes in the year 2011-12 to 5500 million tonnes in 2015-16 and the quantity of large cardamom exports has been reducing and it is shown in the table 8 that large cardamom exports have recorded 600 million tonnes compared to the highest of 1217 million tonnes in the year 2012-13 after which it has been decreasing.

CHAPTER 6

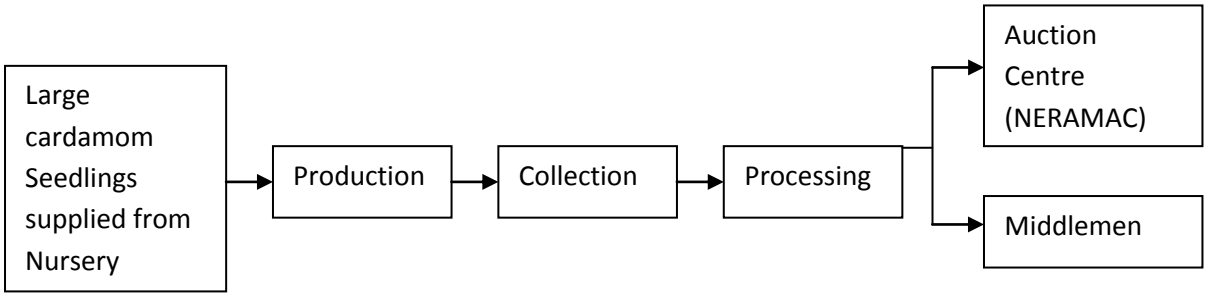
VALUE CHAIN OF LARGE CARDAMOM

6.1 Introduction to Large cardamom Value Chain

Large cardamom (*Amomum Subulatum Roxb.*) is one of the major cash crop cultivated in Sikkim with a total area of 17.02 (000'Ha) as per 2014-15. It is one of the major export items from the state of Sikkim and is also used for various Indian, Nepalese, Chinese and Vietnamese culinary. With its increasing demand, both domestically and internationally have lead to a rising interest among farmers in cultivating this cash crop. The cultivation of this cash crop is largely organic because of which most of the farmers residing in the remote villages of Sikkim making optimum use of the local resources are producing it with much needed enthusiasm and gusto providing livelihood to a number of village residing farmers. It is grown within a period of 3 to 5 years wherein the initial planting is done in the first year and harvesting done on the third or the fifth year which is finally processed and packaged. As a whole large cardamom can be one of the best value chains to work on providing generous benefits to its actors as well as the local and national economy.

6.2 Value chain Mapping of Large Cardamom

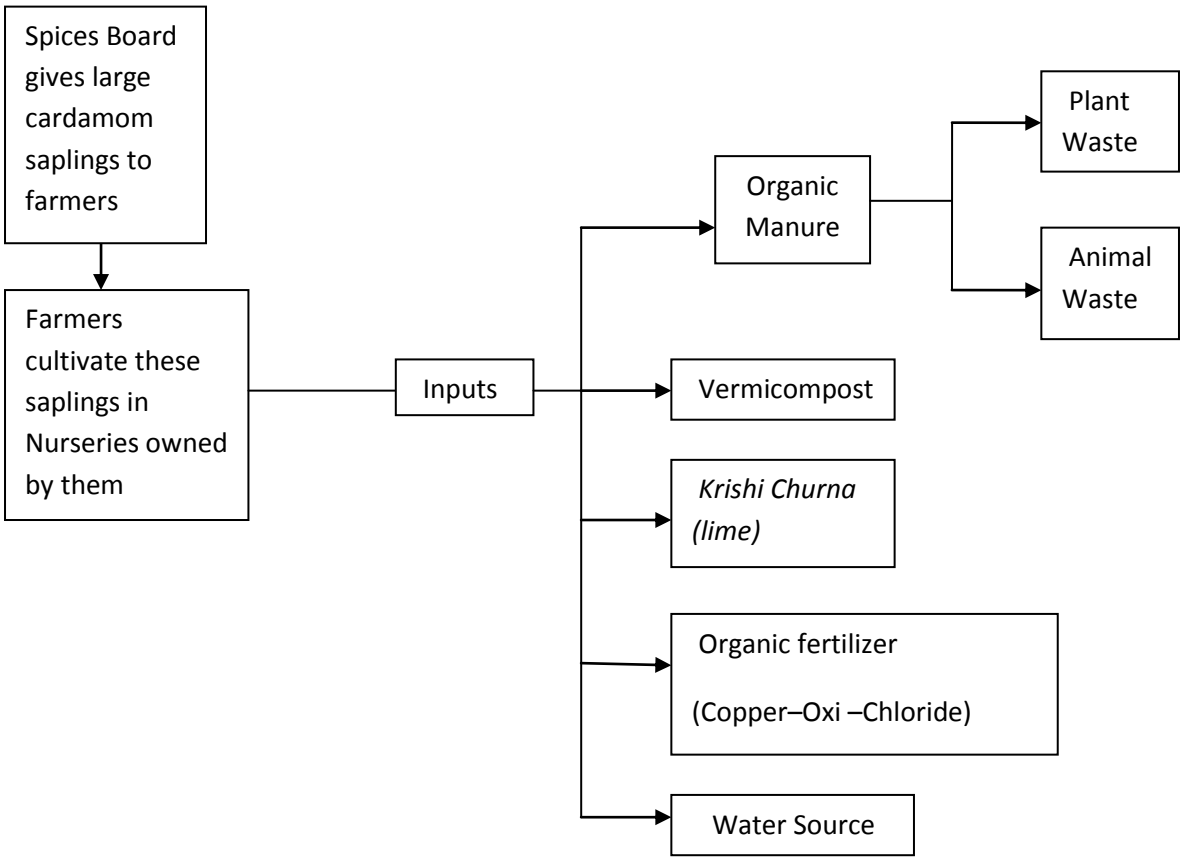
Figure 9: Functions of value chain of large cardamom



Source: Field Survey, 2016.

Figure 9 illustrates the value chain map of the functions of large cardamom in the West and East District of Sikkim. The map presents the various functions of the value chain of large cardamom wherein initially seedlings are supplied from Nurseries, which is put up for production, collected and processed and finally sent to auction centre or the middlemen. The key functions involved in the value chain of large cardamom are large cardamom seedlings which are supplied from Nurseries, production, collection, auction centre (NERAMAC) and Middlemen.

Figure 10 : Mapping of Nursery function of large cardamom



Source: Field Survey, 2016.

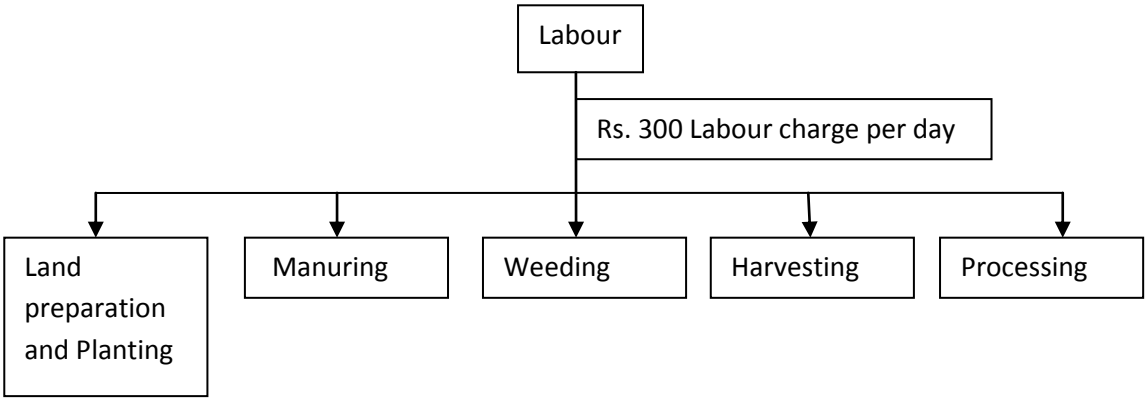
Figure 10 illustrates the nursery function of large cardamom as an initial function of large cardamom cultivation wherein the Spices Board provides the farmers with large cardamom saplings which is to be raised in the Nurseries as set-up by the farmers cultivating large cardamom. The farmers use the inputs such as Organic manure which is available as a local resource which are plant waste and animal waste, Vermicompost, *Krishi Churna* (lime),Copper-Oxi-Chloride which is a certified organic fertilizer and water source. The farmers mix the organic manure, Vermicompost, Krishi Churna (lime) and Copper-Oxi-Chloride with the soil and cultivate the large cardamom saplings accompanying it with plenty of water. This is one of the major initial functions of large cardamom cultivation for limiting the attack of pests and diseases of large cardamom for a better harvest of the cash crop.

Figure 11: Mapping of Rotation Cropping of large cardamom

Source: Field Survey, 2016

Figure 11 shows us the map of the rotational cropping of large cardamom with Corn. In the first year the large cardamom is planted, in the second year continuous monitoring of the large cardamom is done and in the third year the harvesting of large cardamom is done. This is usually the normal cycle that is followed in the large cardamom cultivation of Sikkim. But, in the recent times there has been a value addition in the form of rotational cropping with Corn that is normally cultivated after the third year of harvesting the large cardamom. Corn is grown in the same area where the large cardamom has been currently harvested after a span of three years. This rotational cropping is done by the farmers with a view to retain the soil fertility and also to reduce the risk of diseases. Thus, the addition Corn as a rotation crop has helped the farmer's to produce large cardamom in a sustainable manner.

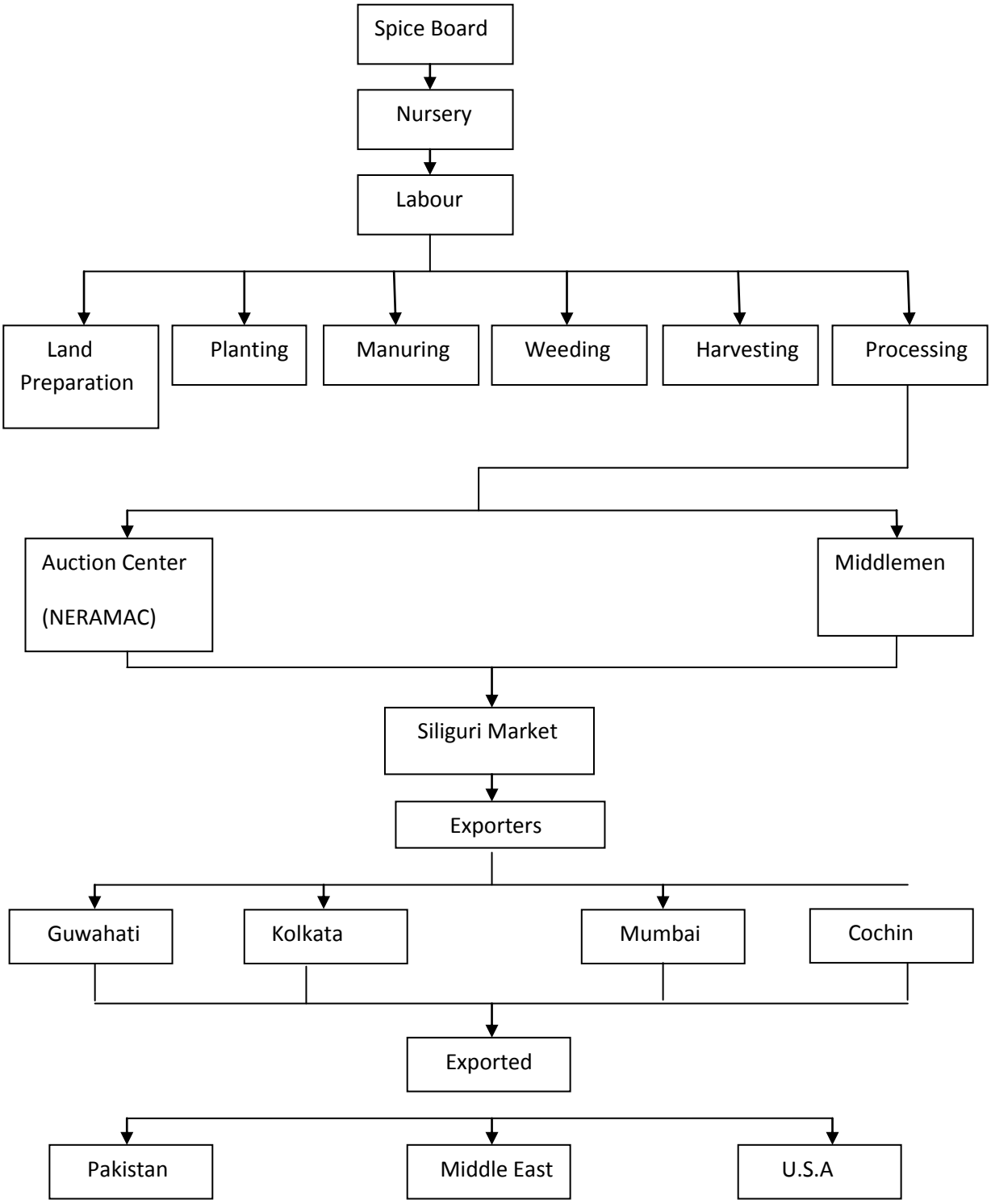
Figure 12: Mapping of labour for large cardamom cultivation



Source: Field Survey, 2016

Labour is one of the most important actor that is required for large cardamom cultivation which requires per day labour charge of Rs. 300. It is required for land preparation and Planting, Manuring, Weeding, Harvesting and Processing.

Figure 13: Value Chain Map of actors



Source: Field Survey, 2016

The figure 13 illustrates the value chain map of the actors involved in the large cardamom value chain in Sikkim. The chain starts with the distribution of large cardamom saplings to farmers by the Spices Board. After which the labourers are employed in land preparation, planting, manuring, Weeding, Harvesting and processing with per day charge of Rs.300 then it is taken to the auction centre (NERAMAC) or the middlemen. From the auction centre (NERAMAC) or the middlemen it is taken to the Siliguri market which is a major location for delivering the large cardamom of Sikkim to the exporters of Guwahati, Kolkata, Mumbai and Cochin. From these cities exporters further export to other countries like Pakistan, Middle East and U.S.A

6.3 Actors

Input Suppliers: The farmers of Sikkim who practice large cardamom cultivation nursery are the major input suppliers of large cardamom saplings selling them at Rs.2 to Rs. 5 per sapling to the Spices Board, State Horticulture Board of Sikkim and a majority of other farmers and also to other States like Nagaland, Arunachal Pradesh, and Darjeeling Hills of West Bengal. On the other hand these institutions like the Spices Board and State Horticulture Board are also involved in the distribution of these saplings that get it from farmers of Sikkim.

6.4 Enablers and Facilitators

The enablers and facilitators involved in the value chain are the North Eastern Regional Agricultural Marketing Corporation Limited (NERAMAC), Spices Board – Gangtok Region and the State Horticulture Board, Government of Sikkim.

6.5 Enablers in Auction of Large Cardamom

The North Eastern Regional Agricultural Corporation (NERAMAC) along with the Spices Board of India conducts auctions for the sale of large cardamom to provide remunerative prices to the farmers. It plays a very important role in the value chain of large cardamom as it has increased competition curtailing the role of middlemen to some extent. Today, the price of large cardamom ranges from Rs.1200/Kg to Rs.1700/kg in the Gangtok market where the auction takes place which has been helpful in fetching a higher price for the produce in the recent times mostly due to the intervention of NERAMAC (North Eastern Regional Agricultural Marketing Cooperation limited) along with the help of Spices Board of India- Gangtok. Earlier, the absence of these institutions had left the marketing of large cardamom solely at the hands of the middlemen of the region who had control over the prices of large cardamom and were exploiting the hard work of the illiterate cardamom cultivators by buying the produce at a much cheaper rate for which the farmers due to need of cash at hand were compelled to sell their produce.

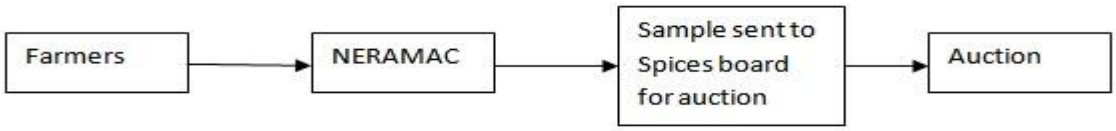
Table 17: Year wise auction details of large cardamom by NERAMAC

Year	Total No of Auction Conducted	Qty. Sold (Kg)	Value of Sold Qty. (in Rs.)	Commission Earned	Exp. Per Auction (Rs.)	Maximum Price Offered in Rs.	Minimum Price Offered in Rs.
2010-11	7	3,592.93	3,336,045	33,360.45	47,908.00	1,220	750
2011-12	5	9,141.70	6,984,969	69,849.69	28,567.00	935	625
2012-13	5	7,439.10	5,405,376	54,053.76	17,976.00	900	560
2013-14	6	8,861.31	8,472,352	102,626.73	17,906.00	1,215	800
2014-15	5	12,401.6	20,552,051	205,520.51	5,737.00	1,740	1,645
Total	28	41436.64	44750793	465411.14	118094	-	-

Source: North Eastern Regional Agricultural Marketing Cooperation Limited-Gangtok, 2016.

The above Table 17 reveals that since 2010-11 to 2014-15 a total of 28 auctions have been held selling a total quantity of 41437 kg of large cardamom. The total value of the quantity sold is Rs. 44750793 out of which the NERAMAC earns commission of 1 % per auction which makes it to Rs.465411. The expenditure for conducting the auction has been a total of Rs.118094. The maximum price ranges from Rs.1220 to 1740 per kg and minimum prices ranges from Rs.750 to 1645 per kg.

Fig.14 The large cardamom auction Value Chain



Source: Field Survey, 2016

The above Fig.14 gives us a brief idea of the Value Chain Analysis of large cardamom .In the first step the farmers get their produce to NERAMAC. The NERAMAC then registers the farmers and the amount of the produce and stores in the warehouses and take the sample registered in the farmers name along with the quantity to the auction centre in this case the Spices Board at Singtam, East Sikkim. After all these procedure the Auction takes place on a fixed date decided by the Spices Board in the presence of the officials of the State Horticulture Development Board ,NERAMAC, Spices Board, buyers and sellers. The sellers (farmers) can withdraw and accept the price decided by the auction.

CHAPTER 7

RESULTS AND DISCUSSIONS

7.1 Demographic Characteristics of the Respondents (large cardamom cultivators)

Table 18: Number of sample farmers in selected areas from West Sikkim and East Sikkim Sub-District Wise

District	Sub-District	Sample Villages	Sample collected	Total sample from each districts
West District	Gyalshing	Dentham	8	60
		Hee Bazar	18	
		Hee Kangbari	8	
		Hee Patal	1	
		Hee Pechrek	11	
		Hee Yangthang	14	
East District	Rongli	Lungchok	1	60
		Pam Gaon	6	
		Reulat	5	
		Rongli	23	
		Tal Kharga	25	
Total			120	120

Source: Author's estimation based on Primary Survey, 2016

Table 19: District-wise Total Cultivated Area (In Acers) under large cardamom

District	Villages	Total Agricultural Area (In Acers)	Total Cultivated Area under large cardamom (In Acers)
West District	Hee Yangthang	87.25	73.5
	Hee Kangbari	25.5	25
	Hee Patal	7.5	7.5
	Hee Pechrek	57.44	54.69
	Hee Bazar	84	73.5
	Dentham	27	22
East District	Tal Kharga	171.25	160.25
	Reulat	24.5	24.5
	Pam Gaon	37	37
	Lungchok	5	5
	Rongli	118.75	113.75
	Total	645.19	596.69

Source: Author's estimation based on Primary Survey, 2016

The Table 19 shows us the District Wise Total Agricultural Area and Total cultivable area of large cardamom in West and East District of Sikkim where Hee Yangthang has the highest total agricultural area of 87.25 acres from West District and Tal Kharga has the highest total agricultural area of 171.25 acres from East District used for agricultural production. The highest area under large cardamom from West District is Hee Yangthang and Hee Bazar with total cultivable area of 73.5 acres for large cardamom and East District is Tal Kharga 160.25acers followed by Rongli with 113.75 acres of area under large cardamom. The total agricultural area for both

Districts is 645.19 acres and total cultivable area under large cardamom in both the districts is 596.69 acres.

Table 20: Descriptive statistics of area under large cardamom (In Acers) of West and East Sikkim

District	Villages	Mean Area (In Acers)	Std. Dev	Min	Max
West Sikkim	Hee Yangthang	5.25	5.34	0.25	17.5
	Hee Kangbari	3.12	2.04	1	7
	Hee Patal	7.5	-	-	-
	Hee Pechrek	4.97	7.13	0.19	20
	Hee Bazar	4.08	3.38	1	15
	Dentham	2.75	1.51	1	5
East Sikkim	Tal Kharga	6.41	8.01	0.25	40
	Reulat	4.9	3.66	1.5	10
	Pam Gaon	6.16	3.89	2	12.5
	Lungchok	5	-	-	-
	Rongli	4.94	2.81	0.25	10
West Sikkim		4.26	4.46	0.19	20
East Sikkim		5.67	5.63	0.25	40

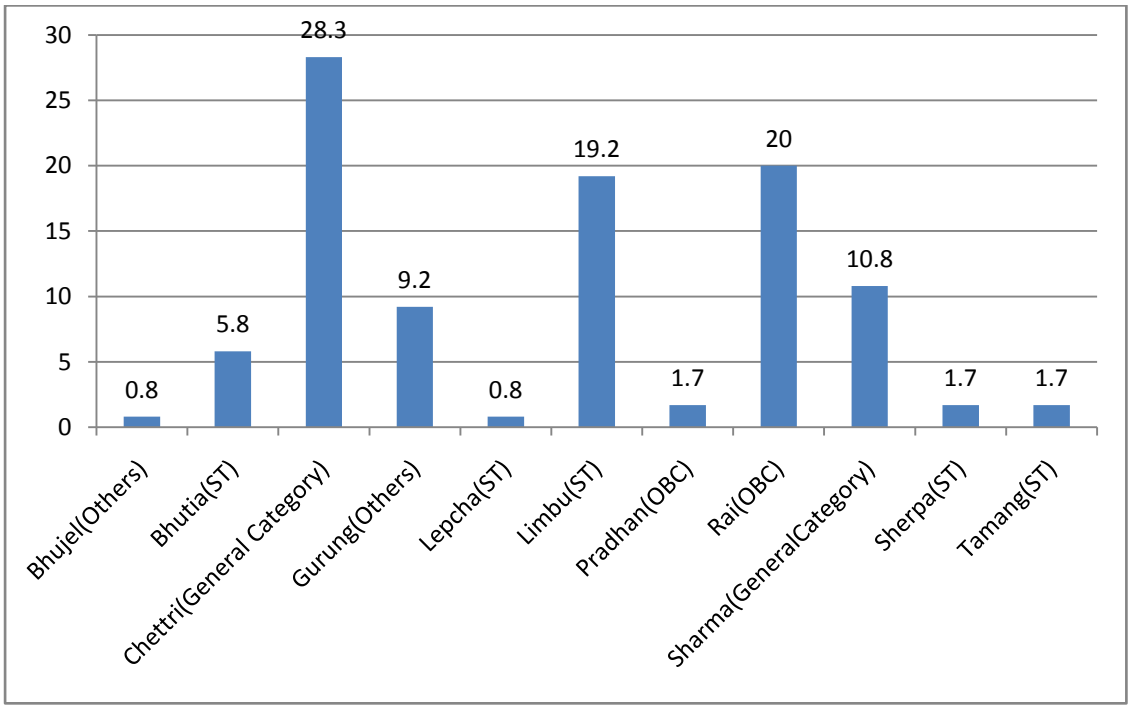
Source: Author's estimation based on Primary Survey, 2016

Table 21: Population Profile of the Sample Area

Villages	Male	Female	Male working population	Female working population	Total working population	Literate
Hee Yangthang	41	42	15	10	25	13
Hee Kangbari	20	21	11	2	17	6
Hee Patal	3	2	1	0	1	7
Hee Pechrek	37	23	17	4	21	9
Hee Bazar	53	54	17	4	19	18
Dentham	22	26	8	1	9	8
Tal Kharga	3	1	0	8	35	17
Reulat	65	76	33	0	8	5
Pam Gaon	7	10	5	1	5	6
Lungchok	11	14	7	1	0	1
Rongli	59	63	35	5	37	23
Total	321	332	149	36	177	113

Source: Author's estimation based on Primary Survey, 2016

Figure 15: Communities cultivating large cardamom in Sikkim



Source: Author's estimation based on Primary Survey, 2016

As shown in Figure 15 there are many communities involved in cultivating large cardamom in Sikkim namely General Category, Schedule Tribe, Other Backward caste and others out of which the *Chettri* community (General Category) were the largest group with 28.3 % followed by the *Rai* community (OBC) 20 % and *Limbu* community (ST) 19.2 %. However, the *Sharma* community (General Category) 10.8 %, *Sherpa* (ST) 1.7%, *Tamang* (ST) 1.7%, *Bhutia* (ST) 5.8%, *Lepcha* (ST) 0.8%, *Pradhan* (OBC) 1.7 %, *Gurung* (Others) 9.2% and *Bhujel* (Others) 0.8 were also involved in the cultivation of large cardamom in the surveyed area.

Table 22 : Classification of farms from the surveyed area

Classification of Farms	No. of Farmers	Total Area (In Acers)	Average Area	Std. Dev.
Marginal farms (<2.5 Acers)	47	53.5	1.13	0.47
Small farms (> 2.5 to 4 Acers)	29	89	3.06	0.57
Medium farms (4 .5 Acers to 10 Acers)	32	199.5	6.23	1.42
Large farms (> 10 Acers)	12	175.5	14.62	2.95

Source: Authors estimation based on field survey, 2016

The farms cultivating large cardamom have been classified into four categories namely marginal farms i.e. (<2.5 Acers), small farms (> 2.5 to 4 Acers), medium farms (4.5 to 10 Acers) and large farms (> 10 Acers).Out of the 120 sampled farmers the number of farmers cultivating large cardamom in marginal farms are 47 followed by 29 farmers from small farms, 32 farmers from medium farms and 12 farmers from large farms. The highest numbers of farmers who are cultivating large cardamom belong to the category of marginal farmers with a total of 47 farmers followed by medium farms and small farms with a number of 32 and 29 farmers respectively. The least number of farmers belong to the large farms with 12 farmers. The total area for cultivating large cardamom (In Acers) is highest for the medium farms with a total area of 199.5 Acers of cultivated land for large cardamom followed by 175.5 Acers for large farms, 89 Acers for small farms and 53.5 Acers for marginal farms.

Table 23: Classification of farms from West District

West District	No. of farmers	Total Area (In Acers)	Average	Std. Dev.
Marginal farms (<2.5 Acers)	25	31	1.24	0.5
Small farms (> 2.5 to 4 Acers)	17	52	3.17	0.46
Medium farms (4 .5 Acers to 10 Acers)	13	80.5	6.19	1.39
Large farms (> 10 Acers)	5	82.5	16.5	3.08

Source: Authors estimation based on field survey , 2016

In the West District of Sikkim there are 25 marginal farms with a total area of 31 Acers used for cultivating large cardamom followed by 17 small farms with a total area of 52 Acers, 13 medium farms with a total area of 80.5 Acers and 5 large farms with a total area of 82.5 Acers for cultivating large cardamom. The average value of marginal farms is 1.24 Acers, small farms is 3.17Acers, medium farms is 6.19 Acers and large farms is 16.5 Acers in the West District of Sikkim. The average area from West Sikkim is 6.77 Acers.

Table 24 :Classification of farms from East District

East District	No. of farmers	Total Area (In Acers)	Averag e	Std. Dev.
Marginal farms (<2.5Acers)	22	22.5	0.97	0.37
Small farms (> 2.5 to 4 Acers)	12	37	3.08	0.7
Medium farms (4 .5 Acers to 10 Acers)	19	119	6.26	1.48
Large farms (> 10 Acers)	7	93	13.28	2.15

Source: Authors estimation based on field survey , 2016

In the East District of Sikkim there are 22 marginal farms cultivating large cardamom with an area of 22.5 Acers followed by 12 small farms, 19 medium farms and 7 large

farms with an area of 37, 119 and 93 Acers respectively for cultivating large cardamom in East District. The average value of marginal farms is 0.97, a small farm is 3.08, a medium farm is 6.26 and a large farm is 13.28. The average area from East Sikkim is 5.90 Acers.

Form both the Districts we have a highest number of marginal farms with an area of less than 2.5 Acers. There are 17 small farms in West District of Sikkim with an average area of 3.17 which is more than 12 small farms from East District with an average area of 3.08 Acers. Again there are 19 medium farms in East District with an average area of 6.26 Acers more than 13 farms of West District of Sikkim which has an average area of 6.19 Acers. Among the large farms there are 7 large farms from East District followed by 5 large farms form West District with an average area of 13.28 and 16.5 respectively.

Table 25 : The production of large cardamom from different farms in West Sikkim

West Sikkim	No. of Farmers	Total Production (In Kgs)	Average Production (In Kgs)	Std. Dev.
Marginal farms (<2.5Acers)	25	843	33.72	15.18
Small farms (> 2.5 to 4 Acers)	17	1379.5	81.14	14.75
Medium farms (4 .5 Acers to 10 Acers)	13	2013	154.84	34.52
Large farms (> 10 Acers)	5	2057.5	411.5	77.69

Source: Authors estimation based on field survey , 2016

The total production of large cardamom from West Sikkim is 6293 Kgs and the average production is 1573.25 Kgs. The large farms produce the largest amount of large cardamom to the tune of 2057.5 Kgs followed by medium farms with 2013 Kgs, small farms with 1379.5 Kgs and 843 Kgs of large cardamom. On an average basis the production from West District is 170.3 Kgs per acre. The average production of

marginal farms from West District of Sikkim is 33.72 Kgs per acre, of small farms is 81.14 Kgs per acre, of medium farms is 154.84 Kgs per acre and of large farms is 411.5 Kgs per acre.

Table 26 : The production of large cardamom from different farms in East Sikkim

East Sikkim	No. of Farmers	Total Production (In Kgs)	Average Production (In Kgs)	Std. Dev.
Marginal farms (<2.5 Acers)	22	577.5	26.25	12.94
Small farms (> 2.5 to 4 Acers)	12	944.5	78.7	20.24
Medium farms (4 .5 Acers to 10 Acers)	19	2987.5	157.23	34.64
Large farms (> 10 Acers)	7	2340	334.28	51.33

Source: Authors estimation based on field survey , 2016

From the East District of Sikkim the medium farms contribute the largest production of large cardamom to the tune of 2987.5 Kgs followed by 2340 Kgs from large farms, 944.5 Kgs from small farms and 577.5 Kgs from marginal farms. The average production of large cardamom from East District of Sikkim is 1574.56 Kgs. The average production from marginal farms is 26.25 Kgs, small farms are 78.7 Kgs, medium farms are 157.23 Kgs and large farms are 334.28 Kgs.

Comparing the average production of marginal farms from both the Districts the West District produces 33.72 Kgs whereas the East District produces 26.25 Kgs of large cardamom. Similarly, on an average the West District produces 81 .14 Kgs of large cardamom compared to 78.7 Kgs from East District. However, the medium farms from East District produce 157.23 Kgs of large cardamom on an average as compared to 154.84 Kgs from West District. Among the large farms on an average the large

farms from West District produce 411.5 Kgs of large cardamom compared to 334.28 Kgs of large cardamom from East District.

Table 27 : The production per acre, Price per Kg and Gross Income of categorized farms of West Sikkim

West Sikkim	Production Per Acer (In Kgs)	Average Price Per Kg. (In Rs.)	Gross Income (In Rs.)
Marginal farms (<2.5 Acers)	26.6	1410.64	48613
Small farms (> 2.5 to 4 Acers)	26.6	1405.88	114579
Medium farms (4 .5 Acers to 10 Acers)	25.1	1442.69	222961
Large farms (> 10 Acers)	24.9	1365	564750
Average	25.8	1406.05	237725

Source: Authors estimation based on field survey, 2016.

On an average the production per acre of West Sikkim is 25.8 Kgs, price per kg is Rs.1406.05 and Gross Income is Rs.2, 37,725. The production per acre of marginal farms is 26.6 Kgs followed by 25.1 Kgs and 24.9 Kgs of medium farms and large farms respectively. The Gross Income is the lowest of marginal farms with Rs.48, 613 followed by medium farms and large farms with Rs 2, 22,961 and Rs.5, 64,750 respectively.

Table 28 : The production per acre, Price per Kg and Gross Income of categorized farms of East Sikkim

East Sikkim	Production Per Acer (In Kgs)	Price Per Kg. (In Rs.)	Gross Income (In Rs.)
Marginal farms (<2.5Acers)	24.7	1364.36	36781.81
Small farms (> 2.5 to 4 Acers)	25.4	1316.66	102341
Medium farms (4 .5 Acers to 10 Acers)	25.2	1463.94	217684
Large farms (> 10 Acers)	25.2	1365	440785
Average	25.12	1377.49	199397

Source: Authors estimation based on field survey, 2016.

On an average the production per acre of East Sikkim is 25.12 Kgs per Acre, the average price per Kg of large cardamom is Rs.1377.49 and Average Gross Income is Rs.1, 99,397. The production per acre of marginal and small farms is 24.7 Kgs per acre and 25.4 Kgs per acre respectively and for the medium and large farms is 25.3 Kgs per acre. The average price of the medium farms is more as compared to the other farms to the tune of Rs.1463.94 per kg in the East District of Sikkim. The highest Gross Income from the East District is Rs.4, 40,785 lakhs as compared to the lowest of Rs.36781.81 from the marginal farms.

7.2 Cost of Cultivation of Large Cardamom

Table 29 : Cost of Cultivation of large cardamom

(Rs. /Acre)

		1st Year					
Sl. No	Particulars	Input		Labour		Total Cost	
A	Direct cost	Qty.	Cost	No. Of Man Days	Cost		
1	Land Preparation	-	-	2	600	600	
2	Planting	7000	14000	2	600	14600	Rs.2 per sapling
3	Manuring@ 2 rounds	-	-	2	1200	1200	
4	Weeding @ 2 rounds	-	-	2	1200	1200	
5	Irrigation	-	-	-	-	-	
6	Spraying of Bio-pesticides @ 2 rounds	-	-	-	-	-	
	Total	-	-	-	-	17600	
2nd Year							
1	Land Preparation	-	-	-	-	-	
2	Gap Filling	2500	5000	1	300	5300	Rs.2 per sapling
3	Manuring@2 rounds	-	-	4	2400	2400	
4	Weeding @ 2 rounds	-	-	4	2400	2400	
5	Spraying of Bio-pesticides @ 2 rounds	-	-	-	-	-	
	Total	-	-	-	-	10100	
3rd Year							
1	Harvesting	-	-	5	1500	1500	
2	Curing and Processing	-	-	6	1800	1800	
3	Misc.	-	-	-	-	150	
	Total	-	-	-	-	3450	

Source: Authors estimation based on field Survey, 2016

Table 29: Contd.

B	Indirect Cost			
Sl. no	Particulars	1st Year	2nd Year	3rd Year
1	Family Labour	300	300	600
2	Implements	500	500	500
3	Farm Produced Manure	250	250	300
4	Rent of owned land	500	500	500
5	Interest on owned Capital	30	30	30
Total		1580	1580	1930
Cost A			Rs.31150	
Cost B			Rs.5090	
Cost C			Rs.36240	
Total Cost			Rs.39400	
Net Profit			Rs.110600	
Total Return to labour			Rs.118850	
Return for Investments			Rs.32950	
Labour Cost			Rs.300 per man day	
Spacing			4 feet ×4 feet	
Plant population per acre			7000 No	
Cost of replanting			Rs.5000	
Price			Rs.1390 per kg	
Gross Income			Rs.150000	
Economic Life Span			3 Years	

Source: Authors estimation based on field Survey, 2016

The cost of cultivation of large cardamom per acre for the period of three years has been given in the table 29 with Direct cost (A) and Indirect Cost (B). In the first year the labour employed is 2 man days with a cost of Rs.600 for land preparation and planting. The quantity of large cardamom saplings planted in the first year is 7000 number of saplings with a cost of Rs.14000 at Rs.2 per sapling. Manuring and weeding @ 2 rounds requires 2 man days of labour with a cost of Rs.1200.The sub-total cost for land preparation per acre in the first year is Rs.600, planting is 14600 and Rs.600 for both manuring and weeding @ 2 rounds with a total cost of Rs.17600 in the first year.

In the second year of large cardamom cultivation Gap filling with 2500 large cardamom saplings costing Rs.5000 at Rs.2 per sapling is planted with 1 man day costing Rs. 300.Manuring and weeding @ 2 rounds requires 4 man days of labour costing Rs. 2400.The total cost in the second year is Rs.10100. In the third year, harvesting takes place and requires 5 man days of labour with cost of Rs.1500 and for processing it requires 6 man days of labourers with a cost of Rs.1800 and Misc. costs Rs. 150.In the third year the total cost is Rs.3450.

The indirect costs involved in the cultivation of large cardamom are family labour, implements, and farm produced manure, rent of owned land and interest on owned capital. The imputed family labour is Rs. 300 for 1st Year and 2nd Year each and Rs.600 for the third year. The implements accounted for Rs.500 for all the three years. The farm produced manure accounted for Rs.250 for 1st Year and 2nd Year and Rs.300 for the 3rd year. The rent of owned land is 500 for respective three years. The interest on owned capital is 30 for all the three years. The total indirect cost for 1st year and 2nd year is Rs.1580 and Rs.1930 for the third year.

The total cost of cultivation of Cost A (Direct Cost) is Rs.31150 and Cost B (Indirect Cost) is Rs.5090. The Cost C that involves both Cost A and Cost B is Rs.36240.The total cost of cultivation for large cardamom observed is Rs.39400. The net profit is Rs.110600. The total return to labour is Rs.118850.The return for investments is Rs.32950. The labour cost is Rs.300 per man day. The spacing required for planting large cardamom is 4 feet × 4 feet .The plant population per acre is 7000 saplings. The cost of replanting is Rs.5000. The price is Rs.1390 per kg of large cardamom. The Gross Income is Rs.150000. The economic life span of large cardamom is 3 years.

7.3 Institutional Role of NERAMAC in Large Cardamom Marketing in Sikkim

The NERAMAC (North Eastern Regional Agricultural Marketing Corporation Limited) was set up in order to support farmers and producers of north east India for getting remunerative prices for their produce. It aims to bridge the gap between the farmers and the market and improve the agricultural, procurement, processing and marketing infrastructure of the Northeastern Region of India. Its authorized capital is Rupees 1000 lakh and the paid-up Capital is Rupees 762 lakh. Currently, it is under the administrative control of the Ministry of Development of North Eastern Region (DoNER), Government of India, and New Delhi. To fulfill its objectives, NERAMAC offers a helping hand in sourcing and procuring cash crops of the producers by intervening in the market and provide them remunerative prices with the help of processing units by providing raw materials and arranging packaging materials through its retail outlets within the North East Region which directly sell various processed and value added products locally in the region.

Keeping in view its mandate for agricultural prosperity in the NE Region, NERAMAC usually undertakes activities such as: Procurement & marketing different agro-horticultural produce like Ginger, Bird's Eye Chillies, Maize, Black Pepper, Raw Cashew Nut, Pineapple, Supari, Brooms etc. outside the region to help the farmers in getting economic returns. NERAMAC also undertakes responsibility of marketing agro-horticultural inputs like Fertilizers, Seeds etc. keeping in view of the overall agricultural development of the region, marketing assistance to small and cottage scale food processing units of the region. NERAMAC has exported True Potato Seeds (TPS) produced in the NEC sponsored project at Nagichera, Tripura. So far, TPS were exported to Bangladesh, Indonesia, Nepal, Mexico and South Korea. Marketed pineapple pulp to Hindustan Unilever Ltd., & is also marketing

frozen pineapple juice concentrate and litchi pulp from the North Eastern Region and supply to M/s. Dabur Foods, Nepal. NERAMAC markets cashew nut processed by different processing units in Mankachar District of Assam and Phulbari region of Meghalaya. NERAMAC is making attempts to generate employment by providing Juice Vending Machines on franchise basis. This scheme is aimed at, apart from employment generation, creation of alternate marketing structure for natural juice and other processed products and fresh fruits & vegetables of NE Region. NERAMAC is also providing training on Post Harvest Management and fruit processing from time to time to develop entrepreneurs for value addition of the agro-horticultural produces grown in the region in collaboration with institutions like Central Food Technological Research Institute (CFTRI), Mysore and other constituents Laboratories of CSIR/Agricultural Universities etc.

7.4 Proceedings of the Auction Held at Singtam on 16/05/2016

The auction proceeded with welcome address by the Chief Guest- Mr. Pinsto Bhutia, Assistant Director, Horticulture Board, and Government of Sikkim. Addressing the gathering he raised certain issues regarding the inferior quality of large cardamom being the hindrance for the lack of traders coming for auction held at Sikkim and feared that Nepal was producing better quality of large cardamom which is proving to be a tough competitor for Sikkim in the recent times. After which Mr. P.C. Roy Senior Zonal Manager from North Eastern Regional Agricultural Marketing Corporation Limited, Sikkim stressed about the less quantities of produce comes to the auction and talked about the e-auction facilities to be provided in Sikkim by April 2017.The auction started at 1: 02 p.m. in the presence of the Chief Guest- Mr. Pinsto Bhutia, Assistant Director, Horticulture Board, Government of Sikkim, Mr. P.C Roy, Senior Zonal Manager and Mr. Rohini

Dangal, Field Assistant from North Eastern Regional Agricultural Marketing Corporation Limited, Mr. Edward Bora, Section Officer, Spices Board of India, Sikkim, traders and farmers.

Table 30 : Auction held at Singtam

Lot No	Name of the farmer	Quantity (In Kgs)	Bid Price (In Rupees)	Sold Price (In Rupees)	Remarks
Lot No.1	B.R. Limbu	146	1200	1210	Trader
Lot No.2	D.S. Limbu	55.6	1300	-	Withdrawn
Lot No.3	B. B. Limbu	57.1	1200	1250	Organic Sikkim
Lot No.4	B.Bdr.Limbu	176	1200	-	Withdrawn
Lot No.5	Susan Bista	96.1	1150	-	Withdrawn
Lot No.6	B.B.Bista	40.8	1200	1200	Trader
Lot No.7	B.K.Chettri	39.4	1200	1200	Trader
Lot No.8	J.B. Tamang	38.4	1175	1175	Trader
Lot No.9	Gopal Chettri	172.3	1150	1175	Trader
Lot No.10	C.M. Limbu	105.8	1200	1275	Trader
Lot No.11	I.K. Limbu	39.6	1160	1225	Withdrawn
Lot No.12	C. S. Limbu	40.2	1150	1160	Withdrawn
Lot No.13	J. B. Limbu	211	1150	1160	Withdrawn

Source: Based on Authors attendance in the auction held at Singtam, 16/05/2016.

Table 31: The percentage of farmers selling their produce

	Percentage of farmers selling their produce
Middlemen	43.3
NERAMAC	56.7

Source: Authors estimation based on field survey, 2016

One of the major objectives of the NERAMAC is to reduce the role of middlemen in order to provide the farmers with remunerative prices through conduct of auctions. From the primary survey conducted we have found that the farmers sell their produce to either to middlemen or the NERAMAC. About 43.3 % of farmers sell their produce to the middlemen and 56.7 % of farmers to NERAMAC. In interaction with Mr. P.C. Roy Senior Zonal Manager from North Eastern Regional Agricultural Marketing Corporation Limited, Sikkim it was revealed to us that the farmers mostly sell their produce to middlemen in need of cash at hand.

Table 32: The location for selling large cardamom by the farmer

	Percent
Farm Gate	19.1
Market center	80.8

Source: Authors estimation based on field survey, 2016

The location for selling large cardamom for the farmers are two namely farm gate wherein the produce is collected from the farms mostly by the middlemen where bargaining is not much prevalent because of the transportation cost being borne by the middlemen and the farmer ends up getting a lower price for their produce and market center wherein the produce is sold to the market which are the NERAMAC auction center or the middlemen .About 80.8 % of surveyed farmers sell their produce at the market center which is a good indicator in inferring that the farmers are aware of the auction as only 19.1 % of the farmers sell their produce to the middlemen.

Table 33: Awareness regarding the functioning of NERAMAC

	Percentage of awareness among farmers
Aware	70.8
Unaware	29.2

Source: Authors estimation based on field survey, 2016

In the recent times the NERAMAC has been very instrumental in promoting large cardamom production by helping farmers achieve remunerative prices as our field visit provides that 70.8 % of farmers are aware of NERAMAC as an institution that promotes auctioning of large cardamom in Sikkim contrary to only 29.2 % of farmers who are unaware of it.

Table 34: The percentage of registered members of NERAMAC

	Percent
Registered	56.7
Unregistered	43.3

Source: Authors estimation based on field survey, 2016

On the question as to how many have registered with the NERAMAC for selling their produce in the auction center 56.7 % have registered while 43.3 % have not registered or sold their produce in the auction center which shows a room for improvement for NERAMAC in order to effectively market large cardamom in the region.

Table 35: The perception of farmers regarding better prices

	Percent
Middlemen	25
NERAMAC	75

Source: Authors estimation based on field survey, 2016

The prices have always been a major motivation for the farmers of large cardamom for producing the high value low volume cash crop. The survey conducted raised the question as to who gives better price for their produce to the farmers is it the middlemen or the NERAMAC. About 75 % of the farmers are of the opinion that the NERAMAC gives them more prices as compared to middlemen.

Table 36: Number of times the registered members have participated in the auction

No. of times the registered members have participated in the auction	Percentage of registered members participated in auction
Nil	43.3
1	20.8
2	7.5
3	15
4	3.3
5	3.3
6	3.3
7	2.5
9	0.8

Source: Authors estimation based on field survey, 2016

About 43.3 % of the surveyed farmers have not participated in the auction organized by the NERAMAC whereas only 0.8 % has participated in the auction the highest number of times and those who have participated in the auction only once is the highest with 20.8 % followed by those who participated in the auction only three times.

Table 37: Sample of large cardamom sent to auction center

	Minimum Sample (In Kg.)	Maximum Sample (In Kg.)	Average Sample (In Kg.)
Sample sent to NERAMAC from farmers	40	550	80.50

Source: Authors estimation based on field survey, 2016

In interaction with Mr. P.C. Roy Senior Zonal Manager from North Eastern Regional Agricultural Marketing Corporation Limited, Sikkim it was revealed to us that the farmers mostly sell their produce to middlemen in need of cash at hand and stressed about the less quantities of produce comes to the auction center for auction proceedings. From our field visit we have come to know that the minimum sample of processed large cardamom sent to the auction is 40 Kg and the maximum sample is 550 Kg. On average about 80.50 Kg of large cardamom is sent to the auction center by the farmers of the surveyed region. On the issue of the less quantities of large cardamom coming to raised by Mr. P.C .Roy from the farmers side the major grievances on the issue is that the sample sent to the NERAMAC losses its weight and the farmers get a lower price for the produce because the auction is not held immediately therefore the farmers are reluctant to sent their produce to the auction center and if they sent for the produce and wait for the auction to be held they would have lost a major amount of their produce. Hence, the opportunity cost in selling the large cardamom to the middlemen is more profitable to the farmers then to the auction.

Table 38: Prices of large cardamom given by NERAMAC and Middlemen

	Minimum Price Per Kg (In Rs.)	Maximum Price Per Kg (In Rs.)	Average Price Per Kg (In Rs.)
Highest Price (NERAMAC)	695	1750	1275.89
Lowest Price (NERAMAC)	725	1650	1179.89
Highest Price (Middlemen)	700	1800	1243.97
Lowest Price (Middlemen)	500	1375	1034.63

Source: Authors estimation based on field survey, 2016

When we look into the prices of large cardamom given to the farmers by the NERAMAC and the middlemen it has been found that the middlemen give a marginally higher price to the farmers. However, with the intervention of NERMAC the prices of large cardamom have been able to soar up higher to Rs. 1800 per kg as it increases the competition between the NERAMAC and the middlemen. In such a way the NERAMAC has been able to provide better prices to the farmers and also a fair income for their produce in the market. But, the farmers have raised concerns regarding the unorganized cartels among the middlemen, NERAMAC and the Spices Board regarding the fixing of prices.

Table 39 : The percentage of satisfaction among the farmers regarding the transportation facilities provided by the NERAMAC

	Percent
Satisfied farmers	16.2
Unsatisfied farmers	83.3

Source: Authors estimation based on field survey, 2016

On the issue of transportation facilities provided by the NERAMAC only 16.2 % of farmers from *Hee Bazar* (West Sikkim) are satisfied with the transportation facilities provided by the NERAMAC as it is the only place where the NERAMAC provides transportation facilities and the other surveyed areas have not been getting adequate transportation facilities especially the surveyed area of East Sikkim such as *Regu* and *Rongli* .Therefore, 83.3 % of the surveyed farmers are unsatisfied with the transportation facilities provided by the NERAMAC which bars the farmers form East Sikkim in getting a good price for their produce.

Table 40: The percentage of satisfaction regarding payment timing from NERAMAC

	Percent
Satisfied with timing of payment	4.4
Unsatisfied with timing of payment	95.6

Source: Authors estimation based on field survey, 2016

The timing of the payment has been a major advantage for the middlemen of Sikkim in buying the produce form the farmers and the NERAMAC somehow fails to achieve progress in this field. The farmers who are in need of cash at hand have complained about the delay in the payment of their sold produce by the NERAMAC therefore they sell their produce to the middlemen who provide the farmers with cash at hand for their produce. Only 4.4 % of farmers are satisfied with the payment from NERAMAC and about 95.6 % of the farmers are unsatisfied with the payment from NERAMAC. There is a major room for scope for NERAMAC in this issue and need to be addressed with concern and find this mechanism to be more effective.

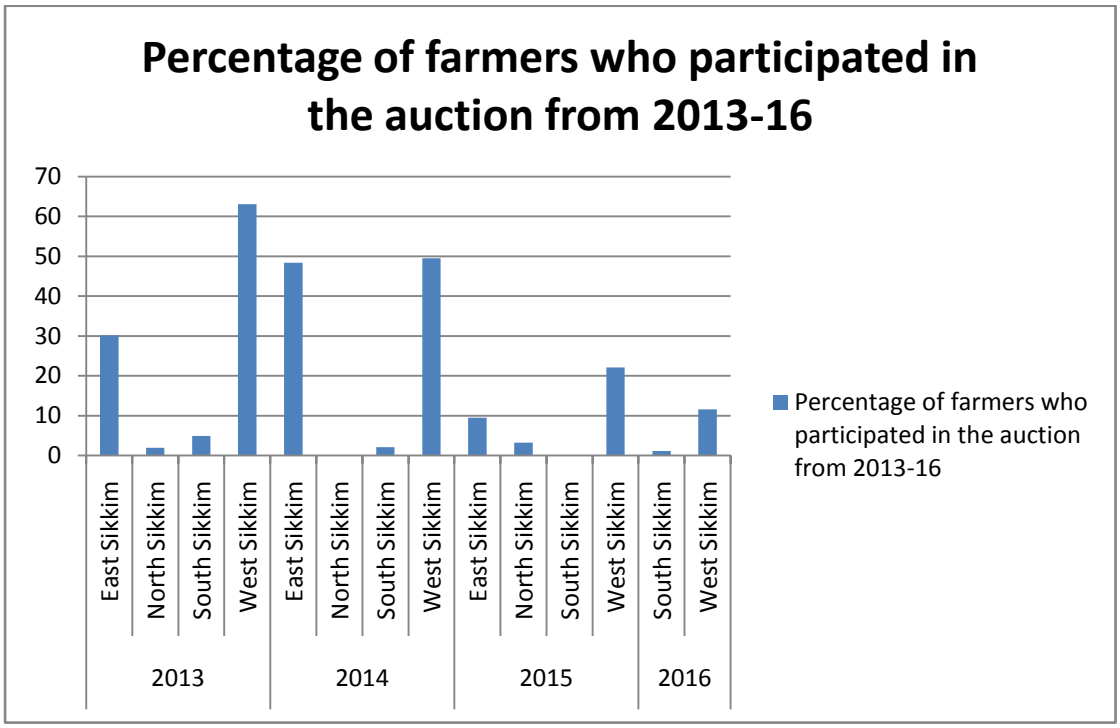
Table 41: The percentage of registered members (farmers) of NERAMAC selling their produce to middlemen

	Percent
Registered members (farmers) of NERAMAC selling their produce to middlemen	68

Source: Authors estimation based on field survey, 2016

The middlemen are still active with certain advantages of granting readily cash to farmers which can be inferred from the fact that still 68 % of registered members (farmers) of NERAMAC who have participated at the auction sell their produce to middlemen which offers ample room for improving the mechanism of the NERAMAC in marketing large cardamom by strengthening its transportation facility, timely payment, etc. and introducing e – auction.

Figure 16 : Percentage of farmers who participated in the auction from 2013-16



Source: North Eastern Agricultural Marketing Corporation Limited,2016

The farmers who participated in the auction held at Gangtok in the year 2013 are 31 farmers from East Sikkim, 65 farmers from West Sikkim,5 farmers from South Sikkim and 2 farmers from North Sikkim. In the year 2014 East Sikkim had 46 farmers and West Sikkim had 47 farmers who participated in the auction and only 2 farmers from South Sikkim with nil from North District. In the year 2015 there were 95 farmers participating in the auction wherein West Sikkim had the highest participation rate of 21 farmers followed by 9 farmers from East Sikkim and 3 farmers from North Sikkim. In the year 2016 farmers from South Sikkim and West Sikkim participated of which 1 farmer and 12 farmers had participated in the auction respectively. The highest percentage of farmers who participated in the auction since 2013 has been West Sikkim followed by East Sikkim and the lowest participation in the auction has been from North Sikkim and South Sikkim.

Table 42 :District-wise lots of large cardamom sold at auction from 2013 to 2016

Year	District	Lots Sold by farmers	QTY Sold in Kgs.	Avg. Qty. sold in Kgs.
2013	West Sikkim	65	5023.3	81.2
	East Sikkim	31	2103.7	75.13
	South Sikkim	5	294.9	58.98
	North Sikkim	2	88.7	44.35
2014	West Sikkim	47	5275.6	112.24
	East Sikkim	46	3575.41	77.26
	South Sikkim	2	318.2	160
	North Sikkim	0	0	0
2015	West Sikkim	21	2114	100
	East Sikkim	9	1018	113.17
	South Sikkim	0	0	0
	North Sikkim	3	132	44
2016	West Sikkim	11	527.6	75.23
	East Sikkim	0	0	0
	South	3	200	66

	Sikkim			
	North Sikkim	0	0	0

Source: North Eastern Agricultural Marketing Corporation Limited,2016

The highest number of lots of large cardamom for the auction held in the year 2013 has been sold by West Sikkim wherein 65 lots have been sold by farmers of West Sikkim with 5023.3 kgs of large cardamom and 81.2 kgs of large cardamom lots of large cardamom sold on an average.

7.5 Marketing Patterns of Large Cardamom in Sikkim

The marketing cost and marketing margin of large cardamom, total quantity produced at different farms, month-wise quantity sold, price received and quantity sold of large cardamom by the producers to different intermediaries are discussed in the following sub-sections:-

7.5.1 Marketing Cost of Large Cardamom in Sikkim

Table 43: Marketing Cost of large cardamom

Marketing Cost	(In Rupees)
Transportation cost (40Kgs)	150
Labour Cost Per Day	300
Collecting and packaging	600
Miscellaneous	150
Total Marketing cost	1200
Average Marketing Cost	300

Source: Authors estimation based on field survey, 2016

The Table 43above gives us the marketing cost of large cardamom in Sikkim wherein the Transportation Cost for 40 Kgs of large cardamom is Rs.150; the labour cost per day is Rs.300, for collecting and packaging the cost is Rs.600 and for miscellaneous activities the cost is Rs.150. The total marketing Cost is Rs.1200 and the average marketing cost is Rs.300.

Table 44: Marketing Margin for large cardamom

Average Retail Price per kg	Farm Gate Price per kg	Average Marketing Cost	Marketing Margin
1450	1100	300	50

Source: Authors estimation based on field survey, 2016

The average retail price of large cardamom is Rs.1450 per kg and the farm gate price is Rs.1100 per kg. The average marketing cost is Rs.300 and the marketing margin is 50 for 40Kgs.

Table 45: Quantity produced of large cardamom at sampled farms:

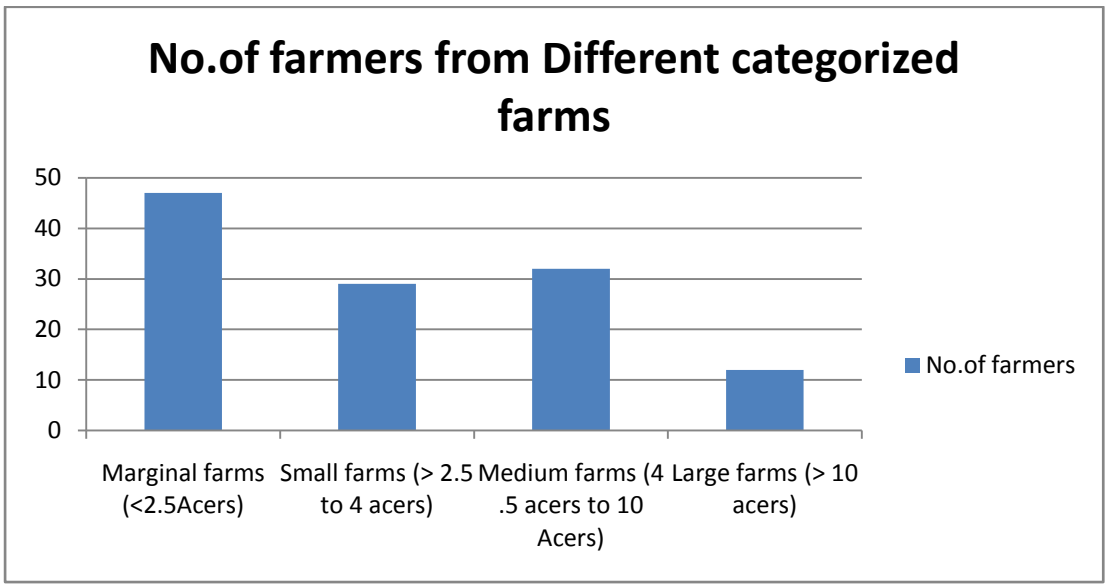
Farms	No .of farmers	Quantity Produced (In Kgs)	Average Production (In Kgs)	Std. Dev.
Marginal farms (<2.5Acers)	47	1420.5	59.97	28.12
Small farms (> 2.5 to 4 Acers)	29	2324	159.84	34.99
Medium farms (4 .5 Acers to 10 Acers)	32	5000.5	312.07	69.16
Large farms (> 10 Acers)	12	4397.5	745.78	129.02

Source: Authors estimation based on field survey, 2016

The quantity produced of the different categories of farms are highest for the medium farms who produce large cardamom to the tune of 5000.5 Kgs per acre followed by the large farms 4397.5 Kgs per acre, 2324 Kgs per acre by small farms and lowest by

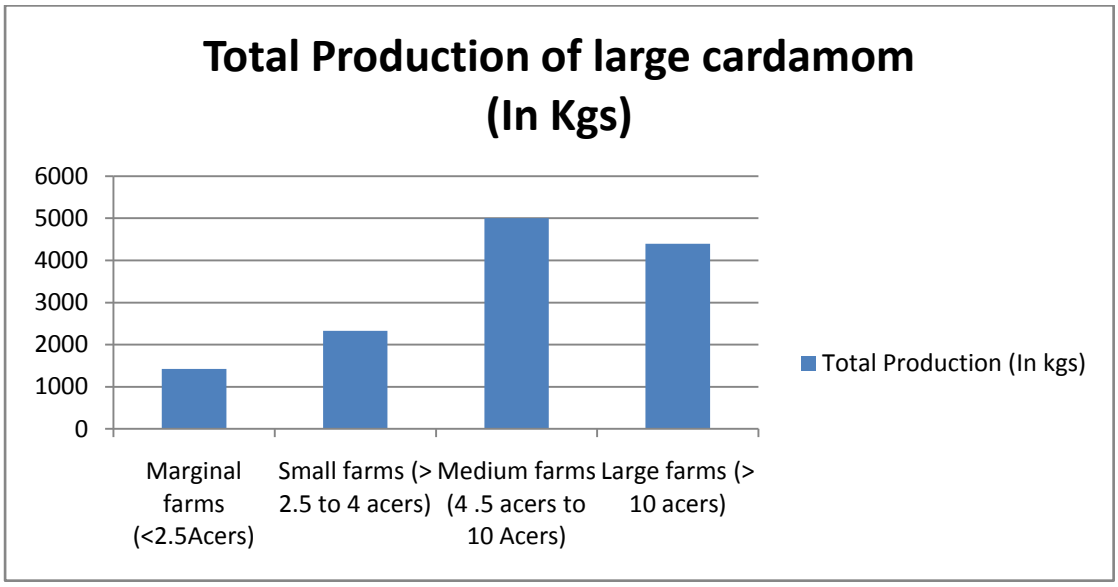
the marginal farms 1420.5 Kgs per acre. The average production of large cardamom of the large farms is the highest with 745.78 Kgs, 312 Kgs for medium farms, 159.84 Kgs for small farms and 59.97 Kgs for marginal farms. The number of farmers cultivating large cardamom is the highest in marginal farms with a total of 47 cultivators cultivating large cardamom, 32 farmers from medium farms, 29 farmers from small farms and 12 farmers from large farms.

Figure 17: Number of farmers based of categorized different farms in Sikkim



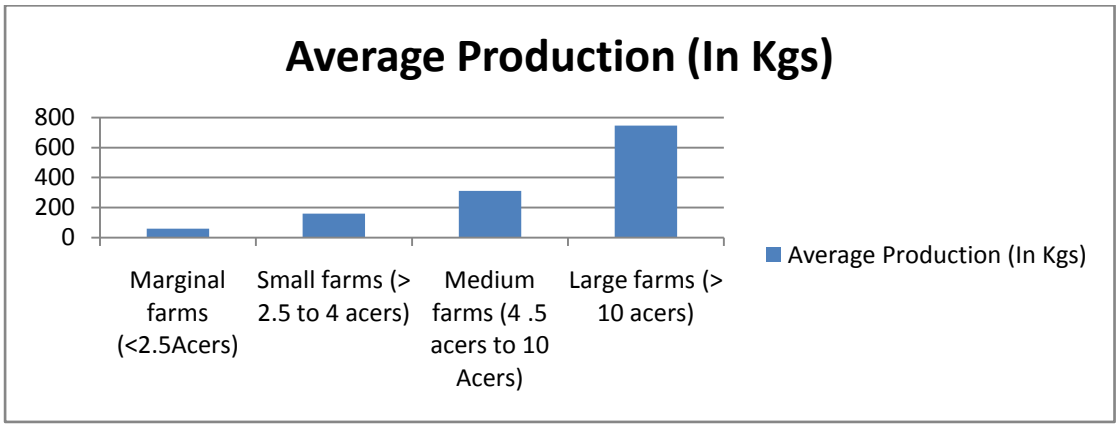
Source: Author's estimation based on field survey, 2016

Figure 18 :Quantity produced of large cardamom in Sikkim



Source: Author's estimation based on field survey, 2016

Figure 19: Average quantity production of large cardamom for different categorized farms



Source: Author's estimation based on field survey, 2016

Table 46 : Monthly details of No. of farmers, sold quantities, Average price per auction and withdrawn quantities of large cardamom held at auctions at Sikkim.

Year	Month	No. of Farmers	Arrival Qty.(Kgs)	Average Rate settled (Rs.) Per Kg	Sold Qty. (Kgs)	Withdrawn Qty. (Kgs)
2013	March	19	2780.8	762.75	2501	279.8
	October	16	975.2	945.68	975.2	0
	November	101	5415.3	991.59	4863.1	552.2
	December	16	1294.4	1110	1294.4	0
2014	January	11	1443.2	1155.91	869.1	574.1
	February	19	2556.21	1154.74	2051.11	505.1
	October	5	940.3	1336	669.9	270.4
	November	27	1590.4	1620.19	1590.4	0
	December	46	7028.3	1669.02	6988.7	39.6
2015	January	29	3140.7	1673.66	255.1	2885.6
	February	30	2991.3	1688	2897.4	93.9
	December	17	3702	1500	1641.1	2060.9
2016	March	13	1119.2	1230	105.8	1013.4
	April	14	1128.6	1350	721.8	406.8
	May	8	1326.1	1335	1247.4	78.7

Source: Data compiled by Mr. C. S. Ghatani, Assistant Director, Spices Board, Gangtok-Sikkim from North Eastern Regional Agriculture Marketing Corporation Limited (NERAMAC), Tadong.

Table 47 : List of buyers who participated in the auction held at Sikkim from 2013 to 2016

Year	Buyers	Place	Sikkim	Qty . Bought (in Kgs)	No. of lots bought
2013	Amalgamated Plantations (A TATA Enterprises)	Calcutta	West Bengal	57.6	1
	Shri .Dharmendra Jain	Singtam	East Sikkim	322.9	9
	Shri .Harikishan Agarwal	Siliguri	West Bengal	125.1	2
	Shri. P. C. Jain & Sons	Siliguri	West Bengal	223.9	1
	Shri .Raghubir Prashad	Singtam	East Sikkim	5630.3	82
	Shri .Omprakash	Gangtok	East Sikkim	186.5	13
	M/s Gaurishankar Ramashankar	Singtam	East Sikkim	91.8	2
	Shri.Gopal Sharma	Singtam	East Sikkim	58.4	2
2014	M/s Gaurishankar Ramashankar	Singtam	East Sikkim	91.1	3
	M/s P. C. Jain & Sons	Siliguri	West Bengal	2040.5	13
	Shri Raghubir Prashad	Singtam	East Sikkim	2843.91	36
	Shri.Sagarmal	Singtam	East Sikkim	67.9	1
	Shri Dharmendra Jain	Singtam	East Sikkim	160	2
	Shri Omprakash Hanumanmal	Gangtok	East Sikkim	3611.8	43
	Shri Ramesh,Agarwal	Singtam	East Sikkim	82.6	1
	Shri.Suresh Kr. Agarwal	Singtam	East Sikkim	334.1	1
2015	Omprakash Hanumanmal	Gangtok	East Sikkim	1621	18
	P. C. Jain & Sons	Siliguri	West Bengal	978.3	8
	Shri.Raghubir Prd. Agarwal	Singtam	East Sikkim	1331.7	6
	Shri. Dharmendra Jain	Singtam	East Sikkim	127.1	1
	Shri. P.C.Jain	Siliguri	West Bengal	529.3	2
	Shri. Sagarmull Agarwal	Singtam	East Sikkim	170	2
2016	Shri. Raghubir Agarwal	Singtam	East Sikkim	1372.8	10
	M/s. Organic Sikkim	Gangtok	East Sikkim	580	5
	M/s P. C. Jain & Sons	Siliguri	West Bengal	123.1	2

Source: Data compiled by the authors based on data provided by Spices Board, Sikkim

Since 2013 there has been only one buyer from Calcutta which is Amalgamated Plantations (A TATA Enterprises) which is only 4 percent of the total buyers . The highest percentage of buyers are from Singtam , East Sikkim which has 56 percent of buyers followed by Siliguri West Bengal which has 24 percent of buyers and Gangtok , East Sikkim which has 16 percent of buyers.

Since 2013 to 2016 buyers from West Bengal have bought 4077.8 Kgs of large cardamom lots sold at auction and buyers from East Sikkim have bought 18683.91 Kgs of large cardamom lots from the auction.

Table 48 : Lots withdrawn to buyers from 2013 to 2016.

Year	Place	State	Lots withdrawn to Buyers	Qty. Withdrawn
2013	Singtam	East Sikkim	Shri Raghubir Prashad	578.9
	Gangtok	East Sikkim	Shri Omprakash	19.2
	Gangtok	East Sikkim	Shri Omprakash	42
	Singtam	East Sikkim	Shri Dharmendra Jain	19.8
2014	Singtam	East Sikkim	Shri Raghubir Prashad	1130
	Gangtok	East Sikkim	Shri Omprakash	259.8
2015	Singtam	East Sikkim	Omprakash Hanumanmal	93.9
	Singtam	East Sikkim	Shri. Raghubir Pd. Agarwal	3418.7
	Singtam	East Sikkim	Sagarmull Agarwal	361.6
	Singtam	East Sikkim	Shri. Dharmendra Jain	583.4
	Siliguri	West Bengal	Shri. P.C.Jain, Naya Bazar	582.2
2016	Singtam	East Sikkim	Shri. Gopal Sharma	186.6
	Singtam	East Sikkim	Shri. Gopal Sharma	40.2
	Gangtok	East Sikkim	M/s. Organic Sikkim	57.1
	Singtam	East Sikkim	Shri. Dharmendra Jain	344.4
	Singtam	East Sikkim	Shri. Ramesh Agarwal	425.6
	Singtam	East Sikkim	Shri. Raghubir Agarwal	485.5

Source: Data compiled by the authors based on data provided by Spices Board, Sikkim

7.6 Institutional Role of the Spices Board for Large Cardamom Cultivation in Sikkim

India produces a wide range of spices. At present, production is around 3.2 million tonnes of different spices valued at approximately 4 billion US $, and holds a prominent position in world spice production. Because of the varying climates - from tropical to sub-tropical to temperate-almost all spices grow splendidly in India. In reality almost all the states and union territories of India grow one or the other spices. Under the act of Parliament, a total of 52 spices are brought under the purview of Spices Board. However 109 spices are notified in the ISO list.(www.indianspices.com)

One of the major spices produced form the region of Sikkim is large cardamom. Its botanical name is *Amomum Subulatum Roxb.* and belongs to the family of *Zingiberaceae* and its commercial part is Fruit (Capsule). Large Cardamom is a perennial herb with subterranean rhizomes and 50-140 aerial leafy shoots. Each shoot has height of 1.7 to 2.6 metre and possess 9 to 13 leaves in each tiller. Leaves are glabrous on both sides with a prominent mid-rib. Inflorescence is a condensed spike with yellowish perianth. Each spike has 10-15 fruits. Fruit is round or oval shape, capsule with reddish brown colour. Each capsule is trilocular with many seeds. It is cultivated in the Sub-Himalayan region of North Eastern India, Nepal and Bhutan. It is grown in cold humid conditions under shade of trees at an altitude between 800-2000 meters above MSL, with an average precipitation of 3000-3500 mm spread over about 200 days and with temperature ranging from 6-30 degree C. It is used as a flavour in dishes like Pulavu, Biriyani and meat preparations. It is an ingredient in curry powder and spice masala mixtures and is also used in Ayurvedic and Unani

medicines. It has applications in flavouring cola, biscuits, liquors. (www.indianspices.com)

The programmes for supporting large cardamom cultivation in Sikkim retrieved from (http://www.indianspices.com/large-cardamom)

Replanting - The programme is intended to encourage the growers to take up replantation of old, senile and uneconomic gardens. A subsidy of Rs. 28000/- per ha is offered to growers owning large cardamom upto 8 ha. Towards 33.33% of the cost of replanting and maintenance during long gestation period. The subsidy is limited to replantation of 4 Ha. The subsidy is paid in two equal annual installments after inspection.

Production of Planting materials through Certified Nurseries - For making available quality planting materials to the growers. The Board gives assistance @ Rs.2 per sucker for raising of sucker nurseries in farmers' field.

Rainwater Harvesting - The programme for rainwater harvesting using devices made of earth excavated pits lined with silpauline sheets is implemented in North Eastern States for large cardamom. 33.33% of the cost of construction of rain water harvesting tanks lined with silpauline subject to a maximum of Rs.12000/- per device is provided as subsidy.

Curing Houses (Modified Bhatti) - The large cardamom growers traditionally cure their cardamom by direct heating in the locally constructed bhatties. Capsules dried under this method are black in colour with smoky smell. ICRI-Gangtok had developed a scientific curing technology for large cardamom by introducing Modified Bhatti in which cardamom capsules are dried using indirect heating system in which

the dried capsules retain the pink [maroon] colour and natural flavour. In order to popularize this method, Board is providing subsidy @ Rs.9,000/- for 200 kg capacity and Rs.12500/- for 400 kg capacity Modified Bhatti respectively towards 33.33 % cost of construction of the modified bhatti. Construction of Irrigation Structures - This programme is aimed at developing water resources in the cardamom plantations, which will help the growers to irrigate their plantations in summer. Assistance is given for construction of irrigation devices i.e. 50% of the actual cost of construction or Rs 20,000/- whichever is less is paid as subsidy.

Installation of Irrigation equipments - Board will assist in installing irrigation equipments at 50% subsidy subject to a maximum of Rs.10, 000/- to farmers of large cardamom. Assistance will be provided for purchase of equipments like pit diggers, sprayers, agricultural tools, grading sieves etc @ 50% of actual cost of the equipment.

Table 49 : Equipment for Mechanization

Type of Equipment	Scale of assistance
Pit digger	50 % cost or Rs.1500/-
PP equipment	50% cost or Rs.2000/-
Agricultural tools	50% cost or Rs.500/-
Grading sieves	50% cost or Rs.1000/-

Source : http://www.indianspices.com/large-cardamom

Large cardamom is mainly grown in the sub- Himalayan tracts of Sikkim, Arunachal Pradesh, Nagaland, and Darjeeling District of West Bengal. The total area under large cardamom during 2015- 16 was 26,387 ha with an estimated production of 5,300 tonnes. Non-availability of quality planting materials, presence of senile, old and uneconomic plants and incidence of blight disease are the major factors affecting

large cardamom production. In order to improve production and productivity of large cardamom, the above mentioned programmes were implemented during 2015 – 16.

The Production of Planting materials through Certified Nurseries for making available quality planting materials to the growers has been a successful programme apart from the other programmes started by the Spices Board of India. This programme has helped the farmers tremendously in raising large cardamom seedlings and achieving self-sufficiency for the large cardamom in Sikkim which is a major success in the West and East District of Sikkim providing a good source of income to farmers producing large cardamom.

Table 50 : The percentage of sampled respondents practicing the production of planting materials through certified Nurseries

	Percent
Farmers practicing production of planting materials through certified Nurseries	46.6
Nil	53.3

Source: Authors estimation based on primary survey, 2016.

In interaction with the farmers from the surveyed region most of the farmers are satisfied with the programme of production of planting materials through certified Nurseries as it helped them in regular supply of large cardamom and also a decent income in selling their produce. About 46.6 % of farmers are successfully practicing this programme which has considerably helped the farmers of the surveyed region materially and monetarily. The seedlings are sold at a price ranging from Rs.2 to Rs.5 per seedling. The programme had been implemented in the sampled areas from West and East Sikkim has been since the year 2000 and it is being successfully continued.

This programme has made Sikkim to be a major supplier of large cardamom seedlings to the North Eastern states of Arunachal Pradesh, Nagaland and the hills of Darjeeling District of West Bengal namely Kalimpong and Darjeeling.

Table 51: Large cardamom Seedlings production in the sampled Region

District	Villages	Seedlings Production
West Sikkim	Hee Yangthang	9,69,000
	Hee Kangbari	2,50,000
	Hee Pechrek	1,48,500
	Hee Bazar	1,91,000
	Dentham	1,60,000
East Sikkim	Tal Kharga	71,000
	Pam Gaon	7000
	Reulat	19000

Source: Authors estimation based on field survey, 2016

The large cardamom has been more successful in the West District of Sikkim wherein places like Hee Yangthang produce a considerable amount of large cardamom seedlings which is sold to Arunachal Pradesh, Nagaland, Darjeeling District of West Bengal, and State Horticulture Development Board of Sikkim etc. Comparatively speaking the East District of Sikkim has not been a major contributor of practicing large cardamom nursery wherein places like Tal Kharga, Pam Gaon and Reulat have lesser involvement in this programme. The highest producer of large cardamom seedlings are Hee Yangthang with a total production of 9, 69, 000 followed by Hee Kangbari of 25, 0000 large cardamom saplings and Hee Bazar with 1, 91000 large cardamom saplings and lowest producer is Pam Gaon with the production of 7000

saplings which shows that the villages from the West District of Sikkim have better implemented this programme as provided by the Spices Board.

Table 52: Sale of Large cardamom Seedlings

Distribution Within Sikkim	Seedlings Sold	Distribution within India and Nepal	Seedlings Sold
Hee Gaon	4,73,000	Assam	71000
Horticulture Board , Sikkim	1,30,000	Nagaland	2,60,000
Chuba, South Sikkim	4000	Arunachal Pradesh	1,25000
		Nepal	23000

Source: Authors estimation based on primary survey, 2016

The price per seedling in Sikkim ranges from Rs.2 to Rs.5.The sale of the large cardamom seedlings has reached as far as Nepal, Assam, Nagaland and Arunachal Pradesh. Also the areas within Sikkim such as Hee Gaon in West Sikkim, Chuba in South Sikkim and Horticulture Board of Sikkim have been buying the large cardamom seedlings. The above table shows that the distribution of seedlings within Sikkim and Distribution within certain states of India and also to neighbouring states of Nepal with a price ranging from Rs.2 to Rs. 5 per seedling provides a huge earning for the farmers who have implemented this programme.

7.7 Identifying the Major Constraints of Large Cardamom Farmers in Sikkim:

The Garrett Ranking Technique has been used in order to find out the constraints in the cultivation of large cardamom in Sikkim. A list of five major constraints was identified after review of literature regarding large cardamom cultivation in Sikkim and tallying it with the farmer's feedback regarding the major problems of large cardamom cultivation in Sikkim from the pilot survey. The list of five major problems were marketing, labour shortage, diseases, pests and landslides which had been ranked accordingly from 1 to 5 by the farmers out of which 5^{th} Rank : major problem, 4^{th} Rank: problem, 3^{th}Rank : moderate problem , 2^{nd} Rank : not much problem and 1^{st} Rank : least problem.

Table 53 : Ranking of the major constraints for large cardamom cultivation in Sikkim

Factors	Average Score	Rank
1.Marketing	52.68	2^{nd}
2.Labour Shortage	33.95	3^{rd}
3.Diseases	25	5^{th}
4.Pests	31.6	4^{th}
5.Landslides	57.85	1^{st}

Source: Calculation based on author's estimation from field survey, 2016

The major problem associated with large cardamom has been diseases with 5^{th} Rank .The interaction with the farmers from the field visit also revealed to the researcher that the problem of diseases has been a major one for them and institutions supporting large cardamom production have also not been able to find a sustainable method for overcoming this problem.

With the second lowest average score of 31.6 the constraint of large cardamom cultivation as pests have been ranked 4th from the Garrett Ranking wherein the pests like Wild Boar, Monkeys, Porcupine etc. operate at night due to which there have been huge losses to farmers in cultivating large cardamom. Ranking 3rd is labour shortage which is a moderate problem as labourers are available most of the times except during off-season period from December to March. The marketing ranked 2nd has not been a major problem due to the presence of NERAMAC and a large number of middlemen. The large cardamom auction has been playing a major role in marketing of large cardamom in the recent years and curtailing the role of middlemen to some extent. The landslides have been ranked 1st as the least problem but in some parts of West Sikkim such as Hee Pechrek the landslides have left a large section of large cardamom farmers to switch to other jobs such as daily wage labourers which could be for other areas as well if not properly addressed.

CHAPTER 8

SUMMARY, RECOMMENDATIONS AND CONCLUSION

8.1 Summary

Since times immemorial large cardamom has been a major spice for Indian and world culinary dishes. It has been a great economic avenue for the people in sustaining their livelihoods. Large cardamom cultivation in Sikkim provides a great prospective for development. This cash crop proves as an important source of livelihood to the rural populace of Sikkim Himalayas. To a large extent local farmers have traditionally cultivated this low volume high value cash crop for many decades.

This study on Large cardamom Value Chain in India: A Study of Sikkim was planned to provide the information regarding the Value Chain of Large cardamom which expands up in the rural areas of Sikkim. The Study proceeded with the following objectives.

- To examine the value chain of large cardamom cultivation in India and Sikkim
- To study the cost of cultivation and profitability of large cardamom cultivation
- To study the marketing costs and marketing margins of large cardamom
- To study the problems of large cardamom cultivation in Sikkim and suggest suitable policy measures for better chain.

The study begins with an introduction to value chain and its mountain specificities, large cardamom scenario in India and Sikkim, the list of exporters of large cardamom in the World showing the demand for large cardamom in the world market In addition to this it contains the research gap, research questions and objectives, scope and limitation of the study.

It was an intensive study undertaken in two districts of Sikkim namely East and West Sikkim. The villages chosen from West District are Hee Yangthang, Hee Kangbari, Hee Patal, Hee Pechrek, Hee Bazar and Dentham and from East district is Tal Kharga, Reulat, Pam Gaon, Lungchok and Rongli. This selection of the study area was based on preliminary information from NERAMAC and researcher's pilot visit to these areas. The marketing information was gathered from NERAMAC and Spices Board – Gangtok Region..Total sample for the thesis preparation was 120.

8.1.1 Value Chain

The value chain mapping has been one of the major findings of the study. The major actors involved in the large cardamom value chain are farmers, labour, middlemen, NERAMAC and the Spices Board.

The mapping of the functions of the value chain includes the production, collection, processing and selling. The mapping of the nursery function is also of prime importance wherein it gives us a detailed information about the mechanism through which the large cardamom saplings are collected from Spices Board after which the farmers are involved in the cultivation of this cash crop followed by the process by which the crops are less infested to the diseases through the addition of Vermicompost, lime (Krishi *Churna),* Copper-Oxi-Chloride and good amount of water supply. The mapping of the rotation cropping of large cardamom has been another important finding of the study which explains the practice of the rotation cropping for large cardamom after the harvesting in the third year which has helped to retain the soil fertility. The mapping of the rotation cropping of large cardamom has been another important finding of the study which explains the practice of the rotation

cropping in the form of Corn for large cardamom after the harvesting in the third year which has helped to retain the fertility of the soil.

Labour is a major actor for large cardamom value chain as it is involved in land preparation, planting, manuring, weeding, harvesting, processing and monitoring out of which the monitoring proves to be major function of labour without which the crops are more likely to be affected with pests and diseases. The enablers and facilitators are another important feature in the value chain of large cardamom which is the NERAMAC, Spices Board and also the State Horticulture Board, Government of Sikkim. For marketing of large cardamom the NERAMAC has a major role in the value chain .It also conducts auction for large cardamom jointly with the Spices Board that has helped to increase the price for large cardamom and helped the farmers to get remunerative prices and curtail the role of middlemen to a certain extent.

8.1.2 Cost

The cost of cultivation of large cardamom per acre for the period of three years has been studied with Direct cost (A) and Indirect Cost (B).

First Year – The labour employed is 2 man days with a cost of Rs.600 for land preparation and planting. The quantity of large cardamom saplings planted in the first year is 7000 number of saplings with a cost of Rs.14000 at Rs.2 per sapling. Manuring and weeding @ 2 rounds requires 2 man days of labour with a cost of Rs.1200.The sub-total cost for land preparation per acre in the first year is Rs.600, planting is 14600 and Rs.600 for both manuring and weeding @ 2 rounds with a total cost of Rs.17600 in the first year.

Second Year- The large cardamom cultivation requires a Gap filling with 2500 large cardamom saplings costing Rs.5000 at Rs.2 per sapling is planted with 1 man day costing Rs. 300.Manuring and weeding @ 2 rounds requires 4 man days of labour costing Rs. 2400.The total cost in the second year is Rs.10100.

Third Year - The harvesting takes place and requires 5 man days of labour with cost of Rs.1500 and for processing it requires 6 man days of labourers with a cost of Rs.1800 and Misc. costs Rs. 150.In the third year the total cost is Rs.3450.

The indirect costs involved in the cultivation of large cardamom are family labour, implements, and farm produced manure, rent of owned land and interest on owned capital. The imputed family labour is Rs. 300 for 1st Year and 2nd Year each and Rs.600 for the third year. The implements accounted for Rs.500 for all the three years. The farm produced manure accounted for Rs.250 for 1st Year and 2nd Year and Rs.300 for the 3rd year. The rent of owned land is 500 for respective three years. The interest on owned capital is 30 for all the three years. The total indirect cost for 1st year and 2nd year is Rs.1580 and Rs.1930 for the third year.

The total cost of cultivation of Cost A (Direct Cost) is Rs.31150 and Cost B (Indirect Cost) is Rs.5090. The Cost C that involves both Cost A and Cost B is Rs.36240.The total cost of cultivation for large cardamom observed is Rs.39400. The net profit is Rs.110600. The total return to labour is Rs.118850.The return for investments is Rs.32950. The labour cost is Rs.300 per man day. The spacing required for planting large cardamom is 4 feet × 4 feet .The plant population per acre is 7000 saplings. The cost of replanting is Rs.5000. The price is Rs.1390 per kg of large cardamom. The Gross Income is Rs.150000. The economic life span of large cardamom is 3 years.

8.1.3 Marketing

The marketing cost of large cardamom in Sikkim involves the Transportation Cost for 40 Kgs of large cardamom is Rs.150; the labour cost per day is Rs.300, for collecting and packaging the cost is Rs.600 and for miscellaneous activities the cost is Rs.150. The total marketing Cost is Rs.1200 and the average marketing cost is Rs.300. The average retail price of large cardamom is Rs.1450 per kg and the farm gate price is Rs.1100 per kg. The average marketing cost is Rs.300 and the marketing margin is 50 for 40Kgs.

The data on auction from NERAMAC reveals that since 2013 there has been only one buyer from Calcutta which is Amalgamated Plantations (A TATA Enterprises) which is only 4 percent of the total buyers. The highest percentage of buyers is from Singtam, East Sikkim which has 56 percent of buyers followed by Siliguri West Bengal which has 24 percent of buyers and Gangtok, East Sikkim which has 16 percent of buyers.

8.2 Recommendations

The researcher after going through the in-depth analysis of value chain of large cardamom suggests some areas for improvements.

- Establishment of Spices Parks in Sikkim.
- Setting up of large cardamom outlets in and around major Tourist attractions of Sikkim.
- Inclusion of more no. of buyers from outside Sikkim in the auction

8.3 Conclusions

The Value Chain of large cardamom cultivation in Sikkim has been quite successful with the intervention of NERAMAC and the Spices Board due to which the farmers have considerably benefitted. The study finds the rotation cropping of Corn along with the large cardamom plantation after the harvesting of large cardamom to be a major function in relation to increasing the soil fertility and fewer diseases. With the support of the government in the form of Spices Board several schemes have supported the large cardamom cultivation in Sikkim the prime one being the Nursery scheme that has started to provide huge returns to the farmers and thus the farmers are enthusiastically involved in this agricultural activity.

From this study the researcher would like to take reservation to state that this venture of livelihood is an economically profitable, financially feasible and socially acceptable business of growers of Sikkim. The researcher even expresses an optimistic prospect that this research work would provide adequate nutrition for the thought to innovative researchers and help to give an idea to sustain large cardamom cultivation in the Himalayan state as a good source of livelihood to farmers without hampering the nature.

Interview Schedule

I) General Information

Name of the Respondent: _____

Village: _____ Block:_____District:_____

Sex: Male [ ] Female [ ] Age: [ ]

[ ]No formal education	[ ]5th class if less [ ]	[ ]6th class if more[ ]	[ ] 10th class [ ] 12thclass	[ ] Degree [ ]	[ ]Certificate

Education level

Marital Status:	[ ] Married	[ ] Unmarried	[ ] Divorced	[ ] Widowed

What are the major sources of income generation from crop production?

[ ] large cardamom	[ ] Tea production	[ ]Vegetables production	[ ] Fruit production	[ ] Pulses production	Other [specify]

Is there a cooperative promoting large cardamom production? Yes [ ] No [ ]

If Yes: Are you a member? Yes [ ] No [ ]

If Yes: how does it help (specify) _____

II) Household and Resource Data

Family size	**Male**	[ ]	**Female**	[ ]	**Total**	[ ]
No. of working persons	**Male**	[ ]	**Female**	[ ]	**Total**	[ ]
No. of children in school	**Male**	[ ]	**Female**	[ ]	**Total**	[ ]

Do you own arable land? [ ] Yes [ ] No

Total crop land	[ ] Acre	[ ] ha.
Total irrigable area	[ ] Acre	[ ] ha.

Do you have Bee hives? If yes, mention the number [_____] // Are you aware that bee hives help to pollinate the large cardamom flower? [ ] Yes [ ] No

Do you own transportation facilities? [ ] Yes [ ] No / {Specify [_____]

III) Crop production

Crop Type	Area	Production Qt.	% sold price	% consumed	Income from sales
Large cardamom					
Ginger					
Vegetables					
Tea					

Oranges					
Others					

How long have you been practicing production of large cardamom? _____in years

How is the trend of large cardamom production?

Increasing [ ]	**Decreasing [ ]**	**Same [ ]**
Reasons if increasing	**Reasons if decreasing**	**Reasons if same**

Would you like to expand the area for large cardamom crop production? [ ] Yes [ ] No

If Yes mention reasons	**If No mention reasons**

What are the major constraints for the cultivation of large cardamom? (Rank Horizontally 1.most severe 2.second severe)

Marketing	**Labour shortage**	**Diseases**	**Pests**	**Insects**	**Seed shortage**	**Fertilizer shortage**	**Landslides**

IV) Marketing

Crop type	***To whom**	**Where ****
Large cardamom		

(*)1. Collectors 2. Consumers 3.Middlemen 5. Cooperatives 7. Exporters 8. NERAMAC 11.Others._____

(**)1.Farm gate 2.Market center 3.Retailing yourself 4.Others (specify)_____

Are you aware of NERAMAC?[ ] Yes [ ] No

If yes: Have you registered with it? [ ] Yes [ ] No

If yes: Did you participate in large cardamom auction organized by NERAMAC? [ ] Yes [ ] No

If yes: how many times? [ ]

How much sample of your large cardamom produce do you send for auction? [ ] Kgs

If your produce is auctioned what is the percentage you have to give to NERAMAC? [ ]

Generally, what is the price you get from the auction? [ ] highest price [ ] lowest price

Is transporting large cardamom to auction centre a problem? [ ] Yes [ ] No

Does NERAMAC provide transportation for transferring your produce to the auction centre? [ ] Yes [ ] No

Is the transport facilities provided sufficient to transfer all you produce to the auction center? [ ] Yes [ ] No

What is the cost if you transport the produce to the auction centre at your own expense? [Rs._____]

Are you satisfied with the payment timing from the NERAMAC? [ ] Yes [ ] No

If No what are the reasons_____

Have you sold your produce to middlemen? [ ] Yes [ ] No

If yes: Do you get more prices from them compared to NERAMAC? [ ] Yes [ ] No

What are the prices you get from these middlemen? [ ] highest price [ ] lowest price

Why do you sell to middlemen?

_____

V) Acess to Credit

Did you borrow money for producing large cardamom? [ ] Yes [ ] No

If yes: from where did you collect the credit

Source	**[ ] Bank [ ] Cooperatives [ ] MFI's [ ] Traders [ ] Moneylenders [ ] Relatives [ ] SHG's [ ] others (specify) _____**
Amount	
Purpose	**[ ] Payment for hired labour [ ] Purchase of Fertilizer [ ] Purchase of farm implements [ ] Others _____**

Have you repaid the loan? [ ] Yes [ ] No

If yes: How did you repay?

Installment	**Amount**
[ ] Weekly	
[ ] Monthly	
[ ] Quarterly	
[ ] Others :	

If No: What is the reason? _____

Did you face any problem in accessing credit? [ ] Yes [ ] No

If Yes: what was the problem? [ ] Limited supply of credit [ ] Limited access to transport [ ] Huge bureaucracy [ ] Others (specify) _____

How were you able to overcome these problems? _____

VI) Training

Have you ever participated in large cardamom production training in the last three years? [ ] Yes [ ] No

If your answer for is No, why?_____

If your answer is Yes, on which aspects, by whom and for how long you have got the training?

No.	**Training type**	**By whom**	**How long (days)**	**Year**

Was the training you get easily understandable and practicable? [ ] Yes [ ] No

Were you able to employ the new knowledge you acquired? [ ] Yes [ ]No

If your answer for Yes, what? _____

VII) Costs of large cardamom cultivation for the period of three years

Sl .No	Particulars	1 st Year			2nd Year			3rd Year		
		Persons	Days	Labour charge/ day	Persons	Days	Labour charge/ day	Persons	Days	Labour charge/ day
1	Land preparation									
2	Planting									
3	Manuring									
4	Weeding									
5	Irrigation									
6	Spraying Biopesticide									
7	Harvesting									

VIII) Processing Cost
Quantity processed
Processing cost per kg

Variety Name of large cardamom : _____

What is the method used for drying? [ ] Traditional bhattis [ ] Modified bhattis [ ] Scientific Dryer

Are you aware of scientific Dryer? [ ] Yes [ ] No

Types	Cost		
Construction of Bhatttis			
Maintenance of Bhattis			
Fuel for Drying			
Labour for drying	Persons [ ]	Days [ ]	Labour charge/ day [ ]
Packaging	Persons [ ]	Days [ ]	Labour charge/ day [ ]
Labour for removing the capsules	Persons [ ]	Days [ ]	Labour charge/ day [ ]
Transporting			

IX) Nursery: Seedling cost and supply from Nursery

What was your occupation before cultivating large cardamom? _____

Do you have seedling nursery for large cardamom? [ ] Yes [ ] No

If yes:

To whom	
Where do you sell	

Since when have you started the seed raising nursery? _____ in years

Production of large cardamom seedling (qt.)	**Cost per seedling (Rs.)**

Year	**1**	**2**	**3**	**4**	**5**
Total seedlings sold					

Which are the main places where most of the seedlings are supplied?

1._____

2._____

3._____

4._____

How do you supply these seedlings to the concerned places?

_____

---------- ---- **THANK YOU**----------

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