

Supply Chain Analysis of Cardamom in Kerala

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Abstract- This study analyses the key players in the supply chain of cardamom. The present study undertaken in Kerala. Interview of key chain players help to identify the supply chain participants and their role in marketing of the product. Analysis of cost of production of cardamom, showed the price margin enjoyed by each participants in supply chain. SWOT analysis also help to identify the strength, weaknesses, opportunities and threats of cardamom cultivation in Kerala. Cardamom cultivation has greater influence in the development of the people, as it provides employment opportunities. Plantations are also attracted by the tourists and it gives earning to the growers. Kumily is a plantation town closely associated with the Thekkady. The spice and tea plantations and bustling spice trading activities have made Kumily one of the important tourist and commercial centre in Kerala.

Index Terms- Supply chain analysis, Cardamom, pricing, Spices plantations, Value chain model

I. INTRODUCTION

Agriculture in Kerala is dominated in commercial crops. Coconut, tea, cashew, rubber, aracanut and spices including pepper, cardamom, vanilla, cinnamon, and nutmeg comprises of agriculture sector. Main agriculture staple is rice. Coconut trees are essential to the traditional life style of the people of Kerala. Kerala is also known for its spice plantations. Major spices in Kerala are black pepper, cardamom, ginger, turmeric, nutmeg, cinnamon, clove, garcinia, vanilla, paprika, etc. Kerala spices have a wide frame across the universe for its aroma and flavour. Cardamom has unique flavour and it has great demand in Middle East, Russia and Japan. Major portion of cardamom production in Kerala, comes from Palakkad and Wayanad are other districts which have cardamom production in Kerala.

Cardamom is considered as 'the Queen of Spices' with its aroma and commercial supply. More over Indian cardamom enjoys a preference in foreign countries. Cardamom cultivation needs continuous care and attention and it is a labour intensive cultivation. Thus growers have to spend more on labour. They got only low price for their produce. At the same time consumers have to give higher price in the open market to purchase cardamom. This situation necessitates a study on the supply chain of Cardamom. This study could help to identify the key players in the supply chain, performance of the supply chain, problems or constraints which affect the performance of the supply chain etc.

M. Christopher (1998) Managing SCRs is a strategic chore that can add to the competitive strength and profitability of individual firms as well as entire chains. G. T. M. Hult, D. J. Ketchen Jr. and E. L. Nichols Jr. (2002) But in spite of the

accepted importance of SCRs, little is known about the determinants of success and failure. M. L. Fisher (1997) Reports that the U.S. food industry alone is estimated to waste \$30 billion annually through poor supply coordination illustrate a significant potential for improvement. M. E. Porter(1985) Porter's well-known value chain model (VCM) and the corresponding idea of value systems have deeply influenced the understanding of how SCRs work. R. Normann and R. Ramirez (1993) These models have formed managerial thinking about such strategic issues as value creation, coordination and positioning. Though, while the VCL is found as representing a strong and suitable logical means for such areas as corporate strategy, it is also supposed to limit complete understanding of how knowledge and service based business systems function. C. Stabell and Ø. D. Fjeldstad (1998) VCA is a current contribution to strategic management theory by Stabell and Fjeldstad, which both introduces the well known VCM and also incorporates an appealing option in the value network model (VNM). A. Hinterhuber (2002) This paper is thus part of a current stream of research on value creation and business development in inter firms relationships and network settings. J. Johanson and L.G. Mattsson (1992) Specifically it relates to preceding work on SCM, industrial networks and strategic supplier networks. A. Cox and R. Lamming(1997) It shares the apprehension expressed in the supply literature that the simple linearity of the traditional supply chain logic may hide levels of complexity that have to be addressed in managing SCRs

II. OBJECTIVES AND METHODOLOGY OF THIS STUDY

The key objectives are:-

1. To understand the functioning and dynamics of the supply chain of cardamom.
2. To identify the key players in the supply chain of the cardamom.
3. To identify the cost of production of cardamom.

The present study is to carry out the product chain study of cardamom in Kerala. It also try to identify the chain actors from input suppliers to retailers, factors affecting the performance of the supply chain, availability of service providers and their linkage/relationship, key constraints and opportunities of the supply chain. The methodology adopted in this study has three main parts. Identification and mapping of the commodity supply chain is the first part. In second part, the constraints and bottlenecks of the supply chain of the cardamom is identified. It is necessary to achieve the competitive advantage of the products. In third part, all the constraints identified were assessed in order to improve the performance of the supply chain. The cost and margin of main players at different levels of

supply chain also identified. The methodology adapted for this study are:-

- Sources of data: - Both primary and secondary data are used for the study. Primary data were collected from the participants in the supply chain of the cardamom, through interview schedule and questionnaires. Key participants in the supply chain are farmers, input suppliers, traders, service providers etc. Secondary data are collected from available literatures in government sectors.
- Interview of key chain players:- An in-depth interview was also held with supply chain agents including local traders/collectors, input suppliers, transporters, wholesalers, processors, representatives from co-operatives, farmers associations, NGOs, etc. The interview was mainly focussed on the performance of the supply chain, such as constraints and opportunities, cost and margins, prices in different markets, trends and perspectives, growth potentials etc. Interaction with the government organisations and NGO's also helped in secondary data collection.
- Focus Group Discussion was held with the major players of the supply chain. Issues covered are supply chain performance, constraints and opportunities, efficiency of the supply chain, profitability, prices, trends and perspectives etc.
- SWOT Analysis: - In depth discussion with the key players of the supply chain was made on strengths, weaknesses, opportunities and treats of cardamom supply chain. Then major strengths, weaknesses, opportunities and treats among the supply chain of cardamom are identified.

Sampling of chain actors: - The growers, traders, service providers formed the focus of this study. People engaged in the marketing of the product are also interviewed. Officials and

participants in NGO's are also form part of the population. Period of study: Data for analysis are taken from the months of April to September, 2013.**Product and market:** - cardamom is the commodity taken for the present study. Supply chain analysis of cardamom, which is the major crop of Kerala. Primary data were collected from farmers and players in Udumbanchola Taluk, Kerala.

Area and Production of Cardamom in Kerala

Cardamom is a perennial, herbaceous, rhizomatous plant. Three varieties of cardamom are recognised based on the nature of panicles. Those are Malabar variety with prostrate panicle, Mysore variety with erect panicle, Vazhukka with semi erect panicles. Cultivation of cardamom is mostly concentrated in the ever green forests of Western Ghats in south India. In international markets, Indian cardamom is offered in different grades. Alleppey Green Extra Bold (AGEB), Alleppey Green Bold (AGB), Alleppey Green Superior (AGS) are the names of different grades. Cardamom oil is an important ingredient in food preparations, perfumery, health foods, medicines and beverages.

Cardamom is used as a flavouring material in food items, backed goods and confectionaries. Arabs used it in the making of 'gahwa'-a strong cardamom coffee- which is an unavoidable habit of their life style. In Europe and North America, it is used as an ingredient in curry powder/sausages products.

For the year 2011- 2012, total area of cardamom cultivation in Kerala is 41600 Ha. Major areas of cultivation of cardamom in Kerala occupies 79% of total area. Wayand district has second position with 10% area to the total. On analysing the area of cultivation of last 4 years, it is maximum during the agricultural year 2011-12 and the area is 41600 ha.

Table-1
Area, Production, Productivity and growth rate of Cardamom
(2008-09 to 2011-12)

Year	Area (Ha)				Production (Mt)				Productivity (Kg/Ha)			
	Kerala	GR	India	GR	Kerala	GR	India	GR	Kerala	GR	India	GR
2008-09	41588	1.00	71170	1.00	8550	1.00	9900	1.00	206	1.00	139	1.00
2009-10	41593	1.01	71170	0	7800	0.12	10075	1.02	188	0.91	142	1.02
2010-11	41242	0.16	71170	0	7935	1.02	10380	1.03	192	1.02	146	1.03
2011-12	41600	1.87	71110	0.92	10222	1.29	12975	1.25	246	1.28	182	1.25

Source: Planter's Chronicle

GR- Growth Rate

Table.1, shows the area, production and productivity of cardamom in Kerala and India. Cardamom production and productivity in India showed a steady growth from 2008-12. For the year 2011-12, there is a slight decrease in the area of production. But production and productivity increased by 0.2% in 2011-12. For the year 2011-12, area of cultivation of

cardamom in Kerala increased by 0.8%. It results in an increase of production and productivity by 0.22% compared to 2010-11.

Kerala accounted for a major share (78.8%) in the total cardamom production in the country. Karnataka and Tamil Nadu contributed 14.7 percent and 6.5 percent share respectively. In Kerala, the area under cardamom is 0.42 lakh ha comprising 59.2

percent of total area of crop in the country during 2011-12. The production has increased from 0.08 lakh MT to 0.10 lakh MT in the respective year.

During 2011-12, India produced 12.98 thousand tonnes of Cardamom with an increase of 2.60 thousand tonnes compared to 10.38 thousand tonnes in the last year. Area under cardamom in the country is 0.71 lakh ha during this period. The price of cardamom in domestic market was ₹ 1013 per kg. in 2010-11, which further declined ₹ 614 per kg. in 2011-12 and slightly increased to ₹ 677.59 per kg in February 2013. Remunerative prices are required for the development of crop in the state.

III. PRODUCTION MANAGEMENT

• **Input Supply Situation**

The quality of produce depends on the input used and the methods adopted in its cultivation, processing, packing, storing, transportation etc. Therefore great care is to be given for the production of agricultural products from seed till harvesting. Cardamom is generally reproduced by vegetative propagation using suckers. This method gives out the production relatively earlier than by seed/seedlings. Thus the cardamom cultivation begins with the management of seed materials and other inputs associated with it. Most of the cardamom growers use suckers produced in the neighbouring plantation. Most of the farmers in the area prefer to use suckers, because they produce normal yield in 3-4 years while seedlings take 5-6 years to come to full bearing.

• **Credit Demand Supply Situation**

If the land is available as owned or leased then cultivation does not involve huge investment. Major portion of the cost of cultivation is for labour and cost of suckers at the beginning. This cultivation does not need fertilizers and plant protection material at the beginning. Hence, credit demand for cardamom cultivation is very low.

• **Plantation and Maintenance (Garden)**

Cardamom is a tropical herb which requires a good amount of sun shine and appropriate rainfall. Loamy soil is appropriate for cultivation. Moderate shade also necessitates for high yield. Plantation can be done with the commencement of monsoon, before heavy rains. For new plantation, overgrown plants are removed and destroyed first and land is cleared of all weeds. Usually the pits are taken at a size of 60cm x 60cm x 35cm each. The pits are dug at a distance of 1.5 m x 1.5m to 2m x 2m on

either side, in the case of Malabar variety and that distance may be 2m x2m to 3m x 2m for Mysore/vazhukka. Undergrowth and weeds collected are put along the inter rows. It will help to improve the soil fertility and prevent soil erosion. Pits are filled with top soil or add some compost.

Regular schedules of cultural operations are needed for the plantation. Cultural practices involve weeding, mulching, trashing, shade regulation, fertilizer application, irrigation, etc. The removal of old and dried shoots, leaves and dried panicles should be taken up once in a year during June-July.

• **Nutrient Management**

Application of organic manures such as cow dung, FYM or compost @ 5 kg/ plant or neem cake @ 1-2 kg/plant may be done during June/July. Recommendation of nutrient is N: P2O5: K2O@ 75:75:150 kg/ha. Recommendation of fertilizers can be applied in two split doses, before and after monsoon.

• **Harvesting and Post Harvesting**

Cardamom plants starts bearing capsules from the third year of planting. Picking of capsule is done at an interval of 30-45 days. Harvested capsules should be processed within 24-36 hours after picking. Harvesting season in Kerala is October-February and September-November is the peak period of harvest.

• **Post-harvest Curing**

Capsules are dried through curing houses after washing in water. Then capsules are spread on wire net trays in curing chamber. Burning fire wood in curing house produces heat for drying. The process of drying takes 18-24 hours. After drying, capsules are rubbed on wire mesh to remove the stalk and portion of flower from the capsules.

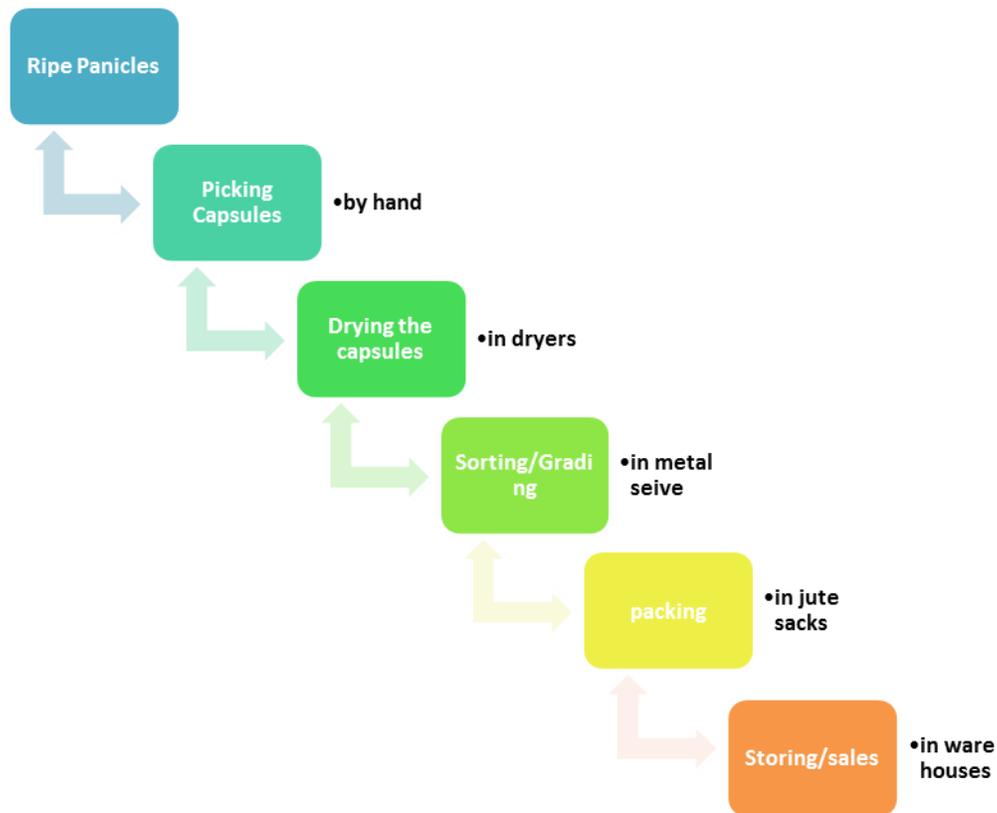
• **Grading and Packing**

Dried capsules are to be graded according to the sizes of 6, 6.5, 7mm etc. Higher graded commodity can fetch high price in market. Quality of cardamom is determined on the basis of size and green colour. Processed commodity is stored in polythene lined gunny bags. This packing helps to retain green colour and to avoid exposure to moisture

• **Transporting**

Transportation of cardamom from producers to customers is not a big problem. Good road networks available in Kerala help the movement of commodity. Farmers bring their produce in private or hired vehicles to the local traders. They transport goods in trucks or vans to the merchants or wholesalers. Merchants may be exporters or wholesalers, they transfer goods using trucks, or through air ways in foreign countries.

**Production flow of cardamom
Fig-1**



Marketing

Farmers are not aware about the new methods in marketing of cardamom. Marginal farmers and farmers sell their produces immediately after drying, without sorting or grading. But some producers, however, store for some period to wait for high price. Some of them now ready to sorting and grading their products. Many of farmers are resorted to the local traders who give relatively high price, after seeing the sample. Marketing channels of the cardamom is flow from farmers/growers, local traders, wholesalers, and exporters. Everyone have their own role in the smooth flow of product. Now farmers are familiar with commodity future market, and some of them engaged in future market. Farmers associations also trying to make more profit through assembling their produce together and operate in large scale.

Pricing

Many of the marginal and farmers sell their produce without grading or sorting. So normally they get lower price than market supply. They approached local dealers with a sample of their produce, then traders offer prices and farmers sell to those who offer highest price. Farmers do not have access to market information. But the medium or large farmers get reasonably fair

price, as they offer their produce in auction. Thus they can ensure market supply.

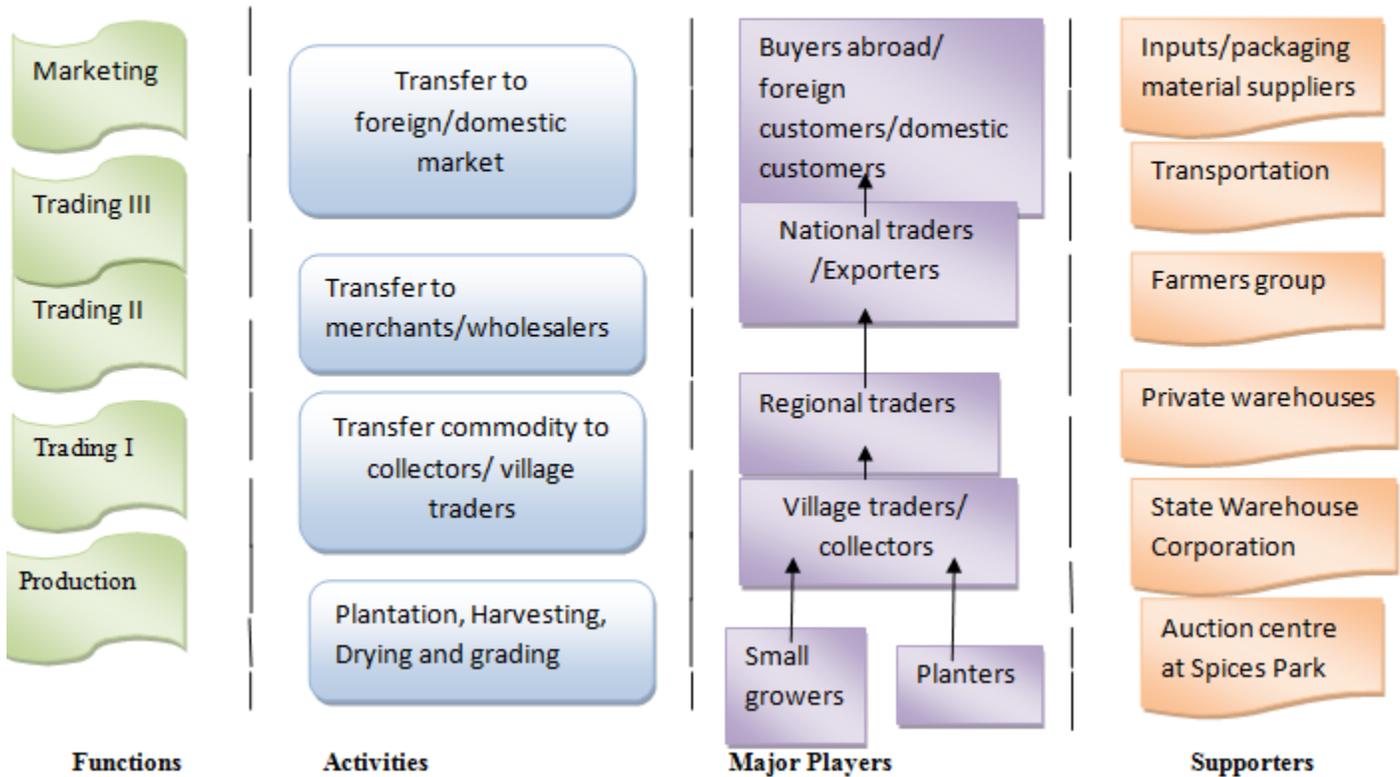
IV. SUPPLY CHAIN ANALYSIS

• Supply Chain Map

As shown in fig-2 the cardamom supply chain in Kerala provides a graphic preview of the movement of commodity from producers to consumers. It depicts the channels or stages thorough which the commodity passes to the customers all over the world. The left hand blocks indicate the major functions of the chain such as production, collection, trading and marketing of cardamom. Second blocks indicate the key players and their various activities in the supply chain. The support service providers have greater importance in the supply chain. They assist or facilitate key players in performing their functions. They are represented in the right hand block and include government institution, non-government organisations, credit suppliers, etc...

Supply Chain Map of Cardamom

Figure-2



Analysis of Supply Chain and Price Margins

The analysis of price margin has been done by using a standard format showing major costs, losses, margins and prices along the supply chain. The flow of supply chain of the commodity moves from farmers to local traders, wholesale market and finally up to the exporters. Information for the

analysis is obtained from the key players at Udmpanchola Taluk in Kerala. The terminal market is Vandenmedu. The following table shows the price margin analysis of cardamom in Vandenmedu, Kerala. The table contains the analysis of per unit margins retained by the major players along the supply chain.

Table-2

Supply Chain of Cardamom (1 kg of Dried Cardamom)							
Farmers/Growers		Local Traders		Wholesaler		Exporter	
	cost		cost		cost		cost
<i>Production cost</i>		<i>Assembling cost</i>		<i>Assembling cost</i>		<i>Assembling cost</i>	
seed material	30	grading	4	sorting	4	sorting	4
labour	234.78	sorting	4	grading	4	grading	4
Processing cost	55	Packing	0.25	Over head	2	Over head	1
other inputs	45.87						
Total Production cost	365.65	Acquisition cost	700	Acquisition cost	710	Acquisition cost	725
Post production cost		Transfer cost	1.75	Trucking cost	3.75	Trucking cost	1.75
Miscellaneous	1						
Total cost	366.65	Total cost	701.75	Total assembling cost	713.75	Total cost	735.75
				Total whole sale level*	713.75	Total export level*	735.75
Losses	30	Losses	5.75	Losses	3.37	Losses	2.5
Margin	336.65	Margin	14	Margin	19.62	Margin	26.75
Average price	685	Assembler level price	710	whole sale level price	730	Whole sale level price	760

Source- Calculation based on field study

* Tax is ignored for this calculation.

• Farmers/Growers

From the table 2, it can be seen that farmers/growers share the largest portion of margin, compared to other participants in the supply chain. Total production cost at full maturity of the plantation is Rs.366.65 per 1kg of dried cardamom (see annex 1 for the detail calculation of cost of production of cardamom). Labour constitutes the major portion of cost of production (86.21%) in the fifth year of production. Rest of 13.79% represents the input used for production. Total farm level cost with post production cost is around Rs.366.65 per 1kg of dried cardamom.

• Local Traders

Local traders have important role in the supply chain; they are the intermediary between the farmers and wholesalers. The major items of costs incurred by them are acquisition, cleaning, sorting, grading, packaging and transferring. The margin enjoyed by local traders is comparatively low (Rs.14 per kg).

• Wholesalers

Wholesalers also have immense role in the supply chain by linking the farmers/traders with exporters. Sometimes the wholesalers act as exporters also. Major costs are sorting, grading, packaging and transferring. The amount tax payable is ignored for the calculation. The margin acquired by them may be Rs.19.62 per kg.

• Exporters

Exporters are the last component and backbones of the supply chain. They also have cost of acquisition, sorting, grading, packaging, and transferring etc. Exporters collect the

products from the farmers/traders. The margin calculated for them is Rs.26.75 per kg.

V. SWOT ANALYSIS OF CARDAMOM

SWOT, involves Strength, Weakness, Opportunities and Threat. SWOT analysis is a tool used in developing strategies for intervention. This provides a framework for interventions and it should address the entire supply chain. The major issues of the SWOT are classified into the following categories:- **S** - Commodities Internal strength, **W** - Commodities Internal weaknesses, **O** – External Opportunities might move the commodity forward, **T** – Threats might hold the commodity back

VI. SUPPORT SERVICES

Nationalised banks and co-operative societies are ready to provide credit facilities to the farmers. Ware house receipt can also be used as security to get loans. Government and non government organisations also worked for the promotion of the cardamom cultivation.

VII. FINDINGS AND CONCLUSION

Cardamom is the major crop cultivated in Kerala. Kerala constitute more than 90% of the cardamom production in Kerala state. Area of production and productivity also become high.

Around 20000 hectares of yielding are consist of around 14000 holdings are there in Udumbanchola Taluk. It is the major area of cardamom production in Kerala. Major viral diseases affected in this area are Katte or mosaic diseases and azhukal disease. There exist potentials for expansion of cardamom in the area. This cultivation is highly labour intensive and it provides people with employment and regular income. Spices Park in Puttadi have greater role in the marketing of cardamom.

Spices Park consisting of a set of institutions such auction centre, ware houses, banks, grading centre, etc which enhance the marketing process. Electronic auction centre is useful for farmers as well as traders to get reasonable price. But the farmers' participation in E- auction is very low. Specialised warehouses (air conditioned) for cardamom also available in Spices park to keep the quality of product for a long period. Farmers are not conscious about the quality of the product. Marginal and farmers always sell their produce, without sorting or drying. They sell their produce to the local traders who give reasonable price. Absence of grading system at producers' level is the main problem of cardamom cultivation in Kerala. Marginal farmers and traders do not have access to market information. Body Naykanur in Tamil Nadu is the main area, where majority of our production assembled.

Cardamom cultivation has greater influence in the development of the people, as it provides employment opportunities. Plantations are also attracted by the tourists and it gives earning to the growers. Kumily is a plantation town closely associated with the Thekkady. The spice and tea plantations and bustling spice trading activities have made Kumily one of the important tourist and commercial centre in Kerala.

VIII. RECOMMENDATION AND SUGGESTIONS

- Problems of cultivation are related to a general lack of knowledge. Farmers should provide practical knowledge in plant protection and pest management.
- Government and non-governmental organisations should encourage replacement of diseased plants with some compensation.
- Financial support should be provided to the farmers during lean periods.
- and marginal farmers need financial support for installing dryers individually.
- Feasibility of storehouse in collaboration with different government and non-government institutions to be carried out.
- Need for using bio-fertilisers and bio-pesticides should be informed to the farmers.
- Farmers should provide knowledge for sorting and grading commodities.

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