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Title

CULTIVATION PRACTICES OF SMALL CARDAMOM GROWERS – A STUDY IN WESTERN GHATS OF SOUTH INDIA

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Abstract:

This article is based on a sample study conducted among 300 cardamom planters in three states viz., Tamil Nadu, Kerala and Karnataka. The study was conducted so as to understanding the cultivation practices of cardamom with a view to provide an understanding to help decision making of cardamom growers. As such the study has revealed the practices in cardamom cultivation in terms of the area under cultivation of cardamom, inter- cropping adopted, cardamom varieties chosen for cultivation, seasonality of cardamom cultivation, high yielding varieties, borrowing for cultivation, replantation, span of cardamom plant, irrigation, manuring, soil testing, application of pesticides and harvesting, and post-harvesting. The study has suggested some measures based on the findings, that would help the cardamom growers in three states to make decisions with regard to quantity and quality of cardamom production.

Key Words: Cardamom Cultivation, Practices, Plantation, Production.

Introduction:

Cardamom is one of the oldest spices in the world, and the most popular spice in ancient Rome was probably cardamom. By the first century AD, Rome was importing substantial quantity of cardamom from India. Today cardamom is cultivated in India, Nepal, Srilanka, Guateamala, Mexico, Thailand and Central America. Cardamom cultivation in India is concentrated mainly in those regions which form the natural habitat of the species, except for a small area in Maharashtra where it is grown as a subsidiary crop in the arecanut gardens. Approximately, 40,500 ha of area scattered throughout the hill forest zone of the Western Ghats is under cardamom. Around 50 per cent of the area lies in the cardamom hills in Travancore – Cochin, some 23 per cent in Shimoga, Hasan and Chikmaglur Districts, 13 per cent in Kodagu District in Karanataka and 13 per cent in Tamil Nadu in the southern foothills of the Nilgiris and the Anamalai, the Nelliampatty and the Kodaikanal hills. It was only after the formal invitation by the Travancore Maharaja, in the 1850s, the crop it was commercially cultivated in the forests of the Western Ghats in Kerala.

Agricultural production has to cross through uncertainty and vagaries of seasonal parameters. There is great risk and uncertainty on account of drought, floods, pest and disease. On the other hand, it requires a large proportion of land than do other industries require. There is also a possibility of getting diminishing returns while increasing the application of inputs like fertilizer. Moreover, farming requires speedy decision on the part of the farmer and farm workers. It is more so in cardamom cultivation. When there is a heavy rainfall the farmer should take immediate decision about controlling certain diseases like capsule rot (Azhukal). Cardamom is seasonal in production. There is wide variation in yield. This affects the estimates of production and thus production plan has to face much risk components, which are not the case with industries. Further, agricultural produce like cardamom can not be produced exactly the same in size, form and quality. This affects the grading and standardization practices. Against these hurdles, cardamom growers have to make attempts to succeed in their agribusiness activities. In this context, it would be of interest to study the cultivation, practices of cardamom with a view providing an undertaking to help decision making of cardamom growers. Against this background an attempt has been made to understand the practices of cardamom cultivation in terms of the area under cultivation of cardamom, inter- cropping adopted, cardamom varieties chosen for cultivation, seasonality of cardamom cultivation, high yielding varieties, borrowing for cultivation, replantation, span of cardamom plant, irrigation, manuring, soil testing, application of pesticides and harvesting, and post-harvesting.

Objectives:

1. To understand the cardamom cultivation process such as area under cardamom cultivation, cropping pattern, plantation, re-plantation, irrigation, mannuring, pest control management, harvesting and Post harvesting technologies of small cardamom in Kerala, Karnataka and Tamil Nadu.
2. To identify the problems of cardamom growers and offer suitable suggestions based on the findings.

Methodology:

This study is a comprehensive and analytical study based on sampling technique. The study adopted multistage random sampling in the selection of 300 sample respondents. Three stage selection of sample is as follows. In the first stage, it was decided to select farmers from three different states, viz, Kerala, Tamilnadu and Karnataka based on the area under cardamom and quantum of production. Accordingly, 70 per cent respondents (210 farmers) were selected from Kerala, 20 per cent (60 farmers) from Karnataka and 10 percent (30 farmers) from Tamilnadu.

In the second stage, it was decided to cover both member and non member cardamom growers of Planters Association at the ratio of 60:40. It was also decided to maintain the total sample size as such and to alter the proportion of member and non-member samples if there is any need. But in the process of data collection, 182 member respondents and 118 non-member respondents were met.In the third stage, member respondents were picked up from three important planters' associations in the region. Viz., CPA, KCPMC and TAPCMS.

An elaborate interview schedule was developed, pre-tested and administered. The interview schedule contained questions for collection of data pertaining to the profile of the cardamom growers, cultivation practices such as area under cardamom cultivation, cropping pattern, plantation mode of irrigation, manuring, application of fertilizers and pesticides, harvesting and post harvesting.

Simple statistical tools were used in the analyse of data. In the process of analysis, inter-state comparision is made in respect of production practices. The inter–state differences if any, in regard to any practice was tested for its significance using x^2 test. The compound growth rate was worked out to find out the trends in production and marketing of cardamom.

ANALYSIS AND DISCUSSION:

Area under Cardamom Cultivation

Cardamom growers cultivate their land only when there are favorable conditions. The actual area under cultivation depends on the factors such as rainfall, financial position, the cost

of production and the like. Therefore the entire area, sometimes, may not be under cardamom cultivation, despite the vast area owned by them.

Table 1

Extent of Area under Cultivation of Cardamom by the Farmers

Area under Cultivation (in Acres)	No of Respondents			
	Kerala	Karnataka	Tamil Nadu	Total
below-2.5ac	42 (20.0)	28 (46.7)	17 (56.7)	87 (29.0)
2.5-5ac	65 (31.0)	25 (41.7)	10 (33.3)	100 (33.3)
above5ac	103 (49.0)	7 (11.7)	3 (10.0)	113 (37.7)
Total	210	60	30	300

(Figures in bracket indicate Percentages to total)

$X^2 = 4.90$ Table value: 9.49 Result: Insignificant

The details of the extent of area under cultivation of cardamom pertaining to the respondents are given in Table -1. It shows that the farmers who cultivate cardamom in an area exceeding 5 acres is at higher with 37.7 per cent, followed by 33.3 percent of farmers who cultivate in lands ranging from 2.5 to 5 acres. About 29 per cent farmers cultivate in lands below 2.5 acres. In the case of Kerala the category of respondents who cultivate above 5 acres is found to be dominant with 49 percent respondents, followed by farmers who cultivate 2.5 to 5 acres of land (31 percent). Marginal cultivators with less than 2.5 acres account for only 20 percent. But in Karnataka and Tamil Nadu marginal cultivators are found to be predominant accounting for 46 percent and 56.7 percent farmers respectively. Cultivators with an area of above 5 acres under cardamom are only 11.7 percent in Karnataka and 10 percent in Tamil Nadu. It can therefore be stated that the majority of the farmers in Kerala have more than 5 acres of land under cultivation of cardamom, whereas in Tamil Nadu and Karnataka farmers who

cultivate less than 2.5 acres are predominant. Thus, small and marginal farmers are more in Karnataka and Tamil Nadu. Farmers with more than five acres are more in Kerala due to the large area under cardamom cultivation as compared to the other two states under study. However, this inter-state differences are not significant statistically as the calculated x^2 value is much less than table value at the 5% level.

Cardamom Season

There is a season for any crop. Cardamom is not an exception. The cardamom cultivation season of differs from area to area and state to state due to the climatic conditions and the rainfall pattern.

Table 2

Seasonality of Cardamom Cultivation

Season starts in the month of	No of Respondents			
	Kerala	Karnataka	Tamil Nadu	Total
June	134 (63.8)	16 (26.7)	5 (16.7)	155 (51.7)
July	66 (31.4)	37 (61.7)	9 (30.0)	112 (37.3)
August	10 (4.8)	7 (11.7)	16 (53.3)	33 (11.0)
Total	210	60	30	300

(Figures in bracket indicate Percentages to total)

$X^2 = 5.63$ Table value: 9.49 Result: Insignificant

The details of the seasonality of cardamom cultivation are presented in Table- 2. The cultivation in this region is normally carried on during June to August every year. As perceived by 51.7 percent of the respondents cardamom cultivation in normal conditions starts in the month of June, followed by 37.3 percent who perceived it as July. The remaining 11 percent of the

respondents reported to have cultivated in August. But, across the states, the plantation season varies. In Kerala the majority of the respondents preferred to start cultivation during June (63.8 percent), the farmers in Karnataka (61.7 percent) started cultivation during July, while in Tamil Nadu 53.3 percent of the respondents started cultivation during August.

Thus, from the above it can be inferred that the cardamom cultivation is taken up from June to August in this region and there is a variation which is of course, insignificant as per x^2 statistics. The differences in the cultivation practices across the states are mainly due to variations in the climatic conditions.

Cropping Pattern

The cropping pattern includes the crops other than cardamom chosen for cultivation. Inter-cropping and mixed cropping practices are prevalent among the cardamom growers in these three states.

Table 3

Details on inter-cropping adopted by the farmers

Name of the Crop	No of Respondents			
	Kerala	Karnataka	Tamil Nadu	Total
Coffee	4 (1.9)	38 (63.3)	10 (33.3)	52 (17.3)
pepper	17 (8.1)	22 (36.7)	4 (13.3)	43 (14.3)
No other crop	189 (90.0)	–	16 (53.3)	205 (68.3)
Total	210	60	30	300

(Figures in bracket indicate Percentages to column total)

It is advised by the experts to maximize the farm income through inter-cropping. However, the major crop is likely to lose cultural attention due to this resulting in poor productivity. Table - 3 presents the details of inter-cropping adopted by cardamom growers. The majority of the respondents (68 percent) in all the states put together reported that they did not

cultivate any other crops in their cardamom land. It is cultivated as a mono-crop. This is followed by 17.3 percent farmers who reported to have cultivated coffee and 14.3 percent cultivated pepper as inter-crop. This practice is common and that all the respondents cultivated either coffee (63.3 percent) or pepper (36.7 percent) in Karnataka as inter-crop. A little less than half of the respondents (33.3 percent) from Tamil Nadu reported to have cultivated other crops in their cardamom land. The figure was only 10.5 percent in Kerala. It may, therefore, be inferred that the practice of cultivating other crops in the cardamom land is found to be very common in Karnataka, it is moderate in Tamil Nadu and limited in Kerala. The climatic condition, rainfall and fertility of the land are the reasons for inter-cropping in Karnataka comparing to the other states.

Table 4

Cardamom Varieties Chosen for Cultivation

Varieties	No of Respondents			
	Kerala	Karnataka	Tamil Nadu	Total
Mysore	11 (5.2)	–	–	11 (3.7)
Nadu	16 (7.6)	–	2 (6.7)	18 (6.0)
Njallani	172 (81.9)	14 (23.3)	1 (3.3)	187 (62.3)
Vazhukka	11 (5.2)	–	1 (3.3)	12 (4.0)
Malabar	–	46 (76.7)	26 (86.7)	72 (24.0)
Total	210	60	30	300

(Figures in bracket indicate Percentages to total)

Though the majority of the cardamom growers cultivate cardamom as a mono-crop, they choose certain varieties suitable for their region, and climatic condition. There are different varieties of cardamom such as Mysore, Valukka, Njallani, Malabar, Nadu, Elarani, etc. The Cardamom varieties chosen for cultivation by the farmers are shown in Table 4. Majority of the farmers (62.3 %) have chosen the variety called Njallani, followed by 24 percent of respondents who cultivated Malabar variety while the remaining 6 percent of the respondents cultivated 'Nadu' the indigenous variety. In Karnataka (76.6 %) and Tamil Nadu (86.7 %) cardamom growers cultivated Malabar variety. While in Kerala the majority of the respondents (81.9) cultivated Njallani followed by 7.6 percent respondents who cultivated the indigenous variety Nadu. From the above it can be drawn that Njallani is the most preferred crop in Kerala while farmers in Karnataka and Tamil Nadu prefer to have Malabar variety. Thus, Njallani is one of most well known high yielding varieties among the cardamom growers in Kerala This may be due to the farmers confidence to enhance the productivity despite the high cost of production.

Planting, Replanting and Gap Filling

Once the cardamom grower has developed an idea about his production plan with financial support, the cardamom variety suitable for the area may be selected for planting. They may be planted in the already prepared and filled pits and plants should be protected from wind by staking. The space between plants should be sufficient according to the variety of the plant. Immediately after planting, the plant base should be mulched well with available dried leaves to protect soil from erosion and to conserve moisture. The seedlings are tied to wooden stakes to prevent them from being dislodged by strong winds and monsoon rains.

Replantation, wherever the plants either did not survive and have not grown to the expected level, has to be done so as to fill up the gap in the field. Gap filling should also be done if there is more gaps in the field.

Table 5

Undertaking of Gap Filling Work in the Field

Details	No of Respondents			
	Kerala	Karnataka	Tamil Nadu	Total
Gap-filling work done	186 (88.6)	55 (91.7)	26 (86.7)	267 (89.0)
Gap-filling work not done	24 (11.4)	5 (8.3)	4 (13.3)	33 (11.0)
Total	210	60	30	300

(Figures in bracket indicate Percentages to total)

$X^2 = 0.03$ Table value: 5.99 Result: Insignificant

The total number of farmers who undertook gap-filling work account for 89 percent of the total respondents (Table 5). The figures across the states do not vary much, but the percentage was higher in Karnataka (91.7 percent) while it was 86.7 percent in Tamil Nadu. Among the farmers from Kerala about 88.6 percent undertook gap-filling works. Thus, the majority of the farmers have taken up gap-filling works in their field and the status in this regard across the states is more or less similar. The x^2 statistics proves the fact that the inter-state differences are highly insignificant given the calculated value 0.03 as against the table value of 5.99 at 5% the level of significance.

Table 6

Sources of Saplings / Seedling Plants for Gap Filling Work

Suppliers of plants	No of Respondents			
	Kerala	Karnataka	Tamil Nadu	Total
Own field	137 (65.24)	20 (33.3)	14 (46.7)	171 (57)
From Other farmers	57 (27.1)	13 (21.6)	10 (33.3)	80 (26.6)

Spices Board	8 (3.8)	3 (5.0)	6 (20.0)	17 (5.6)
Private Agencies	7 (3.3)	24 (40.0)	–	32 (10.6)
Total	210	60	30	300

(Figures in bracket indicate Percentages to total)

Gap filling is a continuous work in the case of plantation crops. The farmers depend on different sources for getting required saplings for gap filling. The sources are varied and depend upon the timing of the requirement and the quantity required. In the study area 57 percent of the total respondents raise saplings in their own field and 26.6 percent of the respondents purchase from other farmers, while 5.6 percent of the respondents depend on the Spices Board for saplings. Private agencies too serve as a source for supply of saplings in the case of 10.6 percent of the respondents. In Kerala, the majority of the respondents (65.24 percent) raised saplings for gap-filling work in their own field, followed by 27.1 percent of the respondents who purchased from other farmers, whereas in Karnataka the percentage of farmers who raised saplings in their own land account for 33.3 percent and in Tamil Nadu for 46.7 percent (Table- 6).

The overall picture is that the farmers from these three different states make use of different sources for procuring saplings for gap filling work. While the majority of the farmers in Kerala and Tamil Nadu take their own efforts to raise the saplings, a substantial number of farmers in Karnataka depend on other agencies.

Table 7

Normal Life Span of Cardamom Plant as Perceived by the Respondents

Normal Life Period (in years)	**No of Respondents**			
	Kerala	**Karnataka**	**Tamil Nadu**	**Total**
5-10	20 (9.5)	5 (8.3)	2 (6.6)	27 (9.0)

10-15	72 (34.3)	20 (33.3)	10 (33.3)	102 (34.0)
15-20	69 (32.9)	23 (38.3)	12 (40.0)	104 (34.7)
Above 20	49 (22.9)	12 (20.0)	6 (20.0)	67 (22.0)
Total	210	60	30	300

(Figures in bracket indicate Percentages to total)

$X^2 = 0.10$ Table value: 12.59 Result: Insignificant

Table - 7 shows the details of the normal life span of cardamom as experienced and expressed by the farmers. The life span of the plant varies with the variety and the quality of the seedlings. Therefore, the farmers expressed that the life span varies from 5 years to more than twenty years. Taking into account all the three states, 34 percent of the farmers expressed that the life span of the cardamom varies between 10 and 15 years and 34.7 percent said the life span was 15 to twenty years, while 22 percent farmers reported that it is more than 20 years and about 8 percent stated 5 to 10 years as span of life. The state wise analysis shows that 40 percent of the respondents in Tamil Nadu and 38.3 percent in Karnataka reported that the normal life span of cardamom is 15-20 years, while about 34.3 percent of respondents in Kerala said the normal life of cardamom is 10-15 years, which was closely followed by responses relating to 15-20 years. So the majority of the farmers in all the three states believe that the normal life span of cardamom plants is about 15 years. The x^2 statistics show that there is no significant differences in the perception regarding the life span of the crop among the farmers of the different states.

Table 8

Replantation Done by the Farmers

Details	No of Respondents			
	Kerala	Karnataka	Tamil Nadu	Total
Replanted	179 (85.2)	54 (90.0)	26 (86.7)	259 (86.3)
Not replanted	31 (14.8)	6 (10.0)	4 (13.3)	41 (13.7)
Total	210	60	30	300

(Figures in bracket indicate Percentages to total)

$X^2 = 0.07$ Table value @ 5% level: 5.99 Result: Insignificant

Table 8 presents the details of replantation done by the farmers. The majority of the respondents (86.3 percent) replanted their land. The remaining 13.7 percent of the respondents did not replant their cardamom land. In Kerala, it was 85.2 percent of the respondents and in Karnataka 90 percent of the respondents and in Tamil Nadu 86.7 percent of the respondents replanted their crop. Thus, it can be concluded that the majority of the respondents replanted their lands, either with the saplings raised on their own land or purchased from the neighboring farmers and private nursery agencies. In this regard, there is no discernible differences among the farmers from the three states under study.

Irrigation

Irrigating land is the most productive kind of farming devised by man. It is also the most expensive, unless it is available free of cost like rain in the plantations. Under normal conditions the farmer may not find it difficult to irrigate the land. But when there is a shortage or even surplus rainfall, farmers have to plan properly to irrigate the land to get more yield. Therefore, irrigation must be done in such a way that yield per unit of water is high and this requires a scientific way of irrigation.

Table 9

Main Sources of Irrigation for Cardamom Cultivation

Sources of Irrigation	No of Respondents			
	Kerala	Karnataka	Tamil Nadu	Total
Rain fall	83 (39.5)	55 (91.7)	8 (26.7)	146 (48.66)
Well	114 (54.3)	–	22 (73.3)	136 (45.3)
River	3 (1.4)	–	–	3 (1.0)
Bore well	5 (2.4)	5 (8.3)	–	10 (3.33)
Canal	3 (1.4)	–	–	3 (1.0)
Farm ponds/ Check dams	2 (1.0)	–	–	2 (0.66)
Total	210	60	30	300

(Figures in bracket indicate Percentages to total)

The details of the main sources of irrigation for the cardamom growers are presented in Table - 9. The majority of the respondents (48.66 percent) have their plantation in the rainfed area and 45.3 percent of the respondents depend on wells for irrigation. Others (only 6 percent) make use of a variety of other sources including farm ponds and check dams. State –wise analysis reveals an altogether different picture in these three states under study. In Tamilnadu 73.3 percent of respondents and in Kerala 54.3 percent of the respondents depend on irrigation wells while all the respondents in Karnataka depend on rainfed irrigation. Thus, it can be stated that all the farmers rely on rainfall in Karnataka. Nearly three quarter of respondents in Tamilnadu depend on well irrigation. Kerala farmers use a variety of irrigation sources. When all the states put together most farmers depend on rainfall.

Manuring

Among the physical application of inputs, organic and inorganic manure have a major part to play in increasing the agricultural production. Soil fertility, crop variety, water availability and management practices determine the dosage of fertilizers. It is to be mentioned here that the Spices Board has set up a soil testing laboratory for testing cardamom growing soils and giving land specific recommendations. At present, the soil testing laboratories are functioning at the Indian Cardamom Research Institute, Myladumpara, Kerala, and Regional Research Station, Saklespur, Karnataka, and they help to a great deal in fixing the fertilizers needed for maximum production.

Table 10

Application of Manure (Organic and Inorganic)

No of Application	No of Respondents							
	Kerala		Karnataka		Tamil Nadu		Total	
	Organic	*Inorganic*	*Organic*	*Inorganic*	*Organic*	*Inorganic*	*Organic*	*Inorganic*
1-2	114 (54.3)	140 (66.7)	53 (88.3)	50 (83.3)	15 (50.0)	11 (36.7)	182 (60.7)	201 (67.0)
2-4	61 (29.0)	43 (20.5)	6 (10.0)	9 (15.0)	6 (20.0)	4 (13.3)	73 (24.3)	56 (18.7)
Above 4	16 (7.6)	10 (4.8)	1 (1.7)	–	5 (16.7)	4 (13.3)	22 (7.3)	14 (4.7)
N0	19 (9.0)	17 (8.1)	–	1 (1.7)	4 (13.3)	9 (30.0)	23 (7.7)	27 (9.0)
Total	210	210	60	60	30	30	300	300

(Figures in bracket indicate Percentages to total)

The yield, among other things, to a greater extent depends on the manuring practices. The farmers in the plantations have the practice of applying both organic and inorganic manures. Details pertaining to the application of manure during a crop season are presented in Table 10.

While taking into account all three states, most respondents have applied organic manure than inorganic fertilizers. In Karnataka, except one farmer all of them reported to have applied organic manure. However, it was found that the majority (88.3 percent) applied one-to two times in a crop season. In the case of Tamilnadu most farmers applied organic manure as against those who applied inorganic manure. Here again, the majority of the farmers applied manure for three to four times. But in the case of Kerala, the farmers apply organic and inorganic manure. However, it could be noticed that there is a positive movement towards inorganic from organic manure. Thus, from the above it can be stated that the farmers, irrespective of their location, apply both organic and inorganic manure at least two times in a crop season.

Table 11

Soil Testing by Farmers

Soil test	**No of Respondents**			
	Kerala	**Karnataka**	**Tamil Nadu**	**Total**
Tested	84 (40.0)	22 (36.7)	22 (73.3)	128 (42.7)
Not Tested	126 (60.0)	38 (63.3)	8 (26.7)	172 (57.3)
Total	210	60	30	300

$X^2 = 0.69$ Table value @ 5% level: 5.99 Result: Insignificant

(Figures in bracket indicate Percentages to total)

Soil testing is one of the good practices in the cultivation of any crop. It helps in finding out the soil deficiencies and thereby facilitating mannuring and soil enrichment measures. It also reduces unnecessary expenses through application of over dosage of fertilizer and helps the growers to cultivate taking into consideration the nature of the soil. It is one of the measures recommended by the experts in the field of cardamom cultivation. The details on the soil testing practices of cardamom growers are presented in Table 11, which indicates that nearly 57.3 percent of the growers do not test the soil and the rest of respondents (42.7 percent) tested the soil on their land. State wise analysis reveals that in Kerala only 40 percent of the respondents

and in Karnataka only 36.7 percent farmers carried out soil testing. But in Tamilnadu most of the respondents (73.3 percent) tested soil on their land for assessing the quality of the soil. From the above, it can be concluded that the majority of the farmers do not test the soil in general and Tamil Nadu is an exception to this. Majority of the farmers in Tamil Nadu tested soil and the farmers in Kerala and Karnataka have not given the required attention. However, the x^2 test shows that the interstate differences are insignificant at 5% level.

Table 12

Suppliers of Manure, Pesticides and Insecticides

Name of the Suppliers	No of Respondents			
	Kerala	Karnataka	Tamil Nadu	Total
Spices Board	10 (4.8)	–	–	10 (3.3)
KCPMC	87 (41.4)	–	–	87 (29.0)
CPA	48 (22.9)	–	–	48 (16.0)
Private	65 (31.0)	60 (100)	30 (100.0)	155 (51.6)
Total	210	60	30	300

(Figures in bracket indicate Percentages to total)

The details of suppliers of pesticide and insecticides are given Table 12. At the outset it must be noted that, the suppliers of manure, pesticides and insecticides include sale depots established by the Spices Board, the KCPMC, the CPA and private agencies. 51.3 percent of the respondents purchased manure from private agencies. The analysis of data reveals that farmers in Karnataka and Tamil Nadu purchased pesticides and insecticides from private traders. In Kerala 41.4 percent farmers depended on the KCPMC and 22.2 percent purchased pesticide, manure etc. from the CPA. From the above it can be concluded that the majority of the respondents purchased it from private traders because of the reason that these private traders adopted door delivery system, and the quality of the pesticides and the insecticides is the same irrespective of

the sources (see Table-12). Thus, non-institutional agencies are dominating as compared to the institutional agencies in supply of agricultural inputs.

Harvesting

In most areas, the peak harvesting season is October - November. In Kerala and Tamil Nadu, harvesting season is August - September and continues till February - March, whereas in Karnataka it starts in July - August and continues upto December - January. Harvesting is continued at intervals of 30-40 days and completed in 5-6 months. Capsules along with peduncles are picked in the correct stage of ripeness with specific objectives viz., 1.For making pickles, it is harvested at a tender stage. 2. For curing, capsules are picked at dark seed stage 3. For seed purposes, they are picked at fully ripened stage.

Table 13

Frequency of Harvesting in Small Cardamom

Frequency	No of Respondents			
	Kerala	Karnataka	Tamil Nadu	Total
Below 2	11 (5.2)	–	–	11 (3.6)
3-5	98 (46.7)	32 (53.3)	6 (20.0)	136 (45.3)
Above 6	101 (48.09)	28 (46.7)	24 (80.0)	153 (51.0)
Total	210	60	30	300

(Figures in bracket indicate Percentages to total)

The frequency of harvesting of cardamom by the farmers is shown in Table 13. The majority of the respondents (51 percent) have reported to have harvested more than 6 times during the 2005-06 season. About 45.3 percent farmers have harvested three to five times and the rest who constituted an insignificant 3.6 percent have harvested two times during the season

under reporting. Among the three states, Tamil Nadu had 80 percent of respondents who harvested more than 6 times, followed by Kerala (48.09 percent) and Karnataka (46.7 percent).

Thus, it can be concluded that in all the three states the majority of the farmers harvested cardamom more than 6 times during 2005-06 except in Karnataka where the majority of the farmers had 3 to 5 times of harvest. In these two states, the majority of the farmers use sprinkler and tap irrigation systems. In Kerala a few farmers had harvested only less than two times. This may be due to low level of rain fall or lack of interest taken by the growers in cultivation of cardamom which resulted in low yield.

Post -Harvesting

- The majority of the farmers have their own processing units in Tamil Nadu and Kerala while, in Karnataka, farmers depend on others for processing. This may be due to the large amount of fixed capital required for installation of processing units, which the small and marginal farmers cannot afford to invest.
- Most of the cardamom growers still follow conventional method of curing despite the fact that modern methods of curing are available in the market. One of the major reasons for this is availability of firewood at cheaper cost.
- It is found that the majority of the farmers in Kerala and Tamil Nadu, before curing, washed the green capsules and in Karnataka, only 50 percent of the respondents had the practice of washing before curing.

Main Findings of the study

- Of the sample respondents, the small and marginal farmers are more in Karnataka and Tamil Nadu, whereas big farmers are more in Kerala.
- Cardamom cultivation is taken up normally during June to August and there is a variation in the cultivation practices across the states due to variations in the climatic conditions.

- The majority of the farmers did not cultivate any other crops in their cardamom land. It is cultivated as a mono-crop. About one- third of the farmers reported to have cultivated coffee and pepper as inter-crop in their land.
- Njallani is one of most well known high yielding varieties among the cardamom growers in Kerala.
- The majority of the farmers have taken up gap-filling works in their field. While the majority of the farmers in Kerala and Tamil Nadu take their own efforts to raise the saplings, a substantial number of farmers in Karnataka depend on other agencies for saplings.
- The majority of the farmers replanted their lands, either with the saplings raised on their own land or those purchased from the neighbouring farmers and private nursery agencies.
- The majority of the cardamom growers in these three states had plantations of 5 to 10 years'.
- Most of the cardamom growers depend on rain for cultivation of plants. There is a marked difference among the states with regard to the mode of irrigation. Tap irrigation was the most popular mode of irrigation among the majority of the farmers, followed by sprinkler irrigation.
- The farmers are using oil motor system in two of the three states under study. Electric supply and connectivity has not reached the plantations to a great extent.
- The farmers, irrespective of their location, apply both organic and inorganic manure at least two times in a cardamom season.
- While the majority of the farmers in Tamil Nadu tested the soil of their land, farmers in Kerala and Karnataka have not shown the required attention to soil testing.
- The majority of the cardamom farmers prefer to purchase inputs from private traders because of the reason that these private traders delivers inputs at door steps. It means that non-institutional agencies are dominating as compared to the institutional agencies in the supply of agricultural inputs.

Harvesting and Post-harvesting

- The majority of the farmers in all the three states harvested cardamom more than 6 times during 2005-06, except in Karnataka, where the majority of the farmers had 3 to 5 harvests.
- The majority of the farmers in Tamil Nadu and Kerala have their own processing units.
- Most of the cardamom growers still follow conventional method of curing because of availability of firewood at cheaper cost.
- Most of the farmers in Kerala and Tamil Nadu, before curing, wash the green capsules and in Karnataka, only 50 percent of the respondents has the practice of washing before curing.

SUGGESTIONS:

Based on the findings, the study makes suggestions as follows.

- Irrigation must be carried out in such a way that yields per unit of water are high. Care should be taken not to spread water on the land unnecessarily, since a great part of it would be lost through seepage and evaporation, a scientific way of irrigation is necessary.
- The manures should be thoroughly mixed with surface soil after application. For the subsequent application to be made in September organic manure need not be applied. In valley areas and in high fertile soils, application of chemical fertilizers may be avoided. Instead organic manure may be applied during May/June and NPK fertilizers given as foliar sprays.
- Proper harvesting will improve the quality and quantity of the produce, whereas faulty harvesting of immature capsules reduces quality, quantity and realizes only lower price in the market.
- Farmers should be educated to avoid the harvest of over ripped a capsule that gets only a lower market value. They should also be educated to adopt the practice of washing the capsules with clean water and draining the water before curing to get good quality dried cardamom. The farmers should also be advised to avoid storing of harvested green capsules.

- Farmers may be encouraged to enroll in crop Insurance Scheme under the National Agricultural Insurance Scheme (NAIS) to reduce the loss incurred by the farmers due to natural calamities and retain sustainability in cardamom cultivation.
- Inter-crop cultivation may be encouraged among the cardamom growers to reduce loss to some extent in cardamom cultivation.
- A lab-to-land scheme may be introduced so as to reach the unreached places to propagate the best method of cultivation of cardamom including soil testing.

Conclusion:

To sum up, cardamom is one of the cash crops which serve many purposes. One of the major reasons to sustaining cardamom cultivation is that it saves the forest and prevents de-forestation because of the shade requirements for effective cardamom cultivation. It provides direct and indirect employment to hundreds of agricultural labourers. Realizing the significance of cardamom the study has made an attempt to provide an understanding of cardamom cultivation practices in India. The study with the data collected through a sample survey among farmers in Tamil Nadu, Kerala and Karntaka has described the cultivation practices followed by them. The study has also suggested some measures to improve cultivation, harvesting and post harvesting practices of cardamom crop. These suggestions have implication for improving quality and quantity of cardamom production in the sample states.

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