A COMPARATIVE PERFORMANCE APPRAISAL OF VFPCK AND KUDUMBASHREE BENEFICIARIES IN THIRUVANANTHAPURAM DISTRICT

by

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(2010 – 11 – 137)

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I hereby declare that this thesis entitled **"A comparative performance appraisal of VFPCK and Kudumbashree beneficiaries in Thiruvananthapuram district."** is a bonafide record of research done by me during the course of research and the thesis has not previously formed the basis for the award of any degree, diploma, fellowship, or other similar title, of any other university or Society.

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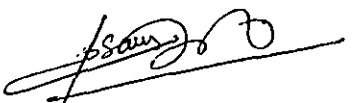

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LIST OF ABBREVIATIONS

VFPCK	- Vegetable and Fruit Promotion Council of Kerala
KHDP	- Kerala Horticultural Development Programme
SHG	- Self Help Group
GOK	- Government of Kerala
CDS	- Community Development Society
Ltd	- Limited
Rs.	- Rupees
JLG	- Joint Liability Group
ISS	- Interest Subsidy Scheme
MNREGS	- Mahatma Gandhi Rural Employment Guarantee Scheme
ADS	- Area Development Society
SPEM	- State Poverty Eradication Mission
MIC	- Marginal Input Cost
MFC	- Marginal Factor Cost
MVP	- Marginal Value Product
SKS	- Swasraya Karshaka Samitis
NHG	- Neighbourhood Groups
ha	- Hectare
ANOVA	- Analysis of Variance

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INTRODUCTION

CHAPTER I
INTRODUCTION

Kerala, fondly called God's own country is blessed with 13 varied agro climatic zones, abundant rainfall, productive soil and skilled human resource. However, paradoxically, agricultural production of Kerala is starkly low. Agriculture sector in Kerala has passed through many changing phases. The major change occurred in the 1970s when rice production became less attractive due to increased availability of rice supply from all over India and decreased availability of labour in Kerala. Consequently, investment in rice production decreased significantly and a major portion of the land was shifted for cultivation of perennial tree crops and seasonal crops. Profitability of crops in Kerala is reducing due to shortage of farm labourers, high wage rate, high price of land and uneconomic size of operational holding area.

With regard to vegetables, Kerala's production is very low. In spite of India being the second largest producer of vegetables in the world, Kerala contributes only 3 per cent of the share of total production (National Horticulture Board, 2011). While comparing with other states like Bihar, West Bengal, Uttar Pradesh, Andhra Pradesh, Karnataka etc the contribution of Kerala is meager both in area and production. The total area under cultivation of vegetables during 2010-11 in Kerala was 1,49,500 hectare while it was 2,77,300 hectare in Tamil Nadu, 4,66,300 hectare in Karnataka, 6,51,200 hectare in Andhra Pradesh and the highest of 13,49,700 hectare in West Bengal (National Horticulture Board, 2011). Area under vegetables in Kerala represents only 4 per cent area of total food crops (Department of Economics and Statistics, 2011). Kerala being thickly populated depends on neighbouring states for meeting the major share of its vegetable requirements.

In spite of the spectacular progress made in vegetable production, per capita consumption in India is only about 176 gram per day per person, which is far below the minimum dietary requirement of 280 gram per day per person

Table.1 District wise area of vegetables in Kerala (hectares)

Sl .no	District	District wise area of vegetables - Kerala												
		Drumstick	Amaranth	Bitter Gourd	Snake Gourd	Ladies Finger	Brinjal	Green Chillies	Bottle Gourd	Little Gourd	Ash Gourd	Pumpkin	Cucumber	Cowpea
1	Thiruvananthapuram	1942	153	58	82	43	45	92	-	34	2	11	84	153
2	Kollam	1875	144	96	36	47	74	194	3	103	43	52	20	173
3	Pathanamthitta	523	75	70	65	44	63	41	-	79	46	42	30	189
4	Alappuzha	608	188	152	129	65	119	110	3	114	66	56	94	335
5	Kottayam	657	70	180	249	46	67	43	1	242	38	40	57	357
6	Idukki	565	59	492	14	21	53	60	2	45	28	55	10	408
7	Ernakulam	585	102	205	189	54	58	32	3	74	70	64	159	1129
8	Thrissur	1224	73	129	44	74	48	149	3	45	63	71	45	445
9	Palakkad	1916	136	588	168	526	208	358	7	60	300	272	106	2411
10	Malappuram	2067	102	100	97	101	38	51	78	33	169	268	330	1023
11	Kozhikode	1657	131	58	18	25	9	102	4	13	48	52	107	174
12	Wayanad	352	48	143	6	6	16	45	2	14	82	168	22	368
13	Kannur	1640	137	72	13	35	30	67	1	46	54	43	243	197
14	Kasaragode	516	39	23	7	41	21	49	1	62	17	23	121	64
	State total	16127	1457	2366	1117	1128	849	1393	108	964	1026	1217	1428	7426

Source: Department of Economics and Statistics, Kerala, 2011.

(Adhiguru et al., 2004). The required production was estimated at 149 million tonnes by 2016. This increase has to be achieved by enhancing the productivity as the scope of area expansion is limited and the average yield of vegetables has to be increased to 25.4 tonnes per hectare by 2016 (Kumar et al., 2004). In this context, the attempts of Vegetable and Fruit Promotion Council, Keralam (VFPCK) and Kudumbashree to scale up vegetable production in Kerala becomes relevant.

2.1 Vegetable and Fruit Promotion Council Keralam

Kerala Horticulture Development Programme (KHDP) was initiated in the year 1993 with the financial support of the European Union and Government of Kerala, with a financial outlay of Rs 130 crores for promoting fruits and vegetable production in Kerala and also to study the feasibility of introducing Self Help Group (SHG) in agricultural sector. KHDP was one of the successful agricultural development programmes in India with a total project outlay of Rs. 131.95 crores. The KHDP was initially visualized as a six year project that would culminate in the formation of an organization called Kerala Horticultural Development Council. Later it was christened as Vegetable and Fruit Promotion Council, Keralam which would carry forward the works initiated by KHDP.

VFPCK is an ISO 9001-2000 certified company registered under section 25 of Indian Companies Act, 1956 and has been established to bring about overall development of fruit and vegetable sector in Kerala. VFPCK is a company with the majority stake resting with farmers and the Government of Kerala and financial institutions as the other major shareholders. Self help Groups of farmers constitutes 50 per cent of shareholders, Government of Kerala has 30 per cent and other related institutions hold 20 per cent of VFPCK's shares.

The mission of VFPCK is to introduce and implement schemes in the field of horticulture which will benefit the farmers and to create attitudinal change towards farming activities among all class of people. The Primary objective of VFPCK is to improve the livelihood of vegetable and fruit farmers by

empowering them to carry on vegetable and fruit production, value addition and marketing as a profitable venture in a sustainable way.

The major activities of VFPCK include training, extension, marketing, credit, insurance etc. VFPCK focuses on empowerment of farmers through training. Most importantly VFPCK trains master farmers who in turn trains other farmers. The extension package include organizing farmers into self help groups, encouraging scientific agriculture, and supporting farmers in group marketing

The pioneering marketing innovation made by VFPCK is "group marketing wherein farmers under various self help groups jointly market their produce under one umbrella which is called the "Swashraya Karashaka Samithi" (SKS). The advantages of group marketing are:

1. Market is close to the farmers which reduces transportation cost.
2. Large volumes of produce induce the traders to procure fruits and vegetables from the SKS.
3. Transparency in weighing since it is done by the farmers themselves.
4. Farmers, as a group are in a better position to bargain with the traders.
5. The commission charged from the farmers on sale value is only 5 per cent, out of which 3 per cent is provided as bonus to the farmers.

VFPCK works closely with 11 commercial banks in Kerala to provide credit support to the farmers. The features of credit package are

1. Bank credit is available to lease land cultivators.
2. Quick disbursement of credit.
3. VFPCK staff assists in screening and monitoring process.

VFPCK has designed an insurance package for farmers to protect them from uncertainities arising during cultivation. VFPCK has tied up with United India

Insurance Company Ltd for insurance coverage of banana, vegetables and tuber crops. Compensation provided for vegetables is 50-100 per cent based upon the stage of the crop.

VFPCK has created a Market Information Center (MIC) for creating an information system that will provide vital market information to the fruit and vegetable farmers and to the horticulture sector as a whole. The MIC at VFPCK headquarters collects market data of vegetables and fruits on a daily basis from 16 wholesale markets in Kerala and also from 4 other states. The reports will be sent to news papers, All India Radio, Farmer Markets (SKS) and other agencies on a daily basis. VFPCK has also started export promotion activities as a part of its market intervention and service diversification with an objective of promoting exports of fruits and vegetables from the State. So far VFPCK has exported 480 million tonnes of fresh fruits and vegetables valuing Rs.1crore.

At present 260 VFPCK Swasraya Karshaka Samithis (SKS) are functioning across Kerala. About 98460 million tonnes of produce worth Rs.157.54 crores were traded by these SKS during the financial year 2010-11 and the construction of as many as 87 permanent buildings for Samithis have already been completed.

2.2. KUDUMBASHREE

Kudumbashree was conceived as a joint programme of the Government of Kerala and NABARD, implemented through Community Development Societies (CDSs) of poor women, serving as the community wing of Local Governments. Kudumbashree is formally registered as the "State Poverty Eradication Mission" (SPEM), a society registered under the Travancore Kochi Literary, Scientific and Charitable Societies Act 1955. It has a governing body chaired by the State Minister for Local Self Governance. There is a state mission with field officers in each district. This official structure supports and facilitates the activities of the community network across the state. The mission of Kudumbashree is to eradicate absolute poverty in ten years through concerted community action under the leadership of Local Governments, by facilitating organization of the poor for

combining self-help with demand-led convergence of available services and resources to tackle the multiple dimensions and manifestations of poverty, holistically. The Kudumbashree community organization is a three-tiered structure with its apex tier anchored in the local self governments. The three tiers are:

- ***Neighbourhood groups (NHGs)*** – Groups of 10-20 women from the same neighbourhood form the foundation of the structure
- ***Area Development Society (ADS)*** – Federation of NHGs within a ward of the panchayath.
- ***Community Development Society (CDS)*** – Registered Society as the Federation of ADS within the panchayath.

Kudumbashree has developed many programmes for local economic development and women empowerment programmes such as "Asraya", "BUDS", "Balasabha", "holistic health" etc for social development and "collective farming", "Samagra projects", "microenterprises", and "special livelihood programme" for economic development. Some important activities are detailed below.

Collective farming activities include identification of available land, selection of beneficiaries, clustering them into groups, giving training, distribution of inputs and release of incentives. The land identified may be government land lying fallow or private land taken up for cultivation. Two types of incentives *viz.,* area incentive and production incentive are given by Kudumbashree to women beneficiaries belonging to neighbourhood groups doing lease land farming. Area incentive is given for bringing the fallow land under cultivation and production incentive is for achieving the inherent productivity of the crop selected for cultivation. Joint Liability Groups (JLG) of women farmers are formed under the collective farming initiative to help women cultivators access agricultural credit from the banking system. JLGs are brought under the purview of interest subsidy

scheme of Kudumbashree (ISS). They become eligible for interest subsidy when they avail agricultural loan from banks. Five per cent subsidy on 7 per cent interest agricultural loan is provided by State Government of Kerala through Kudumbashree. Various activities such as banana cultivation, vegetable cultivation and milk production are done on a group basis as a part of agricultural promotion activities of Kudumbashree. In addition, Kudumbashree has been entrusted with organizing public works under the Mahatma Gandhi Rural Employment Guarantee Scheme (MNREGS) and the Swarnajayanthi Shahari Rozgar Yojana

Kudumbashree plays a vital role in enhancing the financial status of the less privileged women in the State through its thrift and credit societies. These societies facilitate them to save and provide them with cost-effective and easy credit. The savings of the women are pooled together and given out as loans to the most deserving.

In Thiruvananthapuram district both the Samagra projects of Kudumbahsree (involving nendran banana and vegetables) and Swashraya Karshaka Samithis of VFPCK actively provide the livelihood for hundreds of farmers. Nemom block in Thiruvananthapuram district is one of the major vegetable producing areas of the distrct where both VFPCK and Kudumbahsree farmers are available. Hence Nemom block was purposively chosen for the study. Cowpea (*Vigna unguiculata*) and culinary melon (*Cucumis melo* var *acidulus*) the major vegetable crops cultivated in this area, were selected for the study as both of them were cultivated by VFPCK, Kudumbashree and other farmers of the area.

2.3 Objectives of the study

The objectives of the study were

1. To compare the economic performance of VFPCK and Kudumbashree farmers in terms of agricultural production, income generation, expenditure and savings pattern, credit utilization, marketing and
2. To analyze the constraints faced by the farmers in production and marketing of vegetables.

2.4 Scope of the study

VFPCK and Kudumbashree are the two important development organizations that have made a sizeable impact on the agriculture scenario in Kerala. There have been no studies so far involving a comparison between farmers belonging to VFPCK and Kudumbashree in cultivating vegetables. Scientific studies revealing ground realities are required to remodel agricultural development programmes on the basis of objective assessment. In this context, this study will aid planners, policy makers, management personnel and administrators in strengthening the production and marketing of vegetables in Kerala and also in assessing the strengths and weaknesses of both Kudumbashree and VFPCK.

2.5 Limitations of the study

The data for the study was collected through personal interview from farmers who did not maintain any records about their cultivation practices. Hence responses were drawn from memory, which may be subjected to recall bias. Data was collected for one season alone due to time constraints. To make an effective comparison, all the other activities of Kudumbashree and VFPCK needs to be taken into account, which was not possible, again due to time constraints.

2.6 Organization of the study

The thesis consists of five chapters. The present chapter which introduces the study states the purpose, background, scope and limitations of the study. A review of literature is given in chapter two. Chapter three of the thesis deals with the tools used for analysis of the study. In the fourth chapter, the results obtained are presented and their implications are discussed. The fifth chapter gives a summary of the study and pinpoints the findings made.

REVIEW OF LITERATURE

CHAPTER II

REVIEW OF LITERATURE

A comprehensive and up-to-date review of literature is necessary in any field of scientific enquiry so as to understand the various concepts to be used in the proposed study and more importantly to gain a clear knowledge about the gaps in the past studies so that the proposed study would make a serious effort to address those gaps in the existing literature. An appraisal of concepts and analytical tools used in the earlier studies will help to apply the concepts and also to fulfill the various objectives formulated in this study. Hence a brief review of various concepts, findings and explanations reported in the past studies are presented in this chapter. The review is arranged under the following sub-headings.

2.1 Economics of production

2.2 Marketing

2.3 Credit utilization pattern

2.4 Income, expenditure and savings pattern

2.5 Resource use efficiency

2.6 Constraints in production and marketing

2.1. Economics of Production

Mehta et al., (1989) worked out the economics of radish seed production both at farmer's level and at recommended technology in Gurdaspur (Punjab) and Poanta valley (Himachal Pradesh) by calculating the variable cost of all the inputs at current market prices. The total variable costs incurred by the farmer and the net returns were estimated as Rs 4,778 and Rs 12,322 per hectare respectively.

The input requirements, productivity and the economic feasibility of rattoon cabbage were investigated by Mankar et al., (1990). The rattoon crops yielded 27,780 kilogram compared to 32, 241 kilogram per ha compared to main crop. The total cost of cultivation of rattoon crop was Rs 8,167.29 per hectare as compared to Rs 26,169.62 per hectare for main crop. The net returns were Rs 19,612.80 per hectare for the rattoon crop and Rs 6,071.38 per hectare for the main crop.

Mahadeb et al., (1991) found that onion was more profitable than summer rice in West Bengal. The study showed that while onion needs two or three light irrigations with less than 300 mm of water, the water demands of rice maybe as high as 2500 mm in summer. For every rupee invested, the farmer gets Rs 1.23 from summer rice and Rs 2.57 if he switches over to onion.

In their study on economic analysis of potato cultivation in Jaunpur district of UP, Singh et al., (1991) found that the farmers operating at higher level of technology obtained higher level of returns over variable cost.

Kuchhadiya et al., (1992) studied the cost benefit aspects of garlic crop in Jamnagar district of Gujarat state and observed that the net income per hectare was to the tune of Rs 38,369 showing higher profitability of crop. The cost benefit ratio was 1:1.99.

The economics of vegetables in two major vegetable growing regions of Kangra district, Himachal Pradesh was studied by Sharma et al., (1992) and it was found that cauliflower, cabbage and peas were the most remunerative in one region while bottlegourd, aubergine and bitter gourd were more profitable in the other.

Singh et al., (1995) in their study of economics of cauliflower in the vicinity of Faizabad district reported that average total cost of cultivation of cauliflower was maximum for marginal farms followed by small farms and medium farms in that

order. Gross income per ha was more for marginal and small farms as compared to medium and large farms. The benefit cost ratio was estimated to be 1:2.6.

In a study conducted in Bilaspur district of Madhya Pradesh Jain and Gauraha (1996) found that benefit cost ratio was maximum for chilli (1.35) followed by cauliflower (1.21).

Cost and returns per hectare of vegetable production was estimated in Patan block of Jabalpur district by Singh (1997) which indicated that per hectare operational cost was highest in the case of tomato followed by brinjal and okra. Same trend was also observed in the case of net returns of vegetable crops.

Koshta and Chandrakar (1997) conducted a study in profitability of vegetable crops in Chattisgarh region of Durg district of Madhya Pradesh. It was found that cost of production per quintal was minimum for ivy gourd when compared to the other vegetables grown there. The returns from ivy gourd, cabbage and bitter gourd were comparatively higher than that from other crops on per hectare basis.

In a study on economic analysis of production and marketing of vegetables in Azamgarh district of Uttar Pradesh Chauhan (1998) observed that tomato and brinjal were the most profitable crops among the crops studied. Results also revealed greater scope for the increase in farm income through readjustment of resources.

Kumar and Arora (1999) concluded that vegetable cultivation gave better net profit to the growers over different costs. But when marketing cost was included, the net profit was considerably reduced which explained the need to economise on marketing cost, maximise sale price and production level in the region. The vegetables studied were green pea, potato, tomato, capsicum, cabbage, cauliflower, carrot, radish, onion and ginger.

On the production aspects of chillies, Mishra et al., (1999) observed that manures and fertilizers formed the largest share of cost of production at 28.19 per cent, human labour accounted for 16.56 per cent and seed cost accounted for 7 per cent. For marginal farms the share of cost of manure was the highest. The cost of production per quintal has been estimated to be Rs 360.93 and the cost benefit ratio at Cost C was 1:2.27.

Verma and Rajput (2000) studied the costs, returns and marketing of potato in Indore district of Madhya Pradesh. On an average the per hectare total cost of cultivation of potato came to Rs 35,035 (Cost C2). The cost of cultivation per hectare came to Rs 29,035 on Cost A1, Rs 29,310 on Cost B1, Rs 30,810 on Cost B2, Rs 31,850 on Cost C1 and Rs 35,035 on Cost C2 respectively. The gross returns were worked out to Rs 59,400 per hectare. The net returns over Cost A1, Cost B1, Cost B2, Cost C1and Cost C2 on an average were calculated as Rs 30,365, Rs 30,090, Rs 28,590, Rs 27,550 and Rs 24,365 per hectare respectively.

The economics of onion production and marketing in Karnataka was examined by Balappa and Hugas (2003) and it was found that the overall average net returns obtained by onion growers amounted to Rs 45,429.29 per hectare with gross returns of Rs 69,828.67 per hectare. However, farmers of Gulbarga (Rs 70,355.01 per hectare), Bijapur (Rs 67,714.41 per hectare) and Raichur (Rs 64,421.35 per hectare) districts obtained net returns more than three times of Dharwad (Rs 22,365.18 per hectare) and Belgaum (16,578.86 per hectare) districts, mainly due to cultivation of onion with irrigation in these districts.

Dhindsa et al., (2003) studied the economics of potato cultivation in Jalandhar district of Punjab and found that the total variable cost per hectare was Rs 26,827 out of which 86.28 per cent was spent on production inputs. Size wise analysis revealed that the total variable costs were the highest on large farms (Rs 27,439 per hectare) followed by medium and small farms with Rs 26,980 and Rs 26,064.

In a study about the production and marketing aspects of tomato crop in Punjab, Grover et al., (2003) found that the total cost of cultivation (C3) varied between Rs 32,296 per hectare on small farms and Rs 37,746 per hectare on large farms. The share of human labour was about 32 per cent on Cost C3 because tomato cultivation is highly labour intensive. Variable cost accounted for 69 per cent of the Cost C3 in case of tomato cultivation. The benefit cost ratios were almost equal to or greater than 2 over all the costs excepting Cost C3 for all farm size categories showing the profitability of tomato production in the state.

Navadkar et al., (2003) reported that the per hectare cost of cultivation of tomato for summer season cultivation was more expensive followed by kharif and rabi seasons. The per hectare gross as well as net returns were relatively more in kharif season followed by summer and rabi season.

While studying the income and employment generation through summer vegetables versus paddy in Punjab, Singh and Toor (2003) found that the highest per hectare variable cost of Rs 21,468 was incurred on cauliflower crop followed by Rs 20,528 on brinjal, Rs 17,991 on bhindi, Rs 15,718 on sponge gourd, Rs 14,932 on paddy and Rs 10,923 on tinda crop. The returns over total variable cost were the maximum in case of brinjal with Rs 40,961 per hectare. In the case of cauliflower, bhindi, tinda, sponge gourd and paddy returns over total variable cost turned out to be Rs 40,201, Rs 20,301, Rs 13,790 , Rs 13,389 and Rs 11,914 per hectare. Thus all the summer vegetables provided higher returns than paddy crop during the summer period.

Kumar et al., (2004) while studying the economics of production and marketing of vegetables in Andaman and Nicobar islands observed that cost benefit ratio was the highest for chilli followed by cucumber, bhendi, cowpea and snake gourd and it was found to be higher in hilly land than in valley land for all the vegetables.

The export competitiveness of chillies from Punjab state was studied by Bhullar et al., (2005) and it was observed that the returns over variable cost were Rs 9,126 per acre for chillies as compared with Rs 6,890 for okra, Rs 8,428 for brinjal, Rs 5,529 in case of sponge guard, Rs 8,506 for Shimla mirch and Rs 4,603 for paddy.

Lokesh *et al.*, (2005) in a study on the economics of production, processing and marketing of tomato in Karnataka observed that average yield of tomato was 35 tons per acre earning a gross return of Rs 52,500 and net returns was Rs 18,410. Thus, the net returns per acre of tomato production with a long duration variety was higher by Rs 13,209 (42 per cent) when compared to short duration variety.

The economics of elephant foot yam in lowland production system in Kerala was analyzed by Srinivas and Ramanathan (2005) and they reported that, the gross cost of cultivation was Rs 1,73,105 per hectare, in which expenditure on planting material (Rs 69,864) was maximum. On an average, farmers got a yield of 33.5 tonnes per hectare with a gross income of Rs 2,36,368 at the average selling rate of Rs 7.15 per kilogram of tuber. Benefit cost ratio was worked out to be 1.38:1. Farm business income, owned-farm business income, farm investment income and family labour income were estimated as Rs 91,395, Rs 85,033, Rs 67,353 and Rs 80,943, respectively.

Singla et al., (2006) studied the economics of green peas in Punjab and found that the returns over variable cost in peas was Rs 40182 per hectare, which was 129 per cent more than that in the case of wheat (Rs 17547 per hectare). It clearly showed that the cultivation of green peas was more profitable than its main competing crop, wheat.

Khan and Basharat (2006) studied the economic variability of vegetable production in Kashmir and stated that, the most profitable crops were brinjal, saag, knoll khol, radish, cabbage, cauliflower and spinach.

Small farmers were economically most efficient in the production of tomato in Karnataka as evident by the higher profit for every kilogram of production (Rs 2.30 compared to Rs 1.57 for medium farmers and Rs 1.65 for large farmers), higher net return (Rs 1,10,671 per hectare compared to Rs 90,567 per hectare for medium farmers and Rs 88,108 per hectare for large farmers) and higher benefit cost ratio (2.17 compared to 1.79 in medium and 1.90 in large farms). (Murthy et al., 2009)

Chatterjee et al., (2011) studied the economics of solanaceous vegetables in the Gangetic alluvial of West Bengal. It was found that when brinjal, hybrid tomato and chilli were cultivated with an open pollinated local cultivar, the per hectare returns obtained were Rs 2.46, Rs 3.14, and Rs 1.27 respectively for every Rupee spent. The study concluded that during autumn-winter season in West Bengal the cultivation of hybrid tomato was the most remunerative activity, which was closely followed by brinjal.

2.2. Marketing.

Four marketing channels were identified for white onion in Raigad district of Maharashtra by Gadre et al (2002) which were,

a) Channel I - Producer -Consumer
b) Channel II - Producer -Wholesaler -Consumer
c) Channel III - Producer -Retailer -Consumer
d) Channel IV -Producer -Wholesaler -Retailer -Consumer

The producer's share in consumer's rupee was the highest (98.95 per cent) in channel I and it was lowest (65.60 per cent) in channel II. The producers share in consumer's rupee in other channels varies as 70.73 per cent in Channel III and 68.60 per cent in channel IV.

Chole et al (2003) studied the price spread in the marketing of brinjal in Maharashtra state and identified four marketing channels.

a) Channel I - Producer—Retailer—Consumer.

b) Channel II - Producer—Wholesaler—Retailer—Consumer.

c) Channel III - Producer—Commission agent—Wholesaler—Retailer-Consumer

d) Channel IV - Producer -Retailer—Consumer

Channel II was the important channel in sale of brinjal for the farmers in the study area because major portion of the produce was marketed through this channel.

A study conducted by Saha and Mukhopadyay (2003) on the inter temporal variations in marketing margin and price of potato in West Bengal found that wholesale price, harvest price and marketing margin have unidirectional inter-year fluctuation. The fluctuation in marketing margin is more associated with that of wholesale price. Such an association implies the greater control of the wholesalers in the determination of marketing margin which seems to be consistent with the *advantageous position [monosponistic and monopolistic] assumed by the wholesalers* both at buying and at selling ends.

Balappa and Hugas (2003) evaluated the economics of onion production in Karnataka and observed that the average marketing cost incurred by the producer-seller in onion in the overall study area accounted to Rs 56.72 per quintal, its magnitude being higher in Gulbarga (Rs 68.76 per quintal) and Raichur (Rs 60.81 per quintal) markets as compared to Bijapur (Rs 56.06 per quintal), Belgaum (Rs 43.55 per quintal) and Dharwad (Rs 41.05 per quintal) markets, mainly due to higher commission paid by them. Out of the total marketing cost incurred by the product-seller, the commission charge (35.95 per cent) accounted for major component followed by expenditure on transportation (32.04 per cent) and cost of packing (17.35 per cent) in the overall study area. Similar pattern was observed in all the markets except Belgaum and Dharwad markets wherein transportation cost was the major component followed by cost on packing and commission charges. These three

components alone accounted for about 85.34 per cent of the total marketing cost incurred by the farmers.

Babu et al (2003) analyzed the price spread and marketing of green chillies in Andhra Pradesh and identified two marketing channels:

a) Channel-I : Producer—Village Merchant—Wholesaler—Retailer—Consumer.
b) Channel- II : Producer—Local consumer

Three marketing channels were identified for soybean in Madhya Pradesh. The marketing efficiency was highest in channel II, because of the absence of intermediaries as well as low marketing cost. The total marketing cost of soybean was observed to be highest in channel-I (Rs 202.52) and lowest in channel-II (Rs 160.40). The producer's share in consumer price was almost similar in channel-II and channel-III. (Banafar et al., 2003)

Devaraja (2004) studied the producers vs. consumer's price parity for the vegetables in rural and urban markets of Southern Karnataka. It was seen that the total marketing cost for selling all the vegetables in Mysore market (rural) were comparatively lower than that for selling in Bangalore market (urban market).

The presence of four marketing channels was noted for vegetables in Himachal Pradesh by Singh and Chauhan (2004). Regarding disposal of the produce, channel III (Producer –Wholesaler - Commission agent - Retailer -Consumer) was the important one being followed by more than 70 per cent vegetables growers. The marketing margin of wholesalers was observed to be the highest (17.00 per cent) for tomato and the marketing margin of retailer was the highest (19.03 per cent) in the case of cauliflower in channel-III.

Birari et al (2004) studied the marketing of cole vegetables in Western Maharashtra and reported that the marketing efficiency indices for cabbage and

cauliflower were less than one hundred during all the seasons. It indicated that these vegetables were not marketed efficiently during all the seasons.

Khatkar et al (2005) reported that in the marketing of mushrooms in Haryana, producer's share in consumer rupee was 60 per cent. The wholesalers and retailers were taking away the major share of 3 per cent and 31.67 per cent of consumer's price without investing anything in the marketing process. All the expenses in the marketing process were incurred by the producer.

Lokesh et al (2005) studied the economics of production and marketing of tomato in Karnataka and identified five marketing channels. The first channel was farmer to local trader and 75 per cent of the produce was sold to local traders at farm gate. Traders in turn exported tomato to various terminal markets (Bangalore, Chennai, Hyderabad, Bombay, Kolkata, Madurai, Pune and Vijayawada) depending on prices prevailing at a given point of time.

According to Kumar et al (2005) the marketing of onions in Uttar Pradesh involved three important channels: (i) producer-consumer, (ii) producer–hawker-shopkeeper–consumer, (iii) producer-wholesaler–retailer-consumer. Marketing efficiency of onion was estimated by using Shepherds' formula and Shepherd's indices were 31.81, 15.87 and 1.90 for Channel I, II and III respectively.

In a study by Bhosale et al (2006) on the price spread in marketing of cucumber in Raigad district of Maharashtra state, it was observed that out of the total quantity of cucumber marketed, 68.16 per cent was sold through village traders, 21.06 per cent was sold through retailers, and 10.78 per cent was directly sold to consumer by the producer.

Gandhi and Namboodiri (2006) studied the marketing of fruits and vegetables in Ahmedabad wholesale markets. The share of marketing cost in consumer price ranged from 5.5 per cent for potato to 18.3 per cent for onion. For the selected fruits

it varied from 5.1 per cent for apple to 17.9 per cent for mango. The marketing margin, expressed as a percentage of consumer's price for vegetables, ranged from 22.2 per cent for green pea to 50.3 per cent for tomato, for fruits it varied from 33.1 per cent for sapota to 69.4 per cent for apple. Finally, the share of farmer in consumer's Rupee for vegetables ranged from only 41.1 per cent for onion to as high as 69.3 per cent for green pea, and for the selected fruits this share varied from only 25.5 per cent for apple to 53.2 per cent for sapota. Thus, the analysis of farmers' share in consumer rupee in the Ahmedabad regulated wholesale markets indicated that the share was quite low in general but somewhat better for vegetables than for fruits.

Singh et al (2010) identified four channels for marketing of mushroom in Haryana. The share of the producer in consumer's rupee was minimum in channel I (62.62 per cent) and maximum in channel IV (91.51 per cent). But the price received by the grower was highest in channel IV (Rs 35 per kg) and minimum in channel I (Rs 32 per kg). The marketing cost of producer across channels was noticed highest in channel II (10.66 per cent), followed by channel I (9.90 per cent), channel IV (8.49 per cent) and channel III (6.56 per cent) but in absolute terms it was maximum under channel I (Rs 4.37 per kg) followed by channel II (Rs 4.27 per kg).

The marketable surplus and marketing efficiency of vegetables in Indore district was studied by Pramanik and Prakash (2010) and in general, it was found that the producer's share in consumer rupee was very low due to market intermediaries. This was also because of the perishable nature of vegetables, which induced forced sale. The price spread of vegetables clearly revealed that for the same commodity the breakup of consumer's rupee and the resulting producer's share vary greatly among different channels.

Sidhu et al (2010) identified three marketing channels for onion and garlic in Punjab which were,

a) Channel-I : Producer-Commission agent-Wholesaler-Retailer-Consumer

b) Channel-II : Producer-Retailer-Consumer

c) Channel-II : Producer-Consumer

Sangeetha and Banumathy (2011) studied the marketing of vegetables in Cuddalore district in Tamil Nadu and found that in the case of brinjal and tomato the following three channels were patronized by the vegetable growers for marketing of their produce: Channel-I (Producer – Commission agent cum Wholesaler- Retailer – Consumer), Channel-II (Producer-Commission agent cum Wholesaler-Consumer) Channel-III (Producer - Consumer). It could be observed that, the producer's net price for tomato was 39.57 per cent, 53.54 per cent and 93.87 per cent of consumer's Rupee in channel I, II and III respectively. In channel III, the farmers received more than 90 per cent of consumers' rupee.

The marketing of green peas in Punjab involved three supply chains, viz. I: Producer -wholesaler (through commission agent) -retailer - consumer; II: Producer – retailer (through commission agent) - consumer; III: Producer -consumer. The net price received by the producer was 67 per cent, 69 per cent and 94 per cent in supply chains I, II and III respectively in the Hoshiarpur market. The producer's share in supply chain III was the maximum because of direct sale by the producer to the consumer. The supply chain III has been found most efficient because its marketing efficiency was 14.83 as compared to 2.70 in supply chain II and 2.38 in supply chain I. The low marketing efficiency in supply chain I was on account of a higher number of market intermediaries in this chain. (Sidhu et al., 2011)

Sharma and Singh (2011) studied the economics of post harvest losses of vegetables in Uttarakhand and reported that post-harvest losses were maximum in tomato (23.19 per cent) and minimum in radish (6.52 per cent). Potato ranked second in the list registering 16.88 per cent loss, followed by brinjal (16.81 per cent), chilly (16.75 per cent), French bean (16.73 per cent), pea (16.37 per cent), okra (15.63 per

cent), onion (13.77 per cent), cauliflower (13.43 per cent), capsicum (10.43 per cent) and cabbage (8.65 per cent). Across different levels, it was found that the losses were maximum at the grower level in all the vegetables, except capsicum.

2.3. Credit utilization patterm

The pattern of flow of credit in Bichpuri development block of Agra district in Uttar Pradesh was studied by Singh et al., (1978) and it was found that the pattern of financing agriculture was similar both at the national and district level. The proportion of bank finance to agriculture showed a steady but slow increase over a period of four years. The overall share of large farmers in total finance to agriculture was much higher as compared to the small and medium farmers in study period (1972 to 1977). The share of small farmers showed an increasing trend mainly during the years 1976 and 1977 when deliberate efforts were made to direct the flow of bank credit in favour of small farmers.

Biswanger and Khandlyer (1992) in their study, on the impact of formal finance on the rural economy of India provided empirical evidence on the relationship between credit and output in agricultural sector. They found that rural credit led to modest increase in the use of fertilizers and investments in physical capital like tractors, pumps and annual stock. Further they observed that the expansion of rural financial system had a positive effect on rural nonfarm employment and output.

According to Lali (1999) together with the resourceful fruit and vegetable farmers of Kerala, the Kerala Horticultural Development Programme (KHDP) has created a new trend in credit repayment in the state.

Birdar and Jayasheela (2000) reported that in the case of agricultural credit many farmers did not get adequate loans for the intended purposes. This has resulted in the misutilization of the sanctioned loans other than for the intended purpose. Proper supervision over the end use of the credit and other personal reminders

through frequent field visits can be effective methods for checking mounting over dues.

According to NABARD (2001) the on-time repayment performance of SHG loan continued to be above 95 per cent. The coverage of SHG banking is increasing, as it is highly profitable for banks

Sharma (2001) determined the success of non-government organization in micro financing SHGs of rural poor. The study conducted in Himachal Pradesh found out that the repayment of the loans was 100 per cent by all the categories.

In his study on self help groups conducted in Tamil Nadu, Banerjee (2002) found that the repayment performance of loans issued from the common fund was 100 per cent. The study also reported that the interest rate charged varied widely among the groups. About 50 per cent of the groups had charged 2-3 per cent per month and in 20 per cent of the groups, the interest fixed was 15 per cent per month.

Jha (2002) reported that the repayment ethics among the borrower members of micro finance was invariably of higher order, as recovery performance in the case of selected micro finance institutions was observed to exceed 95-98 per cent for all types of credit products.

The agricultural credit flow in Bihar was analyzed by Singh and Nasir (2003). The analysis of the data revealed that agricultural loans increased continuously in Bihar from Rs 9,806 lakhs in 1980-81 to Rs 44,646 lakhs in 1996-97, accounting for an annual growth of 22.21 per cent which was about half of the corresponding growth rate achieved at the national level at current prices. Agricultural loans per hectare also increased continuously from Rs 117.93 in 1980-81 to Rs 581.25 in 1996-97.

Jeromi (2005) undertook a study to analyze the trend and issues relating to agricultural credit in the state of Kerala in the backdrop of developments in the agricultural sector. It revealed that aggregate loans issued for agriculture and allied

activities by all financial institutions in the state have been recording good growth and the share of medium term loans in total loans issued has been declining.

According to Babu et al., (2007) Swarnajayanti Gram Swarozgar Yojana (SGSY) credit played a major role in improving the farmers' standard of living. The findings indicated that the average gross income and net income of farms in post-borrowing situation were Rs 21,665.51 and Rs 8,559.03 when compared to pre-borrowing situation of only Rs 14,763.8 and Rs 3,770.15 respectively.

2.4. Income, expenditure and savings pattern

Singh et al., (1975) analyzed the income and expenditure at the family level to work out the investible surplus and the pattern of investment in agriculture and net savings available for mobilization. The analysis revealed that family income consisted of income from crop production, wages and salaries, milk production and sale of livestock, income from hiring out machinery etc. Annual income per family, annual consumption and expenditure on goods and services changed positively with holding size.

According to Rao and Vivekananda (1980) the personal saving or household saving was equal to the personal disposable income minus personal consumption expenditure of all individuals constituting the community.

Sharma (1980) computed Gini ratio for the year 1975-76 based on the data from NCAER study on household income and its decomposition and compared them with those for the year 1967-68. He concluded that the degree of inequality in income was less for 1975-76 than 1967 -68. He obtained a Gini ratio of 0.416 in 1975-76 as against 0.463 in 1967-68.

Farm income was defined by Satayanarayana and Pandey (1981) as the income inclusive of value of crops, livestock products, sale of farm assets, rent received from land, custom services, etc.

Bhatty and Vasishtha (1988) studied rural household savings and investment behaviour at all India level. According to them the ratio of physical savings had increased much faster for marginal land owners than for small and large ones. Saving rate for rural households increased significantly from 4 per cent in 1970-71 to 10 per cent in 1981-82 and the financial component of savings had risen faster than the physical component, thereby lowering the investment in physical assets.

According to Taneja (1988) average income per household was highest for farm households and lowest for labour households in the rural Punjab. The income disparity among farm households was reported to be greater than that between nonfarm households. He got a positive relationship among the number of earners in a household, family size, level of education and age of household head and average income.

Patel (1994) defined savings of a household as the amount derived after deducting the total family expenditure from net income of the farm family.

The women's participation and employment generation of rural poor through informal groups was studied by Puhazhendhi and Jayaraman (1999) and it was found that the savings were mobilized through cutting down the expenditure on essentials and not from the surplus in view of the subsistence nature of the poor. The rate of savings per member varied from Rs 840 to Rs 1,845 per annum, the average being Rs 1,068. The savings were kept in the common fund and for lending to members with rate of interest varying from 24 to 36 per cent per annum.

Puhazhendhi and Satyasai (2000) studied the economic and social empowerment of rural poor through self help groups and found that about 59 per cent of the sample households registered average net income per household in pre and post group formation which was Rs 20,177 and Rs 26,889 respectively.

The share of non-cereal items in the monthly per capita expenditure has been consistently increasing in both the rural and urban areas in India. The fall in percentage share of cereal items in the monthly per capita expenditure was more in rural areas as it declined from 55.70 per cent in 1972 -73 to 37.31 per cent in 1999-2000, while in urban areas it declined from 36.12 per cent to 25.7 per cent. The share of non food consumption expenditure increased from 27.1 per cent in 1972-73 to 40.6 per cent in 1999-2000 in rural areas while it increased from 35.5 per cent to 51.9 per cent in urban areas. In rural areas 59 per cent of the total expenditure was on food items while it was only 48 per cent in urban areas in 1999-2000. (Nasurudeen et al., 2006)

Verma et al (2007) studied the production and consumption pattern of major food items in North Eastern region of India. In rural areas of north eastern states per capita per month expenditure was highest in Arunachal Pradesh. Out of this amount 55.54 per cent was spent on food items whereas rest was spent on non-food items. Within expenditure on food items, 37.98 per cent was spent on cereals, 5.13 per cent on milk and milk products, 4.04 per cent on pulses, 18.22 per cent on fish, meat and eggs and 6.67 per cent on vegetables etc.

While studying the economics of food consumption pattern in Mysore Pavithra (2008) found that the expenditure elasticities of demand for food were less than one for all the food items in urban areas, whereas the expenditure elasticities were more than one for milk, edible oil, egg-fish group, vegetables, fruits and other food items in rural areas. The expenditure elasticity was highest for vegetables (0.961) and lowest (0.047) for other food items in urban areas. The expenditure elasticities for different food items varied between 0.704 in the case of cereals and 1.155 in the case of other food items in rural areas

The levels of consumption expenditure of the weaker sections in Muktsar district, Punjab showed that annual consumption expenditure on an average was Rs

85,539.34. The agricultural labourers, marginal farmers and small farmers had annual consumption expenditure of Rs 45,445.56, Rs 81,803.89 and Rs 1,39,075.84 respectively. The agricultural labourers spent Rs 35,367.98 on non durables and the corresponding figures for marginal and small farmers were Rs 54,162.98 and Rs 77,825.82 respectively. (Kaur and Singh, 2011)

2.5. Resource use efficiency

Karisomanagoudar (1990) studied resource use efficiency in rainfed onion production in Gadag Taluk of Dharwad district. It was observed that land and labour inputs significantly increased the gross revenue. The seed variable exercised a significant negative influence on earnings from onion. The variables included in the production function explained 96 per cent of the variation in output

Sailaja et al (1998) used Cobb Douglas production function to estimate the production elasticities of resource use on vegetable farms in Guntur, Andhra Pradesh and observed that there was diminishing return to scale for tomato and brinjal, constant returns to scale for cauliflower and increasing returns to scale for coccinia. Regarding production elastcicities, human labour input was found to have positive and significant effect on the output for all the crops concerned.

A study conducted on farm profitability and resource productivity in cultivation of onion production in Bolangir district of Orissa by Mohapatra (2001) using Double Log production function found out that land, seed, fertilizer and labour significantly influenced the yield and income. Also, the returns to scale was found to be constant.

Dileep et al (2002) studied the economics of contract farming in tomato. The ordinary least square estimates of the Cobb Douglas production function indicated that the coefficients of plant protection chemicals in the case of contract farmers were negative and significant at five per cent level, indicating excessive use of these

inputs. Similarly the coefficients of fertilizer expenses in the case of all the categories of non contract farmers were positive and significant indicating lesser use of the same. The R^2 values indicated that human labour, machine power, fertilizer expenses, plant protection expenditure and irrigation expenses explained about 54 to 96 per cent of the variations in the production of tomato among different categories of sample farms.

Srinivas and Ramanathan, (2005) conducted a study on farm profitability and resource productivity in cultivation of elephant foot yam in Kerala, Andhra Pradesh and Tamil Nadu by fitting Cobb-Douglas production function and found that in Tamil Nadu planting material and irrigation significantly influenced the returns from the crop.

Haque, T (2006) studied resource use efficiency in various crops spread over different states in India. A double log regression equation was worked out to find out whether farmers in different regions used various inputs in crop production efficiently during 1981-82 to 2002-03. Human labour continued to influence productivity of paddy in Uttar Pradesh quite significantly while machine labour influenced the productivity positively and significantly in Uttar Pradesh. The expenditure on irrigation had negative elasticities in almost all cases. The results indicated that farmers in several instances did not use inputs optimally.

Singla et al (2006) while studying the economics of production of green peas in Punjab analyzed the relative roles of different factors influencing the yield of green peas using regression analysis. The value of adjusted R^2 was found to be 0.95 in small, 0.81 in medium and 0.91 in large growers. The coefficients corresponding to irrigation and human labour were positive and highly significant in small farms. In medium farms, the coefficients of marketing and fertilizers were highly significant and positively affected the yield. In the case of large farms the coefficients of irrigation and pesticides were significant.

According to Suresh and Reddy (2006) the output elasticity of chemical fertilizers, farmyard manure and human labour were positive and significant in paddy cultivation in Peechi command area of Thrissur district of Kerala.

Sharma and Kachroo (2009) studied resource use efficiency and sustainability of maize cultivation in Jammu region of J & K state. Among the seven variables which were tested, factors which contributed significantly to maize output among the farmers were fertilizers, farmyard manure, human labour, capital and seed. The coefficient of multiple determination R^2 was 0.51 which meant that the explanatory variables included in the model explained 51 per cent variation in maize production.

2.6. Constraints in production and marketing

Thakur *et al.* (1994) identified the problems encountered by the farmers in marketing of vegetables. They were (1) unorganized marketing and low prices paid to farmers, (2) lack of mechanical grading, packing, and proper storage facilities, (3) malpractices, high and undue marketing margins and costs in markets, (4) lack of village roads, lack of sufficient and low cost transportation facilities. (5) lack of market information and market news, and (6) lack of processing units and cooperative societies.

According to Bonny (1996) who studied the constraints on commercial production of vegetable in Pananchery and Duthur, Kerala and reported that increased cost of plant protection chemicals was perceived as the most important factor by the respondents followed by inadequate market facilities, poor storage and other post-harvest facilities, insufficient capital and high labour costs.

Patel *et al.* (1997) in their study on marketing efficiency of Anand vegetable market in Gujarat reported that lack of storage facilities, delay in payment of sale proceeds, high cold storage charges and monopoly of few middlemen were the major problems faced by the cabbage and cauliflower growers.

The most important constraints in production and marketing of potato in Kolar district of Karnataka were identified by Nagaraja *et al.* (1999) by assigning the ranks. In production, high cost of seed material and diseases (Rank-I) were the major constraints followed by frequent power failure (Rank-II), high cost of fertilizers and plant protection chemicals (Rank-III), scarcity and high cost of labourers (Rank-IV) and non-availability of good seed material on time (Rank-V). The frequent fluctuations in price (Rank-I), involvement of too many middlemen (Rank-II), delayed payment (Rank-III), insufficient storage facilities (Rank-IV), low output prices (Rank-V) and high market charges (Rank-VI) were the main constraints in marketing.

Jayapalan and Sushama (2001) reported that among the production constraints of bitter gourd, incidence of pests and diseases ranked first followed by labour scarcity. Non-availability of inputs ranked third followed by weather problems in the fourth position. The other constraints included uneven production and unawareness of plant protection measures. Among the economic constraints, high cost of material inputs ranked first followed by high labour charge. Price fluctuation of the produce was the third important constraint faced by the bitter gourd farmers. Inadequate credit facilities ranked fourth and high transporting charges the fifth. Inadequate marketing facilities obtained the sixth rank among the economic constraints.

According to Joshi et al (2006) who studied the impact of crop diversification on small holders reported that prevailing constraints did not allow smallholders to fully expropriate the emerging opportunities in vegetable production. Major constraints in vegetable production were lack of an assured market and a well-developed seed sector. Since vegetables were perishable in nature, lack of efficient marketing system and appropriate infrastructure resulted in huge post-harvest losses. Further, non-availability of improved and good quality seed reduces the profitability and increases production risk. Other important factors that restrict expansion of area

under vegetables are higher risks in price and yield as compared to those in cereals and low marketable surplus that increases transaction costs

MATERIALS AND METHODS

CHAPTER III

MATERIALS AND METHODS

Formulation of a suitable methodology is a pre-requisite for meaningful economic analysis. This chapter presents the methodological framework used in the study. More specifically, the sampling design, methods of data collection and measurement of variables and the analytical tools used are briefly discussed in this chapter.

3.1 Area of study

A profile of the study region in terms of agro climatic conditions, topography and other socio-economic characteristics of a region are important for understanding the problems of agricultural development in that region. The present study mainly focuses on the performance appraisal of VFPCK and Kudumbashree farmers in Nemom block of Thiruvananthapuram district. The basic information of the study area regarding location, climatic condition, soil type and cropping pattern are reported in this section.

Thiruvananthapuram district is built on seven hills by the sea shore and is located at 8°30'N and 76°54'E on the west coast, near the southern tip of mainland India. The district is situated on the west coast of India, and is bounded by the Arabian Sea to its west and the Western Ghats to its east. The district spans an area of 2192 kilo meter^2 and the greater metropolitan area spans an area of 250 kilo meter^2. The average elevation of the district is 16 feet above sea level. The Geological Survey of India has identified Thiruvananthapuram as a moderately earthquake-prone urban centre and categorized it in the Seismic III Zone. Thiruvananthapuram lies on the shores of Karamana and Killi rivers. Vellayani, Thiruvallam and Aakulam backwaters lie in the district. The highest point in the district is the Agasthyarkoodam which rises 1869 meter above sea level.

Table.2 Classification of area on the basis of land utilization Thiruvananthapuram district (area in hectares).

Total Geographical area	218781
Forest	49861
Land put to non agricultural use	26651
Barren and uncultivable land	224
Permanent pastures and other grazing lands	0
Land under miscellaneous tree crops	30
Cultivable waste	418
Fallow other than current fallow	336
Current fallow	2904
Marshy Land	8
Still water	4340
Water logged area	9156
Social forestry	133862
Net area sown	20526
Area sown more than once	154388

Source: www.trivandrum.gov.in

3.1.1 Climate

The district has a climate that borders between a tropical savanna climate and a tropical monsoon climate. As a result it does not experience distinct seasons. The mean maximum temperature is 34 °C and the mean minimum temperature is 21°C. The humidity is high and rises to about 90 percent during the monsoon season. Thiruvananthapuram is the first area along the path of the

south-west monsoons and gets its first showers in early June. The district gets heavy rainfall of around 1700 mm per year. It also gets rain from the receding north-east monsoons which hit the district by October. The dry season sets in by December. December, January and February are the coldest months while March, April and May are the hottest. The lowest temperature recorded during winter was 15 °C, and the highest temperature recorded in summer was 39 °C.

3.1.2 Location of the study area

Nemom block was purposively selected as it is a major vegetable producing area in the district and since the three categories of farmers, namely the VFPCK, Kudumbashree and others were also available in the area (Table 3).

Nemom block which has an area of 122.41 square kilometer is located in Thiruvananthapuram and Neyyattinkara Taluks of Thiruvananthapuram district (GoK, nd). The grama panchayaths in Nemom block are Maranalloor, Balaramapuram, Pallichal, Vilavoorkkal, Malayinkeezhu, Vilappil and Kalliyoor (figure 1). The major soil types in this block are laterite, red laterite, clayey sand etc. The major fresh water source in the area is Vellayani lake.

3.2 Selection of crops

Cowpea and culinary melon were selected for comparison of the performances of VFPCK, Kudumbashree and other farmers since these crops were cultivated by majority of farmers in the study area.

3.3 Methodology

3.3.1 Selection of the sample

The list of VFPCK, Kudumbashree and other farmers cultivating both cowpea and culinary melon were collected respectively from the VFPCK field centres, Kudumbashree CDSs (Community Development Societies), and a private

Fig. 1. Location – Nemom Block

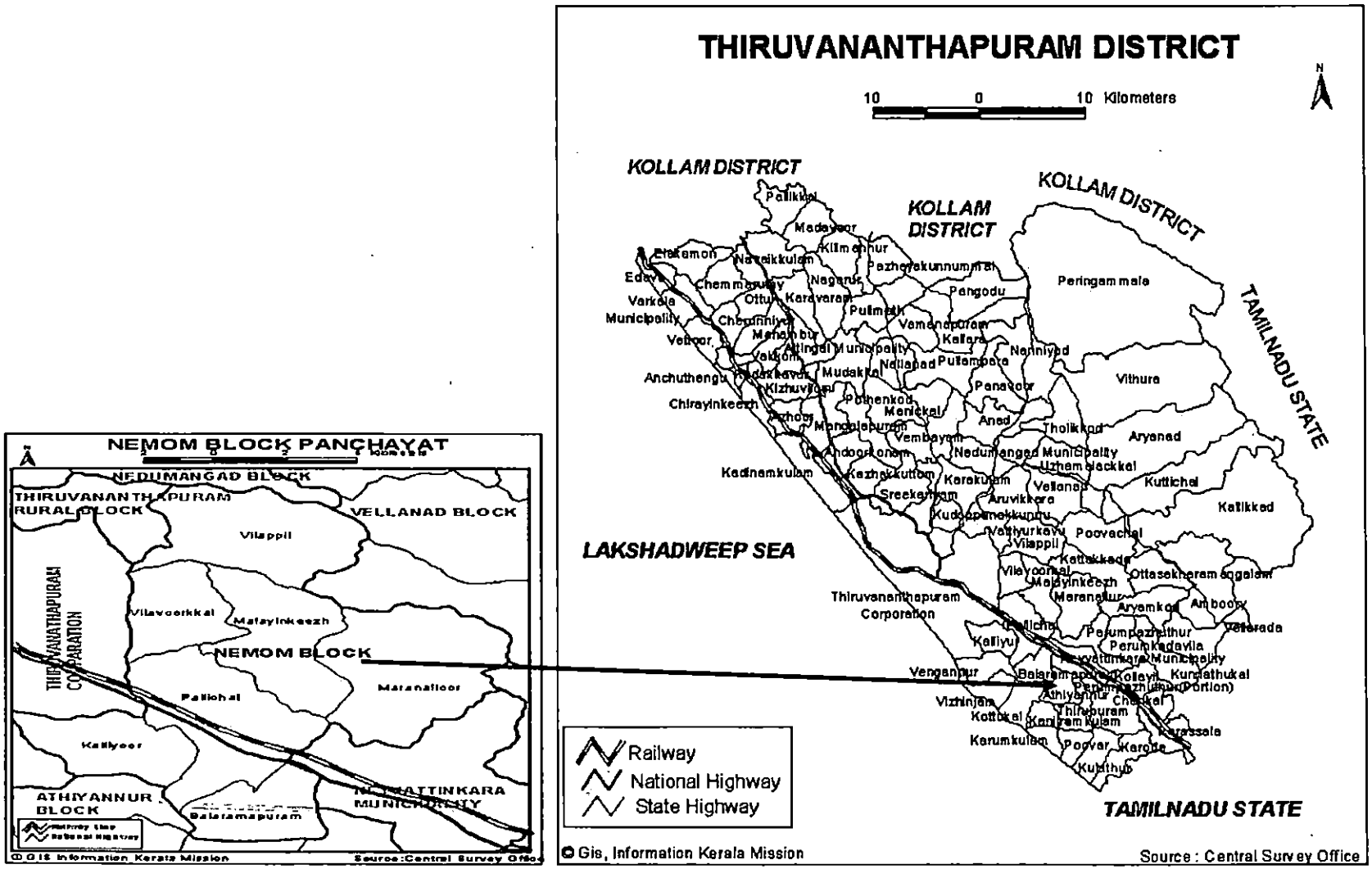


Table.3. Block wise area of vegetables in Thiruvananthapuram district (in hectares)

Name of block	Drum stick	Amaranth	Bitter gourd	Snake gourd	Okra	Brinjal	Green chilli	Bottle gourd	Little gourd	Ash gourd	Pumpkin	Cucumber	Cowpea (achinga)
Thiruvananthapuram	42.51	2.42	0.46	0.87	0.77	1.15	1.25	-	0.48	0.05	0.15	0.21	1.40
Kazhakkuttam	231.13	6.04	2.23	5.7	3.54	4.46	5.9	-	1.30	0.17	0.52	1.45	9.48
Nemom	126.75	24.13	20.3	20.51	9.93	5.91	7.68	-	10.85		1.63	16.1	42.16
Athiyannur	109.14	38.4	1.17	6.54	4.03	1.47	5.13	-	0.77	0.21	0.60	6.95	8.66
Chirayinkeezh	217.86	8.00	2.33	1.63	2.50	3.51	11.94	-	2.34		0.37	0.55	13.42
Kilimanoor	298.79	12.73	2.93	2.13	2.06	4.48	17.16	0.36	3.40	0.22	1.37	1.65	14.99
Varkala	149.26	6.93	3.05	2.26	2.82	4.97	12.52	0.02	3.72	0.20	0.82	0.4	6.28
Nedumangad	57.07	2.19	2.25	2.44	1.17	2.79	4.51	0.03	0.67	0.52	1.06	1.45	5.13
Vellanad	48.30	2.67	5.01	7.72	3.35	4.43	4.29	0.07	1.48	0.07	1.67	5.46	6.19
Vamanapuram	126.12	6.23	8.34	10.08	0.74	1.37	5.63	-	0.66	0.24	1.24	15.75	14.97
Parassala	192.55	18.91	4.04	11.72	6.22	6.52	4.60	-	5.80	0.52	0.36	17.23	13.76
Perumkadavila	167.22	21.84	1.21	9.12	3.75	3.22	5.35	-	1.06	0.23	0.68	15.41	10.62
Corporation and municipalities	174.8	2.65	4.51	0.8	1.71	0.90	5.66	-	1.05	0.01	0.30	1.34	5.96
District total	1941.5	153.14	57.83	81.52	42.59	45.18	91.62	0.48	33.58	2.44	10.77	83.95	153.02

Source: Department of Economics and Statistics, Kerala, 2011.

farmer's market (Pappanchani). Thirty each of VFPCK, Kudumbashree and other farmers were selected randomly from the list so as to make the total sample size 90 (Table. 4). To collect information about marketing aspects, 5 each of city wholesalers, suburban wholesalers and retailers from the study area were interviewed.

Table.4 Sampling distribution

Category	Sample farmers (No)
VFPCK	30
Kudumbashree	30
Others	30
Total	90

3.3.2 Collection of Data

The primary data required for the study was collected through personal interview method with the help of a pre-tested interview schedule. Two separate sets of interview schedules were prepared for collecting information from farmers and market intermediaries. The primary data was collected from the sample respondents during the months of January to April 2012. The data collected was tabulated and analyzed to derive conclusions relating to objectives.

3.3.3. Percentage Analysis

Simple percentage and averages were worked out to interpret the data related to age, family size, education level, income level, land utilization, cropping pattern, income, expenditure and savings pattern of the sample farmers.

3.3.4 Estimation of costs

The cost of cultivation was estimated by adopting the ABC cost concepts. The profitability of a crop enterprise can be estimated by finding the relationship

between the costs incurred and the returns from the crop production. Various cost concepts studied are,

1. Cost A1

It approximates the actual expenditure incurred in cash and kind and it includes the following items of costs.

a. Value of hired human labour (casual and permanent)
b. Value of seeds
c. Value of manures and fertilizers
d. Value of panthalling materials
e. Value of plant protection chemicals
f. Depreciation of farm implements and farm building
g. Interest on working capital
h. Miscellaneous expenses

a) Hired human labour

The actual paid labour engaged in crop production was considered as value of hired human labour. Hired human labour was valued at the prevailing wage rates in the area which ranged from Rs 450-500 for men and Rs 250-350 for women.

b) Seed

Farmers obtained seeds from various sources such as VFPCK, College of Agriculture, Vellayani, other farmers, commercial sellers etc. But most farmers used farm saved seeds. The cost of seed was estimated by taking into account the purchase price and in the case of farm saved seeds, the cost was estimated on the basis of prevailing market price which was Rs 1200 per kilogram for cowpea and Rs 760 per kilogram for culinary melon

c) **Manures and fertilizers**

Farm produced manure was evaluated as per the prevailing market rate in the area. Fertilizers and nonfarm produced manures were evaluated at their purchase prices.

d) Panthalling material

The materials used for panthalling were GI wire and bamboo poles. These materials were used for more than one season. So the cost for one crop was calculated by dividing the total cost of panthalling materials with the number of times the materials were used. Generally, panthalling materials were used for four seasons on an average.

e) Plant protection chemicals

The insecticides and fungicides were evaluated at their purchase prices.

f) Depreciation of farm implements

Depreciation was worked out by straight line method for dead stocks such as sprayer, pick axe, aluminium vessel etc which had a lifespan of more than two years.

g) Interest on working capital

Interest on working capital was charged at the rate of 12.5 percent per annum. This was the rate of recommended by Central Statistical Organization (CSO) for cost of cultivation studies. (Central Statistical Organization, 2008)

h) Miscellaneous expenses

These include items such as cost of transporting manures, fertilizers and panthalling materials to the farm, rent of sprayer, maintenance cost of implements

etc. Since very few farmers cultivated in their own land, land revenue was also added to miscellaneous cost.

2. Cost A2

Cost A2 is equal to cost A1 plus rent paid for leased in land. Land was leased for a period of one year. The rent reported by each farmer was taken into account for computing the rent on leased land since it varied widely in the area.

3. Cost B1

It is equal to cost A1 plus interest on fixed capital. The item fixed capital included implements such as pick axe, manvetty and equipments such as sprayer. The interest on fixed capital was charged at the rate of 10 per cent as recommended by the Central Statistical organization.

4. Cost B2

It is equal to cost B1 plus rent of leased in land plus rental value of owned land.

5. Cost C1

It is equal to cost B1 plus imputed value of family labour. The cost of family labour was imputed based on the prevailing wage rates paid to hired labour in the area.

6. Cost C2

It is equal to cost B2 plus imputed value of family labour.

7. Cost C3

Cost C3 is equal to cost C2 plus 10 percent of cost C2 which is accounted as allowance given for management of farm and risk.

3.3.5 Cost of cultivation and cost of production

Cost of cultivation refers to the total expenses incurred in cultivating one hectare of the vegetable and cost of production is the cost of producing one quintal of the vegetable.

3.3.6 Returns

Gross income was the total value of products at the prevailing market price. Net income was derived by subtracting the total cost from the gross income.

3.3.7 Efficiency Measures

Income measures are used as one of the measures of efficiency in the present study. Different income measures are associated with different cost concepts. They are as follows:

1. Farm business income : It is gross income minus cost A1

2. Own farm business income : Gross income minus cost A2

3. Family labour income : Gross income minus cost B2

4. Net income : Gross income minus cost C3

5. Farm investment income : Farm business income minus imputed value of family labour

6. Benefit cost ratio : It is the ratio of the benefits to the costs.

3.3.8 Analysis of variance

The technique of analysis of variance was developed by Fisher. It involves partitioning the total variation in the data to variation caused by

controlled factors named as treatments and uncontrolled variation known as error variations and comparing controlled variation against uncontrolled variation to determine if the treatments or samples are significantly different. In the present study, analysis of variance was used to test if there are significant differences in means of cost A2, benefit cost ratio and total returns among VFPCK, Kudumbashree and other farmers and thus compared their economic performances.

3.3.9 Resource use efficiency

Production function analysis was employed to evaluate the factors influencing cowpea and culinary melon cultivation and also to examine their relative efficiencies. The average product is a simple measure relating output and input. But to know the efficiency of the resources used in the farm, it is necessary to know the marginal product rather than average product. The marginal product could be known only if the technical relationships between outputs and inputs are estimated. Cobb Douglas production function has been fitted to the collected data in order to describe the relationship between the output and various inputs used for the production of vegetables. From the production function, elasticities of production of inputs were worked out which, in turn, have been used to calculate their marginal value products at their geometric means. Marginal productivity is the measure of the increase in total product, for the addition of one unit of a particular resource above its mean level while other resources are held constant at their respective mean levels. A significant difference between marginal value product and market price of individual inputs would indicate whether farmers are using, on an average, their factors of production efficiently or inefficiently.

3.3.10 Specification of the model

Cobb Douglas Production function has been selected for functional analysis since this model provides a compromise between (a) adequate fit of the data (b) computational manageability and (c) sufficient degrees of freedom

unused to allow for statistical testing. For both cowpea and culinary melon, the function has been fitted separately. The estimated values of the regression coefficients and R^2 were tested for statistical significance. Production Function fitted for cowpea is

$$Y = a\ x_1^{b1} x_2^{b2} x_3^{b3} x_4^{b4} x_5^{b5} x_6^{b6} x_7^{b7} u$$

and the model fitted for culinary melon is,

$$Y = a\ x_1^{b1} x_2^{b2} x_3^{b3} x_4^{b4} x_5^{b5} x_6^{b6} u$$

Where,

y	=	Value of output (Rupees)
a	=	Intercept
x_1	=	Area in cents
x_2	=	Expenditure on human labour (Rupees)
x_3	=	Expenditure on seeds (Rupees)
x_4	=	Expenditure on fertilizers (Rupees)
x_5	=	Expenditure on manures (Rupees)
x_6	=	Expenditure on crop protection chemicals (Rupees)
x_7	=	Expenditure on panthalling materials like rope, iron wires (Rupees ; only for cowpea)
$b_1 \ldots b_7$	=	Regression coefficients of explanatory variables.
u	=	Error term

The function has been estimated by Ordinary Least Square (OLS) technique which assumes the error term (u) to be randomly and normally distributed. Coefficient of multiple determination (R^2) was tested for its significance by applying 'F' test. The regression coefficients (bi) were tested for their significance using 't' test at chosen level of significance.

$$t = \frac{bi}{\text{Standard error of bi}}$$

3.3.11 Marginal productivity analysis

The marginal value product (MVP), marginal factor cost (MFC) and the ratio between these two were worked out for each input to understand the efficiency of input use.

$$\text{Marginal product} = b_i \times \frac{\bar{Y}}{\bar{X}_i}$$

Where,

$\bar{Y}$= Geometric mean of output

X_i = Geometric mean of i^{th} variable.

bi = the regression coefficient of i^{th} variable.

The marginal value product of each resource was calculated by multiplying the marginal product of the resource by the price of the product.

The formula used for the purpose was:

$$\text{Marginal value product of } X_i = b_i \times P_y \times \frac{\bar{Y}}{\bar{X}_i}$$

Where,

Py = Price of cowpea or culinary melon.

The input is used efficiently if the ratio between MVP and MFC is one. A ratio greater than one would indicate under utilization of resource and a ratio less than one would indicate overutilization of resource. Since the farmers used various forms of inputs ranging from simple to complex ones, it was not possible to arrive

at the MFC of each input. So marginal input cost was considered as price of one unit of the input used in production function.

3.3.12 Income inequality- Lorenz curve

Lorenz curve is one of the most useful graphical representations of distribution of income and it was used to show the inequality in the distribution of income. The Lorenz curve was constructed by plotting cumulative percentage share of income against the corresponding cumulative percentage share of households and successively joining the points by a smooth curve. The area between the egalitarian line or line of equality and the Lorenz curve represented the degree of inequality i.e., wider the area, larger was the inequality in the distribution of income. Lorenz curves were drawn separately for VFPCK, Kudumbashree and other farmers.

3.3.13 Marketing

Marketing consists of a series of activities involved in moving goods from the point of production to the point of consumption (Acharya and Agarwal, 2004). Five each of city wholesalers, suburban wholesalers and retailers were surveyed in the study for marketing analysis

3.3.13.1 Marketing costs and margins

In general, the difference between price paid by the consumer and that received by the producer for an equivalent quantity of produce is defined as price spread. Information related to movement and marketing of the harvested produce were collected from the individual farmers and different intermediaries to work out the price spread. To determine the marketing margins, the concept of concurrent margin was used in the present study in which the prices prevailing at successive stages are compared. Marketing margin of the various functionaries was worked out by deducting the costs incurred by them from the total price received by the particular intermediary. The cost items included building rent,

transport, loading, unloading and various prices paid by the trader. Further, the farmer's share in consumer's Rupee was calculated with the help of the following formula.

$$Fs = (Fp/Cp) \times 100$$

Where,

Fs = Farmer's share in consumer's Rupee (percentage).

Fp = Farmer's price

Cp= Consumer's price.

3.3.13.2 Estimation of Marketing Efficiency

Marketing efficiency is the degree of market performance. The movement of goods from producers to the ultimate consumers at the lowest possible cost consistent with the provision of service desired by the consumers is termed as efficient marketing. In this study, Shepherd's index was used to estimate the efficiency of the marketing channels of cowpea and culinary melon. Shepherd (1965) suggested that the ratio of total value of goods marketed to the marketing cost could be used as a measure of marketing efficiency.

$$M.E = [(V/I) - 1] \times 100$$

Where

M.E = Index of marketing efficiency

V = Value of vegetable Sold

I = Total marketing cost.

In the Shepherd's formula, higher the ratio, the higher would be the efficiency and vice versa.

3.3.13.3 Constraint analysis

The problems in production and marketing were analyzed using the Garrett's scoring technique. The respondents were asked to rank the factors or problems in production and marketing of cowpea and culinary melon and these ranks were converted into per cent position by using the following formula

$$\text{Per cent position} = \frac{100 \text{ X } (R_{ij} - 0.5)}{Nj}$$

Where,

R_{ij} = Ranking given to the i^{th} attribute by the j^{th} individual

N_j = Number of attributes ranked by the j^{th} individual. (Garrett, 1969).

By referring to the Garrett's table, the per cent positions estimated were converted into scores. Thus, for each factor, the scores of the various respondents were added and the mean value was estimated. The means thus obtained for each of the attributes were arranged in descending order. The attributes with the highest mean value was considered as the most important one and the others followed in that order.

RESULTS AND DISCUSSION

CHAPTER IV
RESULTS AND DISCUSSION

In the previous chapters, a brief review of the past studies, relevant methodology adopted and the general description of the study area were presented. The data collected during the survey were tabulated with that background and analyzed in relation to each specific objective of the study. In this chapter, the results of the analysis are presented and discussed under eight sections namely,

4.1. General characteristics of the sample farmers

4.2. Cropping pattern and cropping intensity

4.3. Economics of production

4.4. Resource use efficiency

4.5. Credit utilization pattern

4.6. Income, expenditure and savings pattern

4.7. Marketing

4.8. Constraints in production and marketing

4.1. GENERAL CHARACTERISTICS OF THE SAMPLE FARMERS

4.1.1. Age

Distribution of respondents with respect to age is presented in Table 5. It was observed that maximum number of VFPCK farmers (50 per cent) was of the age group of more than 50 years and 43 per cent was in the age group of 35-50 years.

Among the Kudumbashree farmers, a large majority (63 per cent) was in the age group between 35 to 50 years of age and nearly 27 per cent of them were less than 35 years old. As in the case of VFPCK farmers, a higher per cent of the other farmers (47 per cent) were more than 50 years of age and 43 per cent belonged to the age group of 35-50 years. Thus, meager participation of youth in vegetable production was observed in VFPCK and other farmers while Kudumbashree was in a better position with around 27 per cent of youth participation.

Table.5 Distribution of respondents according to age

Age	VFPCK		KUDUMBASHREE		OTHERS	
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
< 35 years	2	6.67	8	26.67	3	10.00
35-50 years	13	43.33	19	63.33	13	43.33
>50 years	15	50.00	3	10.00	14	46.67
Total	30	100	30	100	30	100

From the above analysis, it was observed that, more than 70 per cent of the farmers belonged to the age group of above 35 years among all the categories of vegetable growers. In the case of other farmers and VFPCK farmers, 90 per cent were in the age group of above 35 years. Another observation is that, 90 per cent of Kudumbashree farmers were below the age of 50 years while it was around 50 per cent among VFPCK and other farmers. This result stresses the need for programmes

to motivate younger generation in vegetable cultivation so as to attain self sufficiency in vegetable production.

4.1.2. Education

Educational status of respondents presented in Table 6 revealed that illiterate farmers were absent in all the three categories. Maximum number of farmers had a secondary level education which was 60 per cent each for VFPCK and other farmers and 57 per cent for Kudumbashree farmers. Degree holders were more in number among Kudumbashree farmers (10 per cent) which means that educated women are willing to take up agricultural operations in groups. This analysis reveals that those who are educated up to higher secondary or degree level are least interested in farming.

Table.6 Distribution of respondents according to education

Educational status	VFPCK		KUDUMBASHREE		OTHERS	
	Number	Per cent	Number	Per cent	Number	Per cent
Primary	9	30.00	1	3.33	1	3.33
Upper Primary	2	6.67	2	6.67	7	23.33
Secondary	18	60.00	17	56.67	18	60.00
Higher secondary	0	0	7	23.33	4	13.34
Degree	1	3.33	3	10.00	0	0
Total	30	100	30	100	30	100

4.1.3. Family size of farm households

A perusal of Table 7 indicated that 53 per cent of VFPCK households had a family size of 4-5 members and about 37 per cent had a size of less than 4 members. The same trend was observed in Kudumbashree farmers where 73 per cent households had a family size of 4-5 members and 23 per cent had less than 4 members. Among the other farmers also, 70 per cent had a family size of 4-5 members followed by 20 per cent with a family size of more than 5 members. In all the three categories, most households had a family size of 4-5 members which varied between 53 per cent to 73 per cent.

Table.7 Distribution of the respondents according to size of family

Family size	VFPCK		KUDUMBASHREE		OTHERS	
	Number of households	Average Family size	Number of households	Average Family size	Number of households	Average Family size
<4	11 (36.67)	2.36	7 (23.34)	2.57	3 (10.00)	2.00
4 to 5	16 (53.33)	4.25	22 (73.33)	4.00	21 (70.00)	4.24
> 5	3 (10.00)	6.33	1 (3.33)	7.00	6 (20.00)	6.33
Total	30 (100)	3.77	30 (100)	3.87	30 (100)	4.65

* Figures in parentheses denote per cent to total

4.1.4. Land holding pattern

From Table 8, it is clear that all the three categories of farmers owned less than 0.2 ha (50 cents) of land with the VFPCK farmers owning the lowest land area of 0.09 ha (22.50 cents). With regard to leased land, VFPCK and other farmers had an average of 0.6 and 0.5 hectares respectively while the Kudumbashree farmers who operated as a group of 3-5 members jointly held about 2 hectares of land. Average holding size varied from 0.63 hectares for other farmers to 2.2 hectares for Kudumbashree farmers.

Table.8 Average land holding size of the respondents (in hectare)

Particulars	VFPCK	Kudumbashree	Others
Owned land	0.09	0.18	0.13
Leased land	0.57	2.02	0.5
Average size of holding	0.66	2.2	0.63

4.2. CROPPING PATTERN AND CROPPING INTENSITY

Data presented in Table 9 revealed that the VFPCK farmers had the largest proportion of area under culinary melon (25 per cent) followed by cowpea (23 per cent) and Amaranthus (20 per cent). The Kudumbashree farmers had more than 29 per cent area under banana followed by over 12 per cent area under amaranthus, almost 11 per cent area under culinary melon and 10 per cent area under cowpea. More than 12 per cent of area of other farmers was under banana followed by around 7 per cent area each under cowpea and culinary melon.

Banana, especially Nendran variety was widely cultivated in the study area owing to its high demand in Kerala and highly remunerative nature. About 29 per

Table.9 Cropping pattern (in hectare) and cropping intensity (per cent) of the respondents

Crop	No of times sown	VFPCK		Kudumbashree		Other	
		Gross Area (ha)	per cent	Gross Area (ha)	per cent	Gross Area (ha)	per cent
Banana	1	8.00	15.36	32.00	29.07	5.60	11.81
Culinary melon	4	3.32	25.49	3.00	10.90	3.30	6.96
Cowpea	3	4.01	23.09	3.56	9.70	3.20	6.75
Snake gourd	3	0.98	5.64	1.78	4.85	1.25	2.64
Bitter gourd	3	1.30	7.49	1.72	4.69	2.30	4.85
Coccinia	1	0.24	0.46	0.65	0.59	0.14	0.30
Amaranthus	8	1.28	19.65	1.71	12.43	0.53	1.12
Okra	3	0.31	1.79	1.52	4.14	0.26	0.55
Brinjal	3	0.00	0.00	1.82	4.96	0.20	0.42
Chilli	1	0.05	0.10	2.20	2.00	0.00	0.00
Pumpkin	3	0.00	0.00	0.20	0.55	0.06	0.13
Bottlegourd	3	0.00	0.00	0.10	0.27	0.04	0.08
Elephant foot yam	1	0.00	0.00	0.40	0.36	0.10	0.21
Amorphophallus	1	0.00	0.00	0.40	0.36	0.00	0.00
Ginger	1	0.00	0.00	2.20	2.00	0.00	0.00
Tapioca	1	0.00	0.00	2.00	1.82	0.20	0.42
Paddy	2	0.00	0.00	1.70	3.09	0.20	0.42
Rubber	1	0.00	0.00	5.00	4.54	0.00	0.00
Coconut	1	0.49	0.94	4.04	3.67	1.60	3.37
Gross cropped area		52.10	100.00	110.07	100.00	47.41	100.00
Net cropped area		19.98		66.00		18.98	
Cropping intensity		261.00		166.77		249.79	

cent of the area of Kudumbashree farmers was under banana, because Kudumbashree supported Nendran banana cultivation in the district through its "Samagra" project by giving incentives, arranging subsidized loans and free aid in the form of fertilizers and pesticides through Krishibhavans. The other important crops cultivated in the study area were, okra, brinjal, bhendi, snake gourd, amaranthus, bitter gourd, coccinia, pumpkin, chilli, tapioca, bottle gourd etc.

VFPCK farmers and other farmers had a cropping intensity of about 261 per cent and 250 per cent respectively whereas the Kudumbashree farmers had a low cropping intensity of 167 per cent. The reason is that unlike the Kudumbashree farmers, the other two farmer groups had larger area under vegetables which can be sown multiple times a year whereas more than 29 per cent area of Kudumbashree farmers was under banana. From the cropping pattern analysis it can be seen that the major crops cultivated in the area were banana and vegetables with a small per cent area under rubber and paddy.

4.3. ECONOMICS OF PRODUCTION

The data on cost of production and returns are of special interest since they reveal the profitability of the enterprise and bring out the differences in unit cost and returns incurred by the less efficient and more efficient farms. Thus economics of production is a main criterion to compare the performances of VFPCK and Kudumbashree farmers.

The two crops whose economics of production evaluated, were cowpea and culinary melon. A brief description of the cultivation practices of these crops shall help in the better understanding of cost and returns incurred in the cultivation of these crops.

4.3.1. Cowpea (*Vigna unguiculata*)

Cowpea can be grown throughout the year under the agro climatic conditions of Kerala. It can be grown as a floor crop in coconut gardens and as an intercrop with tapioca during May- September. It can be grown as a pure crop in single crop and double crop rice fallows during rabi and summer seasons. Farmers of the study area cultivated cowpea throughout the year. The spacing for bush type, semi-trailing and trailing varieties is 30 × 15 cm, 45×30 cm and 2m ×2m respectively. Mainly local trailing varieties were grown in the study area, and a few farmers cultivated Vellayani Jyotika variety also. For one hectare of cowpea, 20 tonne farmyard manure, 250 kilogram lime, 20 kilogram N, 30 kilogram P_2O_5 and 10 kilogram K_2O are required as per the recommendations of the package of practices of Kerala Agricultural University. Lime may be applied at the time of first ploughing and half the quantity of N, full dose of phosphorous and potash may be applied at the time of final ploughing. The remaining nitrogen may be applied 15-20 days after sowing. Two irrigations 15 days after sowing and at the time of flowering are recommended. Nevertheless, in the study area farmers irrigated the crop every day. For pest control, Fenval was the main pesticide used by the farmers in the study area. Harvesting starts 45 days after sowing and is carried out once in three days. Yield varies from 15-18 tonnes per hectare (Thamburaj and Singh, 2004).

4.3.2. Cost of cultivation of Cowpea

A notable feature of the study area is that most of the farmers cultivated in leased land. Hence cost of cultivation was compared at both Cost A2 and Cost C3 basis. The cost of cultivation of cowpea is calculated and a detailed percentage analysis at Cost A_2 and Cost C_3 is presented in Table 10 and Table 11 respectively.

Cost of cultivation of Cowpea based on Cost A_2

For VFPCK farmers, out of the Cost A2 of Rs. 1,10,150 per hectare, thirty one per cent was contributed by hired labour followed by 23 per cent by manures (Table 10 and Figure 2).

Table.10 Cost A2 of Cowpea cultivation (Rs per hectare)

Particulars	VFPCK		Kudumbashree		Others	
	Cost	Per cent	Cost	Per cent	Cost	Per cent
Labour (Hired)	34419.08	31.25	833.30	1.52	51116.00	40.72
Seed	3402.30	3.09	2537.70	4.62	2941.00	2.34
Insecticide	6179.50	5.61	1521.50	2.77	7771.00	6.19
Manures	24970.00	22.67	16426.00	29.88	22071.32	17.58
Fertilizers	7524.40	6.83	914.17	1.66	7631.00	6.08
Panthaling materials	19329.00	17.55	21321.00	38.79	17523.00	13.96
Depreciation	1043.00	0.95	1438.60	2.62	871.14	0.69
Interest on working capital	1553.10	1.41	704.24	1.28	1756.95	1.40
Miscellaneous cost	3574.33	3.24	1517.43	2.76	3391.23	2.70
Cost A1	101994.71	92.60	47213.94	85.89	115072.64	91.67
Rent of leased in land	8155.60	7.40	7754.00	14.11	10459.00	8.33
Cost A2	110150.31	100.00	54967.94	100.00	125531.64	100.00

Cost A_2 was estimated as Rs 54,968 per hectare for Kudumbashree farmers of which 39 per cent was contributed by cost of panthalling material and 30 per cent by manures (Figure 3).

For other farmers, Cost A2 was estimated as Rs 1,25,532 per hectare out of which 41 per cent was contributed by hired labour and 18 per cent was contributed by manures (Figure 4).

Figure 2. Cost A2 of VFPCK farmers in Cowpea cultivation

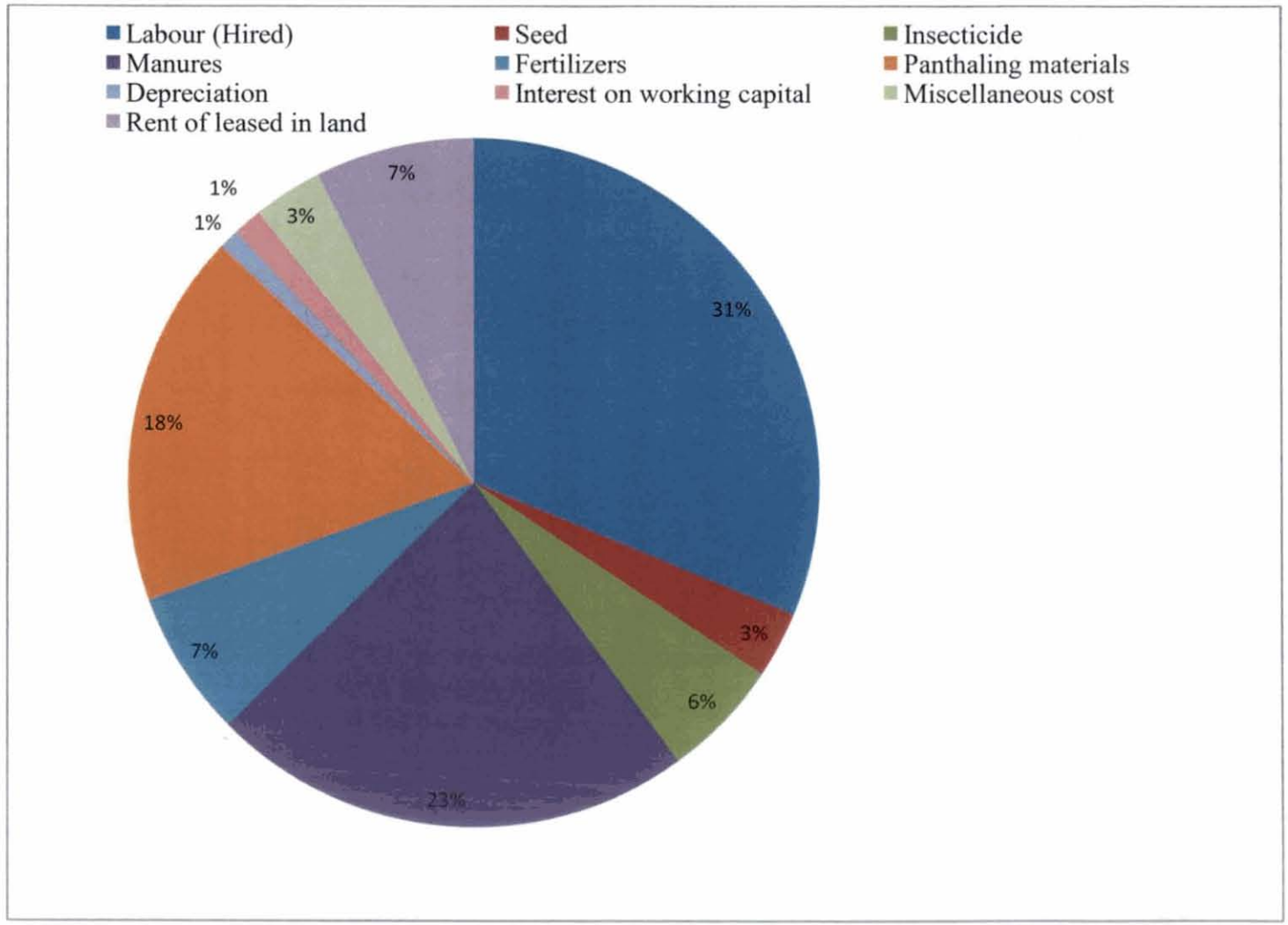


Figure 3. Cost A2 of Kudumbashree farmers in Cowpea cultivation

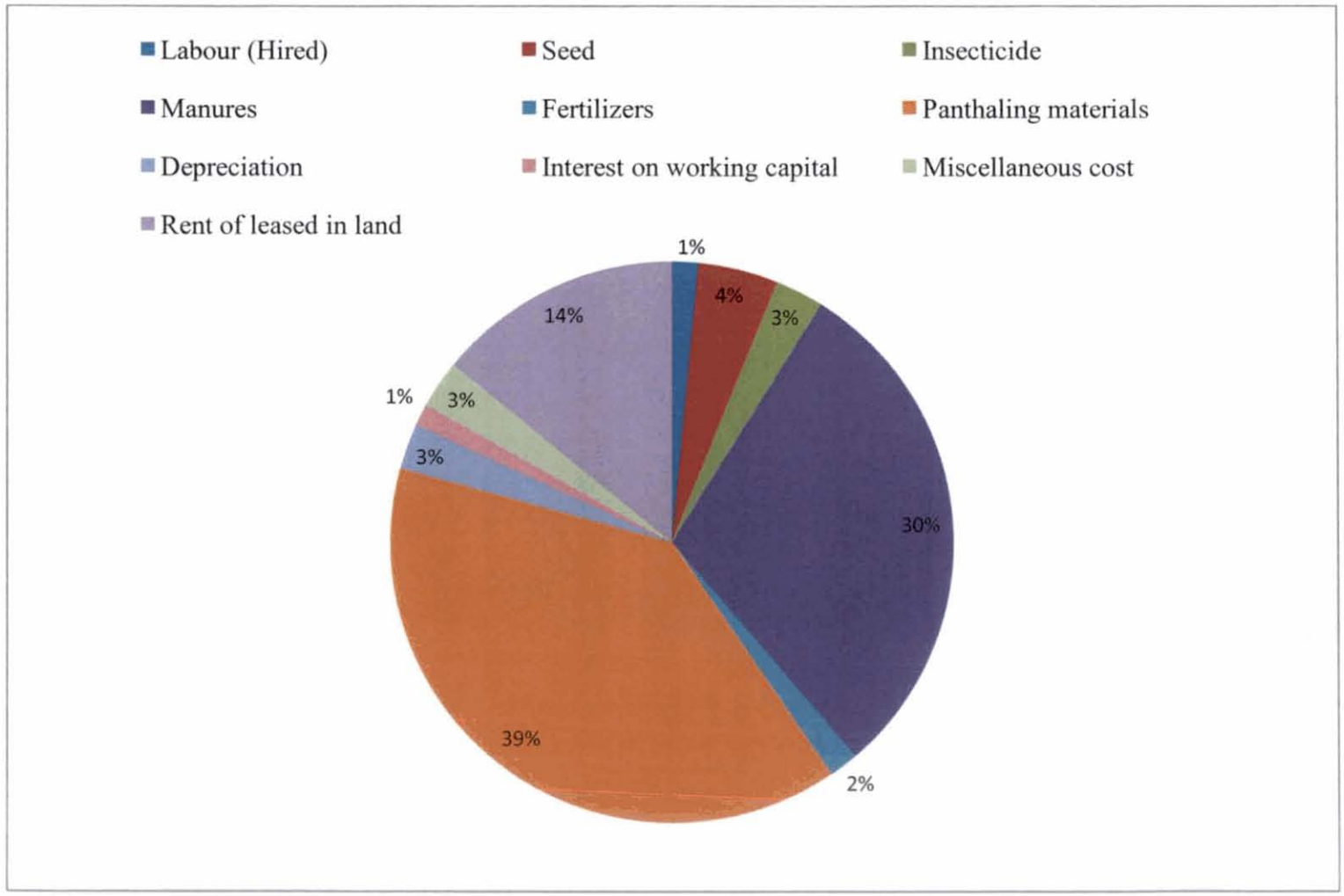


Figure 4. Cost A2 of Other farmers in Cowpea cultivation

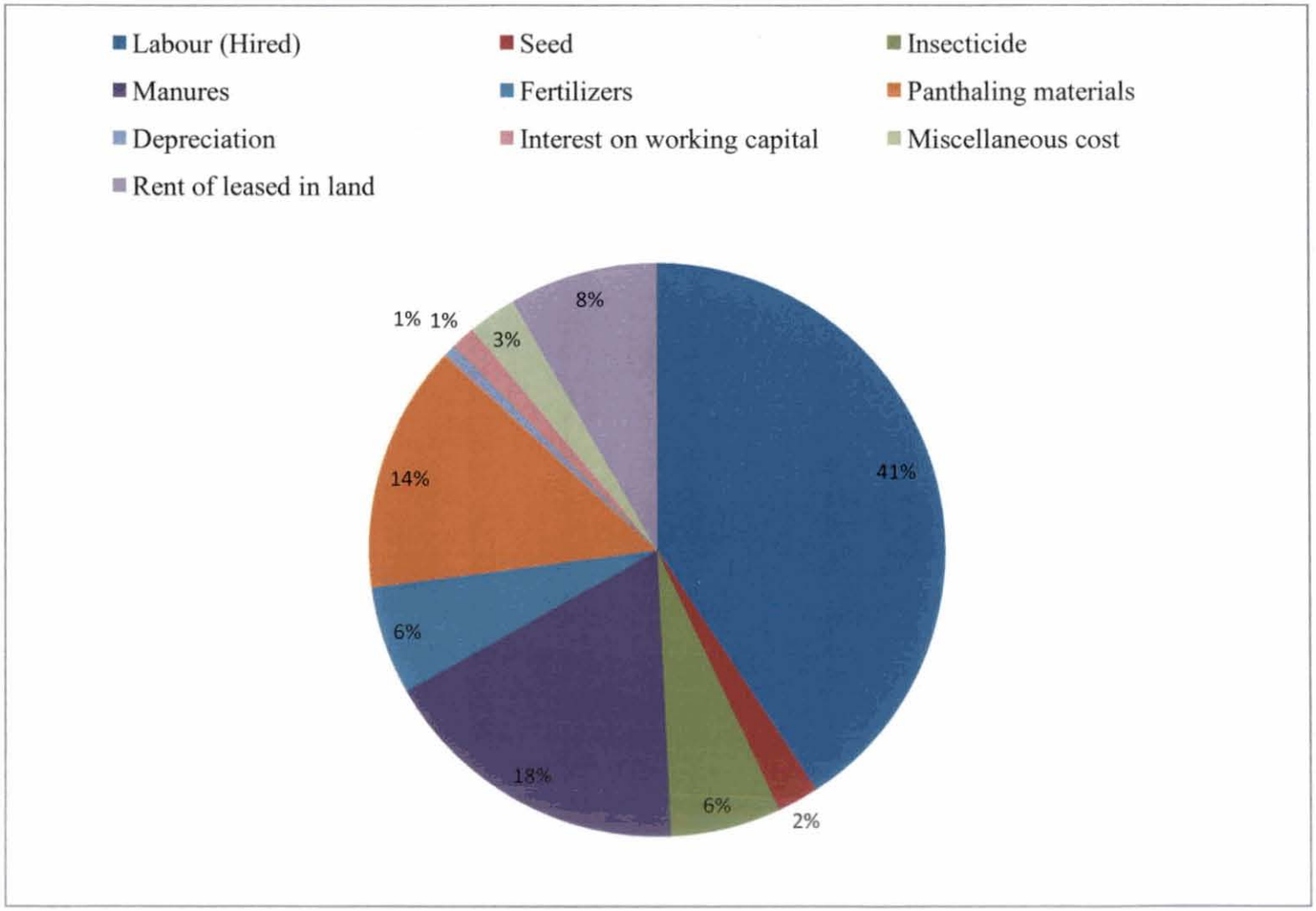
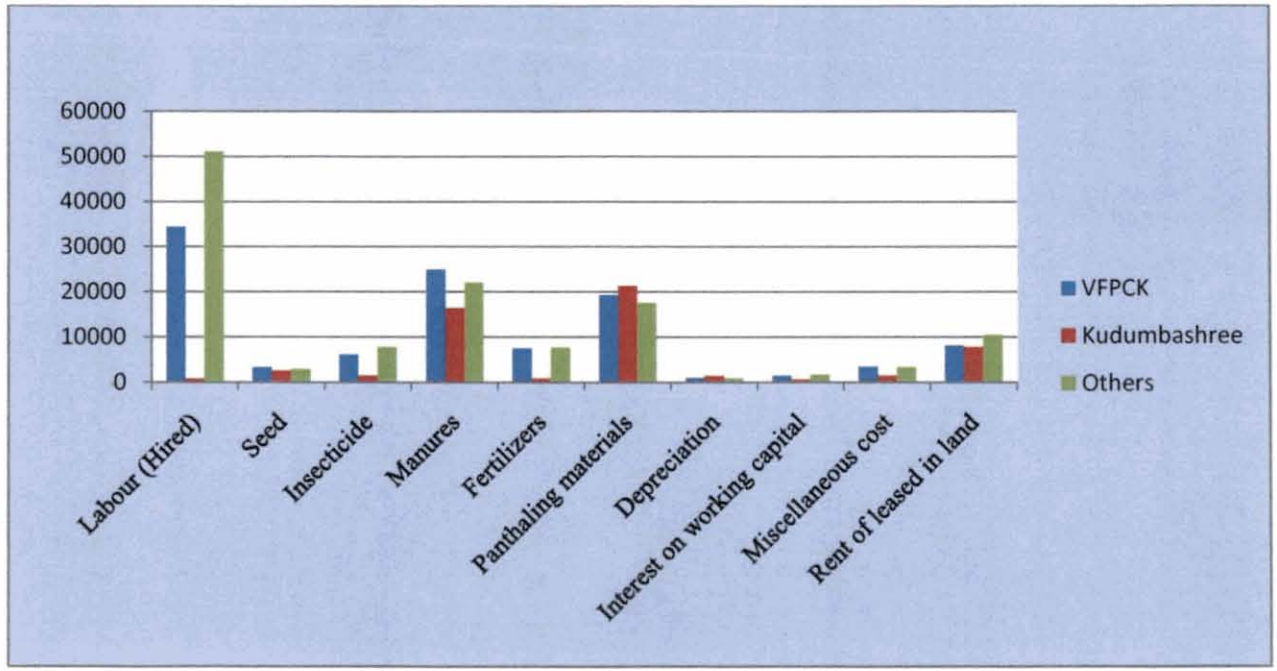


Figure 5. Comparison of Cost A2 of VFPCK, Kudumbashree and Other farmers- Cowpea



From the above analysis, it can be seen that hired human labour with a wage rate of Rs 500 per day was the most expensive item for VFPCK and other farmers, but for Kudumbashree farmers, almost all the operations were done by family labour and so hired labour contribution was very less (Figure 5).

Cost of cultivation of Cowpea based on Cost C_3

Cost of cultivation was also worked out based on Cost C3 also and is given in Table 11. Due to the huge involvement of family labour, cost of cultivation was worked out based on Cost C3 also. For the VFPCK farmers, Cost C_3 was Rs 3,30,613 per hectare with a family labour contribution of 57 per cent. The second important item was hired labour at 10 per cent and allowance given for farm management at 9 per cent.

For the Kudumbashree farmers, Cost C_3 was Rs 2,95,422 per hectare. In the case of Kudumbashree farmers too family labour was the highest item of input cost accounting for 72 per cent of the total cost. Allowance given for farm management occupied the second position with 9 per cent share followed by cost of panthalling (7 per cent). Kudumbashree farmers consisted mainly of housewives who undertook vegetable cultivation in groups of 4-5 members. They used only the manures and organic plant protection chemicals which were either farm produced or given free of cost from Krishibhavans. Also, most of the Kudumbashree farmers hardly used inorganic pesticides or fertilizers. As such the contribution of fertilizers and plant protection chemicals were less to the total cost. However, the cost of manures and organic plant protection chemicals given free of cost from Krishibhavans was imputed for working out the cost ofcultivation.

For the other farmers, Cost C_3 was Rs 3,65,867 per hectare. For the other farmers also, family labour contributed the highest share in the total cost by imparting 56 per cent to the cost of cultivation followed by cost of hired labour at 14 per cent and allowance for farm management at 9 per cent.

From the analysis of data, it could be seen that cost of cultivation (at Cost C_3) was the highest for other farmers followed by VFPCK farmers and Kudumbashree farmers. Human labour constituted the highest share of cost C_3 which was respectively 67 per cent, 72 per cent and 70 per cent of the total cost of cultivation for VFPCK, Kudumbashree and other farmers with a family labour contribution of 57 per cent, 72 per cent and 56 per cent. Hired labour was the highest for other farmers (14 per cent) followed by VFPCK farmers (10 per cent) and the least for Kudumbashree farmers (0.28 per cent). Out of the total labour cost, family labour contributed a major share for all the three categories of farmers. Kudumbashree farmers are mostly housewives and they operate as a joint liability group comprising of about 4-5 members. Thus they have access to a large pool of family labour. Hence most of the farm activities were done by the members themselves and their families which is the reason for the very low cost incurred on hired labour.

Non availability of labour as well as high wage rates which steeply rose from Rs 100 in the year 2004 to Rs 500 in the year 2012 forced the farmers to depend on family labour. Also the idle time of the women members of the family could be utilized effectively by engaging in farm activities. Thus, family labour component was the highest among all the cost components. Similar findings were reported by Sandhya (1992) and Sreela (2005)

Table.11 Cost C3 of Cowpea cultivation (Rs Per Hectare)

Particulars	VFPCK		Kudumbashree		Others	
	Cost	Per cent	Cost	Per cent	Cost	Per cent
Labour (Hired)	34419.08	10.41	833.30	0.28	51116.00	13.97
Seed	3402.30	1.03	2537.70	0.86	2941.00	0.80
Insecticide	6179.50	1.87	1521.50	0.52	7771.00	2.12
Manures	24970.00	7.55	16426.00	5.56	22071.32	6.03
Fertilizers	7524.40	2.28	914.17	0.31	7631.00	2.09
Panthaling materials	19329.00	5.85	21321.00	7.22	17523.00	4.79
Depreciation	1043.00	0.32	1438.60	0.49	871.14	0.24
Interest on working capital	1553.10	0.47	704.24	0.24	1756.95	0.48
Miscellaneous cost	3574.33	1.08	1517.43	0.51	3391.23	0.93
Cost A_1	101994.71	30.85	47213.94	15.98	115072.64	31.45
Rent of leased in land	8155.60	2.47	7754.00	2.62	10459.00	2.86
Cost A_2	110150.31	33.32	54967.94	18.61	125531.64	34.31
Interest on fixed capital	155.32	0.05	621.31	0.21	120.48	0.03
Cost B_1	102150.03	30.90	47835.25	16.19	115193.12	31.48
Rental value of own land	2143.00	0.65	446.23	0.15	446.67	0.12
Cost B_2	112448.63	34.01	56035.48	18.97	126098.79	34.47
Imputed value of family labour	188108.71	56.90	212530.00	71.94	206507.58	56.44
Cost C_1	290258.74	87.79	260365.25	88.13	321700.70	87.93
Cost C_2	300557.34	90.91	268565.48	90.91	332606.37	90.91
Allowance paid for farm management	30055.73	9.09	26856.55	9.09	33260.64	9.09
Cost C_3	330613.08	100.00	295422.02	100.00	365867.00	100.00

4.3.3. Returns

VFPCK farmers obtained the highest yield of 12,661 kilogram per hectare from cowpea followed by the other farmers with a yield of 11,007 kilogram per hectare (Table.12). The yield obtained by Kudumbashree farmers was very small with 5,215 kilogram per hectare. Low yield obtained by Kudumbashree farmers may be due to the less application of fertilizers and plant protection chemicals.

Table.12 Yield and returns form cowpea (per hectare)

Category	VFPCK	Kudumbashree	Others
Yield per ha (Kg)	12661	5215	11007
Gross returns per ha (Rs)	443135	182525	385245
Net returns at Cost A2	332985	127557	259713

Returns obtained were Rs 4,43,135, Rs 1,82,525 and Rs 3,85,245 respectively for VFPCK, Kudumbashree and other farmers at a market price of Rs.35 per kilogram. However, the yield obtained was below optimum for all the categories of farmers as the estimated potential yield of cowpea is 15-18 tonnes per hectare. Net returns at Cost A2 were respectively Rs 332985, Rs 127557 and Rs 259713 for the VFPCK, Kudumbashree and other farmers.

4.3.4. Cost of production of Cowpea

Cost of production on Cost A_2 basis was very low for all the categories of farmers (Table 13). It was Rs 8.7, Rs 10.54 and Rs 11.41 per kilogram respectively for VFPCK, Kudumbashree and other farmers.

Table.13 Cost of production of Cowpea (Rs per kilogram)

Particulars	VFPCK	Kudumbashree	Others
Cost A_1	8.06	9.05	10.45
Cost A_2	8.70	10.54	11.41
Cost B_1	8.07	9.17	10.46
Cost B_2	8.88	10.74	11.45
Cost C_1	22.93	49.93	29.22
Cost C_2	23.74	51.50	30.21
Cost C_3	26.11	56.65	33.24

On Cost C_3 basis, VFPCK farmers had the lowest cost of production of Rs 26.11 per kilogram and Kudumbashree farmers had the highest cost of production of Rs 56.65 per kilogram which was higher than the market price of cowpea (Rs 35 per kilogram). Low yield contributed to the high cost of production of Kudumbashree farmers.

4.3.5. Measures of efficiency of Cowpea cultivation

Income measures in relation to various cost concepts were worked out and are presented in Table 14. The profitability of the crop can be judged from the income measures. Farm business income or profit at Cost A_2 of VFPCK, Kudumbashree and other farmers on per hectare basis were respectively Rs 3,41,140, Rs 1,35,294 and Rs 2,70,173. Farm business income of VFPCK farmers was 152 per cent higher than

that of Kudumbashree farmers and 26 per cent higher than that of other farmers. Family labour income which is gross income minus Cost B_2 was the highest for VFPCK farmers. Out of the three categories of farmers, VFPCK farmers obtained the highest net income followed by the other farmers whereas the Kudumbashree farmers incurred a loss of Rs 1,12,915. In the case of Kudumbashree farmers, net returns were negative because of poor yield and high cost of family labour. For the same reason, net income was low for the other farmers also.

Table.14 Income measures in relation to different cost concepts for Cowpea (Rs per hectare)

Particulars	VFPCK	Kudumbashree	Others
Farm business income	341140.29	135293.56	270172.69
Own farm business income	332984.69	127539.56	259714.00
Family labour income	330686.37	126472.00	259146.54
Net income	112521.92	-112915.00	19378.00
Farm investment income	153031.58	-76846.00	63665.11

Summing up, the farm business income, own farm business income, family labour income, net income and farm investment income were the highest for VFPCK farmers followed by the other farmers whereas the Kudumbashree farmers had the lowest values for all the income measures. The net income values which are the most suitable measures of assessment of profitability of a farm revealed that VFPCK farmers were the most efficient in cowpea production whereas Kudumbashree farmers were the least efficient. Nevertheless Kudumbashree farmers continued to produce since 72 per cent of the cost is on family labour which will be wasted otherwise. Also inputs such as seed, fertilizers, manures and plant protection chemicals were supplied to them through Krishibhavans free of cost which enabled

them to produce enough for their home consumption and for sale in their neighbourhood.

4.3.6. Benefit cost ratio

Benefit cost ratio indicates value of output per rupee of input cost. This ratio will serve as a measure which would indicate as to whether the costs incurred commensurate with the returns obtained. Benefit cost ratio of cowpea for all the three categories of farmers is given in Table 15.

Table.15 Benefit-cost ratio of Cowpea based on different cost concepts

Benefit cost ratio based on	VFPCK	Kudumbashree	Others
Cost A_1	4.34	3.86	3.34
Cost A_2	4.02	3.32	3.06
Cost B_1	4.34	3.81	3.34
Cost B_2	3.94	3.25	3.05
Cost C_1	1.52	0.70	1.19
Cost C_2	1.47	0.67	1.15
Cost C_3	1.34	0.61	1.05

Returns generated per rupee invested were found to be the highest (4.02) for VFPCK farmers and it was 3.32 and 3.06 for Kudumbashree and other farmers respectively on Cost A_2 basis. This was due to a very low Cost A_2 owing to the maximum utilization of family labour and minimal use of hired labour. For VFPCK farmers, a higher yield also contributed to a large benefit-cost ratio when compared to the other two categories of farmers. However the benefit-cost ratio on Cost C_1 basis was more than one only for VFPCK farmers and other farmer. The results obtained here are in harmony with the conclusions derived by Grover *et al.*, (2003) that the

benefit cost ratios in tomato cultivation in Punjab were almost equal to or greater than 2 over all the costs except Cost C_3 which showed the profitability of the crop.

4.3.7. Comparison among the three groups of farmers

Analysis of variance (ANOVA) was done to analyze the significant difference in mean values of Cost A_2, gross returns and benefit cost ratio at Cost A_2 of cowpea production. In analysis of variance, if the difference between group means is greater than the critical difference, then there is a significant difference between the groups. Since Cost A_2 includes all paid out costs including rent paid for leased in land analysis of variance was done to see the extent of difference among different groups of farmers at Cost A_2 level.

Table.16 Comparison of Cost A_2, gross returns and benefit cost ratio at Cost A_2 in Cowpea cultivation

Particulars	VFPCK	Kudumbashree	Others	Critical difference
Cost A_2 (Rs)	110150.31	54967.94	125531.64	24703.41
Gross returns (Rs)	443135.00	182525	385256.90	73467.61
BC ratio at Cost A_2	4.02	3.32	3.06	0.46

The analysis of variance presented in Table 16 revealed that Cost A_2 of both VFPCK and other farmers were significantly higher than that of Kudumbashree farmers while there was no significant difference between Cost A_2 of VFPCK and other farmers. Similarly the gross returns obtained by both VFPCK and other farmers stood at a significantly higher level when compared with that of the Kudumbashree farmers. The benefit cost ratio at Cost A_2 of VFPCK farmers was significantly higher than that of both Kudumbashree farmers and other farmers, while there was no significant difference between the BC ratios of Kudumbashree and other farmers.

From the above analysis it can be concluded that VFPCK farmers are superior to the other two categories of farmers.

4.3.8. Culinary Melon- *Cucumis melo var. acidulus*

Culinary melon is an important cucurbit grown in Kerala. The ideal seasons for cultivation are January to March and September to December. In the present study, details of the crop from January to March were taken into account. Cultivation practices recommended are as follows. Seed rate varies from 0.5-0.75 kilogram per hectare and spacing is 2m × 1.5 m. Pits of 60 cm diameter and 30-45 cm depth are dug and four to five seeds are sown per pit. Farm saved or purchased local variety seeds were used in the study area. Farm yard manure of 20-25 tonne per hectare is applied as basal dose and a fertilizer dose of 35: 25: 25 kilogram of N: P_2O_5: K_2O is recommended. Even though irrigation at 3-4 days interval is recommended the farmers in the study area irrigated the crop every day. The main pesticide used for culinary melon was Ekalux. The yield obtained varies from 20 -25 tonnes per hectare.

4.3.9. Cost of cultivation of Culinary Melon

The cost of cultivation of culinary melon is calculated and a detailed percentage analysis of cost A_2 and cost C_3 is presented in tables 17 and 18 respectively.

Cost of cultivation of Culinary melon based on Cost A_2

For VFPCK farmers, out of the total Cost A_2 of Rs 73,438 per hectare, the most important item of expenditure was hired human labour which accounted to 30 per cent followed by manures which was almost 30 per cent and rent of leased land which was around 13 per cent (Table 17 and Figure 6).

The total Cost A_2 was estimated to be Rs 32,326 per hectare. for the Kudumbashree farmers. The most important item of expenditure was manure which was more than 50 per cent of total cost A_2. The second important item was rent of leased land which was 22 per cent (Figure 7).

For other farmers, out of the total Cost A_2 of Rs. 84,650 per hectare, labour was the major contributor which accounted to 34 per cent, followed by manures (29 per cent) and rent of leased land (14 per cent).

Table.17 Cost A2 of Culinary Melon cultivation (Rs per hectare)

Particulars	VFPCK		Kudumbashree		Others	
	Cost	Per cent to Cost A_2	Cost	Per cent to Cost A_2	Cost	Per cent to Cost A_2
Labour (Hired)	22209.00	30.24	3150.00	9.74	29015.00	34.28
Seed	1685.00	2.29	1055.94	3.27	1118.40	1.32
Plant protection	5535.00	7.54	1329.72	4.11	6300.40	7.44
Manures	21839.00	29.74	16555.31	51.21	24246.00	28.64
Fertilizers	8420.00	11.47	766.67	2.37	7931.40	9.37
Depreciation	972.12	1.32	1200.44	3.71	970.74	1.15
Interest on working capital	811.98	1.11	308.65	0.95	925.81	1.09
Miscellaneous	2672.40	3.64	845.34	2.62	2490.83	2.94
Cost A_1	64144.50	87.35	25213.11	78.00	72998.58	86.24
Rent of leased in land	9293.10	12.65	7113.20	22.00	11651.55	13.76
Cost A_2	73437.60	100.00	32326.31	100.00	84650.13	100.00

From the above analysis it was observed that Cost A_2 was the highest for other farmers while it was the least for Kudumbashree farmers. For VFPCK and other farmers, the major item of expenditure was hired labour but since Kudumbashree

Figure 6. Cost A2 of VFPCK farmers in Culinary Melon cultivation

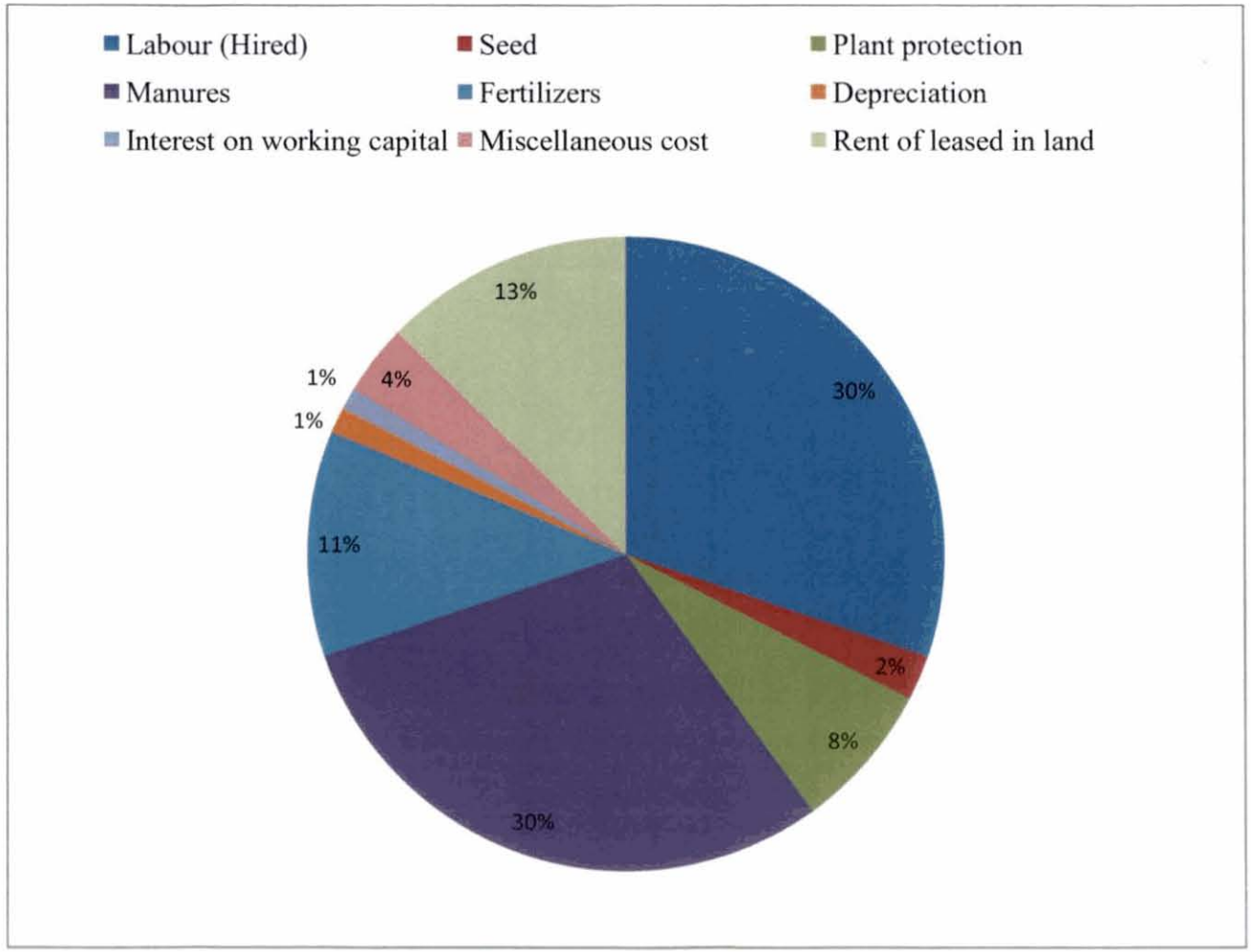


Figure 7. Cost A2 of Kudumbashree farmers in Culinary Melon cultivation

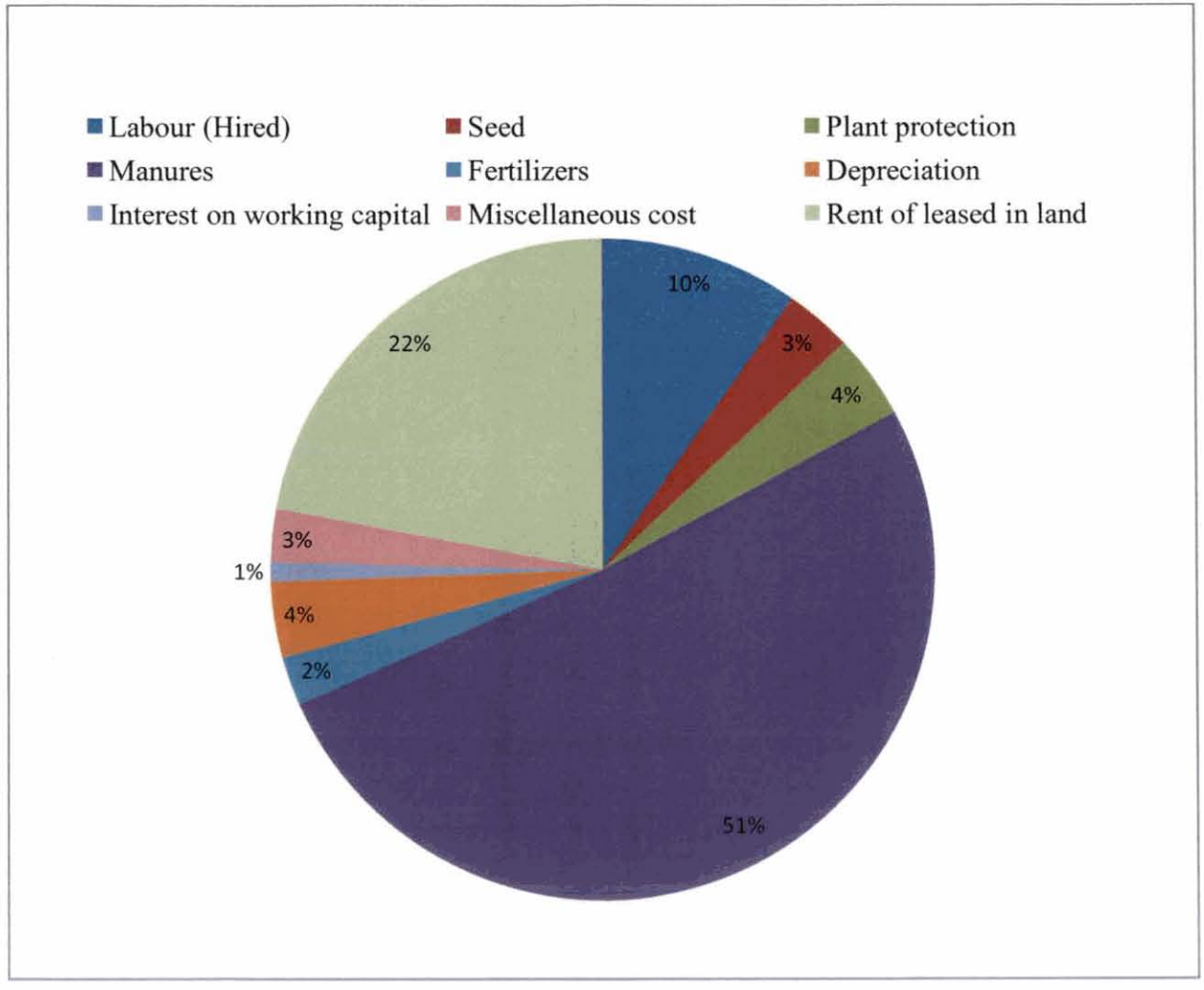


Figure 8. Cost A2 of Other farmers in Culinary Melon cultivation

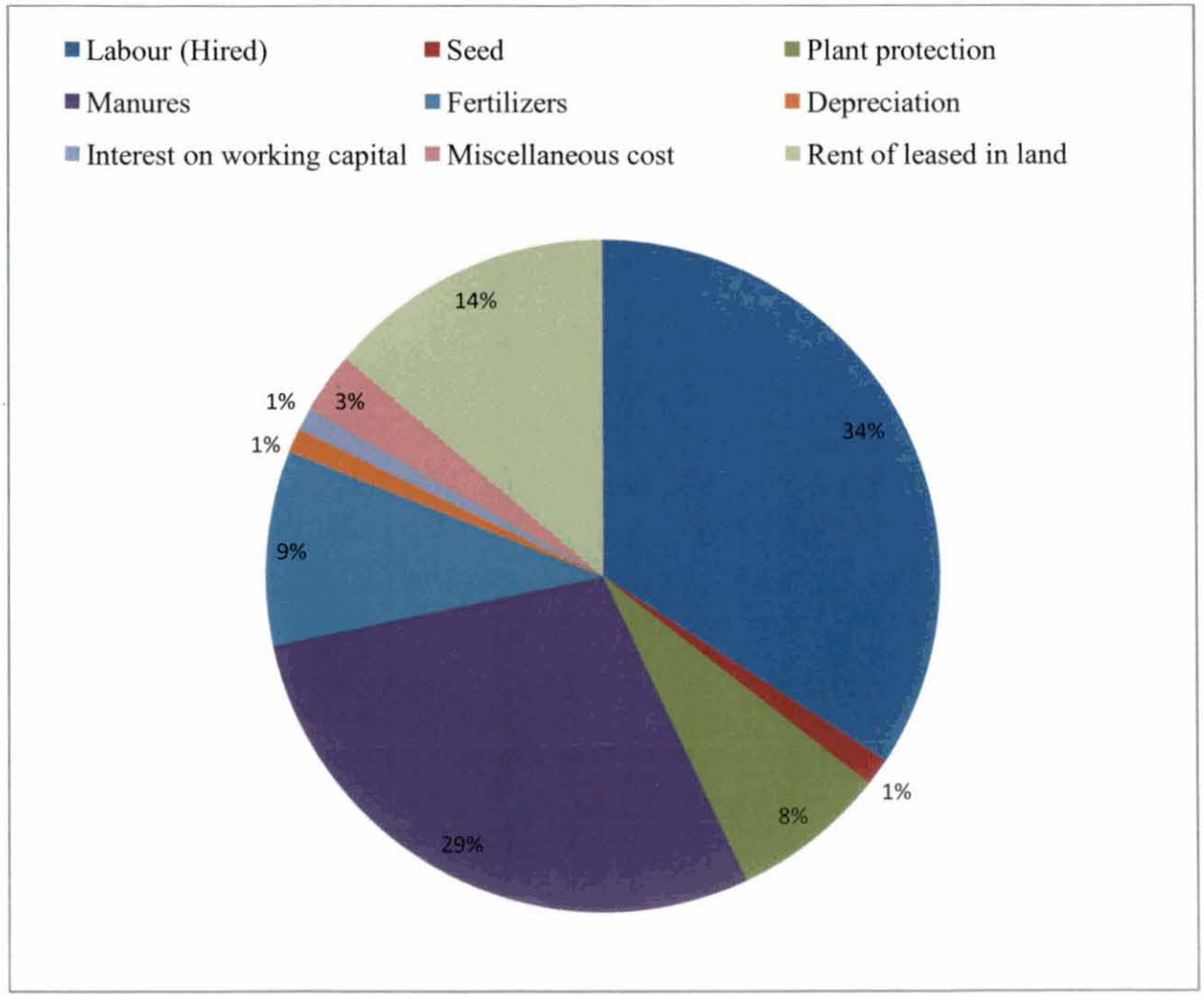
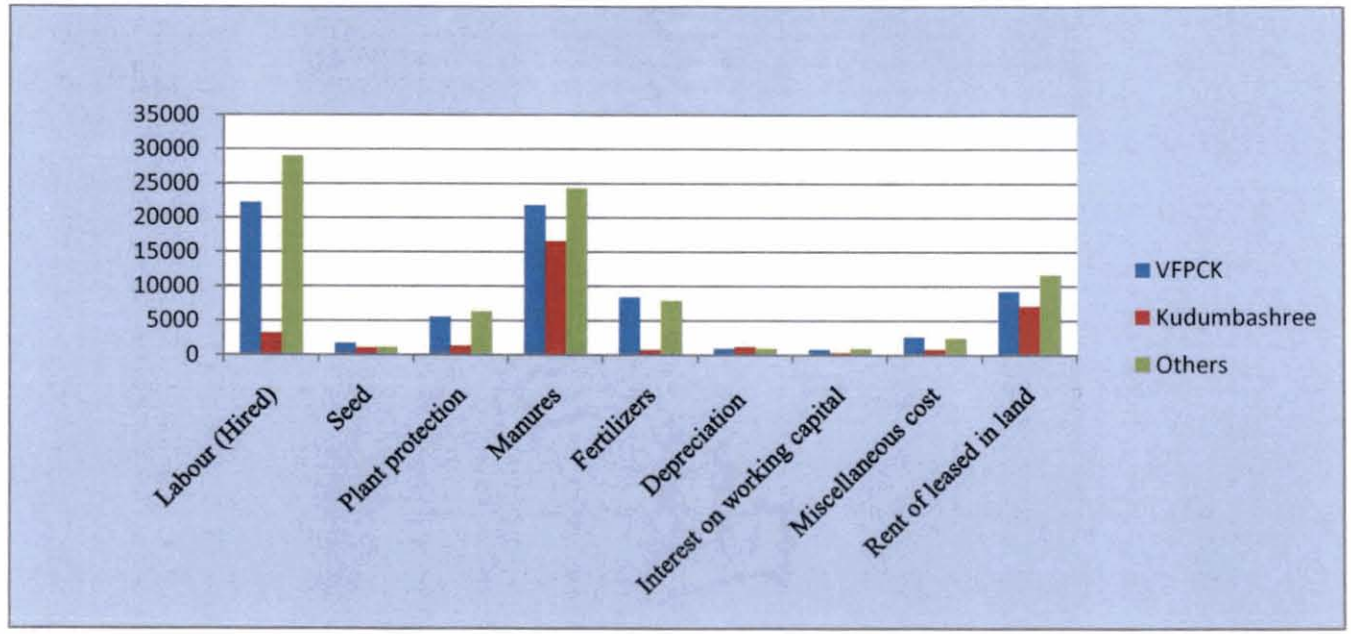


Figure 9. Comparison of Cost A2 of VFPCK, Kudumbashree and Other farmers- Culinary melon



farmers operated using their family labour, hired labour was only around 9 per cent which is one of the reasons for the very low expenses (Figure 9).

Cost of cultivation of Culinary Melon based on Cost C_3

A perusal of Table.18 indicated that for VFPCK farmers, Cost C_3 was Rs 2,96,223 per hectare. Analysis of input wise cost of cultivation revealed that family labour was the largest item of cost adding almost 66 per cent to Cost C_3 of VFPCK farmers followed by allowance for farm management (9 per cent) and hired labour (8 per cent).

For Kudumbashree farmers, Cost C_3 amounted to Rs 1,88,389. Family labour was the largest item of input cost accounting for 73 per cent of the total cost. Allowance given for farm management occupied the second position with 9 per cent share followed by manures (8.8 per cent). For Kudumbashree farmers, hired labour formed only 1.7 per cent of total cost since they depended mainly on family labour. Also, Kudumbashree farmers cultivated culinary melon as an intercrop with banana. Hence the intensive land preparation done for banana reduced the labour requirement for the intercrop. So, imputed value of family labour was lesser for Kudumbashree farmers when compared to the other two categories of farmers.

Cost C_3 was Rs 2,99,004 for the other farmers. As in the case of the other two categories of farmers, family labour contributed the highest share of 62 per cent for other farmers, followed by hired labour (almost 10 per cent) and allowance for farm management (9 per cent).

Table.18 Cost C3 of Culinary Melon cultivation (Rs per hectare)

Particulars	VFPCK		Kudumbashree		Others	
	Cost (Rs per ha)	per cent	Cost (Rs per ha)	per cent	Cost (Rs per ha)	per cent
Labour (Hired)	22209.00	7.50	3150.00	1.67	29015.00	9.70
Seed	1685.00	0.57	1055.94	0.56	1118.40	0.37
Plant protection	5535.00	1.87	1329.72	0.71	6300.40	2.11
Manures	21839.00	7.37	16555.31	8.79	24246.00	8.11
Fertilizers	8420.00	2.84	766.67	0.41	7931.40	2.65
Depreciation	972.12	0.33	1200.44	0.64	970.74	0.32
Interest on working capital	811.98	0.27	308.65	0.16	925.81	0.31
Miscellaneous	2672.40	0.90	845.34	0.45	2490.83	0.83
Cost A_1	64144.50	21.65	25213.11	13.38	72998.58	24.41
Rent of leased in land	9293.10	3.14	7113.20	3.78	11651.55	3.90
Cost A_2	73437.60	24.79	32326.31	17.16	84650.13	28.31
Interest on owned capital	171.90	0.06	731.34	0.39	194.48	0.07
Cost B_1	64316.40	21.71	25944.45	13.77	73193.06	24.48
Rental value of own land	1185.90	0.40	356.67	0.19	357.00	0.12
Cost B_2	74795.40	25.25	33414.32	17.74	85201.61	28.50
Imputed value of family labour	194498.00	65.66	137848.00	73.17	186620.00	62.41
Cost C_1	258814.40	87.37	163792.45	86.94	259813.06	86.89
Cost C_2	269293.40	90.91	171262.32	90.91	271821.61	90.91
Allowance for farm management	26929.34	9.09	17126.23	9.09	27182.16	9.09
Cost C_3	296222.74	100.00	188388.55	100.00	299003.77	100.00

Thus, Cost C_3 was the highest for other farmers (Rs.2,99,004) followed by VFPCK farmers (Rs. 2,96,223) and Kudumbashree farmers (Rs.1,88,389). Cost A_2 also followed the same trend. Family labour was the highest for Kudumbashree farmers which was 73 per cent of Cost C_3 and was about 65 per cent for VFPCK farmers and 62 per cent for other farmers. Hired labour cost was the highest for other farmers (10 per cent), followed by the VFPCK farmers (7.5 per cent) and, Kudumbashree farmers had the lowest cost on hired labour. (1.7 per cent).

4.3.10. Returns

Table.19 revealed that other farmers obtained the highest yield of 20,767 kilogram per hectare followed by the VFPCK farmers with 18,320 kilogram. Average price per kilogram of culinary melon was Rs.10. The highest gross returns were obtained by the other farmers (Rs.2,07,670 per hectare) followed by VFPCK farmers (Rs 1,83,200 per hectare) and Kudumbashree farmers (Rs 58,170 per hectare).

Table.19 Yield and returns from Culinary Melon (Rs per hectare)

Category	VFPCK	Kudumbashree	Others
Yield (Kg)	18320	5817	20767
Gross returns (Rs)	183200	58170	207670
Net returns at Cost A2 (Rs)	109762	25844	123020

Kudumbashree farmers obtained a poor yield of 5817 kilograms per hectare. as culinary melon is cultivated as an intercrop with banana, and the inputs were applied at a lower level when compared to the other two categories which is clearly evident

from the low cost at Cost A_2. Net returns at Cost A2 were respectively Rs 1,0,9762, Rs 25,844 and Rs 1,23,020 for the VFPCK, Kudumbashree and other farmers.

4.3.11. Cost of production of Culinary Melon

Cost of production according to cost concepts presented in Table 20 revealed that cost of production was almost same for VFPCK and other farmers at Cost A_1, A_2, B_1 and B_2.

Table.20 Cost of production of Culinary melon (Rs per kilogram)

Particulars	VFPCK	Kudumbashree	Others
Cost A_1	3.51	4.33	3.51
Cost A_2	4.01	5.56	4.07
Cost B_1	3.51	4.46	3.52
Cost B_2	4.08	5.74	4.10
Cost C_1	14.12	28.15	12.51
Cost C_2	14.69	29.44	13.08
Cost C_3	16.16	32.38	14.39

At Cost C level, the high value of imputed family labour steeply raised the cost of production which exceeded the sale price of culinary melon which was Rs 10 per kg. For Kudumbashree farmers, the rise in cost of production at cost C was very high due to the poor yield obtained and the high value of family labour.

4.3.12. Measures of efficiency of Culinary Melon cultivation

The income measures in relation to various cost concepts are given in Table 21. All the income measures were observed to be the highest for other farmers followed by the VFPCK farmers.

Table.21 Income measures in relation to different cost concepts for Culinary melon (Rs per hectare)

Particulars	VFPCK	Kudumbashree	Others
Farm business income	119055.50	32956.89	134671.42
Own farm business income	109762.40	25843.69	123019.87
Family labour income	108404.60	24755.68	122468.39
Net income	-113022.74	-130218.55	-91333.77
Farm investment income	-75442.50	-104891.11	-51948.58

Farm business income and family labour income of other farmers was higher than that of VFPCK and Kudumbashree farmers. The net returns at Cost C_3 was negative for all the categories of farmers since the imputed value of family labour was very high and the price of the produce was low (Rs.10 per kilogram). Net returns was the lowest for Kudumbashree farmers for which the main contributing factor was the very low yield. But the farmers continued to produce since 73 per cent of the cost was on family labour and hence the crop was profitable when only the paid out costs were considered.

4.3.13 Benefit cost ratio

Benefit-cost ratio of culinary melon for VFPCK, Kudumbashree and others are given in Table 22. Returns generated per rupee invested were greater than 1.5 for all the categories of farmers on Cost A2 basis.

Table.22 Benefit- Cost ratio of Culinary melon based on different cost concepts.

Benefit-cost ratio based on	VFPCK	Kudumbashree	Others
Cost A_1	2.85	2.30	2.87
Cost A_2	2.49	1.79	2.47
Cost B_1	2.84	2.24	2.86
Cost B_2	2.44	1.74	2.45
Cost C_1	0.71	0.35	0.80
Cost C_2	0.68	0.34	0.77
Cost C_3	0.62	0.31	0.70

Benefit-Cost ratios of VFPCK and other farmers were almost similar until Cost B_1 level, after which the ratios were lower for VFPCK farmers due to low yield and high imputed cost of family labour. Kudumbashree farmers had a very low benefit-cost ratio at Cost C level due to low yield obtained by them. Thus among the three categories of farmers, Kudumbashree farmers had the poorest performance in terms of benefit cost ratio at Cost C level which is due to the high imputed cost of family labour and low yield.

4.3.13. Comparison among the three groups of farmers

The analysis of variance revealed that Cost A_2 of the other farmers and the VFPCK farmers was significantly higher than that of Kudumbashree farmers with the cost of other farmers being the highest (Table.23). There was no significant

difference between the cost A_2 incurred by VFPCK and other farmers. The gross returns of the other farmers and VFPCK farmers was significantly higher than that of the Kudumbashree farmers and the other farmers earned the highest gross returns among the three. There was no significant difference between the benefit cost ratios of VFPCK and other farmers but both were significantly higher than that of the Kudumbashree farmers at Cost A_2. It is clear from the above analysis that from for culinary melon cultivation also, performance of Kudumbashree farmers is lower than the othe two categories of farmers.

Table.23 Comparison of Cost A2, gross returns and benefit cost ratio of in Culinary Melon cultivation.

Category	VFPCK	Kudumbashree	Others	Critical difference
Cost A2	73437.60	32326.31	84650.13	36526.54
Gross returns	183200.6	58117.33	205014.9	48760.59
BC ratio at Cost A2	2.49	1.79	2.45	0.45

4.4. RESOURCE USE EFFICIENCY

Production function is defined as the relationship between physical inputs and physical output of a farm. It is useful in providing yardsticks of how efficiently resources are being used on a farm under given conditions (Dhondyal 1997). The productivities of individual resources can be derived from the production function which indicates the efficiency of those resources at various levels.

In the present study Cobb- Douglas production function was used for studying the dependence of output on the various inputs used. Cobb Douglas production function was used since it is the best method of determining the nature of inputs used

in agriculture. For both cowpea and culinary melon, Cobb–Douglas production functions was fitted separately for the VFPCK farmers, Kudumbashree farmers and other farmers. The farmers used different kinds of organic manures and plant protection chemicals, the actual physical quantity of which could not be elicited from them. Hence monetary value of all variables except area was included in the production function. The specification of the function fitted for cowpea is:

$$Y = a\ x_1^{b1} x_2^{b2} x_3^{b3} x_4^{b4} x_5^{b5} x_6^{b6} x_7^{b7} u$$

The function fitted for culinary melon is:

$$Y = a\ x_1^{b1} x_2^{b2} x_3^{b3} x_4^{b4} x_5^{b5} x_6^{b6} u$$

Where,

Y = Value of output (Rupees)

x_1 = area in cents

x_2 = Expenditure on human labour (Rupees)

x_3 = Expenditure on seeds (Rupees)

x_4 = Expenditure on fertilizers (Rupees)

x_5 = Expenditure on manures (Rupees)

x_6 = Expenditure on crop protection chemicals (Rupees)

x_7 = Expenditure on panthalling materials like rope standards, iron wires. (Rupees)

a = Intercept

$b_1 \ldots b_7$ = regression coefficients of explanatory variables.

u = error term

Since culinary melon did not require panthalling, variable x_7 was excluded while estimating the production function.

Fertilizers and plant protection chemicals were not used by 33 per cent of the Kudumbashree farmers. Hence these inputs indicated by variables x_4 and x_6 were excluded for them while fitting the production function.

The coefficient of determination (R^2) explains the proportion of variation in the dependent variable (Y) explained by the independent variables included in the function. The estimated regression coefficients (bi) of independent variables are the production elasticities of the respective factors (xi). The regression coefficient 'bi' indicates the percentage by which the returns (y) would change if input 'xi' changes by one unit while all other factors remain constant at their geometric mean levels.

4.4.1. Resource use efficiency in Cowpea cultivation

A perusal of Table.24 revealed that adjusted R^2 was 0.72 for cowpea production of VFPCK farmers, which means that 72 per cent of the variation in dependent variable (value of output) was explained by the independent variables included in the function. Only expenditure on plant protection chemicals was found to have a positive and significant impact on returns as indicated by its elasticity coefficient. The elasticity coefficient for expenditure on plant protection chemicals

Table.24. Estimated production function for cowpea

Sl No.	Particulars	VFPCK			Kudumbahsree			Others		
		Coefficients	Standard Error	t Stat	Coefficients	Standard Error	t Stat	Coefficients	Standard Error	t Stat
1	Intercept	4.60	3.23	1.42	2.64	1.88	1.40	7.94	1.54	5.14
2	Area in cents	0.47	0.42	1.12	0.27	0.23	1.19	0.71	0.21	3.40**
3	Expenditure on human labour	0.41	0.45	0.90	0.31	0.32	0.95	-0.04	0.20	-0.18
4	Expenditure on seed	-0.07	0.12	-0.58	0.14	0.13	1.04	-0.02	0.10	-0.24
5	Expenditure on fertilizers	0.04	0.13	0.30	-	-	-	-0.01	0.08	-0.20
6	Expenditure on manures	-0.03	0.17	-0.18	0.37	0.11	3.10**	0.08	0.11	0.71
7	Expenditure on plant protection chemicals	0.27	0.13	2.13*	-	-	-	-0.19	0.08	-2.32*
8	Expenditure on panthalling materials	-0.10	0.16	-0.65	-0.12	0.18	-0.63	0.15	0.16	0.93
9	R^2	0.78			0.61			0.81		
10	$\overline{R^2}$	0.72			0.53			0.75		
11	F	11.64**			7.62**			13.65**		
12	$\sum$ bi	0.99			0.98			0.68		
13	No. of Observations	30.00			30.00			30.00		

*Significance at 5 per cent level; ** Significance at 1 per cent level

was 0.27 which meant that 1 per cent increase in expenditure on this input would raise the returns by 0.27 per cent. The elasticity coefficients for expenditure on manures and panthalling materials were found to be negative but non significant for VFPCK farmers which meant that any further expenditure on these inputs would reduce the returns. In other words, these inputs were over utilized in the production of cowpea and reduction of these may result in improved production. Other inputs such as human labour, seeds, fertilizers and area had positive elasticity coefficients but were statistically non significant. The returns to scale of cowpea production by VFPCK farmers was 0.99 which indicated almost constant returns to scale.

For Kudumbashree farmers the value of adjusted R^2 was 0.75 which indicated that 75 per cent of the variation in the dependent variable (value of output) was explained by the independent variables included in the production function. The elasticity coefficient of expenditure on manures was 0.37 and was significant at 1 per cent level which meant that 1 per cent increase in expenditure on manures would increase the returns by 0.37 per cent. As in the case of VFPCK farmers, the elasticity coefficient of panthalling materials was negative which indicated the excess spending on panthalling materials. However it was statistically non-significant. Other variables such as area, seed and manures also had a positive impact on output as indicated by their elasticity coefficients but were also statistically insignificant. The returns to scale from cowpea production was 0.98 for Kudumbashree farmers which indicated almost constant returns to scale.

In the case of other farmers, the explanatory variables included in the production function could explain 75 per cent of the variation in the dependent variable as indicated by the adjusted R^2. Area was found to have an elasticity co efficient of 0.71 which was significant at 1 per cent level. This meant that a one per cent increase in area would increase returns by 0.71 per cent. Plant protection chemicals were found to have a negative and significant elasticity coefficient which

shows the excess use of plant protection chemicals. So to increase returns, expenditure on plant protection chemicals had to be reduced. All other inputs had positive but insignificant elasticity coefficients.

Thus the results of production function analysis suggested that more expenditure on plant protection chemicals would increase returns for VFPCK farmers by reducing the incidence of pests and diseases. The Kudumbashree farmers would get more returns if they spend more on manures and reduce their expense on panthalling materials. For the other farmers an increase in cultivated area and a reduction in expense on plant protection chemicals would increase returns.

4.4.2. Marginal productivity analysis in Cowpea production

Marginal productivity is the measure of the increase in total product, for the addition of one unit of a particular resource above its mean level while other resources are held constant at their respective mean levels. Marginal value product is the marginal physical product represented in its value terms. The resource use efficiency has been judged on the basis of criterion that each factor of production is paid according to its marginal productivity. A significant difference between marginal value product and market price of individual input indicate whether the farmers are using on an average, their factors of production efficiently or inefficiently (Thakur et al., 1990).

In the present study, all the inputs in physical terms except land were changed into values. Therefore, marginal value products and marginal value productivity at factor costs have the same value except for land. In the case of land, the opportunity cost was taken as Rs. 50 and Rs. 42 per unit area (lease value of land per cent) per season for cowpea and culinary melon respectively. Marginal value productivity to factor cost was worked out accordingly.

Marginal value products of all inputs were worked out at their geometric mean levels. For efficient and optimum use of one input in the existing production situation, marginal value product to factor price ratio (MVPxi/MFCxi) should be equal to one or in other words MVPxi should be equal to price of xi, where xi is the ith input. Marginal value productivity to factor cost ratios significantly different from unity would indicate whether the resources are efficiently used or not. The marginal value productivities of the three categories of farmers in cowpea production are given in Table.25.

It can be observed from the table that for VFPCK farmers, the MVP/MFC ratios of inputs such as area, fertilizers and crop protection chemicals were more than one which indicated the sub optimal use of these resources. The MVP/MFC ratio of labour, seed, manures and panthalling materials was less than one which indicated the overutilization of these resources. By reducing the use of these inputs, production could be shifted from a stage of negative returns (third stage of production) to a profitable region (second stage of production).

For Kudumbashree farmers, inputs such as area, seed and manures had MVP/MFC ratios greater than one which indicated the underutilization of these resources. For inputs like labour and panthalling materials, the MVP/MFC ratio was less than one which indicated the excessive use of these inputs. So expenditure on these inputs must be reduced.

For other farmers, area and manures had MVP/MFC ratios more than one indicating the sub optimal use of these inputs. Inputs such as labour, seed, fertilizers, crop protection chemicals and panthalling materials had MVP/MFC values less than one which meant that these resources were being over utilized.

Table.25 Marginal value product (MVP) and marginal factor cost (MFC) of different inputs in Cowpea production

Particulars	VFPCK		Kudumbashree		Other		MFC	MVP/MFC		
	geometric mean	MVP	geometric mean	MVP	geometric mean	MVP		VFPCK	Kudumbashree	Others
Returns	34452.00	- -	5189.74	-	26446.57	-	-	-	-	-
Area	21.33	759.13	13.61	102.95	19.25	975.43	50.00	15.18	2.05	19.50
Labour	20091.00	0.70	11478.20	0.14	26263.58	-0.04	1.00	0.70	0.14	-0.04
Seed	216.19	-11.15	92.25	7.87	157.31	-3.36	1.00	-11.15	7.87	-3.36
Fertilizers	508.27	2.71	-	-	403.22	-0.65	1.00	2.71	-	-0.65
Manures	1666.30	-0.62	484.37	3.96	1231.70	1.70	1.00	-0.62	3.96	1.70
Crop protection chemicals	390.68	23.80	-	-	393.09	-4.07	1.00	23.80	-	-4.07
Panthalling materials	5332.30	-0.64	259.42	-2.40	4736.40	0.83	1.00	-0.64	-2.40	0.83

From the above analysis it was observed that VFPCK farmers must reduce expense on labour, seed and panthalling materials to increase returns whereas the Kudumbashree farmers must reduce expenditure on labour and panthalling materials. The other farmers must reduce expenditure on inputs such as labour, seed, fertilizers and crop protection chemicals to enhance returns.

4.4.2. Resource use efficiency in Culinary melon cultivation

For VFPCK farmers, the production function fitted for culinary melon had an adjusted R^2 value of 0.53 which meant that 53 per cent of the variation in the dependent variable is explained by the explanatory variables included in the function (Table 26). With regard to inputs used, only area which had an elasticity coefficient of 0.41 was found to make a significant positive impact on returns. Expenditure on human labour and manures had a negative but insignificant impact on returns as indicated by their elasticity coefficients. Other inputs such as seeds, fertilizers and plant protection chemicals had positive elasticity coefficients which meant that an increased expense on these would increase the returns. But the elasticity coefficients were non significant for these inputs also.

For Kudumbashree farmers the adjusted R^2 value for the production function fitted for cowpea was 0.57. For Kudumbashree farmers the elasticity coefficient of human labour (0.55) was found to be positive and significant at 1 per cent level. Other inputs such as area, seed and manures were found to have positive but insignificant elasticity coefficients.

For other farmers, the explanatory variables included in the production function fitted could explain 66 per cent of the variation in dependent variable. In this case the variable area had an elasticity coefficient (1.21) that was positive and significant at 1 per cent level. Human labour, seeds and manures had negative and insignificant

Table 26. Estimated production function for culinary melon

Sl No.	Particulars	VFPCK			Kudumbashree			Others		
		Coefficients	Standard Error	t Stat	Coefficients	Standard Error	t Stat	Coefficients	Standard Error	t Stat
1	Intercept	6.72	1.72	3.91	2.44	1.1.4	2.13	10.77	1.99	5.42
2	Area in cents	0.44	0.21	2.14*	0.23	0.33	0.33	1.21	0.31	3.90**
3	Expenditure on human labour	-0.01	0.24	-0.05	0.55	0.14	3.78**	-0.23	0.26	-0.91
4	Expenditure on seed	0.11	0.11	0.97	0.23	0.30	0.76	-0.32	0.19	-1.64
5	Expenditure on fertilizers	0.10	0.17	0.57				0.02	0.13	0.12
6	Expenditure on manures	-0.08	0.19	-0.43	-0.11	0.15	-0.72	-0.23	0.17	-1.32
7	Expenditure on plant protection chemicals	0.16	0.13	1.24				0.04	0.13	0.30
8	R2	0.63			0.63			0.73		
9	$\overline{R^2}$	0.53			0.57			0.66		
10	F	6.39**			10.82**			10.17**		
11	$\sum$ bi	0.71			0.89			0.49		
12	No. of Observations	30.00			30.00			30.00		

* Significance at 5 per cent level; ** Significance at 1 per cent level.

elasticity coefficients which indicated that these inputs were used above optimum level. Fertilizers and plant protection chemicals had positive and significant elasticity coefficients.

Thus the results of production function analysis indicated that VFPCK and other farmers can increase returns by increasing the area under cultivation. Regarding the Kudumbashree farmers, efficient cultivation by employing more labourers can improve gross returns.

4.4.3. Marginal value productivity analysis in Culinary melon production

From Table.27, it can be observed that in the case of VFPCK farmers, inputs such as area, seed, fertilizers and crop protection chemicals had MVP/MFC ratios more than one which indicated the underutilization of these resources. But labour and manures were excessively used in cultivation.

For Kudumbashree farmers, sub optimal utilization of area and seeds was observed while labour and manures were over utilized.

But in the case of other farmers, only area and crop protection chemicals was used sub optimally. All other inputs (labour, seed, fertilizers, manures,) had MVP/MFC ratios less than one which indicated their overutilization. These results agree with the conclusions drawn by Sharma and Kachroo (2009) that labour, seed, fertilizers and seeds were over utilized in maize cultivation in Jammu.

Table.27 Marginal value product (MVP) and marginal factor cost (MFC) of different inputs in Culinary melon production

Particulars	VFPCK		Kudumbashree		Others		MFC	MVP/MFC		
	geometric mean	MVP	geometric mean	MVP	geometric mean	MVP		VFPCK	Kudumbashree	Others
Returns	9694.60	-	2714.53	-	10945.00	-	-	-	-	-
Area	16.56	257.58	15.34	45.87	15.94	686.63	42.00	6.13	1.09	16.30
Labour	12217.00	-0.01	4755.69	0.31	12995.00	-0.23	1.00	-0.01	0.31	-0.23
Seed	67.11	15.89	56.89	10.97	64.45	-54.34	1.00	15.89	10.97	-54.34
Fertilizers	357.67	2.71	-	-	378.81	0.57	1.00	2.71	-	0.57
Manures	1096.00	-0.71	484.37	-0.47	1270.10	-1.98	1.00	-0.71	-0.47	-1.98
Crop protection chemicals	240.40	6.45	-	-	312.25	1.40	1.00	6.45	-	1.40

4.5. CREDIT

4.5.1. Indebtedness

As indicated in Table 28, among the VFPCK farmers, almost 77 per cent were indebted, whereas indebted farmers were 70 per cent and 73 per cent in Kudumbashree and others respectively

Table.28 Distribution of farmers according to indebtedness

Category	Framer groups		
	VFPCK (No)	Kudumbashree (No)	Others (No)
Indebted	23 (76.67)	21 (70.00)	22 (73.33)
Non indebted	7 (23.33)	9 (30.00)	8 (26.67)
Total	30 (100)	30 (100)	30 (100)

*Figures in parenthesis indicates per cent to total

4.5.2. Source of credit

The indebted farmers belonging to all categories have availed more than one loan from different sources of credit and their distribution is given in Table 29. Commercial banks served as the major source of credit for all the categories of farmers. Among the loans taken from banks, 39 per cent were taken by VFPCK farmers, 29 per cent by Kudumbashree farmers and 33 per cent by others.

Table.29 Distribution of indebted farmers according to source of credit

Source	VFPCK (No)	Kudumbashree NHG (No)	Others (No)	Total no of loans (No)
Banks	21(38.8) (80.76)	16(29.09) (50.00)	18(32.72) (64.28)	55(100)
Cooperative	0	4(66.68) (12.50)	2 (33.33) (7.14)	6 (100)
Kudumbashree NHG	0	6(100.00) (18.75)	0	6 (100)
Money lenders	3(27.27) (11.54)	5(45.45) (15.63)	3 (27.27) (10.71)	11(100)
Friends or relatives	2(25.00) (7.69)	1(12.5) (3.13)	5 (62.5) (17.85)	8 (100)
Total no of loans	26(30.3) (100)	32 (37.20) (100)	28(32.55) (100)	86(100)

VFPCK and Kudumbashree have bank linkage programmes that gave easy credit to farmers from nationalized banks. Besides, banks charged only a low rate of interest (7 per cent) for short term agricultural loans for which interest subsidy is given by the Government if repaid before term. The loans are renewed within a few days of repayment which enables perpetual supply of credit to farmers. Thus the ease of obtaining credit as well as the low interest rate encouraged the farmers to depend on commercial banks. Among the loans taken from cooperatives 67 per cent were taken by Kudumbashree farmers.

Maximum number of loans were taken from banks by all categories of farmers. About 81 per cent of loans of VFPCK farmers, 50 per cent of Kudumbashree farmers and 64 per cent loans of other farmers were from banks. About 13 per cent loans of Kudumbashree farmers and 7 per cent loans of other farmers were from co – operatives. Nearly 19 per cent of loans of Kudumbashree farmers were from Kudumbashree neighbourhood groups. About 12 per cent of loans of VFPCK farmers, 16 per cent loans of Kudumbashree farmers and 11 per cent of loans of other farmers were availed from money lenders. Friends or relatives served as a source of 8 per cent loans of VFPCK farmers, 3 per cent loans of Kudumbashree farmers and 18 per cent loans of other farmers. Money lenders, co- operatives, friends and Kudumbashree NHGs were other sources of credit.

4.5.3. Purpose of credit

Among the indebted VFPCK farmers, nearly 81 per cent of the loans taken were for farming and about 8 per cent each of loans were taken for home consumption and housing (Table 30). More than 59 per cent of loans taken by Kudumbashree farmers were for farming followed by 25 per cent for home consumption.

Table.30 Distribution of indebted farmers according to purpose of credit

Purpose	Farmer groups		
	VFPCK (No)	Kudumbashree (No)	Others (No)
Farming	21 (80.76)	19 (59.37)	22 (78.57)
Home consumption	2 (7.69)	8 (25.00)	3 (10.71)
Medical	1 (3.84)	2 (6.25)	1 (3.57)
Housing	2 (7.69)	-	1 (3.57)
Education	-	1 (3.12)	-
Others	-	2 (6.25)	1 (3.57)
Total number of loans	26 (100)	32 (100)	28 (100)
Total number of indebted farmers	23	21	22

Kudumbashree farmers, when compared to the other two groups of farmers are younger and have young children. This is the reason for a high per cent of consumption loans among them. As in the case of the other two categories of farmers the majority (79 per cent) of loans of other farmers was for farming followed by nearly 11 per cent for home consumption.

4.5.4. Extent of indebtedness

VFPCK farmers had an average outstanding debt of Rs 75,800 from banks (Table 31). They have also borrowed small amounts from friends and moneylenders. Kudumbashree farmers had an average debt of Rs 20,500 from banks followed by Rs.4,800 from co-operatives and the rest from Kudumbashree NHGs, friends and money lenders. Other farmers had an average outstanding debt of respectively Rs 1, 03,933 and Rs. 15,000 from banks and co-operatives. Maximum amount of loans were taken from commercial banks by all the three categories of farmers since banks offered the smallest rate of interest (7 per cent) on short term agricultural loans and offered a 3 per cent interest cut if the loans were repaid before due period. This reveals the success of financial inclusion campaign of the commercial banks.

Table.31 Distribution of farmers according to extent of indebtedness (in Rs per person)

Source	Farmer groups					
	VFPCK (Rs.)	Per cent	Kudumbashree (Rs.)	Per cent	Others (Rs.)	Per cent
Banks	75800.00	98.02	20500.00	58.46	103933	82.46
Cooperatives	0.00	0.00	4800.00	13.69	15000.00	11.90
Kudumbashree NHG	0.00	0.00	2666.67	7.60	0.00	0
Friends	700.00	0.91	3333.33	9.51	6100.00	4.83
Moneylenders	833.33	1.08	3766.67	10.74	1000.00	0.79
Total	77333.33	100.00	35066.67	100.00	126033.33	100

4.6 INCOME, SAVINGS AND EXPENDITURE PATTERN

4.6.1. Annual income

Farming was the main source of income for all groups of farmers. A few VFPCK and other farmers were employed as labourers occasionally and Kudumbashree farmers are getting employment for a few days from Mahatma Gandhi National Rural Employment Guarantee Scheme.

Table.32 Distribution of respondents according to annual family income (Rs)

Income group	VFPCK (No)	Average income (Rs.)	Kudumbashree (No)	Average income (Rs.)	Others (No)	Average income (Rs.)
50,001-100,000	2 (6.67)	64000.00	6 (20.00)	90000.00	2 (6.67)	90000.00
100,001-150,000	13 (43.33)	128000.00	21 (70.00)	126095.00	17 (56.67)	128117.60
150,001-200,000	7 (23.33)	174857.10	3 (10.00)	176333.00	9 (30.00)	164000.00
200,001-250,000	5 (16.67)	192000.00	0 (0)	-	2 (6.67)	240000.00
>250,000	3 (10.00)	354240.00	0 (0)	-	0 (0)	-
Total (no)	30 (100)	167957	30 (100)	123900	30 (100)	143800.00

*Figures in parenthesis indicate percentage to total

As indicated in Table 32, all the farmer households earned an average annual income above Rs. 50,000. Majority of the VFPCK farmer households (43 per cent) belonged to the income range of Rs 100,001-150,000 with an average annual income of Rs 1,28,000 while 23 per cent earned an average annual income of Rs 1,74,857. In the case of Kudumbashree farmers, also majority (70 per cent) of the households earned an annual income between Rs 100,001-150,000 with an average income of Rs 1,26,095 while 20 per cent earned an average an annual income of Rs 90,000.

Similarly, majority of the other farmers (57 per cent) also earned between Rs 100,001 and 150,000 per annum with an average annual income of 1,28,118 while 30 per cent earned Rs 1,64,000 per annum.

4.6.2. Income inequality

To depict the income inequalities of the respondents, Lorenz curves were drawn on the basis of income earned by VFPCK, Kudumbashree and other farmers. From the perusal of the figure 10, it could be concluded that the inequality in income distribution was found to be greatest for VFPCK farmers and least for Kudumbashree farmers. Half the population of VFPCK farmers earned only 35 per cent of the total income. Thus the Lorenz curve showed that the poorer population enjoyed less than proportionate share of total income.

4.6.3 Expenditure pattern

Annual family expenditure pattern of the respondents was worked out and is presented in Table 33. The largest item of expenditure of VFPCK farmers was food (31 per cent) followed by social expenses which was almost 18 per cent and health expenses (14 per cent). For Kudumbashree farmers also food was the biggest item of expenditure accounting to 33 per cent followed by education (13 per cent) and livestock (11 per cent). In the case of the other farmers also, the largest item of expenditure was food (39 per cent) followed by social expenses (15 per cent) and other expenses like drinking, spending in tea shops etc.

Thus it can be concluded that food accounted for the major chunk of expenditure of all the categories of farmers. Social expenses such as gifts during weddings, house warming etc and donations and offerings to churches or temples were observed to be very high in the study area and was the second largest item of expenditure for VFPCK and other farmers.

Figure 10. Income inequality-Lorenz curve

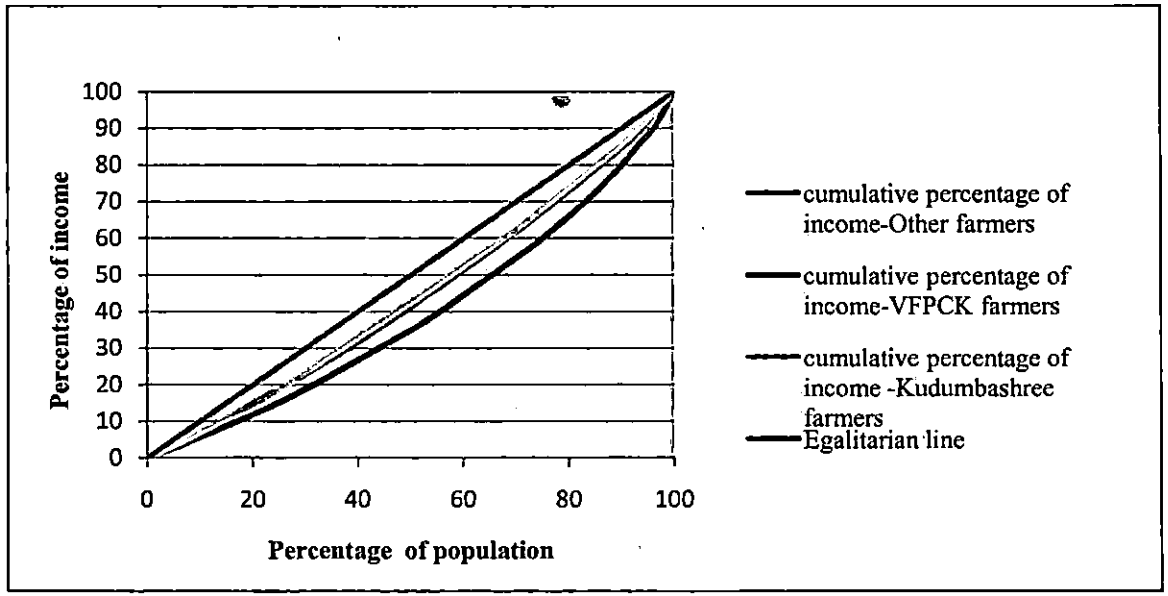


Table.33 Annual expenditure pattern of the respondents (Rs)

Item	VFPCK		Kudumbashree		Others	
	Average Expenditure	Per cent	Average Expenditure	Per cent	Average Expenditure	Per cent
Food	30104.40	31.26	24735.36	33.42	35493.00	38.60
Fuel	2954.52	3.07	2765.76	3.74	3652.68	3.97
Health	13059.96	13.56	7613.76	10.29	8820.00	9.59
Education	7659.96	7.95	9268.92	12.52	4860.00	5.29
Clothes	3999.60	4.15	3124.08	4.22	4779.96	5.20
Recreation	1380.00	1.43	0.00	0.00	0.00	0.00
Social	17097.96	17.75	6866.88	9.28	14264.04	15.51
Travel	7500.00	7.79	5660.64	7.65	9320.04	10.14
Livestock	3099.96	3.22	8184.84	11.06	0.00	0.00
Others	9446.04	9.81	5793.12	7.83	10752.00	11.69
Total	96302.40	100.00	74013.36	100.00	91941.72	100.00

Analysis of expenditure pattern revealed that food expenses was the major item which varied from 31 per cent for VFPCK farmers and 39 per cent for other farmers.

4.6.4 Savings pattern

For assessing the savings pattern of farmers, savings in banks, chits and insurance policies were considered. Among the VFPCK farmers, about 17 per cent of the farmers had savings and among the other farmers 27 per cent had savings deposits (Table 34). On the other hand all the Kudumbashree farmers had at least a minimum amount of savings since it was mandatory for Kudumbashree farmers to save Rs 20 every week.

Table.34 Savings pattern of the respondent farmers

Category	VFPCK (No)	Per cent	Kudumbashree (No)	Per cent	Others (No)	Per cent
With savings	5.00	16.67	30.00	100.00	8.00	26.67
No savings	25.00	83.33	0.00	0.00	22.00	73.33
Total	30.00	100.00	30.00	100.00	30.00	100.00

4.6.5. Extent of savings

Extent of savings of different categories of farmers is depicted in Table 35. The highest amount of savings per person was observed among the other farmers which amounted to Rs 31,096 followed by the VFPCK farmers (Rs 19,333) and the Kudumbashree farmers had the least amount of savings (Rs 10,682).

Table.35 Extent of savings of the respondents (Rs)

Agency	VFPCK	Kudumbashree	Others
Commercial Banks	30000	230,455	500,000
Insurance funds	350,000	50,000	200,000
Chits	200,000	40,000	230,000
Others	-	-	2880
Total	580000	320,455	932,880
Savings per person	19333.33	10681.83	31096.00

4.7. Marketing

Acharya and Agarwal (2004) defined agricultural marketing as comprising of all activities involved in supply of farm inputs to the farmers and movement of agricultural products from the farms to the consumers. Here, marketing channels, price spread and marketing efficiency for all the three groups of farmers were analysed.

4.7.1. Marketing channel

Marketing channels are routes through which agricultural products move from producers to consumers. The length of the channel varies from commodity to commodity, depending on the quantity to be moved, the form of consumer demand and degree of regional specialization in production. In the study area, four marketing channels were identified for vegetables. They were,

Channel I Producer---------consumer

Channel II Producer------VFPCK market-------wholesaler-----retailer------consumer

Channel III Producer------ Pappanchani private market------wholesaler------retailer----consumer

Channel IV Producer--------wholesaler----------retailer--------consumer

VFPCK farmers used channel II and IV but mainly depended on channel II. Kudumbashree farmers relied mainly on channel I but used channel IV also if they had more marketable surplus. Other farmers used channel III and IV, but the major portion of the produce was marketed through channel III. The private market present in channel III is located at Pappanchani and was started by some former VFPCK

farmers who were disgruntled with the time lag required for getting payment from VFPCK.

VFPCK field centres and private markets fix a limit for purchase from farmers based on daily demand from outside. After this limit is reached, they stop purchasing from farmers. When any excess amount exists after sale through VFPCK and private market or if they need immediate payment for their produce, farmers approach wholesalers directly i.e. they market through channel IV.

4.7.2. Price spread and producer's share in consumer's price

In the marketing of agricultural commodities, the difference between the price paid by the consumer and the price received by the producer for an equivalent quantity of farm produce is often known as price spread. (Acharya and Agarwal, 2004).

Marketing margins can be explained by two concepts - concurrent margin and lagged margin. The concept of concurrent margin is used in the present study in which the prices prevailing at different stages of marketing are compared with reference to a given point of time. The marketing costs and margins of cowpea and culinary melon in various channels are given in the following tables.

Channel I was mainly used by Kudumbashree farmers and there were no intermediaries. Hence marketing cost was the only expense incurred by the farmers who themselves sold off their produce at local markets or to their neighbours. The farmers sold the produce at a lower price than the prevailing market prices since the customers were very familiar to them. For both cowpea and culinary melon, the marketing cost was Rs 0.50 per kilogram (Table 36).

Table.36 Marketing costs, marketing margins and price spread in channel I (Rs per kilogram)

Particulars	Cowpea	Per cent	Oriental Pickling melon	Per cent
Marketing cost of the farmer	0.50	1.67	0.50	5.56
Commission paid by the farmer	0.00	0.00	0.00	0.00
Net price received by the farmer	29.50	98.33	8.50	94.44
Price paid by the consumer	30.00	100.00	9.00	100.00
Price spread	0.50		0.50	

The net price received by the farmers was Rs 29.50 per kilogram for cowpea and Rs 8.50 per kilogram for culinary melon which indicates the transportation cost and cost of packing materials. Thus the producers had a 98 per cent share in the consumer's Rupee for cowpea and a 94 per cent share in the consumer's Rupee for culinary melon. The price spread was Rs.0.50 per kilogram for both cowpea and culinary melon.

VFPCK farmers mainly used channel II and the details are presented in Table.37. The VFPCK market charged a commission of 2.75 per cent of the total value of produce sold by the farmer. In channel II the producers received a net price of Rs 33.89 per kilogram which was almost 68 per cent of the consumer's price for cowpea and in the case of culinary melon, the producer received a net price of Rs 9.57 per kilogram which was only 64 per cent of what consumer's pay. The net margin of the intermediaries was Rs 12.5 per kilogram for cowpea (25 per cent) and Rs 3.9 per kilogram (26 per cent) for culinary melon. The price spread in channel II was Rs 16.11 per kilogram for cowpea and Rs 5.43 per kilogram for culinary melon.

Table.37 *Marketing costs, marketing margins and price spread in channel II*

(Rs per kilogram)

Particulars	Cowpea	Per cent	Culinary melon	Per cent
Marketing cost of the farmer	0.15	0.30	0.15	1.00
Commission paid by the farmer	0.96	1.92	0.28	1.87
Net price received by the farmer	33.89	67.78	9.57	63.80
Price received by VFPCK	35.00	70.00	10.00	66.67
Marketing cost of wholesaler	1.50	3.00	0.80	5.33
Net margin of wholesaler	8.50	17.00	2.20	14.67
Price received by wholesaler	45.00	90.00	13.00	86.67
Marketing cost of retailer	1.00	2.00	0.30	2.00
Net margin of retailer	4.00	8.00	1.70	11.33
Price paid by the consumer	50.00	100.00	15.00	100.00
Price spread	16.11		5.43	

Channel III includes a private market called Pappanchani private market which was mainly used by other farmers who had started the same themselves. The private market charged a commission of 2.5 per cent of the total value of produce sold by the farmers at Rs 35 per kilogram.

A perusal of Table 38 revealed that, in channel III the producers received a net price of Rs 33.97 per kilogram which was almost 68 per cent of the consumer's price for cowpea and in the case of culinary melon, the producer received a net price of Rs 9.60 per kilogram (64 per cent) out of Rs 10 per kilogram paid by the market. The net margin of the intermediaries was Rs. 12.50 (25 per cent) for cowpea and Rs 3.9 (26 per cent) for culinary melon. The price spread in channel III was Rs 16.03 per kilogram for cowpea and Rs 5.40 per kilogram for culinary melon.

Table.38 Marketing costs, marketing margins and price spread in channel III

(Rs per kilogram)

Particulars	Cowpea	Per cent	Culinary melon	Per cent
Marketing cost of the farmer	0.15	0.30	0.15	1.00
Commission paid by the farmer	0.88	1.76	0.25	1.67
Net price received by the farmer	33.97	67.94	9.60	64.00
Price received by private market	35.00	70.00	10.00	66.67
Marketing cost of wholesaler	1.50	3.00	0.80	5.33
Net margin of wholesaler	8.50	17.00	2.20	14.67
Price received by wholesaler	45.00	90.00	13.00	86.67
Marketing cost of retailer	1.00	2.00	0.30	2.00
Net margin of retailer	4.00	8.00	1.70	11.33
Price paid by the consumer	50.00	100.00	15.00	100.00
Price spread	16.03		5.40	

All the categories of farmers used channel IV when they needed immediate payment for their produce or when the quota limit for vegetables in the VFPCK or private markets was reached and the details are given in Table 39. The wholesalers in this channel operated in Chalai wholesale market in Thiruvananthapuram city and they charged a commission of 10 per cent of the total value of produce from the farmer. In channel IV for cowpea, marketing cost and commission paid by the farmer to the wholesaler together added to Rs 6.35 per kilogram resulting in a net price realization of Rs 33.65 per kilogram out of Rs 40 per kilogram at which the produce is sold to the wholesaler.

Table.39 Marketing costs, marketing margins and price spread in channel IV (Rs per kilogram)

Particulars	Cowpea	Per cent	Culinary melon	Per cent
Marketing cost of the farmer	2.35	2.45	1.00	6.67
Commission paid by the farmer to the wholesaler	4.00	7.27	1.00	6.67
Net price received by the farmer	33.65	61.18	8.00	53.33
Marketing cost of wholesaler	1.23	2.24	0.35	2.33
Net margin of wholesaler excluding commission	18.77	15.94	1.65	11
Price received by wholesaler	50.00	90.91	12.00	80.00
Marketing cost of retailer	1.00	1.82	0.29	1.93
Net margin of retailer	4.00	7.27	2.71	18.07
Price paid by the consumer	55.00	100.00	15.00	100.00
Price spread	21.35		7.00	

Farmers received only 61 per cent of what the consumer pays, consumer's price being Rs 55 per kilogram. For culinary melon, marketing cost and commission paid by the farmer to the wholesaler together accounted for Rs 2 per kilogram out of Rs 10 per kilogram at which the produce was sold to the wholesaler. The farmer received only 53 per cent of the price paid by the consumer which was Rs 15 per kilogram. The net margin of intermediaries was Rs 16.77 per kilogram for cowpea (30.5 per cent) and Rs 4.96 per kilogram (33 per cent) for culinary melon. The price spread was Rs 21.35 per kilogram for cowpea and Rs 7 per kilogram for culinary melon.

4.7.3 Comparative analysis of marketing channels

Table 40 shows a comparative analysis of price spread and producer's share in consumer's Rupee in different channels.

Table.40 Comparative analysis of main marketing channels

Parameters	Channel I		Channel II		Channel III		Channel IV	
	Cow pea	Culinary melon	Cow pea	Culinary melon	Cow pea	Culinary melon	Cow pea	Culinary melon
Net price of farmer (Rs per kg)	29.50	8.50	33.89	9.57	33.97	9.60	33.65	8.00
Total marketing cost (Rs per kg)	0.50	0.50	3.61	1.53	3.53	1.50	8.58	2.64
Total profit of intermediaries (Rs per kg)	-	-	12.50	3.90	12.50	3.90	16.77	5.36
Price spread (Rs per kg)	0.50	0.50	16.11	5.43	16.03	5.40	21.35	7.00
Producer's share in consumer's price (per cent)	98	94	68	64	68	64	61	53

A perusal of the table revealed that the price spread was lowest in channel I which is a direct channel used by Kudumbashree farmers and highest in channel IV. Among the indirect channels, producer's share in consumer's Rupee was 68 per cent each for cowpea in channel II and III while it was only 61 per cent in channel IV. For culinary melon, producer's share in consumer's price was 64 per cent each in channel II and III and 53 per cent in channel IV. But the net price received by the farmer was

marginally higher in channel III for both cowpea and culinary melon followed by channel II since the marketing costs were lower. The marketing margin of intermediaries was the highest in channel IV and was the same in channel II and III. The private market and VFPCK market was located at almost the same distance from wholesale market. This was the reason for the same marketing margin. The wholesalers in channel IV belonged to a large vegetable market in Chalai, Thiruvananthapuram city whereas the wholesalers in channel II and III were local wholesalers who operated in Balaramapuram, Neyyattinkara etc which are suburban areas. Farmer's selling through the fourth channel (producer-wholesaler-retailer-consumer) have to take their produce to the Chalai market and pay a commission of 10 per cent of the value of produce whereas in the channel II and III the local wholesalers come to the VFPCK or private market and procure the produce. Hence marketing cost was higher in channel IV when compared to the other channels. Usually farmers sell whatever marketable surplus they have in excess of what they can sell in VFPCK market in Chalai wholesale market. So VFPCK should be strengthened to accommodate the needs of the farmers. Also development of private markets must be encouraged through which the farmer's get maximum share of what the consumer pays since unorganized farmers are prone to exploitation by the market intermediaries.

4.7.4 Marketing efficiency

Marketing is said to be efficient if the total marketing margins are higher per unit of marketing cost. Accordingly, the marketing efficiency of four different channels was estimated for vegetable marketing using Shepherd's formula. The results of the analysis of marketing efficiency in the identified marketing channels for culinary melon and cowpea in the study region are furnished in Table 41.

According to Table 41, marketing efficiency was the highest for channel I for both cowpea and culinary melon since it was a direct channel. The second most efficient channel was channel III (producer-private market-wholesaler- retailer – consumer) with a Shepherd's index value of 1316.43 for cowpea and 900 for culinary melon. Channel II (producer-VFPCK market-wholesaler-retailer-consumer) occupied the third position with an index of 1285.04 for cowpea and 880.39 for culinary melon and channel IV (producer-wholesaler-retailer-consumer) was observed as the least efficient channel.

Table.41 Marketing efficiency of Cowpea and Culinary melon by Shepherd's method.

Marketing channel	Cowpea			Culinary melon		
	Value of goods sold (Rs per kg)	Total marketing cost (Rs per kg)	Marketing Efficiency	Value of goods sold (Rs per kg)	Total marketing cost (Rs per kg)	Marketing Efficiency
Channel I	30	0.50	5900	9	0.50	1700.00
Channel II	50	3.61	1285.04	15	1.53	880.39
Channel III	50	3.53	1316.43	15	1.50	900.00
Channel IV	55	8.58	541.03	15	2.64	468.18

Thus it can be concluded that channel III, used by the other farmers is the most efficient channel among the indirect channels.

4.8. Constraint analysis

Constraints expressed by the farmers in carrying out vegetable cultivation were identified and were ranked using Garrett's ranking technique (Table 42). The most important constraints expressed by the VFPCK farmers were pest and diseases, with a Garrett's score of respectively 51.66, followed by high cost of inputs (37.20), water inundation (31.67) and climatic problems (21.08).

The major constraints expressed by Kudumbashree farmers were pest and diseases with a score of 46.93, followed by climatic problems (28.60), water scarcity (16.90) and water inundation (10.60).

For other farmers, the major constraint was water inundation with a score of 42.83 followed by pest and diseases (40.81), high cost of inputs (26.52), climatic problems (23.09) and high cost of labour (13.03).

For all the categories of farmers, among other constraints, high cost of labour and inputs also featured as an important constraint. .

Table.42 Constraints expressed by the respondents

S. No	VFPCK			Kudumbashree			Others		
	Constraints	Score	Rank	Constraints	Score	Rank	Constraints	Score	Rank
1	Pest and diseases	51.66	I	Pest and diseases	46.93	I	Water inundation	42.83	I
2	High costs of inputs	37.20	II	Climatic problems	28.60	II	Pest and diseases	40.81	II
3	Water inundation	31.67	III	Water scarcity	16.90	III	High cost of inputs	26.52	III
4	Climatic problems	21.08	IV	Water inundation	15.00	IV	Climatic problems	23.09	IV
5	High cost of labour	15.30	V	Economic problems	10.77	V	High cost of labour	13.03	V
6	Low returns	8.16	VI	High cost of labour	10.60	VI	Economic problems	8.77	VI
7	Price uncertainty	5.50	VII	Low returns	5.40	VII	Low returns	8.64	VII
8	Economic hardship	5.07	VIII	Price uncertainty	5.26	VIII	Labour scarcity	4.48	VIII
9	Delay in payment	5.03	IX	High cost of transport	1.86	IX	Price uncertainty	3.74	IX
10	Labour scarcity	4.93	X						

SUMMARY AND CONCLUSION

CHAPTER V

SUMMARY AND CONCLUSION

The present study on the comparative performance appraisal of VFPCK and Kudumbashree beneficiaries in Thiruvananthapuram district was conducted in Nemom block which is a major vegetable producing area in the district and has the active presence of both VFPCK and Kudumbashree farmers. The objectives of the study were to compare the performances of VFPCK and Kudumbashree beneficiaries in terms of agricultural production, income generation, expenditure, savings pattern, credit utilization and marketing. It also aimed at identifying the constraints faced by the farmers in the area.

The required information was collected from 30 each of randomly selected VFPCK, Kudumbashree and other farmers so as to make the total sample size 90. A well structured and pre tested interview schedule was used to collect data. A separate interview schedule was used to collect information from market intermediaries and 5 each of city wholesalers, suburban wholesalers and retailers functioning in the area were randomly selected. Culinary melon and cowpea which were the two important vegetables grown in the study area were used to compare the production, cost of cultivation and resource use efficiency of the three categories of farmers. Since almost all farmers in the study area were cultivating in leased land, discussions were made based on Cost A2 onwards. The findings of the study are summarized below.

5.1 Findings of the study

Cost of cultivation per hectare of cowpea was found to be the highest for VFPCK farmers followed by other farmers and Kudumbashree farmers. Cost A2 was estimated as Rs.1,10,150, Rs.54,968 and Rs.1,25,532 per hectare and Cost C3 was estimated as Rs.3,30,613, Rs.2,95,422, and Rs.3,65,867 per hectare respectively for

VFPCK, Kudumbashree and other farmers. The input wise split of total cost of cultivation of cowpea at Cost A2 revealed that the most important cost item was hired labour for VFPCK (31 per cent) and other farmers (41 per cent) while it was panthalling materials (39 per cent) for Kudumbashree farmers. The second most important item at Cost A2 was manures for all the three categories of farmers.

Cost analysis based on Cost C3 revealed that family labour contribution was 57 per cent for VFPCK farmers, 72 per cent for Kudumbashree farmers and 56 per cent for other farmers at Cost C3 level. The share of hired labour to Cost C3 was very small for Kudumbashree farmers (0.28 per cent) when compared to the VFPCK farmers (10 per cent) and other farmers (14 per cent). This was because the Kudumbashree farmers operated as a group of 4-5 members and they carried out all the cultivation operations along with their family members. The other two categories of farmers also mostly relied on family labour by utilizing their leisure time because of the small size of their holdings. Scarcity and high cost of hired labour also motivated them to utilize maximum family labour. The second important item of expenditure was hired labour for VFPCK and other farmers while it was allowance given for farm management for Kudumbashree farmers at Cost C3. Allowance for farm management (9 per cent each) was the third highest item of expenditure for both VFPCK and other farmers while it was panthalling materials (7 per cent) for the Kudumbashree farmers.

The percentage share of inputs such as seeds, fertilizers and plant protection chemicals were relatively low for all the categories of farmers. Kudumbashree farmers applied only those inputs given free of cost from Krishibhavans and did not apply any inorganic fertilizers and pesticides. As such their input application is very low resulting in a reduction in cost of cultivation when compared to other groups and is in turn reflected in the low yield of cowpea cultivated by them.

In culinary melon cultivation, Cost A2 per hectare was the highest for other farmers (Rs 84,650), followed by the VFPCK farmers (Rs 73,438) and Kudumbashree farmers (Rs 32,326). The major items of expenditure of Cost A2 was hired labour for VFPCK and other farmers which accounted respectively for 30 and 34 per cent of the cost. The second largest item of Cost A2 was manures for VFPCK (30 per cent) and other farmers (29 per cent) while it was rent of leased land for Kudumbashree farmers (22 per cent). Cost C3 also followed the same trend as that of Cost A2and was the highest for other farmers (Rs 2,99,004) followed by VFPCK farmers (Rs.2,96,223) and Kudumbashree farmers (Rs.1,88,389). Here also family labour accounted for the highest share of Cost C3 for all the categories of farmers which was 66 per cent, 73 per cent and 62 per cent for VFPCK, Kudumbashree and other farmers. The second largest item of cost at Cost C3 was allowance for farm management for both VFPCK and Kudumbashree farmers (9 per cent each) while it was hired labour for the other farmers (10 per cent). The third major item of expenditure was hired labour for VFPCK farmers (7.5 per cent), manures for Kudumbashree farmers (8.8 per cent) and allowance for farm management for the other farmers (9 per cent). As in the case of cowpea, inputs such as seeds, fertilizers and plant protection chemicals contributed only a small share to the total cost of cultivation.

A comparison of yield and income of the three categories of farmers from vegetable production on per hectare basis led to the following conclusions. The yield of cowpea was found to be the highest for VFPCK farmers (12,661 kilograms) followed by other farmers (11,007 kilograms) and Kudumbashree farmers (5,215 kilograms). The corresponding gross returns obtained by the three categories of farmers were Rs.4,43,135, Rs.1,82,525 and Rs.3,85,245 at an average market price of Rs.35 per kilogram.

For culinary melon, the highest yield was obtained by other farmers (20,767 kilograms), followed by VFPCK farmers (18,320 kilograms) and the lowest yield was obtained by Kudumbashree farmers (5,817 kilograms). The corresponding gross returns per hectare obtained by the three categories of farmers were respectively Rs.2,07,670, Rs.1,83,200 and Rs.58,170 at a market price of Rs 10 per kilogram.

The cost of production per kilogram of cowpea was the lowest for VFPCK farmers (Rs. 8.7) and about Rs.10.54 for Kudumbashree and Rs. 11.41 for other farmers at Cost A2 level. Cost of production at cost C3 was also the lowest for VFPCK farmers (Rs. 26.11 per kilogram), followed by other farmers (Rs.33.24 per kilogram) and was the highest for Kudumbashree farmers (Rs.56.65 per kilogram).

Cost of production at Cost A2 for culinary melon was about Rs. 4.01 per kilogram for VFPCK farmers, Rs. 4.07 per kilogram for other farmers while it was Rs. 5.56 per kilogram for Kudumbashree farmers. The cost of production at Cost C3 was the lowest for other farmers (Rs 4.39 per kilogram) followed by VFPCK farmers (Rs.16.16 per kilogram) and the highest cost was incurred by Kudumbashree farmers (Rs.32.38 per kilogram). The high cost of production of Kudumbashree farmers was due to the comparatively low yield obtained for their crop.

In cowpea cultivation, the measures of income like farm business income, own farm business income, family labour income and farm investment income for cowpea production were found to be the highest for VFPCK farmers followed by other farmers and Kudumbashree farmers. At Cost A2 level, the highest net income per hectare was obtained by the VFPCK farmers (Rs 3,32,985) followed by the other farmers (Rs 2,59,713) and Kudumbashree farmers (Rs 1,27,557). The highest net income per hectare for cowpea production at Cost C3 was obtained by VFPCK farmers (Rs.1,12,522 per hectare) followed by other farmers (Rs.19,378 per hectare) while the Kudumbashree farmers incurred a loss of Rs.1,12,915 per hectare.

In culinary melon cultivation, farm business income, own farm business income, family labour income and farm investment income were found to be the highest for other farmers followed by VFPCK farmers and the lowest value for income measures was obtained by Kudumbashree farmers. At Cost A2 level, the highest net returns were obtained by the other farmers (Rs 1,23,020) followed by the VFPCK farmers (Rs 1,09,762) and Kudumbashree farmers (Rs 25,844). There was net loss at Cost C3 which was respectively Rs.1,13,023, Rs. 1,30,219 and Rs 91,334 for the VFPCK, Kudumbashree and other farmers respectively. At Cost C level all the categories of farmers incurred loss because of the high imputed value of family labour, low yield and low price of the produce which was only Rs 10 per kilogram.

Benefit cost ratio of cowpea cultivation at Cost A2 was the highest for VFPCK farmers (4.02) while it was 3.32 for Kudumbashree farmers and 3.06 for other farmers and benefit cost ratio at Cost C3 was the highest for VFPCK farmers (1.34), followed by other farmers (1.05) and lowest for Kudumbashree farmers (0.61). Benefit cost ratio for culinary melon at Cost A2 was 2.49 for VFPCK farmers 2.47 for other farmers while it was 1.79 for Kudumbashree farmers. At Cost C3, benefit cost ratio was the highest for other farmers (0.70) followed by VFPCK farmers (0.62) while it was very low for Kudumbashree farmers (0.31).

Analysis of variance (ANOVA) revealed that the gross returns obtained by both VFPCK and other farmers from cowpea and culinary melon were significantly higher than that of Kudumbashree farmers.

Cobb Douglas production function was used to analyze the resource use efficiency of all categories of farmers. The analysis revealed that expenditure on plant protection chemicals had a significant impact on returns for VFPCK farmers in the case of cowpea while manures showed a positive and significant impact on returns for Kudumbashree farmers. For the other farmers, area had a positive and

significant positive impact on returns, while plant protection chemicals had a negative and significant impact.

The resource use efficiency analysis for VFPCK farmers and other farmers in culinary melon cultivation revealed that area had a significant positive impact on returns while for the Kudumbashree farmers, human labour had a significant positive impact on returns.

Among the VFPCK farmers, indebtedness was about 76 per cent while it was 70 per cent for Kudumbashree farmers and about 73 per cent for others. Commercial banks were the main source of credit for all the categories of farmers. Loans taken by all the categories of farmers were mainly for agricultural purpose.

Average annual income was the highest for VFPCK farmers (Rs 1,67,957) followed by the other farmers (1,43,800) and Kudumbashree farmers (1,23,900). Most of the VFPCK (43 per cent) , Kudumbashree farmers (70 per cent) and other farmers (57 per cent) earned an annual income between Rs. 1,00,000 and Rs.1,50,000.

The expenditure on food was the major item of expenditure for all the categories of farmers which varied from 31 per cent for VFPCK farmers to 38 per cent for other farmers. For VFPCK farmers, the second and third largest items of expenditure were social expenses and health expenses while for Kudumbashree farmers it was education and expenditure on livestock. The respective items of expenditure for the other farmers were social and other expenses. Only 17 per cent of VFPCK farmers and 27 per cent of other farmers had savings while all the Kudumbashree farmers had savings. Highest amount of savings per person was seen among other farmers (Rs.30,196), followed by the VFPCK farmers (Rs.19,333) and Kudumbashree farmers (Rs.10,681).

The Lorenz curve was drawn to depict income inequality among the respondents. Income inequality was the highest in VFPCK farmers and least in Kudumbashree farmers.

Four marketing channels were identified in the study area for vegetables. They were (i) producer-consumer (ii) producer-VFPCK market-wholesaler-retailer-consumer (iii) producer- private market-wholesaler-retailer-consumer, (iv) producer--wholesaler-retailer-consumer. The first channel was mainly used by Kudumbashree farmers, the second channel by the VFPCK farmers and the third channel by other farmers. But all the categories of farmers used the fourth channel where they sell whatever excess marketable surplus is available after selling through the main channels. Price spread was the lowest in channel I since it involved no intermediaries followed by channel III and channel II. Marketing efficiency was the highest in channel I and lowest in channel IV according to Shepherd's index. The important constraints faced by all the categories of farmers as ranked by Garrett's ranking technique were pests and diseases, water inundation and high costs of labour and inputs.

5.2 Conclusion

In the present study, it was found that, the gross returns, yield and benefit- cost ratio of VFPCK farmers and other farmers were significantly higher than that of Kudumbashree farmers in the case of both cowpea and culinary melon. Average annual income was the highest for VFPCK farmers followed by the other farmers whereas the Kudumbashree farmers earned the lowest income per annum. Other farmers had the highest amount of savings per person followed by the VFPCK farmers while the Kudumbashree farmers had the smallest amount of savings.

Among the marketing channels identified, channel I, which was mainly used by Kudumbashree farmers was found to be the most efficient since it did not have any

intermediaries. But the disadvantage of this channel is that only small quantities of produce can be sold through this channel. Among the three indirect channels, channel II, used by the other farmers was found to be the most efficient.

5.3 Policy options

Vegetables are a rich source of vitamins and minerals. Besides their importance in human nutrition, vegetable crops support many industries like processing industry and seed industry and gives higher returns per hectare than other crops. But in spite of the favourable climatic conditions, Kerala is still heavily dependent on its neighbouring states for vegetables. Import of vegetables from other states is risky and costly. Hence the following policy options are suggested based on the findings of the present study.

Scarcity and high wage rates of labour make cultivation a losing proposition in Kerala. So, even though the performance of Kudumbashree farmers is low, such collective farming must be encouraged as they can pool family labour and do cultivation. Support must be given in terms of inputs to encourage vegetable production. Since almost all farmers cultivate in leased land, subsidizing the rent paid also encourages them to cultivate. Maximum encouragement should be given to cultivate in small holdings by utilizing family labour.

Processing and value addition of vegetables must be promoted and steps must be taken to introduce grading and quality control for vegetables so that large processors can approach the VFPCK market for procurement. The major thrust in the processing of vegetables should be on value addition, employment generation, diversification of rural economy and acceleration of rural industrialization. Private markets, operated by farmers must also be encouraged to promote healthy competition and to check the monopoly or oligopoly of a few players in the market.

The farmers in the study area did not follow recommendations of package of practices of Kerala Agricultural University and cultivated local varieties of vegetables. So, the yield was far behind the potential yield. Hence they must be encouraged to cultivate high yielding varieties like Jyotika in cowpea and Mudicode and Arunima in culinary melon. So, extension machinery must be strengthened for proper technology transfer and follow up must also be done.

Since most of the farmers did not have any savings, a pension scheme which is now restricted to paddy and coconut farmers must be extended to vegetable farmers too. Apart from group marketing, VFPCK should start micro thrift activities as well like the Kudumbashree self help groups so as to promote savings among members. The marketing options for Kudumbashree farmers are poor since they get only a very low yield. So measures must be taken to increase their productivity and marketing facilities. Lastly a better collaboration between farmers and scientists must take place to develop high yielding and resistant crop varieties.

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ABSTRACT

A COMPARATIVE PERFORMANCE APPRAISAL OF VFPCK AND KUDUMBASHREE BENEFICIARIES IN THIRUVANANTHAPURAM DISTRICT

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ABSTRACT OF THESIS

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Abstract

The study entitled "A comparative performance appraisal of VFPCK and Kudumbashree beneficiaries in Thiruvananthapuram district" was undertaken in Nemom block of Thiruvananthapuram district with the objective to compare the performances of VFPCK farmers, Kudumbashree farmers and other farmers in terms of agricultural production, income generation, expenditure, savings pattern, credit utilization and marketing. It also aimed at identifying the constraints faced by the farmers in production and marketing. The required information was collected from 30 each of randomly selected VFPCK, Kudumbashree and other farmers so as to make the total sample size 90. Culinary melon and cowpea which were the two major vegetables grown in the study area were used to compare the production, cost of cultivation and resource use efficiency of the three categories of farmers. A noteworthy feature of the study area is that almost all farmers cultivated in leased land.

In the present study cost of cultivation was worked out using A B C cost concepts and resource use efficiency was estimated using Cobb- Douglas production function. Marketing channels of the three categories of farmers were identified and the price spread and efficiency of channels were calculated. Credit utilization, expenditure and savings pattern were also worked out and constraints were ranked using Garrett's ranking technique.

The total cost of cultivation of cowpea calculated on per hectare basis revealed that it was the highest for VFPCK farmers followed by other farmers and Kudumbashree farmers. Cost A2 was estimated as Rs.1,10,150, Rs.54,968 and Rs.1,25,532 per hectare and Cost C3 was estimated as Rs.3,30,613, Rs.2,95,422, and Rs.3,65,867 per hectare respectively for VFPCK, Kudumbashree and other farmers. Labour accounted for 31 per cent of Cost A2 of VFPCK farmers followed by manures (23 per cent) while for Kudumbashree farmers 39 per cent of Cost A2 was

contributed by panthalling material and 30 per cent by manures. For other farmers, also, hired labour contributed the major share of Cost A2 (41 per cent) followed by manures (17 per cent). In culinary melon cultivation, Cost A2 per hectare was the highest for other farmers (Rs.84,650), followed by the VFPCK farmers (Rs.73,438) and Kudumbashree farmers (Rs.32,326). Cost C3 also followed the same trend and was the highest for other farmers (Rs.2,99,004 per hectare) followed by VFPCK farmers (Rs.2,96,223 per hectare) and Kudumbashree farmers (Rs.1,88,389 per hectare). For VFPCK farmers, hired labour accounted for 30 per cent of Cost A2 followed by rent of leased land at 13 per cent while for Kudumbashree farmers, manures (50 per cent) occupied the largest share followed by rent of leased land (22 per cent). For other farmers, labour accounted the major share of Cost A2 (34 per cent) followed by manures (29 per cent).

The yield of cowpea was found to be the highest for VFPCK farmers (12,661 kilograms) followed by other farmers (11,007 kilograms) and Kudumbashree farmers (5,215 kilograms). The corresponding gross returns obtained by the three categories of farmers were Rs 4,43,135, Rs 1,82,525 and Rs 3,85,245 per hectare at an average market price of Rs 35 per kilogram. For culinary melon, the highest yield was obtained by other farmers (20,767 kilograms), followed by VFPCK farmers (18,320 kilograms) and the lowest yield was obtained by Kudumbashree farmers (5,817 kilograms). The corresponding gross returns per hectare obtained by the three categories of farmers were respectively Rs.2,07,670, Rs.1,83,200 and Rs.58,170 per hectare at a market price of Rs. 10 per kilogram.

The cost of production per kilogram of cowpea was the lowest for VFPCK farmers (Rs. 26.11 per kilogram), followed by other farmers (Rs.33.24 per kilogram) and it was the highest for Kudumbashree farmers (Rs.56.65 per kilogram) at Cost C3 level. The cost of production per kilogram of culinary melon was the lowest for other

farmers (Rs.14.39 per kilogram) followed by VFPCK farmers (Rs.16.16 per kilogram) and the highest for Kudumbashree farmers (Rs. 32.38 per kilogram).

The production function analysis revealed that expenditure on plant protection chemicals had a significant impact on returns of VFPCK farmers in the case of cowpea while manures showed a positive and significant impact on returns of Kudumbashree farmers. For the other farmers, area had a positive and significant positive impact on returns, while plant protection chemicals had a negative and significant impact. The production function analysis of culinary melon revealed that, for VFPCK farmers and other farmers, area had a significant impact on returns while for the Kudumbashree farmers, human labour had a significant positive impact on returns.

Among the VFPCK farmers, indebtedness was 76 per cent while it was 70 per cent for Kudumbashree and about 73 per cent for others. Average annual income was the highest for VFPCK farmers followed by the other farmers and was the lowest for Kudumbashree farmers. The largest item of consumption expenditure for all the categories of farmers was food which varied from 31 per cent for VFPCK farmers to 38 per cent for other farmers.

Four marketing channels were identified in the study area for vegetables of which channel-I was found to be the most efficient one whereas the net price received by the farmer was highest in channel- III. The important constraints identified using Garrett's ranking technique were, pests and diseases, water inundation and high costs of labour and inputs for all the categories of farmers.

APPENDICES

APPENDIX – I (a)

PERFORMANCE APPRAISAL OF VFPCK AND KUDUMBASHREE BENEFICIARIES IN THIRUVANANTHAPURAM DISTRICT

SCHEDULE

1) Identification
   - Name And Address
   - Village
   - Taluk

2) Family Size And Composition

Name	Sex	Relation To The Head	Age	Literacy	Occupation			Annual Income		
					M	S	O	M	S	O

3) Cropping Pattern

Name Of Crop	Season	Area In Cents	
		Total Area	Irrigated Area

4) Inventory Of Land Resources

Particular	Total	Wet	Garden	Other
Land Value				
Area Leased In				
Area Leased Out				
Net Cropped Area				
Cropping Intensity				
Value Of Owned Land				
Rent of leased out Land				
Rent of leased in land				
Land Tax				
Water Tax				
Panchayath Tax				
Income Tax				
Others				

5)Inventory Of Other Resources

Sl No	Particulars	Value In Rs	Year Of Purchase	Expected Life	Maintenance Cost
	Implements				
1	Ploughs				
2	Manvettie				
3	Crowbar				
4	Sickles				
5	Spades				
6	Pick Axe				
7	Carts				
	Machineries				
1	Dusters				
2	Sprayers				
3	Hose				
4	Pumpset				

6) Temporary Dead Stock

Item	No	Value	Expected Life
Coir Rope			
Baskets			
Bamboo Sticks			
Bags			
Murams			
Others			

7) Buildings And Other Structures

Sl No	Particular	No	Value In Rs	Expected Life	Maintenance Cost

8) Cost of Cultivation

Crop:
Variety:
Area:
Duration:
Wage Rate: Male-
Female-

Operation	Manual Labour	Cost	Human Labour				Quantity	Cost	Total Cost
			Hire		Family				
			M	F	M	F			
Preparatory Cultivation									
Ploughing									
Pandal									
Seeds and Sowing									
Seeds									
Sowing of Seeds									
Manures and Manuring									
FYM									
Urea									
MOP									
Mussoriephos									
Application of Fertilizers									

Inter cultivation									
Weeding									
Plant Protection									
Insecticides									
1									
2									
3									
4									
Application									
Fungicide									
1									
2									
3									
Application									
Irrigation									
Pump set									
Manual									
Harvesting And Transporting									
Harvesting									
Transporting									
Total									

9) Method of Sale

Sl No	Method Of Sale	Quantity	Price
1	Pre harvest Contract		
2	Village Merchant		
3	Direct Sale To Consumer		
4	Sale In Wholesale Market		
5	VFPCK		
6	Other		

10) Marketing Aspects at Producer's Level

1. Total Qty Produced
2. Qty Retained For Home Consumption
3. Qty Spoiled
    a) During Physical Handling
    b) Due To Perish ability

4. Seed Purpose
5. Gift/Charity
6. Qty Marketed

11)Cost Of Marketing

A. Cost Incurred By The Farmer

1. Preparation For Market
   Packing:
   Sack:
2. Loading And Unloading
3. Transport
   Mode of Transport:
   Distance from the Market:
   Transport/Unit/Trip:
   Total Charges:
4. Cost Incurred By The Farmer At The Market
   Gate Fee:
   Stall Fee:
   Commission:
   Brokerage:
   Taxes:

12) Expenditure and Savings Pattern

A) *Food Expenses (Monthly Average)*

Item	Source	Quantity Purchased (Kg)	Rate/Kg	Total Expenses
Cereals				
Vegetables				
Fish				
Meat				
Pulses				
Fruits				
Oil				
Gas				
Kerosene				
Wood				

B) Other Expenses

Items	Consumed Quantity	Rate/Unit	Total Expenditure
House Rent			
Medical Expenses			
Educational Expenses			
Clothes			
Recreational Expenses			
Fuel			
Social Expenses			
Travel			
Service Charges			
Livestock			
Others			

C) Savings

No	Type	Institution	Period	Amount	Interest	Total Value

13) Credit Availed And Its Utilization

Source	Year of Borrowing	Purpose	Security	Amount	Interest
Formal Organization					
1 Banks					
2.Co-Operatives					
3. Others (Specify)					
Informal source					

1.Moneylenders					
3.Friends					
4.Relatives					
5.Others					

14) Loan Utilization

Purpose	Amount Repaid	Source of Repayment	Whether Repayment Is Prompt	Reasons For Non Repayment	Amount Overdue
Vegetable					
Other Crops					
House Repair					
Education					
Health					
Marriage/Other					
Household Consumption					
Other					

A) Periodicity of Obtaining Loans:
Never/Occasional/ Regular/ Only When Needed

B) Agency Most Preferred For Credit
Reasons: 1. Easiness to Obtain Loans
2. Lower Interest Rate
3. Better Co-Operation
4. Others (Specify)

C) Problems in Obtaining Loans If Any: Yes/No
If Yes Give Reasons
a) Procedural Irregularities
b) Bureaucratic Set Up
c) Others (Specify)

D) Use of Availed Credit
1. Used For the Original Purpose- Yes/ No
2. Used For Other Purpose - Yes/No
3. Misused - Yes/No

(2) And (3) Give Reasons

APPENDIX –I (b)

SCHEDULE FOR MARKETING INTERMEDIARIES

1. Type of intermediary
2. Name and address
3. Type of vegetable handled
4. Fixed costs

SL NO	PARTICULAR	EXPENDITURE
1	RENT	
2	FURNITURE	
3	STAFF	
4	LICENSE FEE	
5	OTHERS	

5. Working costs

SL NO	PARTICULAR	EXPENDITURE
1	CASUAL LABOUR	
2	ELECTRICITY	
3	WATER CHARGE	
4	SPOILAGE	

6. Value of the business

TOTAL PURCHASE			TOTAL SALES		
QUANTITY	PRICE /UNIT	VALUE (Rs.)	QUANTITY	PRICE /UNIT	VALUE (Rs.)

APPENDIX- II

GARRETT RANKING CONVERSION TABLE

The conversion of orders of merits into units of amount of "socres"

Percent	Score	Percent	Score	Percent	Score
0.09	99	22.32	65	83.31	31
0.20	98	23.88	64	84.56	30
0.32	97	25.48	63	85.75	29
0.45	96	27.15	62	86.89	28
0.61	95	28.86	61	87.96	27
0.78	94	30.61	60	88.97	26
0.97	93	32.42	59	89.94	25
1.18	92	34.25	58	90.83	24
1.42	91	36.15	57	91.67	23
1.68	90	38.06	56	92.45	22
1.96	89	40.01	55	93.19	21
2.28	88	41.97	54	93.86	20
2.69	87	43.97	53	94.49	19
3.01	86	45.97	52	95.08	18
3.43	85	47.98	51	95.62	17
3.89	84	50.00	50	96.11	16
4.38	83	52.02	49	96.57	15
4.92	82	54.03	48	96.99	14
5.51	81	56.03	47	97.37	13
6.14	80	58.03	46	97.72	12
6.81	79	59.99	45	98.04	11
7.55	78	61.94	44	98.32	10
8.33	77	63.85	43	98.58	9
9.17	76	65.75	42	98.82	8
10.06	75	67.48	41	99.03	7
11.03	74	69.39	40	99.22	6
12.04	73	71.14	39	99.39	5
13.11	72	72.85	38	99.55	4
14.25	71	74.52	37	99.68	3
15.44	70	76.12	36	99.80	2
16.69	69	77.68	35	99.91	1
18.01	68	79.17	34	100.00	0
19.39	67	80.61	33		
20.93	66	81.99	32		