INDICATORS OF SUSTAINABLE AGRICULTURAL DEVELOPMENT: A MULTI-VARIATE ANALYSIS AMONG SELF-HELP GROUPS OF "*KUDUMBASHREE MISSION*" IN THIRUVANANTHAPURAM DISTRICT

by

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THESIS

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DECLARATION

I, hereby declare that this thesis entitled "**Indicators of sustainable agricultural development: A multi-variate analysis among self-help groups of "*Kudumbashree Mission*" in Thiruvananthapuram district**" is bonafide record of research work done by me during the course of doctoral research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title, of any other University or Society.

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INTRODUCTION

CHAPTER I

INTRODUCTION

"It is in the agricultural sector that the battle for long term development will be won or lost"

_ Gunnar Myrdal

Development is fundamentally a process of change that involves the whole society- its economic, socio-cultural, political and physical structures as well as the value system and way of life of the people (Alexander, 1993). Development aims at (i) increasing the opportunity of people with respect to health, knowledge and skill development, income and participation in decision making (ii) creating conducive environments in reducing social and economic inequalities, and (iii) bringing all the present and potential natural resources to the most optimal use and at the same time striving for conservation and sustainable development (Choudhury and Rajakutty, 2000).

September 2015 was a crucial month in the history of development through United Nations (UN). This was the month where a paradigm shift in the vision towards development was adopted in the UN Sustainable Development Summit held at New York, USA, by the world body. The title of the agenda was "*Transforming our World: The 2030 Agenda for Sustainable Development*". From January 1, 2016, the Millennium Development Goals (MDG) model of development was replaced by more inclusive and powerful development strategy called Sustainable Development

Model (SDM). Sustainable development denotes the development of natural resources to meet the immediate needs of the present population without hampering the requirements of future generations as well as endangering the ecology and environment (Gupta and Gurjar, 1993). United Nations (2007) in its guidelines identified economic development, social development and environmental protection as the three pillars of sustainable development.

The history of the concept of sustainable development was started with the establishment of International Union for the Protection of Nature (IUPN). Then came the '*Silent Spring*' of Rachel Carson, where the horror of ecological degradation for the sake of economic development and food production was brilliantly highlighted. The time line of the evolution of the concept is given in Table 1.

Table 1: Time line of the evolution of the concept of Sustainable Development

Year	**Event**
1948	International Union for the Protection of Nature (IUPN) was founded
1954	Harrison Brown publishes "The challenge of man's future"
1961	World Wide Fund for Nature (WWF) was established
1962	Rachel Carson publishes "*Silent Spring*"
1968	Paul Ehrlich publishes "The population bomb''
1969	"Friends of earth" was formed
1970	The first "Earth Day" was proclaimed
1971	Green peace began operations
1972	• UN conference on human environment • Publication of "The Limits to Growth" • Publication of "Blueprint for Survival"
1973	Chipko movement was born
1975	Publication of "What now: Another Development"

1980	International Union for Conservation of Nature (IUCN) publishes "World Conservation Strategy"
1987	Publication of "Our Common Future" (Brundtland Report)
1988	Intergovernmental Panel on Climate Change (IPCC) was established
1990	International Institute for Sustainable Development was established
1992	Earth Summit in Rio and Agenda 21
1993	The UN Commission on Sustainable Development was established
1994	The UN Convention on desertification was adopted
1999	The global sustainability index was launched
2002	The world summit on Sustainable Development was held at Johannesburg
2005	Kyoto protocol enters into force
2012	The UN conference on Sustainable Development at Rio de Janeiro
2015	Sustainable Development Model adopted in the UN Sustainable Development Summit
2016	Sustainable Development Model will be implemented

It is highly imperative to bring the agriculture under the ambit of sustainable development as no individual or no civilization can develop when the basic requirement called food is short in supply. But, agriculture is more than an economic activity designed to produce a crop or to make as large a profit as possible from a farm (Gliessman, 2001). Farming is now viewed as a much larger system with many interacting parts including environmental, economic and social components. It is the complex interactions and balance among these parts which will give us sustainability (Flora, 2001).

A major goal for the agricultural development policy in most countries is to increase food production (Ban and Hawkins, 1996). Green revolution in the latter

half of the 20th century could dramatically increase food production around the world due to the use of improved crop varieties, increased use of fertilizers and plant protection chemicals, use of agricultural machinery and irrigation. But these developments were brought about not without any disadvantages. The soil fertility began to reduce, salt content in the irrigated lands increased, water sources began to deplete, diseases like cancer became more prevalent and genetic erosion of crops gained momentum. Kimbrell (2002) states that with their excessive dependence on fossil fuels and external inputs, most commercial agro-ecosystems are overusing and degrading the soil, water, genetic and cultural resources upon which agriculture has always relied.

Mass production of agricultural products led to market glut and drastic fall in prices. This led to a situation where agriculture became non-profitable for a vast majority of farmers. Socially also there were impacts. The rich and affluent farmers could make use of technologies and they grew richer. Conversely, the small and marginal farmers became poorer and poorer and finally got themselves reduced to the status of agricultural labourers. On parallel side, agricultural production had reached a plateau or stable situation. It was at this juncture, the concept of 'sustainable agriculture' had surfaced. The concept is nothing but the increased and profitable production of agricultural products in a consistent manner without exhausting natural resources.

1.1 IMPORTANCE OF THE STUDY

Kerala of late has been facing multiple problems like increase in population, decline in availability of per capita land, under-employment of women, shrinkage and fragmentation of farm land and less profitability of agriculture. According to Krishnakumar (2006), Kerala face a deep crisis in employment in the organized sector and a fall in employment elasticity in the service sector. The high unemployment rate among women (26 per cent in rural areas and 28 per cent in urban

areas) is a sign of the severity of the unemployment situation in the state, especially among those engaged in agriculture, traditional industries and fisheries.

On the other hand, poverty alleviation schemes based on micro- credit system have been implemented in many of the developing countries in recent years. The Government of Kerala State in India had introduced a novel scheme of poverty alleviation based on micro-credit and self help grouping. Paraphrased as '*Kudumbashree*' (Prosperity of the Family), the scheme aims at improving the living levels of the poor women in rural and urban areas (Raghavan, 2006). Kudumbashree is synonymous with the prosperity of Kerala and had produced a lot of agricultural items. Women are the backbone of agricultural work force. In an era when other SHGs were concentrating on small-scale industries, Kudumbashree SHGs had concentrated on agriculture and thus contributed to the food security of the state of Kerala. It could even bring a lot of fallow lands in the state under cultivation.

Many other Indian states and even foreign countries, especially those from developing world where the socio-economic conditions are similar to that of Kerala, are trying to adopt Kudumbashree model of development in their respective areas. The African countries like South Africa and Ethiopia has learnt valuable lessons from the Kudumbashree poverty eradication model in Kerala and has already identified the regions where the Kudumbashree model can be implemented.

In the above stated context, the present study was undertaken to assess the sustainability of the Kudumbashree model of agriculture based on women SHGs. Uphoff (1992) reported that farmers' organizations lead to sustainable development through mobilization of local resources and their regulated use. If the women are prospering through agriculture, certainly the next generation will be benefited as stated out by Karl (1995); who had said that better living standards for women impacts positively upon the health of other family members, especially children.

1.2 NATURE AND SCOPE OF THE STUDY

"Exploratory or Formulative Research Design" was employed for the study. This design is characterized by a great amount of flexibility and adhoc versatility. For a given problem situation, the result of an exploratory study may indicate that further research can be reduced and/or certain aspects of the larger study can be eliminated or further thrust areas can be identified. As a result of the current study, an index for the measurement of sustainability of group farming will be developed. This methodology will definitely be a contribution to the body of research in the discipline of extension education and can be adopted by the future researchers of the similar subjects. The constraints identified in the study, if properly addressed by the concerned individuals, can improve the sustainability of group farming through the SHGs of Kudumbashree Mission. Viewed in this backdrop, the study on sustainability of group farming is much relevant and timely.

1.3 PRACTICAL/SCIENTIFIC UTILITY

We are living in an era where agriculture faces multiple problems like alienation from the youth, increase in fallow lands, increasing stress to environment and being itself non-remunerative as an occupation. In spite of all these odds, Kudumbashree Mission is leading by example a visibly viable agricultural development model by harnessing the group efforts of poor women of the state. The present study will scientifically find out the sustainability of this model and will spell out any needed improvements.

1.4 OBJECTIVES OF THE STUDY

The present study was undertaken with the specific objective of critically analyzing the extent of attainment of the three pillars of sustainable development, namely, economic development, social development and environmental protection by the agricultural activities of the self-help groups under Kudumbashree Mission in the study area and to identify the constraints and formulate a strategy for increasing the effectiveness of the programme.

1.5 LIMITATIONS OF THE STUDY

As the study formed part of the doctoral degree programme, time, infrastructure, finance and other resources at the disposal of the researcher were limited. However, careful and rigorous procedures have been adopted to carry out the study as objectively as possible. Since the work was carried out in only one district (Thiruvananathapuram) of Kerala, generalization of results to other areas may not be appropriate. However due care was taken to ensure high reliability of data through discussions, meetings and triangulation.

1.6 SCOPE FOR FUTURE WORK

The present study is undertaken in Thiruvananathapuram district alone. Similar studies pertaining to the Kudumbashree Mission can be done in rest of the 13 districts also. A larger study, taking samples from each of the 1,072 Community Development Societies (CDS) of the state, can also be done in future. Further separate and detailed analysis of each of the three indicators of sustainable development, namely, economic development, social development and environmental protection can be undertaken by adding up more number of sub-indicators under each of the indicators. Avenues for the establishment of Woman Farmer Producer

Companies (WFPO) or "Anand Pattern" co-operatives under Kudumbashree Mission can also be explored in future as an extension of this work.

1.7 ORGANIZATION OF THE THESIS

The thesis is presented in five chapters. The first chapter of 'introduction' highlights the nature, scope, importance, utility, objectives, and limitations of the study. The second chapter 'review of literature' deals with the definitions, concepts and findings made by other researchers, but related to the present study. The third chapter 'materials and methods' encompasses the details on the research design adopted for the study, selection of study area, sampling procedures employed in the study, operationalization of the variables used in the study, details of the construction of index used in the study, procedures used for data collection and statistical tools used. In the fourth chapter, the results of the study in relation to the objectives with interpretation of findings and their discussion are presented. The fifth chapter summarizes the study highlighting its salient findings.

REVIEW OF LITERATURE

CHAPTER II

REVIEW OF LITERATURE

"A literature review is not an annotated bibliography in which you summarize briefly each article that you have reviewed. While a summary of what you have read is contained within the literature review, it goes well beyond merely summarizing professional literature. It focuses on a specific topic of interest to you and includes a critical analysis of the relationship among different works, and relating this research to your work. It may be written as a stand-alone paper or to provide a theoretical framework and rationale for a research study."

- Galvan (2006)

Review of literature helps to acquire broad and general background in the given field of discipline. The systematic presentation of the relevant aspects drawn from various literatures not only provides strong base for the empirical investigation but also facilitates to arrive at a proper understanding of the different components of the problem under study. Keeping in view the objectives of the study, an attempt was made to review the literature which had meaningful relation to the study and are presented under the following sub heads:

2.1 Self Help Group Movement

2.2 Introduction to Kudumbashree Mission

2.3 Reviews on Related Variables

2.4 Sustainable agriculture and development

2.4.1 Economic development

2.4.2 Social development

2.4.3 Environmental protection

2.5 Indicators used in various studies

2.6 SWPC analysis

2.7 Constraints faced by farmers

2.8 Hypotheses framed for the study

2.1 SELF HELP GROUP MOVEMENT

Rao (1989) said that there are many resources at the farm level that can be used more significantly on group basis. Technologies which are very costly and uneconomic for individual farmers can be used more economically at group level.

Fernandez (1998) while explaining the experiences of Mysore Resettlement and Development Agency (MYRADA) observed that self help groups are helpful in setting priorities to take decisions and risks, to draw up rules of behaviour, to resolve conflict and apply sanctions effectively for non-compliance.

Abhas (2000) defined SHG as a small, economically homogeneous affinity groups of the rural poor voluntarily coming together to save small amounts regularly which are deposited in a common fund to meet their emergency needs and to provide collateral free loans with terms decided by the group at market driven rates.

Gurumoorthy (2000) defined SHG as an organization formed to enhance the quality of status of women as participants, decision makers and beneficiaries in the democratic, economic, social and cultural spheres of life.

According to Mohanan (2000), SHG is a voluntary association of a homogeneous set of people, either working together or living in neighbourhood, engaged in similar line of activity, working with or without registration for the common good of the members. The minimum number of members to form as SHG is five while maximum is 20 and it will have convener or other office

bearers, president and secretary, elected by the group and all members have to meet regularly every week, every fortnight or every month, in a specified place at a stipulated time, as decided by group. Members discuss their problems and during this meeting they collect their small savings and these savings are used to meet the credit requirements of the members.

A SHG is a collection of people who have common problems that cannot be solved individually and have therefore decided to form a group and take joint action to solve the problems. The group may be known by different names in different places. Some of the terms used are *Sangha, Samooh, Mandal* and *Sangham* depending upon the region (Nath, 2000).

Banerjee (2002) in his study conducted in Tamil Nadu reported that members in the age group of above 40 years participated actively in the group activities. Groups, which were more than 3 years old, had 42.00 per cent of the members of age above 40 years. On the other hand increased participation of members below 40 years was observed among newly formed groups.

Rao (2002) stated that SHGs have been recognized as a useful tool to help the poor and as an alternative mechanism to meet the urgent credit needs of poor through thrift.

Jain *et al.* (2003) defined SHGs as a forum formed voluntarily by neighborhood basis for collective learning, promoting democratic culture, fostering an entrepreneurial culture, providing a firm base for dialogue and co-operation in programmes with other institutions possessing credibility and power to ensure participation of the members. SHGs enhance the equality of status of women as participants, decision-makers and beneficiaries in the democratic, economic, social and cultural spheres of life.

Nirmala (2004) found that Self Help Groups had led to socio-economic empowerment of rural poor.

According to Ponnarasu (2004), self-help group is a small economically homogeneous and affinity group of rural poor people who voluntarily agree to

contribute to a common fund to its members savings, promotes income generating activities.

Selvachandra (2004) defined SHG as self-governed, poor-controlled informal group of people with similar socio-economic background and having a desire to collectively perform common purpose.

According to Mishra (2005), SHGs are informal, voluntary, grass root level institutional arrangements to meet the credit requirements of the poor.

Gangaiah *et al.* (2006) defined SHG as an informal association of 10- 15 women who have voluntarily come together for the business of saving and credit and it is a significant instrument in the process of empowerment.

According to Gupta and Gupta (2006), SHG is a group of people that meets regularly to discuss issues of interest to them and look at solutions of commonly experienced problems. The group may or may not be promoted by government or non-government institutions.

From the above reviews, it is very clear that a Self-Help Group is a group of about 10 to 20 people, usually women, from a similar class and region, who come together to form savings and credit organization. They use seed money and pool financial resources to make small interest bearing loans to their members to help pay for important needs.

Self Help Groups (SHGs) are novel and innovative organizational setup in India and world for the upliftment of women and their welfare. All women in India are given chance to join any one of SHGs for training and development, so as to be a prospective entrepreneur or a skilled worker. When the SHGs arrange training facilities to carry out certain kind of work which are suitable for women in India, bank must arrange financial assistance to carry out manufacturing, trading activities and for arranging marketing facilities while the government will procure the product of SHGs, arrange for enhancing the capacity of women in terms of leadership quality and arranging for the management of SHGs by themselves so as to have administrative capacity. As a social movement with

government support, SHGs become more or less a part and parcel of the society (Moses, 2011).

2.1.1 Concept of Self Help Group

The concept of self help group had its origin in the co-operative philosophy and the co-operators by and large, including the National Federations in the credit sector, could not think of any better SHG than a primary co-operative credit society itself (TNCDWL, 2007).

As SHGs are small and economically homogenous affinity groups of rural poor, they are voluntarily coming together for achieving the following:

a. To save small amount of money regularly

b. To mutually agree to contribute a common fund

c. To meet their emergency financial needs

d. To have collective decision making

e. To solve conflicts through collective leadership and mutual discussion

f. To provide collateral free loan with terms decided by the group at the market driven rates

2.1.2 Reasons for forming the SHGs

According to Das (2012), the reasons for forming the Self Help Groups are as presented in Table 2.1.

Table 2.1: Reasons for forming the Self Help Groups

Sl. No.	Reasons	No. of SHGs	Percentage
1.	Improve Social Status	13	8.67
2.	Improve Economic Status	21	14.00

3.	Promote Saving Habit	24	16.00
4.	Obtain Financial Support	57	38.00
5.	Initiate Group Activities	11	7.33
6.	Community Development Activities	10	6.67
7.	Influenced by friends and relatives	14	9.33
Total		150	100.00

2.1.3 Features of Self Help Groups

According to D'Souza (1999) the SHGs are basically small informal groups, characterized by voluntary memberships, a democratic and consultative structure of governance, economic participation of members, autonomy, education and training and concern for the poor. Apart from a number of things the members do as a group, they pool their savings and lend within the group to meet the credit needs of the members. Creation of a common fund by regular contribution of members and issuance of loan with minimum documents and often without any security are in fact the key features of SHGs. Fund generation in the initial stages may be substantially low in these groups. Such funds though meager, will be supplemented by external resources mainly, loans from banks or grants given by NGOs, which promote them.

SHGs offer to its members preliminary banking services characterized by cost effectiveness, flexibility and freedom from defaults. Assessment of the credit needs of members is done periodically at group meetings. The claims for credit are settled within the group by consensus. In case of any surplus, the amount is

deposited in the bank or post offices. Defaulters are subjected to severe penalties but such occurrences are unusual. There is always peer group pressure on those who avail loans which to a large extent prevent defaults. The influence of the group on members is very powerful because it can put actions against defaulters and monitor the behaviour of members in order to forestall default (Karmakar, 2003).

The distinguishing features of self help groups are given below:

i) An SHG normally consists of not less than five persons (with a maximum of twenty) of similar economic outlook and social status.

ii) It promotes objectives like economic improvement and raising resources for development and freedom from exploitation.

iii) It has its own by-laws for the proper functioning of the group as well as for the observance of certain rules by the group members and regulations concerning membership.

iv) The form of such a group could be mostly on an informal basis (unregistered).

v) Periodical meetings of members are held for solving their problems (economic and social) and they collect fixed savings of the members.

vi) The savings of members are kept with a bank in the name of group and authorized representative of the group operates the bank account. The deposit kept in the bank is used for giving loans to members for purposes including consumption at the rate of interest decided by the group (usually higher than what the banks charge).

vii) Sources of funds are the contribution of member's savings, entrance fee, interest from loans, proceeds of joint business operation and income from investment. Funds may be used for loans, social services and common investment.

The SHG, being a group of like-minded persons, gets empowered to solve most of its problems of a non-financial nature such as raw material and input supply marketing, better adoption of technology, education and training for realization of its objectives for development.

2.1.4 Characteristics of SHGs

The important characteristics of self help groups as said by Subramanian (2010) are as follows :

1. They usually create a common fund by contributing their small savings on a regular basis.
2. The groups evolve a flexible system of operations often with the help of the non-governmental organizations (NGOs) and manage their common pooled resource in a democratic manner.
3. Groups consider loan requests in periodical meetings, with competing claims on limited resources being settled by consensus regarding greater needs.
4. Loaning is mainly on the basis of mutual need and trust with minimum documentation and without any tangible security.
5. The amounts loaned are small, frequent and for short duration.
6. Rates of interest vary from group to group depending upon the purpose of loans and are often higher than those of banks but lower than those of moneylenders.
7. At periodical meetings, besides collecting money, emerging rural, social and economic issues are discussed.
8. Defaulters are rare due to group pressure and intimate knowledge of the end use of the credit as also the borrower's economic resources

2.1.5 Motivating agents to join in SHGs

Loyola extension services (2004) had conducted a comparative study of self help groups (SHGs) organized and promoted by non-governmental organizations (NGOs) and Kudumbashree- a government organized non-governmental organization (GONGO) in Kerala- towards empowerment of poor women. The Table 2.2 depicts the result of the study with respect to the motivating agent to join the SHGs.

Table 2.2: Motivating agent to join the SHGs

Motivated by	Agency				Total	
	NGO		Kudumbashree			
	No.	%	No.	%	No.	%
Neighbours	5	2.5	22	11	27	6.7
Friends	7	3.5	21	10.5	28	7.0
SHG Members	83	41.5	78	39	161	40.3
Officials of Organization	105	52.5	69	34.5	174	43.5
Others	-	-	10	5	10	2.5
Total	200	100	200	100	400	100

From the Table 2.2, it can be observed that majority of the respondents (43.5 %) joined the SHG because of the officials of NGOs and those of Kudumbashree. But in this case there was a significant difference between NGOs and Kudumbashree. The officials of NGOs have motivated more (52.5 %) of the respondents to join the SHGs, while it was only 34.5 per cent by the officials and others of Kudumbashree. Other major motivating agents were the SHG members. Even in this matter the SHG members of NGOs were found better than the Kudumbashree in motivating women to join the SHGs. In the case of Kudumbashree, the office bearers of Kudumbashree, namely, members of Area Development Societies (ADS) and Community Development Societies (CDS) also played an important role in motivating women to join the SHGs. Friends and neighbours also played the role of motivators of poor women to join the SHGs.

2.1.6 Dropouts from the SHGs

There were dropouts from the SHGs of both NGOs as well as those of Kudumbashree as per the comparative study of self help groups (SHGs) conducted by Loyola extension services (2004) among 200 dropout women from each group. Usually the dropout starts after 6 to 12 months. Several reasons were given by the respondents for the dropout from SHGs. The reasons for dropouts from the SHGs are given in the following Table 2.3.

Table 2.3: Reasons for dropouts from the SHGs

Reason	Agency				Total	
	NGO		Kudumbashree			
	No.	%	No.	%	No.	%
Undisclosed reason	29	14.5	72	36	101	25.25
Financial constraints	33	16.5	30	15	63	15.75
Rules and regulations	22	11	20	10	42	10.5
Physical problem	5	2.5	9	4.5	14	3.5
Change in residence	39	19.5	8	4	47	11.75
Not interested to continue	52	26	29	14.5	81	20.25
Marriage	20	10	32	16	52	13
Total	200	100	200	100	400	100

Constitution and functioning of SHGs could also be assessed from the number of dropouts and the reasons for dropouts. Economic empowerment of women was considered as one of the main reasons for joining the SHGs. But financial constraint was found as a major factor for the members leaving the SHGs. Defaulters in loan repayment usually end up in non-interest and drop out. Another important reason for drop out was due to the change in residence of the members. Strict rules like punctuality and regular attendance in meeting, timely repayment of loans and regular thrift savings might not be possible especially for daily wage labourers and other self-employed persons. When they found it difficult, they preferred to leave the group. Physical problems and marriage of members were found to be the other reasons for dropout.

2.1.7 Changes in abilities to face problems due to SHGs

The National Council of Applied Economic Research (NCAER), in 2000, had reported three different aspects of problematic situations, namely, health

related, finance related and family related and were indicated to the women members of various SHGs. Then the current information on their ability to face them were recorded and compared to the pre-SHG situation. The percentage of women respondents indicating changes in abilities to face such situations by level of improvement is given in Table 2.4.

Table 2.4: Distribution of women members based on the level of improvement in their ability to face problems

Type of problem	**Level of improvement (per cent)**			
	Significantly improved	**Improved**	**No change**	**No response**
Health related	29.5	44.1	14.3	12.1
Financial problems	22.8	49.2	15.8	12.3
	Sum= 72.0			
Family disputes	22.4	41.4	23.8	12.3
	Sum= 63.8			

From the study, it was revealed that "improvements" and "significant improvements" in their ability to face health-related problems of households were reported by 44.1 per cent and 29.5 per cent women members respectively. Adding up responses of "improved" and "significantly improved", we can observe that as high as 72 per cent of the women respondents said that they were confident to handle financial crisis while 63.8 per cent said that they could do so with regard to family disputes.

2.1.8 Constraints of SHGs

Although there is remarkable success in SHG-based micro-financing, the movement has its own constraints also. The constraints of the Kudumbashree programme that were identified at the beneficiary level (Devi, 2008) are given in the Table 2.5.

Table 2.5: Constraints of the Kudumbashree programme identified at the beneficiary level

Sl.No.	Constraints	Mean value	Rank
1.	Enterprises involve tasks demanding more time, energy and drudgery	6.1	1
2.	Apathy of bank staff to inconvenient repayment schedule	5.9	2
3.	The ADS and CDS secretaries not attending the group meetings frequently	5.7	3
4.	Dominant members are separating to initiate their own enterprises	5.5	4
5.	Incentive of access to larger loans immediately after successful repayment of first loan not issued	5.2	5
6.	Heavy rent for infrastructure and working premises	4.7	6

From the Table 2.5, we can observe that the SHG based women consider tasks that demand more time, energy and drudgery as their most prominent constraint.

2.2 INTRODUCTION TO KUDUMBASHREE MISSION

Kerala is witnessing a silent revolution, spawning women-power, possibly restoring to the State its lost matriarchal legacy, where the women enjoyed pre-eminence, safety, security and respect, including self-respect. This female empowerment is taking place through the Kudumbashree movement, which has engulfed the State (The Hindu, 2003).

Kudumbashree programme is recognized as a successful programme which attempted to eradicate poverty among rural and urban poor (Sushama *et al*, 2003).

Radhakrishnan and Kuttappan (2005) stated that *Kudumbashree* is the largest micro finance institution in the state with a federated network of 3.2 million families over 17,575 ha of land was brought under *Harithashree,* where the lease land farming activities were undertaken.

Kudumbashree is a multi-faceted women based participatory poverty eradication programme jointly initiated by Government of Kerala and National Bank for Agriculture and Rural Development (NABARD) in 1998, May 17th for wiping out absolute poverty from the State through concerted community action under the leadership of Local Self Governments, Kudumbashree is today one of the largest women-empowering projects in the country. Built around three critical components, micro credit, entrepreneurship and empowerment, the Kudumbashree initiative has today succeeded in addressing the basic needs of the less privileged women, thus providing them a more dignified life and a better future. Literal meaning of Kudumbashree is prosperity (*shree*) of family (*kudumbam*). It is implemented by Community Based Organizations (CBOs) of poor women in co-operation with Local Self Government Institutions.

According to Muneer (2015), all the activities of Kudumbashree mission are focused on poverty alleviation through the economic and social empowerment of the women folk in the state. Of the numerous activities undertaken by the Kudumbashree mission, agriculture through women groups is of prime importance as it can improve the income level of the women and at the same time ensure the food security of our society. At present, it is the nodal agency for implementing the centrally sponsored scheme "Mahila Kissan Sasaktheekaran Pariyojana" (MKSP) in the state of Kerala. Over 40.54 lakh women are now directly working under Kudumbashree mission. It has 2,57,047 Neighbourhood Groups (NHGs), 19,773 Area Development Societies (ADSs) and 1.072 Community Development Societies (CDSs) across the state. Of these, 2.01.650 women and 60,512 groups are exclusively concentrated on agricultural activities over an area of around 42,000 ha.

2.2.1 Organization of Kudumbashree mission

As per Madhu and Shaji (2015), the following are the three tiers in the grass root level functioning of Kudumbashree mission:

- Kudumbashree Ayalkoottam (NHG)

  Neighbourhood groups (NHG) are the fundamental units in the functioning of Kudumbashree mission. A panchayath/municipal ward can have any number of NHGs according to its population. An individual NHG can have 10 to 20 women from the locality as members. The minimum age for a member is fixed at 18 years.

- Kudumbashree Ward Samithy (ADS)

  Area Development Societies (ADSs) are panchayath/municipal ward level bodies comprising of representatives of all the NHGs coming under the respective ward.

- Kudumbashree Panchayat Samithy (CDS)

  Community Development Societies (CDSs) are panchayath/municipal level bodies and are at the top of the three tier organizational structure of Kudumbashree mission. It will be registered under Charitable Societies Act. The strength of the governing body of a CDS will be equal to the number of ADSs coming under it. Each CDS will be having an elected Chairperson and Vice-chairperson as well as a government official as member secretary.

2.2.2 Joint Liability Groups (JLGs)

Ajith (2015) stated that Joint Liability Groups consist of four to ten individual Kudumbashree members. The members can be from different NHGs

coming under the same ward but must have interest and abilities to do various agricultural activities. All the JLGs coming under a particular ward will be under the observation of the same ADS. An individual can be a member of only one JLG. Every JLG must be registered under the respective CDS and will be having a Unique Identification (UID) number. It must open a joint bank account in the name of the president and secretary of the group. Then only it can avail interest subsidy for agricultural loans from the government as well as area and production incentive from the Kudumbashree mission. It is mandatory for a JLG to cultivate in an area of minimum 50 cents. For the cultivation of vegetables and medicinal plants, the minimum area to be cultivated is fixed as 25 cents. The maximum area that a JLG can cultivate is 12 acres and the number of separate plots that can be used for farming is limited to three.

2.2.3 Samagra Programme

Samagra programme was aimed at enhancing the net income of the Kudumbashree activity groups through improved productivity and reduced cost of cultivation. The detailed projects that were covered through Samagra programme are given in Table 2.6.

Table 2.6: Projects under Samagra programme

Sl.No.	Project Name	District	Crop
1.	*Samagra*	Thiruvananthapuram	Banana
2.	*Harithasree*	Thiruvananthapuram	Vegetables
3.	*Ksheerasree*	Thiruvananthapuram	Dairy
4.	*Nedumpana mini-apparal park*	Kollam	Non-farm
5.	*Madhuram*	Pathanamthitta	Honey
6.	*Ornamental fish*	Kottayam	Ornamental fish
7.	*Ksheerasagaram*	Idukki	Dairy

8.	*Haritham*	Ernakulam	Vegetables
9.	*Thirumadhuram*	Ernakulam	Pineapple
10.	*Nivedyam*	Thrissur	Poojakadali
11.	*Kondattom*	Palakkad	Value-addition
12.	*Foot wear*	Kozhikode	Foot wear
13.	*Goat village*	Kannur	Goats
14.	*Saphalam*	Kasaragode	Cashew

2.3 REVIEWS ON RELATED VARIABLES

2.3.1. Age

Saravanakumar (2000) found that among farm women, 57.75 per cent were young aged, 40.8 per cent were middle aged and only 1.4 per cent belonged to old age category.

Mathews (2001) reported that 78.3 per cent of the group leaders of working women's self-help groups in Tamil Nadu were in the active age group of 21 to 40 years while it was 58.3 per cent in case of Kerala. In Kerala 73.3 per cent of group leaders were between the age of 30 to 50 years and 78.3 per cent in Tamil Nadu were aged between 20 to 40 years.

Ambika (2002) reported that among the rural women SHG members, 30.56 per cent were young aged, 13.88 per cent were middle aged and 55.56 per cent were old aged.

Sujhi (2004) reported that majority (43.3 %) of the micro financial institution (MFI) beneficiaries were found to be young, followed by 33.33 per cent middle aged and the remaining 23.4 per cent old. With regard to Banking Institution (BI) beneficiaries, majority (51.7 %) were young followed by 33.3 per cent middle aged and the rest 15 per cent old.

Selvarani (2006) stated that majority (73.07 %) of the SHG members were found to be young. Less than one-fourth (24.62 %) of the respondents were middle aged and meager percentage (2.31 %) of the respondents were old.

Mary (2009) reported that more than half (58.82 %) of the SHG women were found to be middle aged, while less than one fourth (21.56 %) of the respondents were young (up to 34 years) and the remaining less than one forth (19.60 %) of the respondents were old (>45 years). In general, majority of the SHG women were middle aged.

Chinchu (2011) observed that 20 per cent of the beneficiary farmers of State Horticulture Mission- Kerala were of the age group less than 40 years, 67 per cent were from the age group 41 years to 60 years and 13 per cent were above 60 years of age.

2.3.2. Family Type

Mathews (2001) stated that majority of leaders in Kerala and Tamil Nadu states had nuclear family with number of persons in the family ranging from 3 to 6 in Kerala and 2 to 5 in Tamil Nadu with an average size of 4 in Kerala and Tamil Nadu. Group leaders from nuclear family constituted 81.6 per cent in Kerala and 85 per cent in Tamil Nadu, whereas leaders from joint family were 18.30 per cent and 15 per cent in Kerala and Tamil Nadu respectively.

Sailaja (2002) reported that 81 per cent of the women respondents in Andhra Pradesh belonged to nuclear family and 19 per cent belonged to the joint family.

Tamilselvi (2002) revealed that 54 per cent of the rural women respondents in Tamil Nadu were found living in smaller families of up to five members and the remaining 46 per cent were in larger families of more than five members.

Vanitha (2002) observed that majority (42.5 %) women beneficiaries of Swarnajayanthi Gram Swarozgar Yojna (SGSY) in Karnataka belonged to medium size family (4-6 members) followed by 29.17 per cent of them who belonged to small family size (1-3 members) and 28.33 per cent of women had large family size (> 7 members).

Asokhan (2006) found that a nearly three-fourth (72.23 %) of the SHG-based rural women had a nuclear family type. Slightly more than one-fourth (27.67 %) of them were in joint family system.

Selvarani (2006) stated that majority (73.08 %) of the SHG-based respondents were found to live in nuclear family while one fourth (26.92 %) of the respondents lived in joint family.

Prasad *et al.* (2008) revealed that 70.97 per cent of commercial Chawki rearing centre owners in Kolar District of Karnataka were found to live in larger families of more than five members and the remaining 29.03 per cent of the respondents were found living in smaller families of up to five members.

Mary (2009) reported that majority of the women beneficiaries of tank irrigation system (71.57 %) were found to live in nuclear family while more than one fifth (28.43 %) of women were lived in joint family.

Thorat *et al.* (2009) reported that majority (67.5 %) of the women SHG members belonged to nuclear family system and the remaining 32.5 per cent belonged to joint families.

Kiran and Kanani (2010) revealed that majority (53 %) of the SHG women in Junagadh district of Gujarat belonged to joint families, while 47 per cent were having nuclear families.

Majority (65.56 %) of the Mahatma Gandhi National Rural Employment Guarantee Programme (MGNREGP) workers in Palakkad district of Kerala belonged to nuclear families and 34.44 per cent were in joint family (Prabu, 2011).

2.3.3. Educational Status

Saravanakumar (2000) found that 38.03 per cent of the Tamil Nadu Women in Agriculture (TANWA) programme based respondents completed their secondary education and 32.4 per cent and 26.77 per cent have completed their middle and primary education respectively.

Mishra (2001) reported that majority (54 %) of the agro-industrial entrepreneurs in Odisha had education up to matriculation level.

Thangamani and Umapriya (2001) reported that 40 per cent of women beneficiaries of loan fund scheme of Avinashilingam Trust were educated up to middle school level.

Ambika (2002) revealed that 35.9 per cent, 25.64 per cent and 12.82 per cent of the TANWA SHG members had completed their middle school, primary and secondary education respectively. About 15.38 per cent were functionally literates and only meager numbers of participants were illiterate or graduate.

Krishnakumar (2002) reported that more than one third of the farm women (39.17 per cent) had middle level education followed by primary level education 38.83 per cent. His observation further revealed that there were about 85 per cent of the farm women who had educational range from primary to secondary level of education.

Narmatha *et al.* (2002) reported that majority of the livestock farm women were literates. A high proportion of the respondents had primary (32.67 %) and high school (30.66 %) education. Only 17.33 per cent of the respondents had college education.

Rangi *et al.* (2002) in the study conducted at Fategarh Sahib district of Punjab reported that 70.00 per cent of SHG members were educated and the rest 30 per cent were totally illiterate. Among the educated category of the respondents, majority (57 %) had education up to 5th to middle standard and 29 per cent were educated up to 9th and 10^{th} standard.

Tamilselvi (2002) revealed that nearly one-third (34 %) of the respondents possessed primary education, followed by those with secondary education (30 %) and middle school education (29 %). Only a negligible percentage of the respondents possessed collegiate education (4 %) and functional literacy (3 %). None of the respondents was found to be an illiterate.

Femina (2003) found that 51.6 per cent of the voluntary organizations based respondents were illiterates, 19.4 per cent had primary education, 24.2 per cent had secondary education and 4.8 per cent had collegiate education.

Hema (2003) reported that 30.83 per cent of the women were illiterates and 44.17 per cent were functionally literates. Among literates, 6.67 per cent had education up to primary level, 10.83 per cent had education up to middle school and 7.5 per cent had higher secondary education.

Shanthi (2004) observed that one-third (33.33 %) of the SHG women possessed middle school level of education, followed by primary education (24.17 %), illiterate (21.67 %) and secondary education (18.33 %). Only a negligible percentage (1.67 %) of the respondents possessed functional literacy and only one respondent had collegiate education.

Dillikumar (2006) observed that majority (68.3 %) of the women SHG members had formal education.

Selvarani (2006) stated that more than one-third (35.38 %) of the respondents had primary education followed by illiterates 32.31 per cent. More than one-tenth (13.08 %) of the respondents were found to be functionally literates. One-tenth (10 %) of the respondents had their education up to middle school level while little less than one-tenth (8.46 %) of the respondents had their education up to secondary school level.

Mukesh (2007) revealed that majority (75 %) of the SHG women of Thanjavur district had formal education and only one-fourth (25 %) of the respondents were illiterates.

Mary (2009) reported that more than one fourth (28.43 %) of the SHG women had primary education, followed by functionally literates 22.55 per cent one sixth (16.67 %) of them had secondary education and more than one tenth (11.76 %) of the women had middle school level education, one tenth (10.78 %) of the respondents were illiterates and collegiate were 9.80 per cent.

Thorat *et al.* (2009) concluded that majority (50.83 %) of the women SHG respondents were illiterates and only 28.34 per cent of the respondents were educated up to higher secondary level.

Chinchu (2011) found out that among the 100 beneficiary farmers of State Horticulture Mission- Kerala who were interviewed for the study, no one was found to be illiterate, 31 per cent had only primary education, 42 per cent had secondary education, 18 per cent had studied up to higher secondary and only 9 per cent had gone to colleges.

2.3.4. Occupational Status

Rose (1990) found that more than half (55 %) of the viewers of agriculture related programmes in Kerala had agriculture as their secondary occupation.

Mathews (2001) found that majority of the group leaders in Kerala were without any occupation and they constituted 46.6 per cent. In Tamil Nadu 96.6 per cent of group leaders were labourers whereas in Kerala, labourers constituted only 16.6 per cent of group leaders. Group leaders engaged in agriculture were 23.3 per cent in Kerala and none was engaged in agriculture in Tamil Nadu. Ten per cent of the group leaders were employed in office works in Kerala while it was 'nil' in Tamil Nadu.

Narmatha *et al.* (2002) reported that nearly 85 per cent of the respondents had livestock rearing as subsidiary occupation and only 15 per cent of them had livestock enterprise as their primary occupation.

Tamilselvi (2002) concluded that majority (85 %) of the women entrepreneurs had subsidiary occupation along with their enterprises and only 15 per cent of them were practicing enterprise alone.

Hema (2003) reported that nearly three-fourth (75.83 %) of members in women SHGs of Puducherry Union Territory were wage earners. The remaining 24.17 per cent had no occupation.

Shanthi (2004) found out that most (97.5 %) of the TANWA based farm women of Cuddalore district had agriculture as their main occupation.

Sujhi (2004) found that majority (45 %) of the Micro Financial Institution based cultivators were wage earners, followed by 21.7 per cent involved in business alone and 16.7 per cent involved in service. The rest 16.7 per cent were found involved in farming associated with other income generating activities. With regard to Banking Institution respondents, majority (63.3 %) of them were found to be wage earners, followed by 20 per cent involved in business, 8.3 per cent with service alone and the rest 8.4 per cent involved in farming associated with other income generating activities.

Dillikumar (2006) observed that majority (91.7 %) of the SHG women members practicing jasmine cultivation had agriculture as their main occupation and for the rest (8.3 %), agriculture was found to be the subsidiary occupation.

Mukesh (2007) reported that three-fourth (75 %) of the women SHG members of Thanjavur district had agriculture as their primary occupation and the remaining one-fourth (25 %) who had it as a secondary occupation.

Prasad *et al.* (2008) revealed that majority (93.55 %) of the respondents in Kolar District had agriculture as their main occupation.

Thorat *et al.* (2009) concluded that 41.67 per cent of women SHG members of Haryana had agriculture and dairy as their occupation followed by 35.83 per cent who had agriculture alone as their occupation. Only a lesser

proportion of the respondents had agriculture and labour (12.5 %) and agriculture and service (10 %) as their occupation.

Jadhav and Tambat (2010) reported that majority (58.12 %) of the women SHG members in Sindhudurg district of Maharashtra had agriculture as main occupation and wage earning as subsidiary occupation.

Kiran and Kanani (2010) revealed that 39 per cent of the SHG Women in Junagadh district of Gujarat were found to be the daily labourers and 31 per cent had been involved in agriculture and allied activities.

2.3.5. SHG Experience

Manimekalai (2004) opined that more than three fourth (80 %) members of the self-help groups in Tiruchirapalli district of Tamil Nadu had medium to low level of self-help group experience. Exactly one fifth (20 %) members had high level of experience in SHGs.

Ganesan (2005) stated nearly 60 per cent of the respondents had medium level, that is, four to five years of experience in self –help group.

Asokhan (2006) found that nearly three fourth (70 %) of the SHG-based rural women had three to seven years of experience as self-help group members. Only a little more than one-tenth (10.67 %) of respondents had more than seven years of experience. The remaining 19.33 per cent of the respondents had less than three years of experience.

2.3.6. Nature of SHG Membership

Puhazhendhi and Satyasai (2000) in their study on rural poor found that a little less than two-third (65 %) of the respondents had ordinary membership position in SHGs while 35.00 per cent were office bearers.

Ganesan (2005) found that one-third of self-help group members accepted the offers for the post of animator or representatives while the rest acted as an ordinary member in the group.

Asokhan (2006) found that a little above half (52 %) of SHG-based rural women were holding ordinary membership and one-third (33.33 %) of them were representatives and more than one-seventh (14.67 %) of them were animators.

2.3.7. Farming Experience

Sumathi (1999) observed that more than fifty per cent (55.24 %) of the farm women were found to have medium level of farming experience followed by nearly one-third with high farming experience.

Theodore (1999) observed that 43.33 per cent of the diversified farmers were found with high farming experience, followed by 41.67 per cent with low and the rest 15 per cent with medium level of farming experience.

Suresh (2001) stated that 56.67 per cent of the respondents possessed high level of farming experience followed by medium (37.5 %) and low (5.83 %) levels.

Palmurugan (2002) found that 63.5 per cent of the farm women had medium level of farming experience.

Banumathi (2003) stated that 55.83 per cent of the rainfed rice growers possessed high level of farming experience followed by medium (29.17 %) and low (15 %) levels.

Senthilvadivoo (2003) revealed that majority (66.67 %) of the respondents were found to possess more than ten years of farming experience followed by 20.83 per cent who had attained five to ten years of experience and only 12.5 per cent of the respondents possessed less than five years of experience.

Suji (2003) indicated that majority (65.83 %) of the paddy farmer respondents had medium level of farming experience followed by 18.34 per cent with high level of farming experience and 15.83 per cent with low level of farming experience.

Ramasubramanian (2003) inferred that in total, 44 per cent of the dry land farmers were found to possess medium farming experience followed by high farming experience (38.5 %).

Sasikala (2011) observed that in the below normal rainfall blocks, 42 per cent of farmers had 11-30 years experience, while 50 per cent of the farmers had more than 30 years of experience. In the above normal rainfall block, 54 per cent of farmers had 11-30 years experience. The average level of farming experience was 30.43 and 27.62 for below and above normal rainfall blocks, respectively.

2.3.8. Information Seeking Behaviour

Prasad *et al.* (1988) stated that farm women preferred more localite sources of information.

Padmanabhan (1990) could find out a highly significant and positive relationship between the information seeking behaviour of the instructor of adult education center and the efficiency of the center.

Perumal (1994) reported that more than half (55.33 %) of the participants had low level of information seeking behaviour. Remaining 44.67 per cent had high level of information seeking behaviour.

Banerji (2005) reported that communication through Tele Vision (T.V) is very effective because the consumer can see the product along with other information regarding price and quality being communicated to him at the same time.

2.3.9. Self Confidence

Krishnasrinath (1991) reported that empowerment means to develop the capacity to face challenges of modern life by improvement in skills, comprehension and attitudes which in turn will help to inculcate self-confidence and value judgement.

Narmatha *et al.* (2002) reported that majority (79.34 %) of the livestock entrepreneurs possessed medium to high level of self-confidence.

Shanthi (2004) reported that 44.17 per cent of the SHG women possessed high level of self-confidence, followed by 42.5 per cent of the SHG women with medium level of self- confidence. There were 13.33 per cent of the respondents who possessed low level of self- confidence.

Dillikumar (2006) reported that 36.7 per cent of the women SHG members possessed high level of self-confidence, followed by 35 per cent with medium level of self- confidence. There were 28.3 per cent of the respondents who possessed low level of self- confidence.

Selvarani (2006) reported that more than one-third (41.54 %) of the respondents had high level of self-confidence, less than one-third (32.31 %) of the respondents had low level of self-confidence followed by medium (26.15 %) level of self-confidence.

Mukesh (2007) revealed that 32.5 per cent of the respondents had high level of self–confidence. Majority (52.5 %) of the respondents had medium level and 15 per cent of them had low level of self-confidence.

Sathiyabama (2008) observed that majority (60 %) of the respondents had high level of self-confidence followed by medium (25.5 %) and low (16 %) levels of self-confidence.

Tamilselvi and Vasanthakumar (2008) reported that majority (74 %) of the respondents had high level of self -confidence, followed by medium (15 %) and low (11 %) levels of self -confidence.

2.3.10. Innovativeness

Jamatia (1999) revealed that 40 per cent of the respondents had medium level of innovativeness, followed by 43.3 per cent with low and 10.7 per cent with high level of innovativeness.

Saravanakumar (2000) reported that farm women in general had high level of innovativeness. About seventy per cent of the respondents had high level of innovativeness and 19.72 per cent had low level of innovativeness.

Narmatha *et. al.* (2002) revealed that more than half (55 %) of the proportion of respondents had high level of innovativeness followed by medium (27 %) and low (18 %) levels of innovativeness.

Palmurugan (2002) inferred that majority (87.8 %) of the farm women had medium level of innovativeness, followed by 10.8 per cent and 1.40 per cent of farm women who had low and high levels of innovativeness respectively.

Sakunthalai (2004) found that majority (68.84 %) of the respondents had medium level innovativeness, followed by 31.16 per cent of the respondents had high level of innovativeness.

Sathiyabama (2008) observed that 52 per cent of the respondents had high level of innovativeness followed by medium (32 %) level of innovativeness. Only 16 per cent respondents had low level of innovativeness.

Tamilselvi and Vasanthakumar (2008) reported that a little more than half (52 %) the proportion of respondent had high level of innovativeness followed by medium (33 %) and low (15 %) levels of innovativeness.

2.3.11. Scientific Orientation

Senthilkumar (2000) found that majority of farmer respondents had a high degree of scientific orientation.

Ananthamanikandan (2003) observed that majority of the respondents had high level of scientific orientation.

Oommen (2007) reported that 74 per cent of the television viewers had a medium level of scientific orientation.

Sangeetha (2009) found that 50 per cent of the respondents had a higher level of scientific orientation followed by 36.36 per cent and 13.64 per cent under medium and low level respectively.

Rakesh (2010) reported that 42.7 per cent of the sugarcane farmers possessed medium level of scientific orientation followed by 35.3 per cent with high level and 22 per cent with low level.

Hanjabam (2013) found that the respondents were having a medium to high level of scientific orientation in their approach to take up precision farming practices.

Sobha (2013) stated that 53.34 per cent of the respondents had medium level of scientific orientation followed by 23.33 per cent each with high and low level of scientific orientation.

2.3.12. Achievement Motivation

Palmurugan (2002) opined that a very high proportion (87.8 %) of farm women had possessed medium level of achievement motivation, whereas, a meager per cent (1.4 %) had high level and 10.8 per cent had low level of achievement motivation.

Priyadarshini (2002) reported that 57.5 per cent of the SHG respondents had high level of achievement motivation, followed by 40 per cent of respondents with medium level of achievement motivation.

Hema (2003) observed that 40.83 per cent of the respondents had medium level of achievement motivation, followed by high (34.17 %) and low (25 %) levels of achievement motivation.

Shanthi (2004) reported that more than two-fifth of the respondents (45.83 %) fell under medium category of achievement motivation followed by 31.67 per

cent belonging to high and 22.5 per cent belonging to low categories of achievement motivation.

Asokhan (2006) found that 100 per cent of SHG members had attained a medium to high level of achievement motivation, whereas none had fallen under low level of achievement motivation.

Dillikumar (2006) observed that 43.33 per cent of the respondents had medium level of achievement motivation, followed by high (30 %) and low (26.67 %) levels of achievement motivation.

Selvarani (2006) reported that more than half (51.54 %) of the respondents had high level of achievement motivation. Less than one-fourth (24.62 %) of the respondents had medium level of achievement motivation followed by low (23.84 %) level of achievement motivation.

Mukesh (2007) revealed that 42.5 per cent of the women SHG members had medium level of achievement motivation followed by 35 per cent and 22.5 per cent of respondents with low and high level of achievement motivation respectively.

Prasad *et al.* (2008) observed that majority (75.81 %) of the respondents had medium to high level of achievement motivation followed by one-fourth (24.19 %) of the respondents who had low level of achievement motivation.

Sathiyabama (2008) observed that most of the respondents (41 %) were found to possess high level of achievement motivation followed by medium (40 %) level of achievement motivation. Only 19 per cent of the respondents had low level of achievement motivation.

Tamilselvi and Vasanthakumar (2008) reported that majority (66 %) of the respondents were found to possess high level of achievement motivation followed by 26 per cent with medium level. Only 8 per cent of the respondents had low level of achievement motivation.

Meenakshi (2011) reported that nearly half (48.33 %) of the respondents had high level of achievement motivation followed by 26.67 per cent and 25 per

cent of the respondents had medium and low level of achievement motivation respectively.

2.3.13. Economic Motivation

Theodore (1999) reported that in Thirunelveli and Tuticorin districts among diversified farmers, 41.67 per cent were observed with medium level of economic motivation, followed by 35 per cent with low and the remaining 23.33 per cent with high level of economic motivation. As far as the non-diversified farmers were concerned, nearly half (46.67 %) of them had medium level of economic motivation, followed by one-third (33.33 %) with low and the rest 20 per cent with high level of economic motivation.

Saravanakumar (2000) stated that 47.89 per cent and 45.07 per cent of the participants had medium and high level of economic motivation respectively, followed by low (7.04 %) level of economic motivation.

Priyadarshini (2002) found that majority (76.67 %) of the SHG members had high level of economic motivation.

Hema (2003) reported that 38.33 per cent of the respondents had high level of economic motivation, followed by medium 34.17 per cent and low 27.5 per cent level of economic motivation.

Sakunthalai (2004) inferred that more than one third (36.92 %) of the respondents had high level of economic motivation, followed by medium 33.08 per cent level of economic motivation. Less than one-third (30 %) of the respondents had low level of economic motivation.

2.3.14. Risk Orientation

Vijayalan (2001) inferred that 40 per cent of the paddy farmer respondents had medium level risk orientation followed by low level (30.83 %) and high level (29.17 %).

Jayashree (2004) interpreted that majority of the respondents (57.50 %) had medium level of risk orientation followed by high (25.83 %) and low (16.67 %) levels.

Dev (2009) stated that so as to de-risk agriculture, we have to focus more on management of land and water, including irrigation development, soil conservation, watershed development, water conservation and improvement in public delivery systems.

Anamica (2010) carried out a study among the dry land farmers of Tamil Nadu. She revealed that the risk orientation level is generally high among the respondents (42.22 %) followed by moderate (31.11 %) and low levels (26.67 %).

Palanisamy (2011) found that 45 per cent of the precision farming beneficiaries had high level of risk orientation, while 42 per cent of the precision farming beneficiaries had medium level of risk orientation and rest 13 per cent of the precision farming beneficiaries had low level of risk orientation.

2.3.15. APL/BPL Members

Dasgupta and Goldar (2005) in their study on rural female labourers reported that 40 per cent of the respondents belonged to Below Poverty Line (BPL) households and 60 per cent to Above Poverty Line (APL) households. Considering only BPL households, 74 per cent of females were engaged in manual work in cultivation which includes ploughing, sowing, transplanting, weeding, harvesting and other cultivation activities. Among females from APL households, this percentage falls to 58 per cent.

Yadav and Garg (2010), in their study on socio-economic conditions of Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) workers, found that 59 per cent of workers surveyed belonged to BPL family.

Under the Targeted Public Distribution System (TPDS), households were classified as Above Poverty Line (APL) or Below Poverty Line (BPL), based on the economic status of households (Khera, 2011).

Nishanth *et. al.* (2015) through their study on food security and nutrition consumption revealed that about one third (34 %) of the respondent families belonged to the BPL category and the remaining 66 per cent were in the APL category.

2.3.16. General Category/OBC/SC/ST Members

Dalapati (2010) in his study on MGNREGS workers found that majority (42.4 %) of beneficiaries were from scheduled tribes and 21.5 per cent belonged to scheduled caste category. The participants of other backward castes were reported to be 32.1 per cent, whereas only 4 per cent general castes people participated in the wage employment programme.

Galab *et al.* (2010) observed that the proportion of SC, ST and BC household participation was around 64 per cent and only 15 per cent among other castes.

Sharma *et al.* (2010) while studying Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) in Haryana reported that 68.8 per cent of the participants belonged to scheduled castes and 16.3 per cent were other backward castes.

Padhi *et al.* (2010) observed that the portion of SC households among participants is much greater than their share in total population for all the four surveyed districts of Odisha.

Prabu (2011) found out that the majority (62.22 %) of the MGNREGP workers belonged to backward community followed by forward community and ST and SC, respectively.

2.3.17. Credit Status

Birdar and Jayasheela (2000) reported that in case of agricultural credit, many farmers do not get adequate loans for the intended purposes.

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

Devi (2003) reported that the total rewards were the same as total repayments in the case of most SHGs.

2.3.18. Use of External Labour

Alex (1994) defined agricultural labourer as a person doing any kind of agricultural operation for a farmer in receipt of wages in the form of either cash or kind or both.

Dubgaard (1994) studied the economic analysis of organic farming in Denmark and his results showed that the organic farms used about twice as much labour per hectare as the conventional farms.

Agricultural labourers are those people who are engaged in raising crops and in other agricultural occupations like dairy, farming, horticulture, raising of bees, poultry etc. on payment of wages (Padhi, 2007).

FAO (2011) stated that often there is a pronounced gender division of labour for particular agricultural tasks, with the result that male and female labour cannot be easily substituted. Some farming activities, such as ploughing and spraying, rely on access to male labour without which women farmers face delays that may lead to losses in output.

2.3.19. Trainings attended

According to Ashaletha (2000), training was significantly and positively related to the awareness about National Agricultural Research Project (NARP).

Ghosh *et al.* (2000) stated that, involvement in production oriented training and extension programmes not only led the farmers as beneficiaries but also change agents.

Thomas (2000) found out that one day duration training was most preferred and one month training was the least preferred duration of training. Further he found out that as the duration of training increased, the performance decreased. He also found out that majority of the farmers liked training on marketing followed by processing.

Krishnakumar (2002) reported that more than two-fifth (42.5 %) of the farm women attended more than one training, followed by 30.83 per cent farm women who attended one training and 26.67 per cent farm women who attended no training.

Parthasarathi and Govind (2002) reported that the knowledge level of trained farmers was much higher on biological and physical methods of Integrated Pest Management (IPM).

Sailaja (2002) found that 58 per cent of the respondents had undergone low levels of training followed by 21 per cent each that had undergone medium and high levels of training respectively.

Tamilselvi (2002) observed that majority (73 %) of the respondents attended training programmes and 27 per cent did not attend any training programme.

Hema (2003) observed that majority (68.33 %) of the SHG women attended two to three training programmes. None was found without any training participation.

Jaganathan (2004) reported that 57 per cent of the vegetable farmers in Thiruvananthapuram district had medium level of training followed by 33 per cent with low level.

Dillikumar (2006) stated that majority (56.7 %) of the SHG women had attended up to 3 training programmes, followed by medium (30 %) and high (13.3 %) categories with regard to number of training programmes attended.

Selvarani (2006) stated that little less than half (48.46 %) of the respondents had one training, while less than one-third (32.31 %) of the respondents had two trainings. More than one-tenth (11.54 %) of the respondents had attended three trainings, while less than one-tenth (7.69 %) had attended four trainings.

Mukesh (2007) reported that nearly half the proportion of respondents (45 %) had attended four to five training programmes on dairy management, followed by 32.5 per cent who had attended more than six training programmes.

Kiran and Kanani (2010) revealed that more than half (57 %) the proportion of respondents had received training in tailoring (design stitching) followed by 43 per cent of the respondents who had not received any training.

Zaman *et al.* (2010) opined that women's work efficiency could be increased by training, education and extension supports.

Meenakshi (2011) found that one-fourth (25 %) of the respondents had one training and nearly half (47.5 %) of the respondents had two trainings. More than one-fourth (27.5 %) of the respondents had attended more than two trainings.

Esakkimuthu (2012) found that majority (66.63 %) of banana farmers in Thiruvananthapuram district had attended three to four trainings.

2.3.20 Cost of Cultivation

Fayas (2003) found that land preparation accounted about one-third of the cost of cultivation of vegetable farmers.

Shirsagar (2008) studied the impact of organic farming on economics of sugarcane cultivation in Maharashtra and found that its cost of cultivation is lower by 14.2 per cent when compared to inorganic farming.

The average cost of cultivation of paddy (basmati) in Punjab through organic methods was Rs.9,325 per acre while the same in conventional farming was Rs.7,818 per acre. The cost of cultivation was nearly 19 per cent higher in organic farming when compared to conventional farming (Charyulu and Biswas, 2010).

Cost of cultivation and the value of output are generally found to be higher for irrigated crops as compared to less-irrigated or crops that are cultivated under rain fed condition. For instance, the cost required for cultivating one hectare of gram is substantially less than the same required for cultivating sugarcane. Since reasonable profit margin is essential to solve the agrarian crisis and to alleviate the indebtedness among the farmers' households, the prices for the crops should be fixed in consonance with the cost of cultivation (Narayanamoorthy, 2013).

Rao (2014) through his study found out that the average total cost of cultivation per acre increases from lower to the higher categories of sugarcane growers, that is, marginal farmers to large farmers. The expenditure on cultivation and input use are less in case of marginal and small farmers.

2.4 SUSTAINABLE AGRICULTURE AND DEVELOPMENT

Brown (1984) defined sustainable agriculture as a stewardship. It emphasizes the stewardship of both natural and human resources. These include

concern over the living and working conditions of farm labourers, consumer health and safety and the needs of rural communities.

According to the Brundtland (1987), the core idea of sustainability is the concept that current decisions should not damage the prospects for maintaining or improving the living standards in future. With mounting criticism and growing recognition of problems with modernist's approach to agriculture as well as increased public awareness about environmental issues, search for conceptualization, description and operationalization of alternate forms of agriculture intensified. Sustainable agriculture emerged as the term to describe the varied field of agricultural practices that differ from the conventional concepts of modern agricultural production.

Khosla and Ashok (1987) characterized sustainable agriculture as designed with factors like resource conserving, equitable, economically efficient, waste reducing, socially compatible, enjoyment generating, self reliant and need fulfilling.

Lockeretz (1988) delineated the following physical and biological parameters for sustainable agriculture:

- Diversity of crop species
- Selection of crops and livestock that are adapted to particular environment
- Preference for farm generated resources rather than purchased materials
- Tightening of nutrient cycles to minimize nutrient losses
- Livestock housed and grazed at low stocking densities
- Enhancement of storage of nutrient in the soil
- Maintenance of protective cover on the soil
- Rotation that include deep rooted crops and control weeds
- Use of soluble inorganic fertilizer
- Use of pesticide for crop protection only as a last resort

Sustainable agriculture is an umbrella term that embraces but is not restricted to nor is defined by such terms as organic, regenerative, biodynamic, ecological, alternative or low input agriculture. Just because a farm is organic or alternative, it does not however mean that it is sustainable (Reganold *et al.*, 1990). A sustainable farm must bring out sufficient produce in an economically viable manner by using organic or inorganic input in judicious combination so as not to have any long term detrimental effects on the ecosystem.

Altieri (1992) opined that the goal of sustainable agriculture is to maintain agricultural productivity with minimal environmental impact, assuming adequate returns while providing for the social needs of the entire population.

Haily and Runye-Metzger (1992) stated that the sustainability of food production systems involves both environmental and socio-economic dimensions. A system will prove sustainable only if it can maintain or enhance environmental quality and remain robust against external stress or major disturbances, satisfy society's future demands for food and fibre and assure the economic and social well being of the producer.

Nehar (1992) defined sustainable agriculture as a system, which contains four equally important components, namely, environmental quality, ecological soundness, plant and animal productivity and socio-economic viability.

As per Pretty (1996), the adverse impacts of modern agriculture are:

1) Contamination of water by pesticides, nitrates and other wastes, causing harm to wildlife, disruption of ecosystem and possible health problems.
2) Contamination of food and fodder by pesticide residues.
3) Damage to farm and natural resources by pesticides.
4) Contamination of atmosphere by ammonia, methane etc.
5) Atmospheric pollution, ozone depletion and global warming.
6) Over use of natural resources causing depletion of ground water.

7) Displacement of traditional varieties and breeds by modern varieties/breeds.
8) New health hazards due to agrochemicals-during field spray and working in manufacturing industries.

According to Swaminathan (1999) the success of sustainable agriculture results from a combination of science, technology, service and public policy.

As reported by McNeill (2000), it was the Report of the World Commission on Environment and Development (the Brundtland Report) published in 1987, which brought in the terminology of 'sustainable development'.

According to Venkataraman (2002), the future growth in agriculture has to necessarily come from increased productivity from a shrinking natural resource base through efficient management. Simultaneously conservation of natural resource must receive sustained attention. He also pointed out that our vision of growth should not be clouded by short-term gains, but strongly focus on long term sustainability.

For sustainable agriculture, it has to hold in balance the three sides of sustainable development, that is, economy, environment and health of the society ensuring enhanced quality of life for the farmers and society as a whole (Khuspe, 2003).

In the words of Kumaraswamy (2003), "the philosophy of sustainable agriculture is to maximize crop production through scientific methods of farming, growing crop varieties for high yielding and high quality potential and using optimum inputs of manures, fertilizers, bio-fertilizes and agricultural chemicals without exploiting and polluting the natural resources of soil, water and environment. Sustainable agriculture must be in harmony with the environment without exploiting and exhausting the natural resources.

Sustainable development envisages optimum utilization of resources for each generation with sufficient resources to generate its own wealth (Singh, 2007).

According to Sinha (2011), sustainable agriculture is a key element of sustainable development and is essential to the future well being of human race and the planet earth. Sustainable agriculture needs to be economically viable, environmentally sound and socially acceptable. It is a system of agricultural production that over the long term will:

- Satisfy human food, feed and fiber needs.
- Enhance the environmental quality and the natural resource base upon which the agricultural economy depends.
- Make the most efficient use of available technologies, non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls.
- Sustain the economic viability of the farm operations.
- Enhance the quality of life of farmer and society as a whole.

According to Anilkumar *et al.* (2014), the criteria and indicators of sustainability are economic sustainability (economically viable), environmental sustainability (ecologically sound), social sustainability (social equity), humane and adaptable.

Mishra *et al.* (2014) claimed that major adjustments are needed in agricultural, environmental and macroeconomic policy, at both national and international levels, to create the conditions for sustainable agriculture. Large scale and injudicious application of synthetic fertilizers and toxic pesticides besides large scale irrigation led to colossal damage to the ecosystem and more importantly the human and cattle health.

2.4.1 Economic Development

Garforth (1993) stated that from a social perspective, rural and agricultural development must provide sustainable livelihood for households in rural areas particularly for those with few resources and little opportunity for non-agricultural employment and income. An economic perspective points to the need for farming system to generate sufficient returns to justify the resources used.

According to Anilkumar *et al.* (2014), the indicators of economic sustainability are:

- The family savings constantly going up
- The debt is constantly going down
- The farm enterprises are constantly profitable from year to year
- Purchase of farm inputs from outside is decreasing
- Reliance on government subsidies is decreasing

According to Wikipedia (2015a), an economic indicator is a statistic about an economic activity. Economic indicators allow analysis of economic performance and predictions of future performance. Economic indicators include various indices, earnings reports, and economic summaries.

According to Wikipedia (2015b), economic development is the sustained, concerted actions of policy makers and communities that promote the standard of living and economic health of a specific area. Economic development can also be referred to as the quantitative and qualitative changes in the economy.

2.4.1.1 Area Cultivated

Jha and Shaktawat (1972) in their study found out that size of land holding had no significant relation with adoption behaviour of farmers.

Satheesh (1990) found a significant and positive relationship between area cultivated and knowledge.

Muller (1997) reported non-significant relationship between farm size and group relationship of women.

Ashaletha (2000) found a non-significant relationship of farm size with both awareness and knowledge in case of both rice and sesamum farmers.

Surendran (2000) reported that large farm size resulted in more returns from farming.

Fayas (2003) found no correlation between farm size of vegetable farmers and their economic performance.

Esakkimuthu (2012) found that majority (70 %) of the respondents possessed land holding below 60 cents.

2.4.1.2 Economic Motivation

Shanti (1996) reported that earning money to meet day to day requirements is the prime motive of women labourers in rice farming and hence economic motivation has emerged as the most contributing variable to managerial efficiency of those farm women.

Sivaprasad (1997) found that economic motivation is an important character that persuades people to adopt improved practices that are proven worthy.

Thomas (1998) reported that the more one is motivated by economic ends, the more he will try to adopt the practices that are aimed at increasing sustainable returns.

Parvathy (2000) found that economic motivation had a positive correlation with extent of participation of rural women in people's plan programmes.

2.4.1.3 B-C Ratio

Mahadeb *et al.* (1991) found that onion was more profitable than summer rice in West Bengal. For every rupee invested, the farmer gets Rs 1.23 from summer rice and Rs 2.57 if he switches over to onion.

Kuchhadiya *et al.* (1992) studied the cost benefit aspects of garlic crop in Jamnagar district of Gujarat state and observed that the cost benefit ratio was 1:1.99.

Singh *et al.* (1995) in their study of economics of cauliflower in the vicinity of Faizabad district reported that 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).

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.

Smitha (2011) compared the B-C ratio of eco-friendly rice cultivation, conventional rice cultivation and cow based mini budget rice farming (*Go-adharitha krishi)* and found out that it was 1.39, 1.79 and 2.2 respectively.

Investopedia (2015) describes B-C ratio as a ratio attempting to identify the relationship between the cost and benefits of a proposed project. Benefit cost ratios are most often used in corporate finance to detail the relationship between possible benefits and costs, both quantitative and qualitative, of undertaking new projects or replacing old ones.

2.4.1.4 Increase in Income

Gowda and Jayaramaiah (1990) in their study found that the extent of increase in annual gross income of farmers was due to the implementation of watershed development programmes.

Sankaran (1997) concluded that increased income of farmer beneficiaries was the directly perceived impact of Integrated Watershed Development Programme.

Lakshmi (2000) reported a positive and significant relationship between economic motivation and increase in income.

Meera (2001) found out that training had a positive relationship with increase in income whereas age had a negative relationship with the variable.

2.4.1.5 Credit Orientation

Narmatha *et al.* (2002) revealed that an equal proportion of the respondents (34.33 %) had high and low levels of credit orientation, while 31.34 per cent of them had medium level of credit orientation.

Priyadarshini (2002) reported that majority (75 %) of the SHG members had medium level of credit orientation, followed by low and high levels of 22.5 per cent and 2.5 per cent respectively.

Sailaja (2002) revealed that 40 per cent of the farm women had medium level of credit orientation followed by 33 per cent and 27 per cent who had high and low levels of credit orientation respectively.

Tamilselvi (2002) noticed that nearly half (47 %) the proportions of the SHG women were having high level of credit orientation followed by 36 per cent under medium level. Comparatively a lesser proportion (17 %) of SHG women was observed with low level of credit orientation.

Femina (2003) observed that two-third of the respondents were in the high level (67.7 %) of credit orientation, followed by 32.3 per cent were in low level of credit orientation.

Hema (2003) reported that more than half (55 %) of the farm women possessed medium level of credit orientation, followed by 36.67 per cent with high level of credit orientation. Only 8.33 per cent of the respondents possessed low level of credit orientation.

Solanki and Soni (2004) reported that majority (44.82 %) of the potato growers were found to be medium in their credit orientation.

Ganesan (2005) found that cent per cent of the SHG respondents had repaid their loans.

Dillikumar (2006) reported that 55 per cent of the respondents had medium level of credit orientation, followed by 23.33 per cent with low and 21.67 per cent with high levels of credit orientation.

Selvarani (2006) reported that less than half (44.61 %) of the respondents were found with high credit orientation followed by medium level of (43.08 %) credit orientation. Less than one-fifth (12.31 %) of the respondents were found with low credit orientation.

Mukesh (2007) noticed that majority (82.5 %) of the women SHG members had medium to high level of credit orientation.

2.4.1.6 Employment Generation

Prasad and Krishna (1995) revealed that the direct employment generation programmes are more suitable for creating additional employment opportunities than the assets creation programme.

Lakshmi (2000) reported that indebtedness of farmers and orientation towards incentives were positively and significantly correlated with employment generation.

Barkley (2002) stated that employment growth is a primary economic development goal of most small communities. Job growth permits the expansion and improvement of public goods and services, leading to an improved local quality of life and enhanced prospects for future employment growth.

According to Singh and Srivastava (2003), diversification of traditional agriculture by promoting allied industries like horticulture, bee keeping, dairy, poultry, pisciculture etc. in specific locations will enhance the prospects of establishing large number of allied industries in rural areas to provide employment.

Maintaining agro-processing industry, biocomposting units and insitu conservation of medicinal plants with the help of private institutions can generate employment (Krishnakumar, 2003).

2.4.2 Social Development

Gopikuttan (2002) stated that performance of Kerala in the sphere of social development is often projected as a model to be replicated.

Social sustainability refers to the quality of life of those who work or live in the farm as well as those who live in the local community through positive farm family relationship, personal interaction with the consumers and purchase of local inputs from markets (Anilkumar *et al.*, 2014). In social sustainability, the farm supports the community and the community supports the farm.

2.4.2.1 Transparency

Muller (1997) is of the opinion that good governance involving participation and transparency were essential for sound development.

Sreedharan (1997) suggested that transparency in business operation and the overall conduct of the group activities should be ensured.

Cambessus (1998) observed that increasing transparency of government operation decreases the chances for corruption and enhances public accountability.

Food and Agriculture Organization (FAO) (1999) stated that transparency has to be built into management functions in farmers organizations, no matter whether leadership is shared or not.

Sreedaya (2000) was of the opinion that transparency is one of the effective ways to ensure fair and equitable delivery of goods and services to the people.

2.4.2.2 Equity

Adam's Theory of Equity says that people are motivated to maintain fair relationship with others and will try to rectify unfair relationships by making them fair (Adam and Rosenbaum, 1962).

Hay (1995) observed that equity means people enjoying equal access to opportunities. Development without equity means a restriction of choices of many individuals in society.

Fernandez (1998) reported that for the sustainability of SHGs, the equity must be ensured.

Sreedaya (2000) found that to develop a sense of equity among members, participation either as a member or as an office bearer is required.

2.4.2.3 Group Leadership

Gibb (1947) reported that leadership is both a function of the social situation and a function of personality, but it is a function of these two interactions.

Dahama and Bhatnagar (1985) stated that leadership is the process of influencing the behaviour of the individual in a given situation.

Hussain (1992) reported that lack of sustained group leadership was one reason for failure of earlier group approaches.

Desai (1995) found that leadership is an important ingredient in the level and form of community participation.

Riddell and Robinson (1995) observed that a frequent objective of group approach is to try to develop effective leadership among poor.

Ban (1997) reported that a participatory approach requires changes in the leadership styles and culture of extension agency.

Muller (1997) found a significant relationship between group leadership and information source utilization.

2.4.2.4 Group Cohesion

Santhanam *et al.* (1990) defined group cohesiveness as the forces that hold group together.

Ghosh (1995) opined that group cohesiveness refers to the ability of the group members to relate emotionally to each other for a given task so as to integrate with each other effectively for achieving the common goals.

Muller (1997) observed a positive and significant relationship between group cohesion and characters like extension participation, information source utilization, cosmopoliteness and training.

Sreedaya (2000) found out that group cohesion is significantly and positively correlated with cosmopoliteness, perception about SHGs and social participation and significantly and negatively correlated with annual income, educational status and economic motivation in Kerala Horticulture Development programme (KHDP) SHGs. In Integrated Village Development Project (IVDP) SHGs also the same result was obtained.

2.4.2.5 Accountability

According to Larson (1989) an effectively functioning group is characterized by clear roles and accountabilities.

Mishra and Mishra (1998) observed that participation brings accountability.

Hansari (1998) reported that participatory approaches aim to develop teams which have greater accountability while taking actions in identification and solving of problems.

FAO (1999) said that groups should be fully accountable to its members.

2.4.2.6 Team Spirit

Mukherjee (1997) reported that some people in the community have individualistic approach and do not easily get involved in community efforts.

Sreedaya (2000) reported that members who had high perception about the group will try to maintain cohesion within the group and develop team spirit.

Meera (2001) found out that maximum number of respondents in the high category was observed for the variable team spirit.

Business Dictionary (2015) defines teamwork as the process of working collaboratively with a group of people inorder to achieve a goal.

Kent University (2015) elaborated teamwork as a crucial part of any business, as it is often necessary for colleagues to work well together, trying their best in any circumstance. Teamwork means that people will try to cooperate, using their individual skills and providing constructive feedback despite any personal conflict between individuals.

2.4.2.7 Group Co-operation

Rao (1989) pointed out that the essential element of group action is the co-operation between the members of the group.

Gautam and Shimla (1990) opined that the problem of non-functioning of Development of Women and Children in Rural Areas (DWCRA) groups in Himachal Pradesh was due to the lack of co-operative zeal among members of the group.

Bardhan (1993) revealed that co-operation works better in small groups with similarity of needs, clear boundaries and shared norms and patterns of reciprocity.

Muller (1997) reported a positive relationship between social and extension participation and group co-operation.

Meera (2001) found out a positive relationship between increase in income and group co-operation

2.4.3 Environmental Protection

Swaminathan (1989) opined that prevention of soil erosion, conservation and management of water resources, conservation of biological diversity using in-situ, ex-situ, in-vitro and in-vivo methods and promoting the spread and development of economically viable and ecologically sound farm techniques are the main components of a sustainable system.

Lal and Miller (1990) pointed out that some of the manipulatable components for attaining sustainability are improved cultivars and cropping systems, conservation tillage and crop residue management, application of fertilizers and organic amendments and water management.

According to Venkataraman (2002), the future growth in agriculture has to necessarily come from increased productivity from a shrinking natural resource base through efficient management. Simultaneously conservation of natural resource must receive sustained attention.

In the words of Kumaraswamy (2003), "the philosophy of sustainable agriculture is to maximize crop production through scientific methods of farming, growing crop varieties for high yielding and high quality potential and using optimum inputs of manures, fertilizers, bio-fertilizes and agricultural chemicals

without exploiting and polluting the natural resources of soil, water and environment. Sustainable agriculture must be in harmony with the environment without exploiting and exhausting the natural resources.

Prabu (2011) found out that various works undertaken in order to conserve and strengthen the natural resources under the Mahatma Gandhi National Rural Employment Guarantee Programme in Palakkad district of Kerala were showing an increasing trend after every financial year.

Anilkumar *et al.* (2014) proposed that environmental sustainability deals with the indicators to find out whether the farming supports a sustainable environment. The indicators are:

- There is no bare ground. The land is fully covered with vegetation
- Clean water flows through streams
- Wildlife is abundant
- Diversification of farm

2.5 INDICATORS USED IN VARIOUS STUDIES

The word for *indicator* in Arabic is *pointer*. Indicators point to a desirable outcome, to 'which way is up' in the policy arena.

2.5.1 Empowerment Index

Empowerment Index followed by Meera (2001) in her study had the following five dimensions namely, Leadership propensity, Self confidence, Employment generation, Increase in income and Decision making.

2.5.2 Employment Potential Index

Palmurugan (2002) developed the employment potential index.

$$\text{Employment potential index} = \frac{\text{Employment opportunities available for farm women in mandays/hectare/crop}}{\text{Crop duration}} \times 100$$

2.5.3 Human Development Index

Sarojini and Moorthi (2002) developed human development index. This index includes the following three indicators.

1. Fix up the minimum and maximum values for the indicator variables – life expectancy, adult literacy rate, gross enrolment ratio and per capita Gross Domestic Product (GDP).
2. Construct separate indices for each indicator variable.
3. Take the simple average of the index for life expectancy, educational attainment index and an adjusted GDP per capita index. The general formula used to construct the index was as follows:

$$\text{Human Development Index} = \frac{\text{Actual value} - \text{Minimum value}}{\text{Maximum value} - \text{Minimum value}} \times 100$$

2.5.4 Sustainable Tribal Development Index

Rajendralal (2005) had delineated nine parameters for developing Sustainable Tribal Development index namely, Socio–economic status, Land alienation, Indebtedness, Level of aspiration, Economic motivation, Guidance and supervision, Orientation to incentives, External interference and Value orientation.

2.5.5 Indices for Measuring Poverty Eradication

Devi (2008) had used the following indices for measuring poverty eradication:

a) Physical Quality of Life Index (PQLI)
b) Human Development Index (HDI)
c) Housing Index
d) Human Poverty Index
e) Nine Point Poverty Index (Urban)
f) Nine Point Poverty Index (Rural)
g) Human Empowerment Index (HEI)

2.6 SWPC ANALYSIS

SWPC as an acronym stands for strengths, weaknesses, potentials and challenges of any entity. SWPC analysis is a management tool for analyzing any system. The SWPC analysis can help the strategy planners and policy formulators to make the given programme more effective and efficient.

2.7 CONSTRAINTS FACED BY FARMERS

Reganold *et al.* (1990) broadly outlined the factors that inhibit farmers from adopting sustainable agricultural practices as governmental policies, lack of information on sustainable farming practices and lack of awareness about the adverse effects of agro-chemicals.

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.

According to Sandhya and Intodia (1999), the rural women have to face a host of problems like poverty, poor participation in decision making, limited access to resources, input and credit and inadequate skill and technical competency.

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.

Fayas (2003) found that the most important constraint faced by vegetable farmers was the high cost of production.

Singh (2004) opined that the rainfall, drought, lack of knowledge on improved dry land practices, lack of finance and low price of produce were very severe constraints faced by arid zone farmers.

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

Torquebiau and Perot (2006) pointed out that high reliance on manual labour, limited markets for specific products, delayed production and delayed return on investment were the major constraints of respondents.

Government of Kerala (2007) in its economic review stated that long agricultural production cycle, lack of access to credit, high cost of borrowing, excessive reliance on money lenders, problems of marketing and adverse terms of trade were the constraints faced by the farmers of the state.

2.8 HYPOTHESES FRAMED FOR THE STUDY

The null hypotheses framed for the present study were as follows:

2.8.1 The most important sub-indicator of economic development will be 'benefit-cost ratio'.

2.8.2 Group cooperation will be the most important sub-indicator of social development.

2.8.3 Avoidance of chemical herbicides and pesticides will be the most important sub-indicator of environmental protection.

2.8.4 Environmental protection attained through the agricultural activities of Kudumbashree SHGs will be very high.

2.8.5 All the three indicators of sustainable agricultural development contribute equally towards it.

2.8.6 Majority of the SHGs will be having medium level of sustainability towards agriculture.

2.8.7 Difficulty in getting loans, subsidies, incentives and other financial assistances during distress will be the most important constraint faced by the Kudumbashree groups regarding group-farming.

MATERIALS AND METHODS

III. MATERIALS AND METHODS

This chapter deals with the salient features of the study area, rationale behind its selection, sampling method followed, selection of variables and their measurement, data collection tools and the statistical tools and techniques used in the analysis of data. The details have been dealt with under the following sub-headings:

3.1 Research design

3.2 Locale of the study

3.3 Sampling procedure employed in the study and selection of variables

3.4 Study on individual SHG members

3.5 Study on SHGs

3.5.1 Operationalization and measurement of independent variables

3.5.2 Operationalization and measurement of index-based variables

3.5.2.1 Economic development
3.5.2.2 Social development
3.5.2.3 Environmental protection

3.5.3 Sustainable Agricultural Development Index (SADI)

3.6 SWPC analysis

3.7 Constraint analysis

3.8 Suggestions for the improvement of agriculture through Kudumbashree Mission

3.9 Tools and techniques used for data collection

3.10 Statistical tools used for the study

3.11 Conceptual model of the study

3.1 RESEARCH DESIGN

A research design is the plan, structure and strategy of investigation conceived, so as to obtain answers to the research questions and to control variance (Kerlinger, 2008). In a broad sense research design is the process of planning and carrying out research. According to Kothari (2008), a research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. In broader sense, the research design is the conceptual structure within which research is conducted. It constitutes the blue print for the collection, measurement and analysis of data.

Accordingly "Exploratory or Formulative Research Design" was employed for the study. Ray and Mondal (2011), says that the major emphasis in this design is on the discovery of ideas and insights. This design is characterized by a great amount of flexibility and adhoc versatility. The researcher is involved in investigating an area or subject in which the individual is not sufficiently knowledgeable to have formulated detailed research questions. The researcher is seeking information that will enable to formulate specific research questions and/or to state hypotheses about the problem. In short, the researcher seeks to gain familiarity and/or to achieve new insights into the problem situation. For a given problem situation the result of an exploratory study may indicate that further research can be reduced and/or certain aspects of the larger study can be eliminated.

3.2 LOCALE OF THE STUDY

The study was undertaken in the Thiruvananthapuram district of Kerala. Thiruvananthapuram is the southernmost district as well as capital of the state.

The study was undertaken in the Thiruvananthapuram district of Kerala as both the pioneering agricultural development programmes of the Kudumbashree Mission, namely, "*Harithasree*" for the augmented production of vegetables and Nendran banana project called "*Samagra*" were being implemented in the district successfully with more than 13,000 beneficiaries. Further, all the important offices in the state including the head quarters of Kudumbashree Mission are located in the district.

Thiruvananthapuram district has an area of 2,192 square kilometres and is divided into six taluks, namely, Thiruvananthapuram, Chirayinkeezhu, Neyyattinkara, Nedumangadu, Varkala and Kattakkada. The climate of Thiruvananthapuram district is generally hot tropical. The district has three major rivers, several freshwater lakes and more than 300 ponds. The land use pattern of the district is given in the table 3.1.

Table 3.1: Land use pattern in Thiruvananthapuram district during the year 2013-14

Land use	**Area (ha)**
Forest	49861
Non-agricultural	30396
Fallow	3646
Still water	4342
Total cropped area	159217
Net area sown	129750
Area sown more than once	29467

Source: Farm Information Bureau (FIB), 2016

The district can be divided into three geographical regions: Highlands, Midlands, and Lowlands. The highland regions on the east and the northeast comprise the Western Ghats. This area is ideal for major cash crops like rubber, tea, pepper and other spices. Timber trees like teak and rosewood are growing in this region. The midland region lying between the Western Ghats and lowlands is made up of small and tiny hills and valleys. This is an area of intense agricultural activities. This region is rich in produce such as paddy, tapioca, rubber, coconut, vegetables and banana (Table 3.2). The lowlands are comparatively narrow, consisting of rivers, deltas and seashore. Jacob *et al.* (2014) stated that the Agro Ecological Units (AEUs) in Thiruvananthapuram district are southern coastal plains, southern laterites, south-central laterites and southern high hills.

Table 3.2: Area and production of major crops in Thiruvananthapuram district during 2013-14

Crop	**Area (ha)**	**Production (tonnes)**
Paddy	2001	5326
Coconut	71320	551 million nuts
Banana*	8503	72644
Tapioca	14210	467512
Rubber	31840	37470

*include both banana and plantain

Source: Farm Information Bureau (FIB), 2016

Fig. 1- Location of the study

3.3 SAMPLING PROCEDURE EMPLOYED IN THE STUDY AND SELECTION OF VARIABLES

3.3.1 Selection of Development Blocks and CDSs for the Study

There are 12 development blocks in the district, namely, Parassala, Perumkadavila, Athiyanoor, Nemom, Thiruvananthapuram Rural, Kazhakuttom, Vellanad, Nedumangad, Vamanapuram, Kilimanoor, Chirayinkeezhu and Varkala. From these 12 blocks, five were randomly selected (Figure 1). They were Parassala, Perumkadavila, Nemom, Nedumangad and Vellanad. From each of the blocks, one agriculturally active Community Development Society (CDS) was purposively selected in consonance with the opinion of the Kudumbashree mission. The blocks and the selected CDSs are given in the Table 3.3.

Table 3.3: Blocks and the CDSs selected for the study

Block	**Community Development Society**
Parassala	Kunnathukal
Perumkadavila	Karode
Nemom	Malayinkeezhu
Nedumangad	Karakulam
Vellanad	Kattakkada

3.3.2 Selection of Respondents

There were two categories of respondents for the study. Two hundred numbers of SHG based farm women formed the first category of respondents. The second category of respondents was 40 numbers of agriculturally active SHGs.

In this study JLGs were considered as basic units to study sustainability of group farming and were referred synonymously as SHGs.

3.3.2.1 Selection of SHG based Farm Women

There were five Community Development Societies. From each of them, 40 numbers of agriculturally active farm women were randomly selected from the list prepared. These add upto 200 individuals.

3.3.2.2 Selection of SHGs

An exhaustive list of agriculturally active SHGs was prepared for each of the five CDSs. Eight agriculturally active SHGs were randomly selected from each of the five Community Development Societies and these added upto 40 SHGs.

3.3.3 Selection of Variables for the Study

The relevant variables covering the universe of content in the measurement of sustainability of group farming were collected by reviewing literature and discussion with experts in the concerned field. These were then sent with appropriate instructions to 40 judges for estimating their relevancy with respect to the current study (Appendix- II). The judges comprised of experts in the field such as the scientists of pertinent disciplines of Kerala Agricultural University.

The judges rated the universe of variables in a three point continuum as 'more relevant', 'relevant' and 'less relevant' with scores 3, 2 and 1 respectively. Out of the 40 judges, 30 responded within a period of one month. The scores for

each of the items were summated over all the respondents and a relevancy index was worked out using the formula:

$$\text{Relevancy Index} = \frac{\text{Total score obtained on each item}}{\text{Maximum possible score}} \times 100$$

Following the methodology used by Smitha (2011), those variables which secured a relevancy index of 80 and above were selected for the study and is given in the Appendix- III.

3.4 STUDY ON INDIVIDUAL SHG MEMBERS

Fourteen variables were used to study the individual SHG members. ANOVA was done where ever possible to find out if there exists any difference between each of the five sample CDSs for any particular variable.

3.4.1. Age

Age was operationalised as the number of calendar years completed by the respondents at the time of enquiry.

Based on the chronological age, the respondents were classified as per census report 2011 classification method.

Scoring procedure for age of the respondents

Sl. No.	Category	Score
1.	Young (Up to 35 years)	1
2.	Middle aged (36 to 55 years)	2
3.	Old aged (More than 55 years)	3

3.4.2. Family Type

The above variable was operationally defined for the study as the category of family in which the respondent resides permanently at the time of study based on the number of family members.

Actual number of family members was recorded and categorized as follows:

Sl. No.	Number of family members	Family type
1.	Up to 4 members	Nuclear
2.	More than 4 members	Non-nuclear

3.4.3. Educational status

Educational status was operationalised as the level of formal education possessed by the respondent.

The respondents were categorized into illiterates, primary education, secondary education, pre-degree, degree/graduation and post graduation based on the scoring procedure developed by Mansingh (1993) and followed by Selvarani (2006) with slight modification.

Scoring procedure for educational status of the respondents

Category	Score
Illiterate	1
Primary education	2
Secondary education	3
Pre-degree	4
Degree	5
P.G	6

3.4.4. Occupational status

It was operationalized in this study as any activity/activities in which the respondent was engaged to achieve a standard of living.

Based on the occupational status, the respondents were categorized into two as follows:

Activity	Score
Farming alone	2
Farming +others	1

3.4.5. SHG Experience

SHG experience referred to the number of completed years of working in SHG at the time of enquiry.

One score was assigned for each year of experience in SHG. The respondents were categorized into three, namely, low, medium and high based on the quartiles method.

3.4.6. Nature of SHG membership

Nature of SHG membership was operationally defined as the role played by the respondent throughout her career in the self help group. The following scoring procedure adopted by Manimekalai (2004) was followed in the study with slight modification.

Post	Score
Member	1
Office bearer	2

3.4.7. Farming experience

Farming experience of a member was referred to the number of completed years of experience acquired in agricultural activities at the time of enquiry.

One score was assigned for each year of experience in farming. The respondents were categorized into three viz., low, medium and high based on the quartiles method.

3.4.8. Information seeking behaviour

It was operationalised as the sources used by the respondent to receive information regarding agriculture.

The respondents were asked to spell out the source/sources from which they collect information regarding agriculture and then were categorized based on number of respondents towards each information source as given below:

Information source	Kunnathukal	Karode	Malayinkeezhu	Karakulam	Kattakkada	Total
Other farmers						
Group members						
Krishibhavan						
Seminars & trainings						
Farm magazines						
Multiple sources*						
No source						

*include more than one source like Krishibhavan, farm magazines, seminars & trainings, group members and other farmers

3.4.9. Self confidence

It referred to the extent of faith an SHG member possesses in her ability, initiative and zeal to achieve her goal.

This variable was measured by the scale developed by Pandiyaraj (1978).

The scale consists of eight statements to be related on a five point continuum namely, 'Strongly Agree', 'Agree', 'Undecided', 'Disagree' and 'Strongly Disagree' with the weightages of 5, 4, 3, 2 and 1 for positive statements and 1, 2, 3, 4 and 5 for negative statements respectively. The scores obtained by a respondent were added to arrive the individual's maximum score of 40 and minimum score of 8. High score indicates more self-confident nature of the respondent. Quartiles method was used for the categorization of the respondents into low, medium and high.

3.4.10. Innovativeness

In this study, innovativeness was operationalized as the degree to which an individual is relatively earlier in adopting new ideas than other members of the social system. The person who is ready to accept the change and followed the required change in her field would be considered as more innovative compared to the person resistant to change.

The statements and scoring procedure developed by Singh (1971) was followed to measure innovativeness and the same is given below:

Question: When would you prefer to adopt an improved agricultural practice?

Responses	Score
As soon as it is brought to my notice	3
After I had seen it adopted by other member successfully	2
Prefer to wait and take my own time	1

Based on the score obtained by the respondents, they were classified into low, medium and high innovative levels by quartiles method.

3.4.11. Scientific orientation

Scientific orientation was operationalised as the degree to which a farmer is oriented to use the scientific methods in decision making in farming and allied activities.

In this study, the scale developed by Supe (1969) and followed by Surendran (2000) was used with appropriate modifications to measure this variable. The scale consists of six statements of which one was negative. The responses for each statement were rated over a five point continuum which ranged from strongly agree to strongly disagree and the scoring procedure was followed as below:

Response	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**
Scores for +ve item	5	4	3	2	1
Scores for -ve item	1	2	3	4	5

Summation of scores of all the items gave the score of the respondent with respect to her scientific orientation. Thus maximum score of an individual could be 30, while the minimum is 6. Further the respondents were categorized into three groups by quartiles method.

3.4.12. Achievement motivation

Achievement motivation was operationally defined as a social value that emphasizes a desire for excellence for an individual in order to attain a sense of personal accomplishment.

The scoring procedure followed by Senthilkumar (2009) was adopted in this study with appropriate modifications.

It consisted of a five item scale with five alternative responses to each item with scores ranging from 5 to 1. The respondents were asked to give their responses to each item. Total score for an individual respondent was obtained by summing up the score of statements. The maximum and minimum possible scores an individual could obtain were 25 and five respectively. The respondents were categorized into low, medium and high based on quartiles method.

3.4.13. Economic motivation

Economic motivation was operationally defined as an individual's orientation towards maximizing economic gains.

It was measured using the scale developed by Supe (1969). The scale consisted of six items against a five-point continuum from 'strongly agree' to 'strongly disagree'. All the items were positive and were given scores from 5 to 1.

The score for each individual was arrived at by summing up the scores obtained for all the statements. The maximum and minimum scores were 30 and six respectively. The maximum and minimum scores indicated the highest and lowest economic motivation of respondents respectively. Based on the quartiles, they were classified into low, medium and high level of economic motivation.

3.4.14. Risk orientation

Risk orientation for the purpose of this study was defined as the mental orientation of the woman farmer towards encountering risks and uncertainty in farming and adopting new ideas for better returns.

The scale developed by Supe (1969) was used with required modification to measure the risk orientation of the respondents. The scale consisted of six

statements of which two were negative. The responses were collected on a five-point continuum as follows:

Response	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**
Scores for positive statements	5	4	3	2	1
Scores for negative statements	1	2	3	4	5

The score obtained for all statements by an individual was summed up to get total score of risk orientation of the respondents. Thus the maximum score of an individual could be 30 while minimum could be 6. Further, the respondents were grouped into three categories, namely, low, medium and high by using quartiles method.

3.5 STUDY ON SHGs

3.5.1 Operationalization and measurement of independent variables

3.5.1.1 Size of the group

It was operationally defined as the total number of members a SHG had when the study was carried out.

The numbers of members was recorded as such and the groups were categorized based on it.

3.5.1.2 Number of BPL members

It was operationally defined as the number of BPL members a SHG had when the study was carried out.

The numbers of BPL members in each group was recorded as such and the SHGs were categorized based on their strength of BPL members.

3.5.1.3 Number of APL members

It was operationally defined as the number of APL members a SHG had when the study was carried out.

The numbers of APL members in each group was recorded as such and the SHGs were categorized based on their strength of APL members.

3.5.1.4 Number of General Category members

It was operationally defined as the number of members belonging to 'General Category' a SHG had when the study was carried out.

The numbers of General Category members in each group was recorded as such and the SHGs were categorized based on their strength of General Category members.

3.5.1.5 Number of OBC members

It was operationally defined as the number of members belonging to 'OBC' a SHG had when the study was carried out.

The numbers of OBC members in each group was recorded as such and the SHGs were categorized based on their strength of OBC members.

3.5.1.6 Number of SC/ST members

It was operationally defined as the number of members belonging to 'SC/ST' a SHG had when the study was carried out.

The numbers of SC/ST members in each group was recorded as such and the SHGs were categorized based on their strength of SC/ST members.

3.5.1.7 Crops cultivated

It was defined as the various types of crops that were being cultivated by the SHGs when the study was carried out.

The various crops cultivated were recorded and were categorized into three as 'Banana alone', 'Banana+Vegetables' and 'Banana+Vegetables+Others'.

3.5.1.8 Credit status

It was defined as to whether or not the SHGs had taken loan from any source for the purpose of raising the crops.

The credit status was recorded in a dichotomous pattern of 'YES' or 'NO'.

3.5.1.9 Loan amount availed

It was defined as the actual amount of money that the SHGs had availed as loan from any source for the purpose of raising the crops.

The actual amount of money availed in rupees was recorded and were categorized based on quartiles.

3.5.1.10 Status of external labour use

It was defined as to whether or not the SHGs had depended on external labour for the purpose of raising the crops.

The external labour use was recorded in a dichotomous pattern of 'YES' or 'NO'.

3.5.1.11 Activities employing external labour

It was defined as those farm activities where the SHGs had depended on external labour for their completion.

The activities were recorded and were classified as follows:

Activity	No. of SHGs	Percentage of SHGs
Land preparation		
Taking furrows		
Planting		
Fertilizer application		
Intercultural operations		
Multiple agricultural activities		

3.5.1.12 Trainings attended

It was defined as to whether atleast one member of the group had participated in a training programme related to agriculture or allied activities.

The various agriculture-related training programmes attended by the group members were recorded as such and were classified as follows:

Training topic	No. of SHGs	Percentage of SHGs
Banana		
Vegetable cultivation		
Banana + vegetable		
Mushroom		
Animal husbandry		
General agriculture		

3.5.1.13 Training requirement

It was defined as the opinion of the group members on whether they require any further training programme related to agriculture or allied activities.

The variable was recorded in a dichotomous pattern of 'YES' or 'NO'.

3.5.1.14 Training areas

It was defined as the areas identified by the group members where they require training.

The various training areas identified by the group members were classified as follows:

Training area	No. of SHGs	Percentage of SHGs
Banana		
Vegetable cultivation		
Banana + vegetable		
General agriculture		
Kitchen garden		

3.5.1.15 Cost of cultivation

It was operationally defined as the total amount of money spent by the group for their agricultural activities during the last one year.

The actual amount of money spent in rupees was calculated based on area and type of crop cultivated by each group and was categorized based on quartiles.

3.5.1.16 Current returns

It was operationally defined as the total amount of money received by the group from their agricultural activities during the last one year.

The actual amount of money received in rupees was recorded and were categorized based on quartiles.

3.5.1.17 Previous returns

It was operationally defined as the total amount of money received by the group from their agricultural activities during the year before the last one year.

The actual amount of money received in rupees during the year before the last one year was recorded and were categorized based on quartiles.

3.5.2 Operationalization and measurement of index-based variables

3.5.2.1 Economic development

It is operationally defined as the prosperity in the economic front brought about by the activities of SHGs in the study area.

Economic development was calculated as the mean of the sum of its sub-indicators. They were as follows:

3.5.2.1.1 Area cultivated

It was defined as the total area that was being cultivated by the SHGs when the study was carried out.

The area cultivated was recorded in cents and was classified based on quartiles as follows:

Area	No. of SHGs (f)	Percentage of SHGs
Less than 100 cents		
100-250 cents		
More than 250 cents		

3.5.2.1.2 Economic motivation

It is operationally defined as the group's orientation towards maximizing economic gains through their activities.

It was measured using a scale developed by Supe (1969) and slightly modified for this study.

The scale consists of six statements of which five were positive and one was negative. A three-way continuum was followed. The scoring procedure was as follows:

Nature of statement	Agree	Undecided	Disagree
Positive	3	2	1
Negative	1	2	3

The total score was obtained by summing up the weightages on individual's responses. Maximum possible score was 18 and the minimum was six.

3.5.2.1.3 B-C ratio

It is operationally defined as the ratio of total benefits and total cost of cultivation of the group. It is measured by assigning score to the actual values in the following pattern and the groups were categorized into three, namely, low, medium and high based on the quartiles method.

B-C ratio	**Score**	**Category**
Upto 1.33	0	Low
1.34 – 1.61	1	Medium
>1.61	2	High

3.5.2.1.4 Increase in income

Increase in income refers to the increase in total earnings of the group due to farm activities over the past two years.

The measurement of increase in income was done by asking the respondents to state their returns in rupees during the previous year and the year immediately prior to that. Their difference gave the increase in income for the group. The groups were categorized into three, namely, low, medium and high based on the quartiles method.

3.5.2.1.5 Credit orientation

Refers to the orientation of the group to avail and utilize credit.

It was measured by using a teacher made scale developed for the study. The scale consisted of four statements over a five point continuum ranging from 'Strongly Agree' to 'Strongly Disagree'. The total score was obtained by summing up the weightages on individual's responses. Maximum possible score was 20 and the minimum was 4. The groups were then categorized into three, namely, low, medium and high based on the quartiles method.

3.5.2.1.6 Employment generation

It refers to the extent to which the agricultural activities of SHGs generated additional employment opportunities.

In this study, employment generation was measured by considering the number of man- days of employment generated per year due to the agricultural activities of the group. The employment generated was recorded in man days and was classified based on quartiles as follows:

Number of man-days	No. of SHGs	Percentage of SHGs
Low (Less than 120 days)		
Medium (120 to 303 days)		
High (More than 303 days)		

3.5.2.2 Social development

It was operationally defined as the advancement in the group activities seen within the agriculturally active SHGs in the study area. The procedure for measuring the extent of social development achieved by SHGs was developed by the researcher for the study.

Social development was calculated as the mean of the sum of its sub-indicators. They are as follows:

3.5.2.2.1 Transparency

Refers to the extent to which the activities of the group are open and clear to the members of the group.

Transparency was measured using a scale with four positive statements in a three-point continuum as 'always', 'sometime' and 'never' with respective scores of 3, 2 and 1. The maximum possible score was 12 and the minimum was four.

3.5.2.2.2 Equity

Refers to how far the group approach minimizes or eliminates inequalities in the distribution of production inputs and outputs among the members.

Equity was measured on a five-point continuum ranging from 'strongly agree' to 'strongly disagree'. The scoring pattern ranged from 'five' to 'one' for positive

statements and 'one' to 'five' for negative statements. There were four statements in the scale. The maximum possible score was 20 and the minimum was four.

3.5.2.2.3 Group leadership

Refers to the effectiveness of the group's leader in promoting the stability and success of the group.

Group leadership was measured on a three-point continuum as 'always', 'sometime' and 'never' with respective scores of 3, 2 and 1. There were five statements in the scale and all were positive in nature. The maximum possible score was 15 and the minimum was five.

3.5.2.2.4 Group cohesion

Refers to the degree to which the group members are affiliated to one another and are motivated to remain in the group even if some differences may rise rarely.

Group cohesion was measured on a three-point continuum as 'always', 'sometime' and 'never' with respective scores of 3, 2 and 1 for positive statements and 1, 2, and 3 for negative statements. There were five statements in the scale of which three were positive and two were negative. The maximum possible score was 15 and the minimum was five.

3.5.2.2.5 Accountability

Refers to the extent to which the members are answerable for performance of responsibility over achievement of objectives as agreed upon previously.

Accountability was measured using a scale with four positive statements in a three-point continuum as 'always', 'sometime' and 'never' with respective scores of 3, 2 and 1. The maximum possible score was 12 and the minimum was four.

3.5.2.2.6 Team spirit

Refers to the attitude of the group members towards collective goals and the extent to which zealous joint action behaviour is exhibited by them through co-ordinated efforts to achieve those goals.

Team spirit was measured on a five-point continuum ranging from 'strongly agree' to 'strongly disagree'. The scoring pattern ranged from 'five' to 'one' for positive statements and 'one' to 'five' for negative statements. There were four statements in the scale. The maximum possible score was 20 and the minimum was four.

3.5.2.2.7 Group co-operation

Refers to the tendency among group members to associate and work with other members of the group during the planning and execution of the group activities.

Group co-operation was measured on a three-point continuum as 'always', 'sometime' and 'never' with respective scores of 3, 2 and 1. There were five statements in the scale and all were positive in nature. The maximum possible score was 15 and the minimum was five.

3.5.2.3 Environmental protection

It is operationally defined as the extent of adoption of those practices which are both environment-friendly and promoting sustainability of farming, in the agricultural activities of SHGs in the study area.

The procedure for measuring the extent of Environmental Protection practiced by SHGs was developed by the researcher for the study. Environmental protection was calculated as the mean of the sum of its sub-indicators. They are as follows:

3.5.2.3.1 Use of soil conservation measures

Soil conservation measures include growing cover crops, mulching, contour bunding, minimal tillage and soil test based nutrient application.

The groups were asked about their level of adoption of atleast one of the above soil conservation measures and were given the scores '3', '2' and '1' respectively for 'Continued use', 'Occasionally practiced' and 'Never practiced'.

3.5.2.3.2 Use of water conservation measures

Water conservation measures include taking rain water harvesting pits in the farm, establishing micro-irrigation structures, bunding and irrigation using waste water.

The groups were asked about their level of adoption of atleast one of the above water conservation measures and were given the scores '3', '2' and '1' respectively for 'Continued use', 'Occasionally practiced' and 'Never practiced'.

3.5.2.3.3 Avoidance of chemical fertilizers

The groups were asked about their level of avoidance of chemical fertilizers and were given the scores '3', '2' and '1' respectively for 'Continued avoidance', 'Occasionally avoid' and 'Never avoided'.

3.5.2.3.4 Avoidance of chemical herbicides and pesticides

The groups were asked about their level of avoidance of chemical herbicides and pesticides and were given the scores '3', '2' and '1' respectively for 'Continued avoidance', 'Occasionally avoid' and 'Never avoided'.

3.5.2.3.5 Utilization of farm waste

The groups were asked whether they had been making compost, vermicompost, biogas, animal feed or mulch using the farm waste and were given the scores '3', '2' and '1' respectively for 'Continued use', 'Occasionally practiced' and 'Never practiced'.

3.5.3 Sustainable Agricultural Development Index (SADI)

Sustainable Agricultural Development Index (SADI) was the mean of the indices of the 40 SHGs which were studied and was computed using the formula:

$$SADI = \sum_{i=1}^{40} \left(\frac{SADi}{40}\right)$$

SAD = Sustainable Agricultural Development value for an individual group

The Sustainable Agricultural Development value for an individual group is the mean of the scores of the three indicators of sustainable agricultural development, namely, economic development (ED), social development (SD) and environmental protection (EP) of that particular group.

$$SADi = \frac{EDi + SDi + EPi}{3}$$

The value for economic development (EDi) for individual group is the mean of the values of its six sub-indicators, after converting them to a zero to one scale.

$$EDi = \frac{ED1 + ED2 + ED3 + ED4 + ED5 + ED6}{6}$$

Where,

ED1 = Area cultivated

ED2 = Economic motivation

ED3 = BC ratio

ED4 = Increase in income

ED5 = Credit orientation

ED6 = Employment generation

The value for social development (SDi) for individual group is the mean of the values of its seven sub-indicators, after converting them to a zero to one scale.

$$SDi = \frac{SD1 + SD2 + SD3 + SD4 + SD5 + SD6 + SD7}{7}$$

Where,

SD1 = Transparency

SD2 = Equity

SD3 = Group leadership

SD4 = Group cohesion

SD5 = Accountability

SD6 = Team spirit

SD7 = Group co-operation

The value for environmental protection (EPi) for individual group is the mean of the values of its five sub-indicators, after converting them to a zero to one scale.

$$EPi = \frac{EP1 + EP2 + EP3 + EP4 + EP5}{5}$$

Where,

EP1 = Use of soil conservation measures

EP2 = Use of water conservation measures

EP3 = Avoidance of chemical fertilizers

EP4 = Avoidance of chemical herbicides and pesticides

EP5 = Utilization of farm waste

3.6 SWPC ANALYSIS

The Strengths, Weaknesses, Potentials and Challenges of SHG based agricultural activities were elucidated from the respondents using open ended questions and were categorized under the respective heads.

3.7 CONSTRAINT ANALYSIS

Various constraints faced by the SHG based farm women and the SHGs engaged in agricultural activities were collected using open ended questions and then were ranked according to their respective frequencies.

3.8 SUGGESTIONS FOR THE IMPROVEMENT OF AGRICULTURE THROUGH KUDUMBASHREE MISSION

Based on the results of the study, observations made by the researcher in the field, opinion of the SHG members, suggestions by the various implementing officials and other socio-cultural phenomenon emerging in the state, suggestions for the improvement of agriculture through Kudumbashree Mission were spelt out at the end of the study.

3.9 TOOLS AND TECHNIQUES USED FOR DATA COLLECTION

Two comprehensive and well structured pre-tested interview schedules were constructed after considering the scope, objectives and the variables under

Plate 1: Survey at Location 1 and Location 2

Data collection at Kunnathukal

Data collection at Kattakkada

Plate 2: Survey at Location 3 and a farmer's field in the locaion

Data collection at Malayinkeezhu

Farmer's field at Malayinkeezhu

Plate 3: Survey at Location 4 and Location 5

Data collection at Karakulam

Data collection at Karode

the study. The items included in the interview schedule were both structured and objective type of questions, which were suitable to the Kudumbashree members as well as Kudumbashree SHGs. The most relevant, unambiguous and practical questions were included in the schedule in order to gather adequate and precise information. The finalized schedule is appended in Appendix II to Appendix V.

After finalization of the interview schedule, the data collection was carried out with the Kudumbashree members as well as Kudumbashree SHGs through direct interview method and focus group discussions. Through these methods, first hand information and detailed discussion about the research problem were easily generated.

The data collected from the respondents were coded, tabulated, analyzed and presented in the form of tables in order to make the findings meaningful and easily understandable. The findings emerged from the analysis of data were suitably interpreted and conclusions were drawn.

3.10 STATISTICAL TOOLS USED FOR THE STUDY

The data gathered were coded and tabulated for statistical analysis. The following statistical techniques were applied for the study:

i. Percentage analysis
ii. Cumulative frequency method
iii. Correlation analysis
iv. ANOVA
v. Principal Component Analysis

3. 10. 1. Percentage analysis

Percentage analysis was used in descriptive analysis for making simple comparisons. For calculating percentage the frequency of the particular cell was multiplied by 100 and divided by the total number of respondents pertaining to

particular cell. Where ever applicable, percentage was corrected to two decimal places.

3. 10. 2. Quartiles method

In this method the respondents were categorized into low, medium and high groups. The number of items less than Q1 will fall in the "low" category, those lying between Q1 and Q3 will fall in the "medium" category and those lying above Q3 will fall in the "high" category. Based on the score values, the number of farm women or groups belonging to each category was determined.

3.10.3. Correlation analysis

Correlation analysis was done so as to find out whether there exists any linear relationship between any two variables in the study and also its nature, if such a relationship exists. Correlation coefficient was calculated also to find out the degree of relationship between two variables X and Y by using the following formula:

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sqrt{\left(\sum x^2 - \frac{(\sum x)^2}{n}\right) \times \left(\sum y^2 - \frac{(\sum y)^2}{n}\right)}}$$

Where,

r	Co-efficient of correlation between X and Y
n	Sample size
$\Sigma xy-(\Sigma x)(\Sigma y)/n$	Sum of product of x and y
$\Sigma x^2-(\Sigma x)^2/n$	Sum of square of x
$\Sigma y^2-(\Sigma y)^2/n$	Sum of square of y

The significance of the r values was tested for 5 per cent and 1 per cent levels

The programme MS-Excel was used to calculate the correlation coefficients.

3. 10. 4. ANOVA

If we compare two means only, then the t-test (independent samples) will give the same results as the ANOVA. As doing multiple two-sample t-tests would result in an increased chance of committing a statistical type I error, ANOVAs are useful for comparing (testing) three or more means (groups or variables) for statistical significance.

Like so many of our inference procedures, ANOVA has some underlying assumptions which should be in place in order to make the results of calculations completely trustworthy. They include:

(i) Subjects are chosen via a simple random sample.

(ii) Within each group/population, the response variable is normally distributed.

(iii) While the population means may be different from one group to the next, the population standard deviation is the same for all groups.

ANOVA is somewhat robust, that is, results remain fairly trustworthy despite mild violations of these assumptions.

The programme MS-Excel was used for one-way ANOVA.

3.10.5. Principal Component Analysis

Principal Component Analysis (PCA) is the multi-variate data analysis technique which is used to reduce the number of variables in the original data. In this study it is used to find out the relative importance of each of the sub-components towards the respective main component. PCA is useful when we have obtained data on a number of variables, and believe that there is some redundancy in those variables. Redundancy means that some of the variables are correlated with one another, possibly because they are measuring the same construct. As a result, it should be possible to reduce the observed variables into a smaller number of principal components (artificial variables) that will account for

most of the variance in the observed variables. An examination of the reduced dimension data set will allow the user to spot trends, patterns and outliers in the data, far more easily than would have been possible without performing the principal component analysis. Technically, a principal component can be defined as a linear combination of optimally-weighted observed variables.

The first component extracted in a principal component analysis accounts for a maximal amount of total variance in the observed variables. Under typical conditions, this means that the first component will be correlated with at least some of the observed variables. It may be correlated with many. The second component extracted will have two important characteristics. First, this component will account for a maximal amount of variance in the data set that was not accounted for by the first component. Again under typical conditions, this means that the second component will be correlated with some of the observed variables that did not display strong correlations with component 1. The second characteristic of the second component is that it will be uncorrelated with the first component. Literally, if you were to compute the correlation between components 1 and 2, that correlation would be zero. The remaining components that are extracted in the analysis display the same two characteristics: each component accounts for a maximal amount of variance in the observed variables that was not accounted for by the preceding components, and is uncorrelated with all of the preceding components. A principal component analysis proceeds in this fashion, with each new component accounting for progressively smaller and smaller amounts of variance (this is why only the first few components are usually retained and interpreted). When the analysis is complete, the resulting components will display varying degrees of correlation with the observed variables, but are completely uncorrelated with one another.

Computing the Principal Components

In computational terms the principal components are found by calculating the eigenvectors and eigen values of the variance or correlation matrix. This process is equivalent to finding the axis system in which the variance or

correlation matrix is diagonal. The eigenvector with the largest eigen value is the direction of greatest variation, the one with the second largest eigen value is the (orthogonal) direction with the next highest variation and so on.

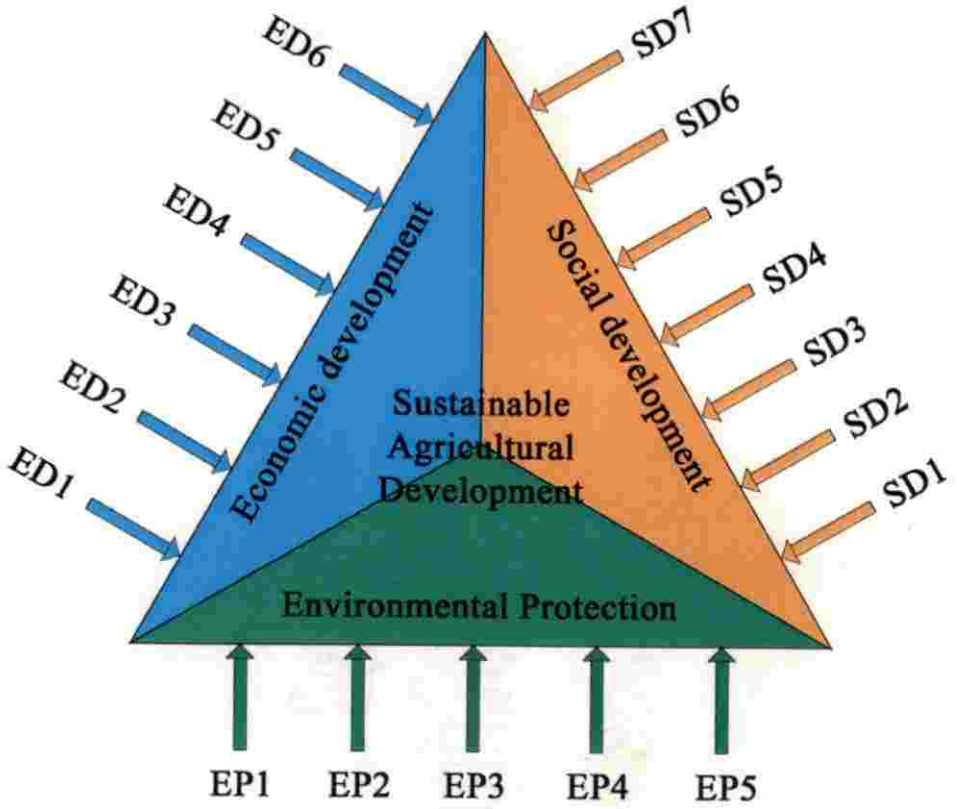
Interpretation of the principal components is based on finding which of the variables are significantly correlated (absolute correlation value above 0.5) with that component whose corresponding eigen value's cumulative contribution level is more than 60 per cent.

The software SAS 9.3 was used for Principal Component Analysis (PCA) in the study.

3.11 CONCEPTUAL MODEL OF THE STUDY

The presumed conceptual model of the study is being depicted in the Fig.2.

Figure 2 : Conceptual model of the study



ED1: Area cultivated
ED2: Economic motivation
ED3: B-C ratio
ED4: Increase in income
ED5: Credit orientation
ED6: Employment generation

SD1: Transparency
SD2: Equity
SD3: Group leadership
SD4: Group cohesion
SD5: Accontability
SD6: Team spirit
SD7: Group co-operation

EP1: Use of soil conservation measures
EP2: Use of water conservation measures
EP3: Avoidance of chemical fertilizers
EP4: Avoidance of chemical herbicides and pesticides
EP5: Utilization of farm waste

RESULTS AND DISCUSSION

IV. RESULTS AND DISCUSSION

The results obtained from the present study are presented and discussed according to the set forth objectives under the following broad headings:

4.1 Profile characteristics of SHG members

4.2 Profile characteristics of Self Help Groups

4.3 Index-based variables of groups

4.4 Sustainable Agricultural Development

4.4.1 Economic Development of the SHGs

4.4.2 Social Development of the SHGs

4.4.3 Environmental Protection by the SHGs

4.4.4 Correlation between Indicators of Sustainable Agricultural Development

4.4.5 Relative Importance of Each Indicator towards Overall Sustainability of Group Farming

4.4.6 Sustainable Agricultural Development Index (SADI)

4.5 SWPC analysis

4.6 Constraint analysis

4.7 Suggestions for improvement

4.8 Testing of hypotheses

4.9 Empirical model of the study

4.10 Suggested lines of future research

4.1 PROFILE CHARACTERISTICS OF SHG MEMBERS

4.1.1 Age

The study could reveal that women of age from 24 years to 65 years were engaged in group farming in the study area. The mean age of the women was found to be 44.95 years. Majority of the women were of middle age (Table 4.1) and only 13.5 per cent of the respondents were young. The result is broadly in agreement with the studies of Mary (2009). This implies that younger generation is not being attracted into group farming by the Kudumbashree mission.

Table 4.1: Age-wise distribution of SHG based farm women (n= 200)

Category	Kunnathukal		Karode		Malayinkeezhu		Karakulam		Kattakkada		Total	
	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%
Young (Up to 35 years)	6	15	7	17.5	5	12.5	4	10	5	12.5	27	13.5
Middle aged (36 to 55 years)	34	85	32	80	30	75	25	62.5	29	72.5	150	75
Old aged (More than 55 years)	0	0	1	2.5	5	12.5	11	27.5	6	15	23	11.5
Total	40	100	40	100	40	100	40	100	40	100	200	100

On comparing the five CDSs for the variable 'age' (Table 4.2), it could be found out there exists significant difference between the CDSs for the particular variable. The CD-value obtained was 3.705 and using the value it could be deduced that Kunnathukal and Karode are relatively younger than both Malayinkeezhu and Karakulam.

Fig. 3: Age-wise distribution of SHG based farm women in percentage

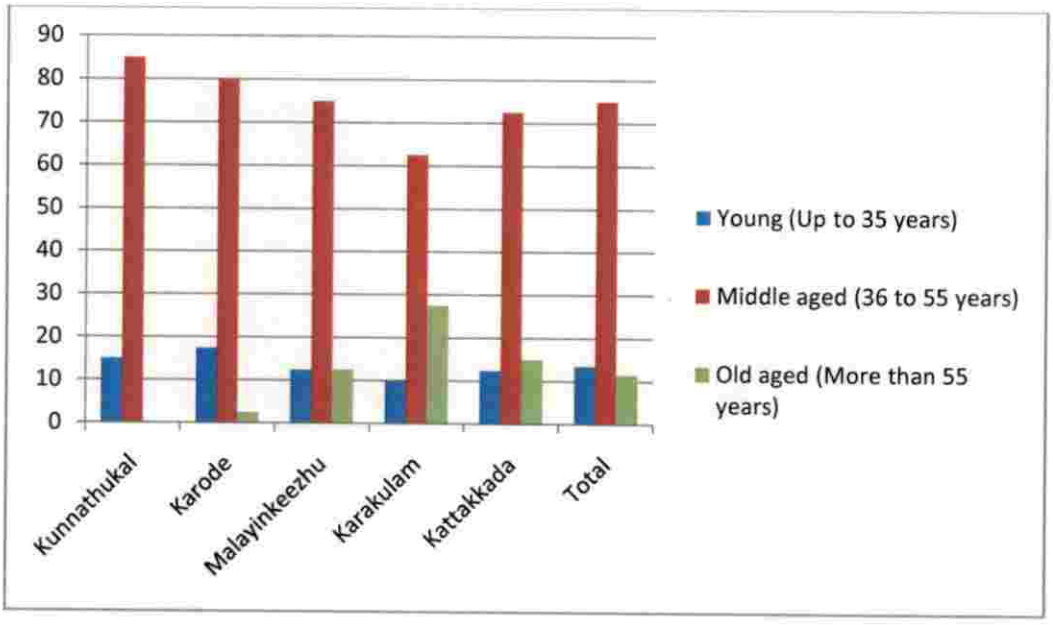


Fig. 4: Family type as per number of family members in percentage

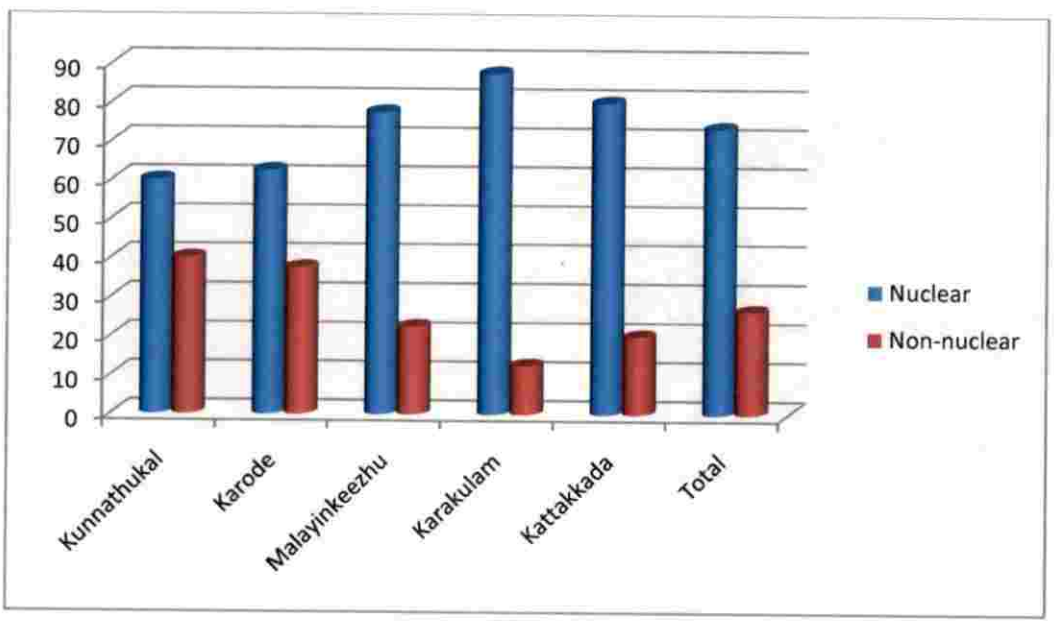


Table 4.2: Comparison between the five CDSs for the variable 'age'

ANOVA SUMMARY		
Groups	*Average*	*Critical Difference*
Kunnathukal	41.600	
Karode	42.625	
Malayinkeezhu	46.525	
Karakulam	48.175	
Kattakkada	45.800	
		3.705

4.1.2 Family Type

The study could find that majority of the respondents had a nuclear family. (Table 4.3). The family size of the respondents varied from '1' to '8' with a mean family size of 4.135.

Table 4.3: Family type as per number of family members (n= 200)

Family Type	Kunnathukal		Karode		Malayinkeezhu		Karakulam		Kattakkada		Total	
	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%
Nuclear	24	60	25	62.5	31	77.5	35	87.5	32	80	147	73.5
Non-nuclear	16	40	15	37.5	9	22.5	5	12.5	8	20	53	26.5
Total	40	100	40	100	40	100	40	100	40	100	200	100

Predominance of nuclear families among the SHG members is in line with the trend prevailing in the state. Selvarani (2006) also obtained a similar result through her study on SHG-based respondents.

4.1.3 Educational Status

Regarding the educational status of the SHG members, the study revealed that nearly half (49.5 %) of the respondents had studied up to secondary level (Table 4.4). As much as 25 per cent had atleast primary education. Only a negligible proportion of members (0.5 %) were illiterates. The educational status of the SHG members is encouraging in the sense that they have the basic knowledge and understanding so as to receive latest agricultural technologies and lessons on sustainable agricultural practices. This result is broadly in agreement with the study of Chinchu (2011).

Table 4.4: Educational status of SHG based farm women (n= 200)

Category	Kunnathukal		Karode		Malayinkeezhu		Karakulam		Kattakkada		Total	
	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%
Illiterate	0	0	0	0	0	0	1	2.5	0	0	1	0.5
Primary education	3	7.5	19	47.5	10	25	10	25	8	20	50	25
Secondary education	20	50	17	42.5	21	52.5	24	60	17	42.5	99	49.5
Pre-degree	9	22.5	2	5	7	17.5	4	10	8	20	30	15
Degree	7	17.5	1	2.5	2	5	1	2.5	5	12.5	16	8
P.G	1	2.5	1	2.5	0	0	0	0	2	5	4	2
Total	40	100	40	100	40	100	40	100	40	100	200	100

Fig. 5: Educational status of SHG based farm women in percentage

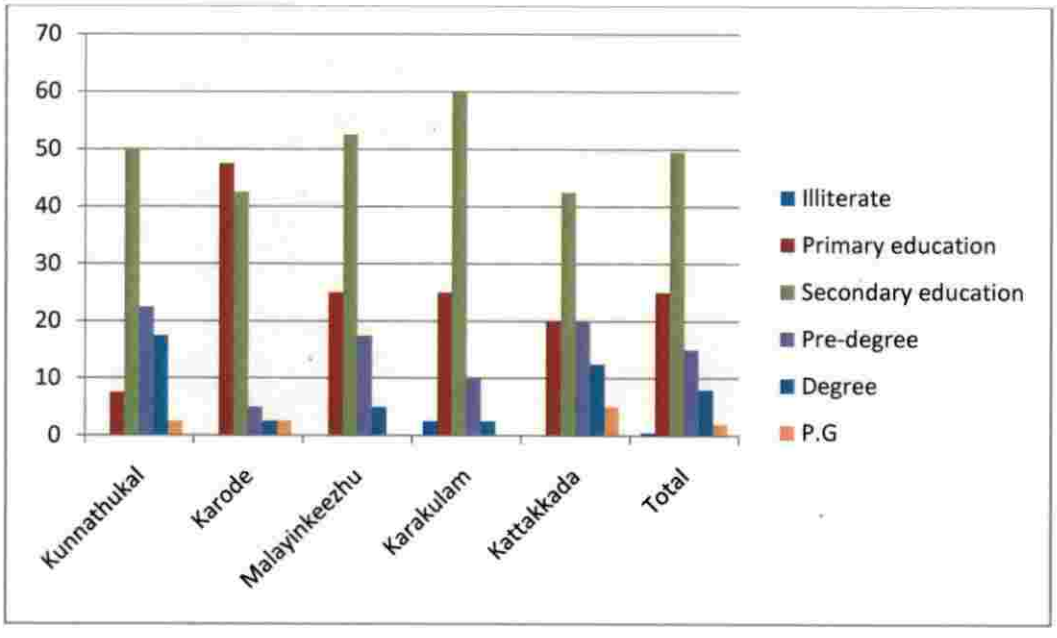
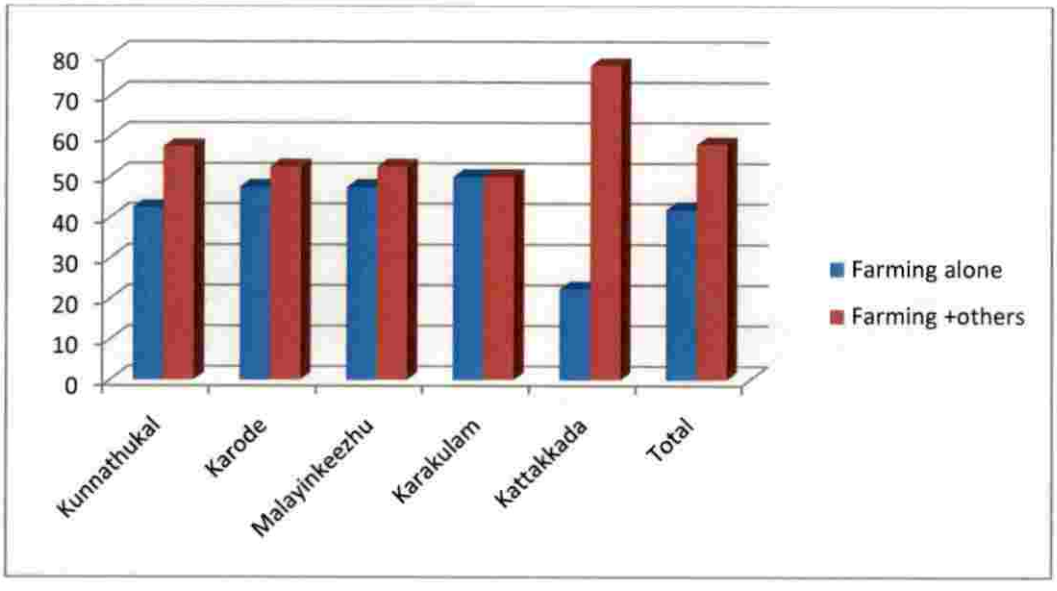


Fig. 6: Occupational status-wise distribution of SHG based farm women in percentage



4.1.4 Occupational Status

Regarding the occupational status of the respondents, the study could find that majority of the SHG-based women were engaged in some income generating activities other than agriculture (Table 4.5). This included occupations like running small businesses, doing handicrafts and working in MGNREGP.

Table 4.5: Occupational status-wise distribution of SHG based farm women (n= 200)

Activity	Kunnathukal		Karode		Malayinkeezhu		Karakulam		Kattakkada		Total	
	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%
Farming alone	17	42.5	19	47.5	19	47.5	20	50	9	22.5	84	42
Farming +others	23	57.5	21	52.5	21	52.5	20	50	31	77.5	116	58
Total	40	100	40	100	40	100	40	100	40	100	200	100

Dependence of SHG women in other activities may be due to the fact that income from agriculture is not a steady one and varies with season. But a steady source of income is a must for poor families to meet their daily living expenses.

4.1.5 SHG Experience

The study could find that a very large majority of the respondents had good experience, that is, medium to high, in working within SHGs (Table 4.6). Only a meager, four per cent had less than five years of experience in working within SHGs. On an average, an SHG member had 10.77 years of experience in the field. These results are contradictory to those obtained by Asokhan (2006). Though this may be perceived as positive, the other side of the coin is that though Kudumbashree Mission is able to retain its members who had joined earlier, it is not able to attract new women to its fold in mass.

Table 4.6: Distribution of women based on SHG experience (n=200)

Category	Kunnathukal		Karode		Malayinkeezhu		Karakulam		Kattakkada		Total	
	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%
Low (<5 years)	2	5	3	7.5	1	2.5	0	0	2	5	8	4
Medium (5-10 years)	21	52.5	14	35	17	42.5	16	40	16	40	84	42
High (>10 years)	17	42.5	23	57.5	22	55	24	60	22	55	108	54
Total	40	100	40	100	40	100	40	100	40	100	200	100

On comparing the five CDSs for the variable 'SHG experience' (Table 4.7), it could be found that there exists no significant difference between the CDSs for the particular variable.

Table 4.7: Comparison between the five CDSs for the variable 'SHG experience'

ANOVA SUMMARY		
Groups	*Average*	Critical Difference
Kunnathukal	10.025	
Karode	10.925	
Malayinkeezhu	10.550	
Karakulam	11.400	
Kattakkada	10.925	
		1.681

Fig. 7: Distribution of women based on SHG experience in percentage

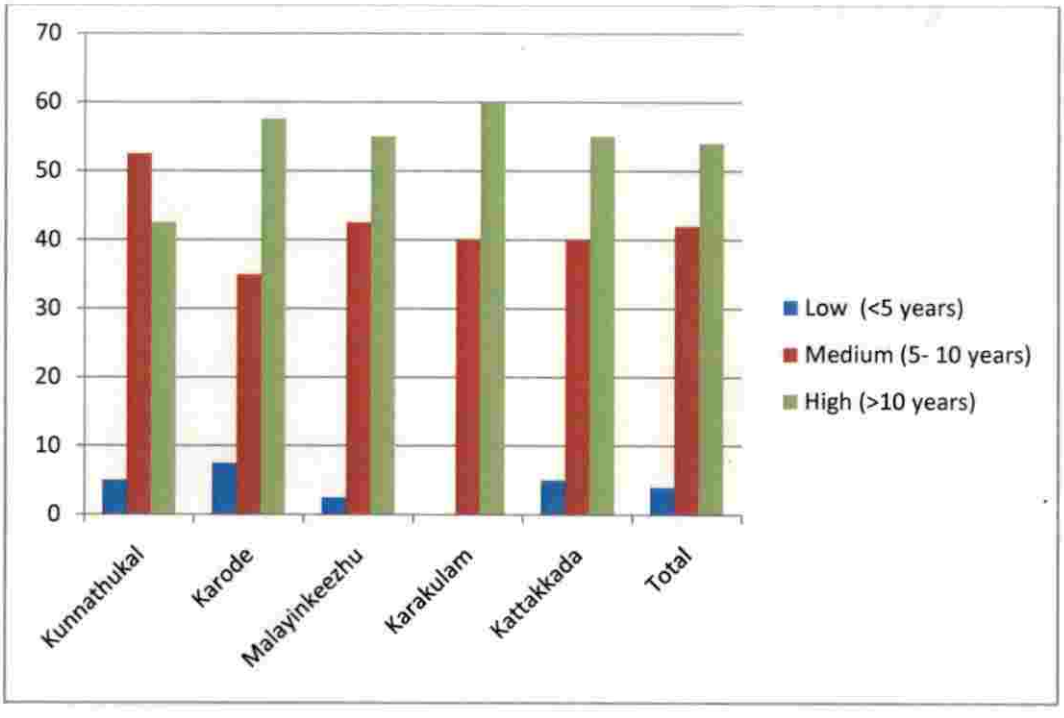
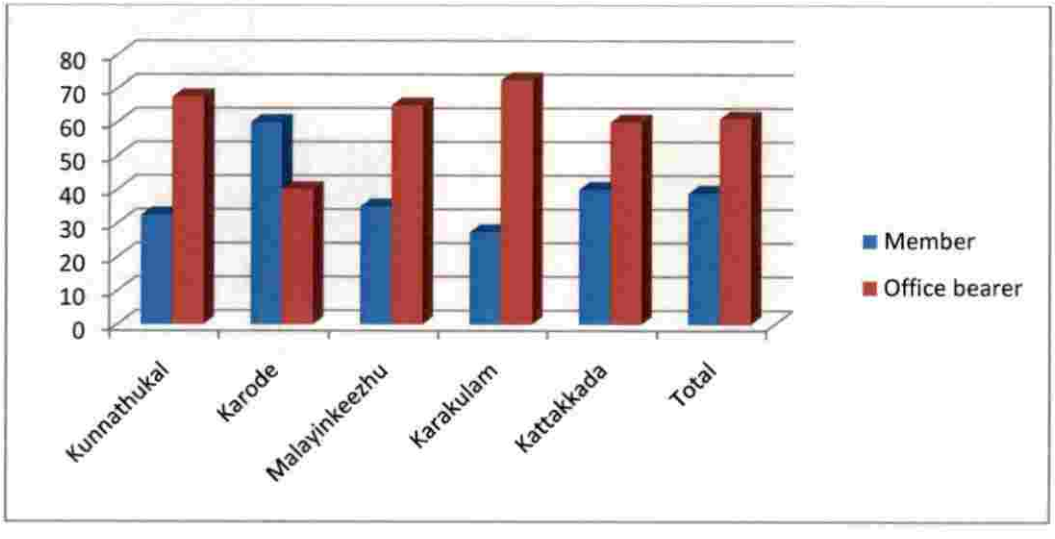


Fig. 8: Distribution of the respondents based on the nature of their membership within the SHG in percentage



4.1.6 Nature of SHG Membership

Table 4.8 shows the distribution of the respondents based on the role they had played within their entire career in SHGs. It can be seen that, except in Karode CDS, majority of the respondents had been an office bearer of their respective SHG at some point of time. This might have empowered them in one way or another and it can be counted as an achievement of Kudumbashree Mission.

Table 4.8: Distribution of the respondents based on the nature of their membership within the SHG (n=200)

Category	Kunnathukal		Karode		Malayinkeezhu		Karakulam		Kattakkada		Total	
	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%
Member	13	32.5	24	60	14	35	11	27.5	16	40	78	39
Office bearer	27	67.5	16	40	26	65	29	72.5	24	60	122	61
Total	40	100	40	100	40	100	40	100	40	100	200	100

4.1.7 Farming Experience

The study could reveal that majority of the respondents had medium to high experience in agricultural activities (Table 4.9). On an average, they had 7.47 years of experience in farming. But a sizeable chunk (37.5 %) of the sample was relatively new to farming and Kudumbashree linked SHGs was the reason behind them venturing into farming. The result obtained is exactly the opposite of that had obtained by Banumathi (2003).

Table 4.9: Distribution of respondents based on farming experience (n=200)

Category	Kunnathukal		Karode		Malayinkeezhu		Karakulam		Kattakkada		Total	
	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%
Low (<5 years)	6	15	12	30	30	75	9	22.5	18	45	75	37.5
Medium (5- 10 years)	19	47.5	17	42.5	5	12.5	26	65	16	40	83	41.5
High (>10 years)	15	37.5	11	27.5	5	12.5	5	12.5	6	15	42	21
Total	40	100	40	100	40	100	40	100	40	100	200	100

On comparing the five CDSs for the variable 'farming experience' (Table 4.10), it could be found out that there exists significant difference between the CDSs for the particular variable. The CD-value obtained was 2.951 and using the value it could be deduced that farm women in Malayinkeezhu and Kattakkada were the least experienced while those from Kunnathukal and Karode were relatively more experienced.

Table 4.10: Comparison between the five CDSs for the variable 'farming experience'

ANOVA SUMMARY		
Groups	*Average*	Critical Difference
Kunnathukal	10.400	
Karode	9.350	
Malayinkeezhu	4.471	

Fig. 9: Distribution of respondents based on farming experience in percentage

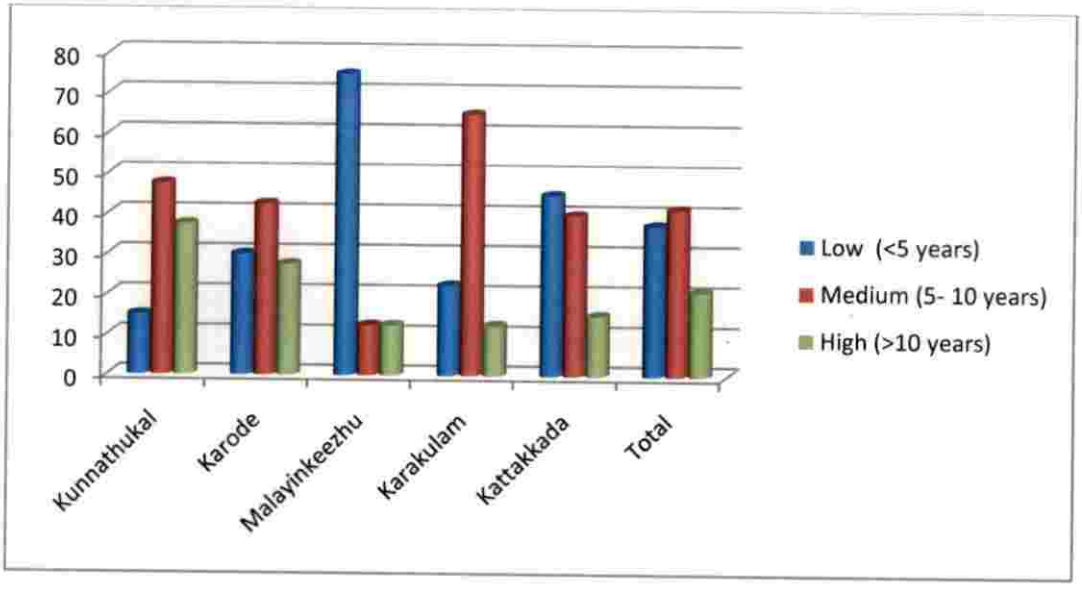
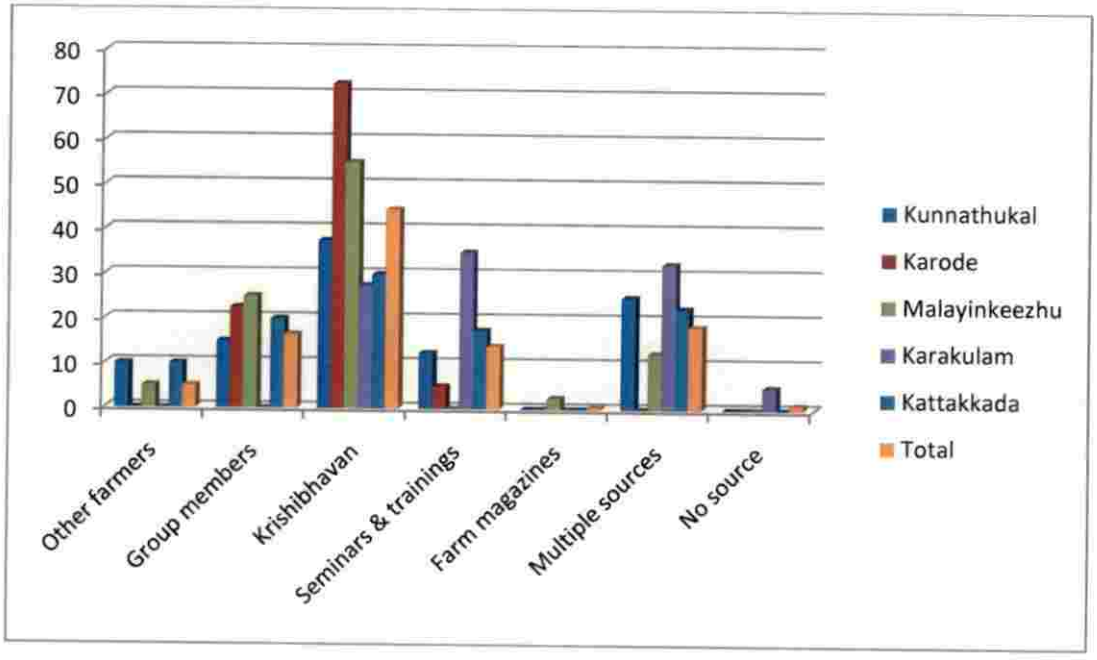


Fig. 10: Distribution of respondents based on their behaviour in seeking information in percentage



Karakulam	7.150	
Kattakkada	5.988	
		2.951

4.1.8 Information Seeking Behaviour

The sample population altogether was found to be approaching a minimum of five different sources for obtaining relevant and timely information regarding various agricultural activities. Of these, the most approached source was 'krishibhavan' (Table 4.11). Nearly half (44.5 %) of the women were obtaining the farming-related information from Krishibhavan alone. This is followed by 'multiple sources' (18.5 %), 'group members' (16.5 %) and 'seminars & trainings' (14 %).

Table 4.11: Distribution of respondents based on their behaviour in seeking information (n=200)

Information source	Kunnathukal		Karode		Malayinkeezhu		Karakulam		Kattakkada		Total	
	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%	Feq.	%
Other farmers	4	10	0	0	2	5	0	0	4	10	10	5
Group members	6	15	9	22.5	10	25	0	0	8	20	33	16.5
Krishibhavan	15	37.5	29	72.5	22	55	11	27.5	12	30	89	44.5
Seminars & trainings	5	12.5	2	5	0	0	14	35	7	17.5	28	14

Farm magazines	0	0	0	0	1	2.5	0	0	0	0	1	0.5
Multiple sources*	10	25	0	0	5	12.5	13	32.5	9	22.5	37	18.5
No source	0	0	0	0	0	0	2	5	0	0	2	1
Total	40	100	40	100	40	100	40	100	40	100	200	100

*include more than one source like Krishibhavan, farm magazines, seminars & trainings, group members and other farmers

4.1.9 Self-confidence

The study could find out that majority (55.5 %) of the Kudumbashree based farm women were having a very high level of self confidence (Table 4.12). This result is roughly in tune with the study of Shanthi (2004). Among the five CDSs, the members coming under Kunnathukal were found to be having lesser self-confidence when compared to all the other four CDSs (Table 4.13).

Table 4.12: Distribution of respondents based on self confidence (n=200)

Category	**Number of members**	**Percentage (%)**
Low	27	13.5
Medium	62	31
High	111	55.5

Fig. 11: Distribution of respondents based on self confidence (n=200)

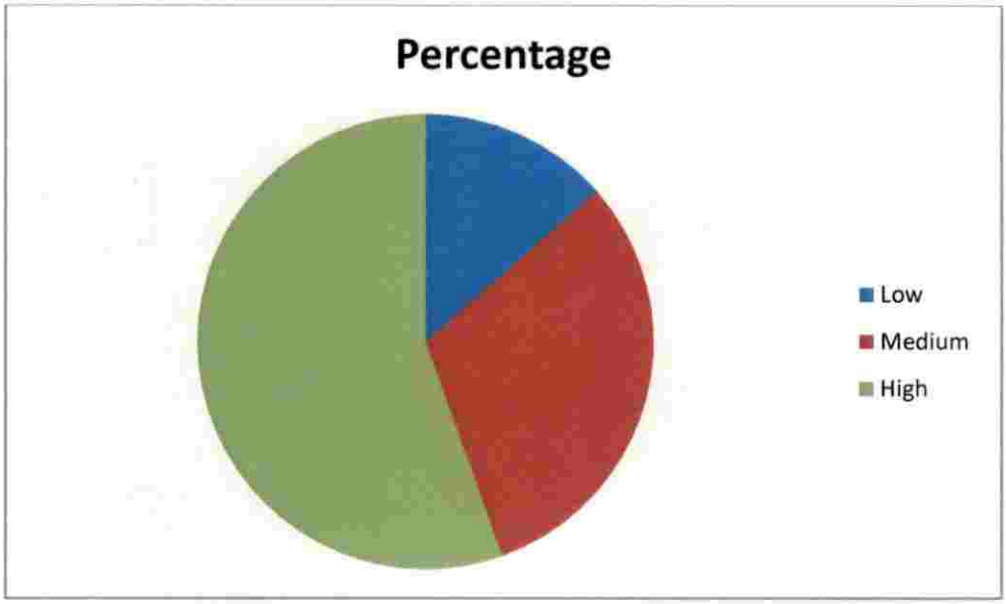


Fig. 12: Distribution of respondents based on their degree of innovativeness (n=200)

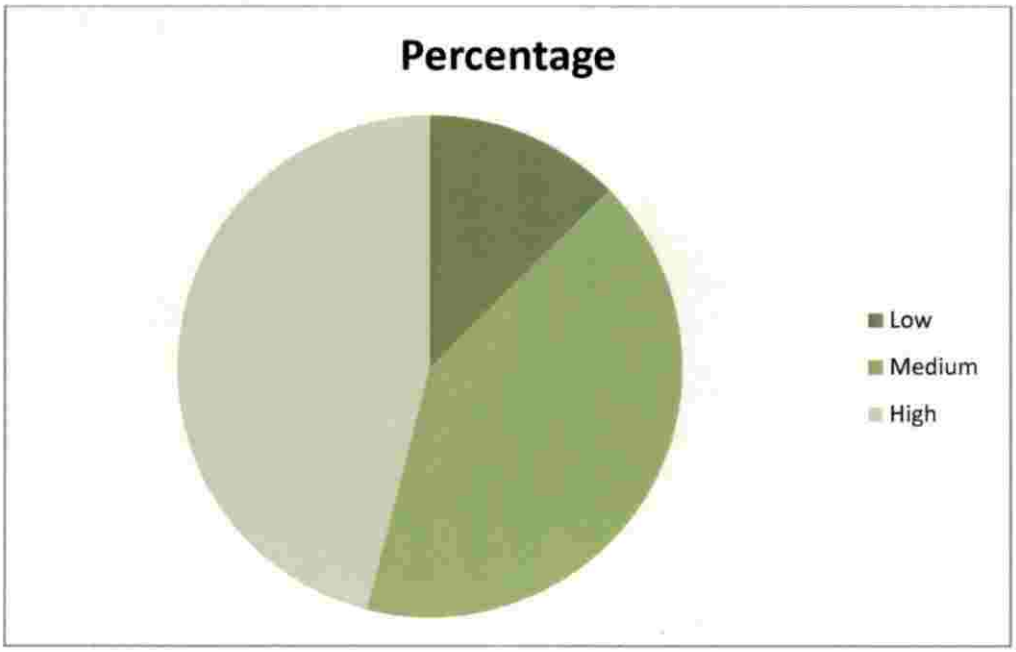


Table 4.13: Comparison between the five CDSs for the variable 'self confidence'

ANOVA SUMMARY		
Groups	*Average*	*Critical Difference*
Kunnathukal	26.800	
Karode	29.350	
Malayinkeezhu	29.450	
Karakulam	30.275	
Kattakkada	30.150	
		1.500

4.1.10 Innovativeness

The study revealed that majority of the respondents were having medium (41.5 %) to high (46 %) degree of innovativeness as shown in Table 4.14. Tamilselvi and Vasanthakumar (2008) had obtained more or less similar results. Between the five CDSs, no difference was observed in case of innovativeness as evident from the Table 4.15.

Table 4.14: Distribution of respondents based on their degree of innovativeness (n=200)

Category	**Number of members**	**Percentage (%)**
Low	25	12.5
Medium	83	41.5
High	92	46

On comparing the five CDSs for the variable 'Innovativeness' (Table 4.16), it could be found out that there exists no significant difference between the five CDSs for the particular variable.

Table 4.15: Comparison between the five CDSs for the variable 'innovativeness'

ANOVA SUMMARY		
Groups	*Average*	*Critical Difference*
Kunnathukal	2.200	
Karode	2.250	
Malayinkeezhu	2.400	
Karakulam	2.425	
Kattakkada	2.400	
		0.303

4.1.11 Scientific Orientation

The study could find that a high proportion of the respondents (48 %) had a medium level of orientation towards adopting scientific agricultural practices (Table 4.16). These results are in agreement with those obtained by Rakesh (2010).

Table 4.16: Distribution of respondents based on their scientific orientation (n=200)

Category	**Number of members**	**Percentage (%)**
Low	37	18.5
Medium	96	48
High	67	33.5

On comparing the five CDSs for the variable 'Scientific orientation' (Table 4.17), it could be found out that there exists significant difference between the CDSs for the particular variable. The CD-value obtained was 0.789 and using the value it could be deduced that farm women in Kunnathukal and Malayinkeezhu were having the least scientific orientation while those from Karakulam and Karode were having relatively more orientation towards scientific farming practices.

Table 4.17: Comparison between the five CDSs for the variable 'scientific orientation'

ANOVA SUMMARY		
Groups	*Average*	*Critical Difference*
Kunnathukal	25.800	
Karode	26.950	
Malayinkeezhu	26.225	
Karakulam	27.575	
Kattakkada	26.925	
		0.789

4.1.12 Achievement Motivation

The study could find that majority (54 %) of the Kudumbashree based farm women were having a medium level of motivation to achieve their goals (Table 4.18). Shanthi (2004) had obtained similar results in her study on self-help groups.

Fig. 13: Distribution of respondents based on their scientific orientation (n=200)

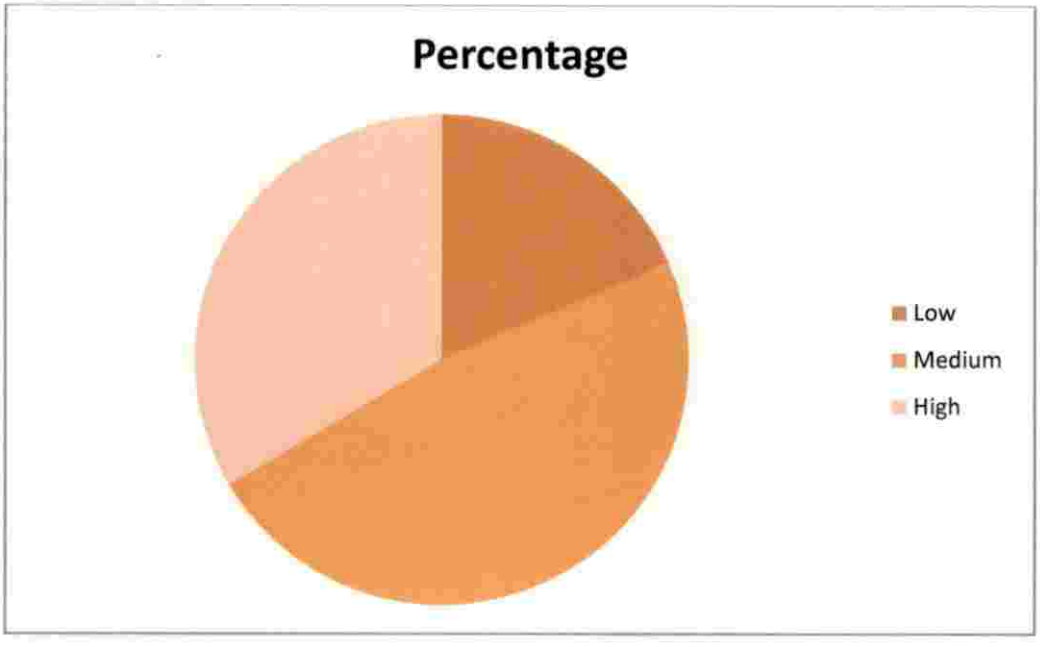


Fig. 14: Distribution of respondents based on their achievement motivation (n=200)

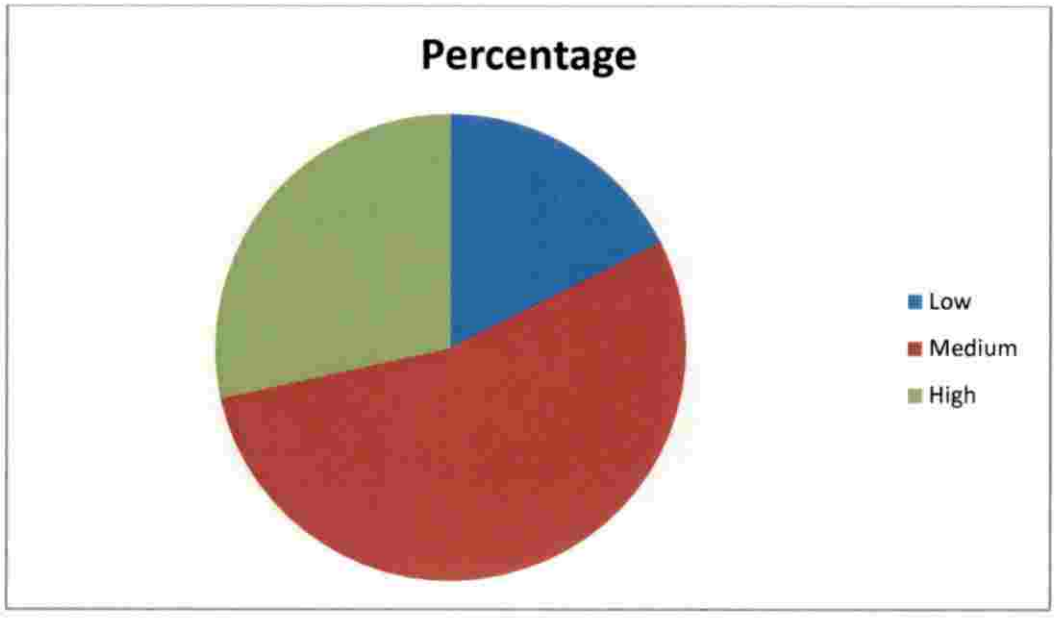


Table 4.18: Distribution of respondents based on their achievement motivation (n=200)

Category	**Number of members**	**Percentage (%)**
Low	35	17.5
Medium	108	54
High	57	28.5

Among the five CDSs, the members coming under Kattakkada were found to be having highest achievement motivation when compared to all the other four CDSs (Table 4.19).

Table 4.19: Comparison between the five CDSs for the variable 'achievement motivation'

ANOVA SUMMARY		
Groups	*Average*	*Critical Difference*
Kunnathukal	20.975	
Karode	23.225	
Malayinkeezhu	22.975	
Karakulam	22.950	
Kattakkada	23.375	
		0.923

4.1.13 Economic Motivation

The results of the study proved that almost half (49 %) of the respondents had a medium level of motivation towards achieving maximum economic gains (Table 4.20).

Table 4.20: Distribution of respondents based on their economic motivation (n=200)

Category	**Number of members**	**Percentage (%)**
Low	43	21.5
Medium	98	49
High	59	29.5

The differences exhibited by the women of the five CDSs for the variable 'Economic motivation' were compared using ANOVA (Table 4.21). It could be found out that there exists significant difference between the CDSs for the particular variable. The CD-value obtained was 0.652 and using the value it could be deduced that farm women in Karakulam were having the most economic motivation while those from Kunnathukal were least in their levels of economic motivation.

Table 4.21: Comparison between the five CDSs for the variable 'economic motivation'

ANOVA SUMMARY		
Groups	*Average*	*Critical Difference*
Kunnathukal	26.15	
Karode	27.25	

Fig. 15: Distribution of respondents based on their economic motivation (n=200)

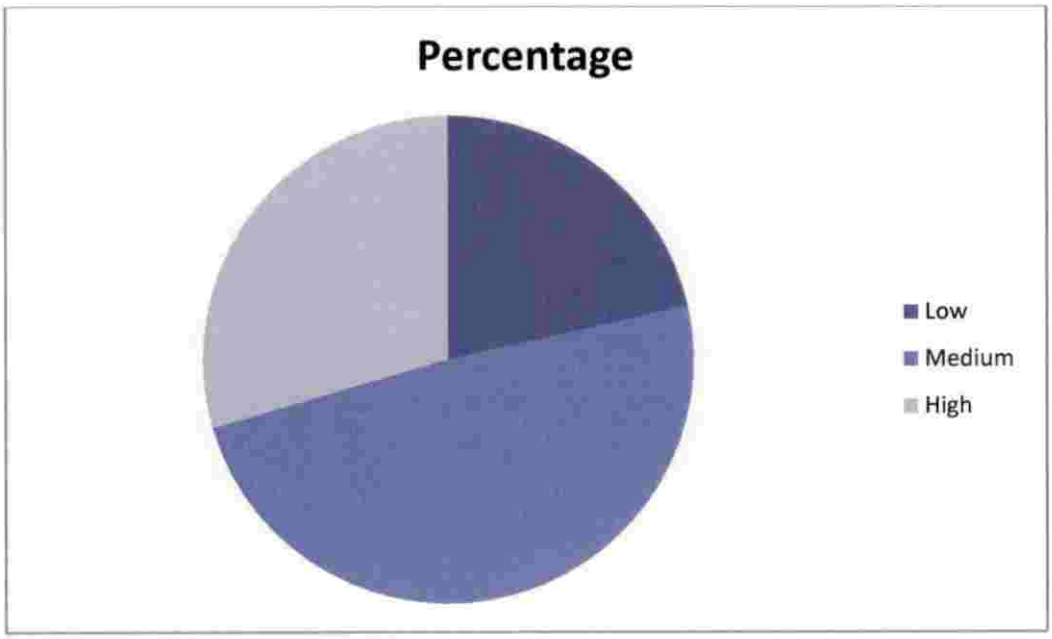
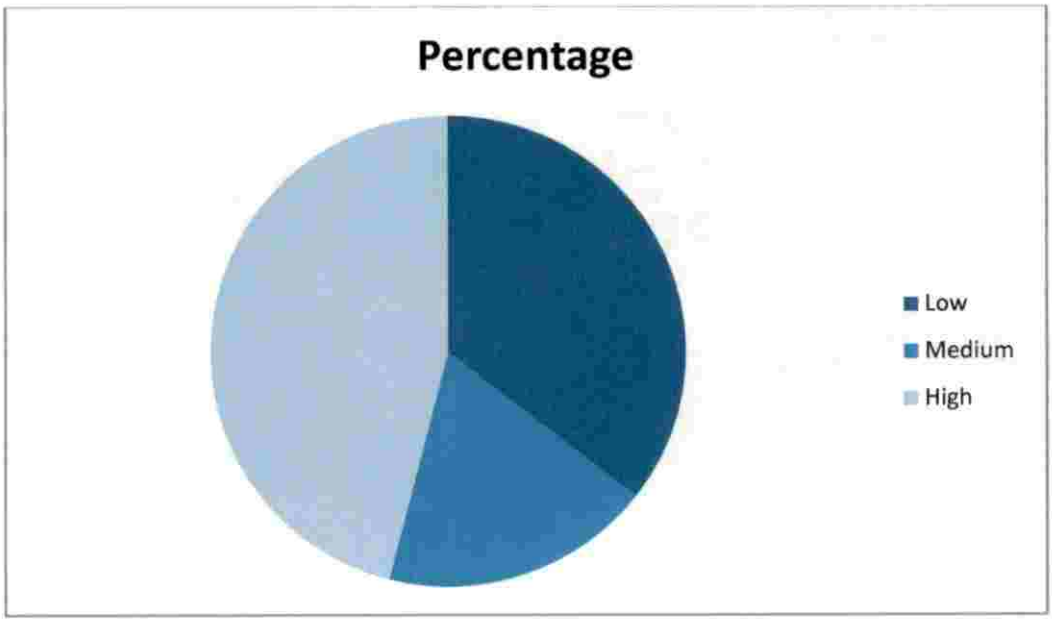


Fig. 16: Distribution of respondents based on their risk orientation (n=200)



Malayinkeezhu	27.15	
Karakulam	27.85	
Kattakkada	27.20	
		0.652

4.1.14 Risk Orientation

Regarding the orientation of SHG based women towards taking risks for profitable gains, the results of the study (Table 4.22) proved that a high proportion (46 %) of them were having a high risk orientation. Jayashree (2004) had obtained a result for the variable, which is completely in disagreement with the current study.

Table 4.22: Distribution of respondents based on their risk orientation (n=200)

Category	**Number of members**	**Percentage (%)**
Low	71	35.5
Medium	37	18.5
High	92	46

The comparison between the five CDSs for the variable risk orientation (Table 4.23) showed that there exists significant difference between the CDSs for the particular variable. The CD-value obtained was 0.870 and using the value it could be deduced that farm women in Kunnathukal were least interested in taking risks while those in Karakulam were most likely to take risks.

Table 4.23: Comparison between the five CDSs for the variable 'risk orientation'

ANOVA SUMMARY		
Groups	*Average*	*Critical Difference*
Kunnathukal	23.625	
Karode	25.175	
Malayinkeezhu	25.025	
Karakulam	25.375	
Kattakkada	25.075	
		0.870

4.1.15 Relationship between Major Profile Characteristics of SHG Members

The relationship between nine major profile characteristics of SHG members were estimated using correlation analysis and the results are given in Table 4.24.

Table 4.24: Correlation analysis of major profile characteristics of SHG members

	Age	SE	FE	SC	INO	SO	AM	EM	RO
Age	1								
SE	0.206*	1							
FE	0.286**	0.201*	1						
SC	-0.174	0.0792	-0.257**	1					
INO	-0.274**	0.001	-0.212*	0.779**	1				
SO	-0.161	0.102	-0.163	0.581**	0.516**	1			
AM	-0.099	0.140	-0.257**	0.714**	0.613**	0.579**	1		
EM	-0.037	0.144	-0.087	0.406**	0.329**	0.436**	0.446**	1	
RO	-0.062	0.122	-0.074	0.434**	0.384**	0.385**	0.492**	0.257*	1

* Significant at 5 per cent level

** Significant at 1per cent level

SE- SHG experience; FE- Farming experience; SC- Self confidence; INO- Innovativeness; SO- Scientific orientation; AM- Achievement motivation; EM- Economic motivation; RO- Risk orientation

The variable 'age' was found to be positively and significantly related to the variables 'SHG experience' and 'farming experience' at 5 per cent and 1 per cent respectively. That means as the age increases, both SHG experience and farming experience will also increase. At the same time, age was found to be significantly and negatively related to the variable 'innovativeness' at 1 per cent level. This means as age increases, innovativeness goes on decreasing among the farm women.

The variables 'SHG experience' and 'farming experience' were found to be positively and significantly related to each other at 5 per cent. It shows that as the SHG experience increases, farming experience will also record an increase.

'Farming experience' was found to have a negatively significant relationship with 'self confidence' and 'achievement motivation' at 1 per cent level. 'Farming experience' was also found to have a negatively significant relationship with 'innovativeness'. We can infer from these relationships that as a woman farmer gains experience in agriculture (she becomes older), a kind of "mental plateau" is created and she will be doing routine things without trying newer technologies and get satisfied with what she regularly gain from her vocation.

The six variables namely self confidence, innovativeness, scientific orientation, achievement motivation, economic motivation and risk orientation were found to have a positive and significant relationship with one another at 1

per cent level. That means if any one of the above variable shows a raise, correspondingly any other given variable will also show a raise and vice-versa.

4.2 PROFILE CHARACTERISTICS OF SELF HELP GROUPS

4.2.1 Size of the Group

The mean size of a sample group in the study area was found to be 4.33. As much as 75 per cent of the groups had four members each (Table 4.25) and the group size ranged from four to six in number. The small size of the group can help to improve the communication and co-ordination between the members and these in turn can augment the efficiency in the functioning of the group.

Table 4.25: Distribution of SHGs based on their size (n= 40)

No. of members in the SHG	Number of SHGs	Percentage (%)
4	30	75
5	7	17.5
6	3	7.5

4.2.2 Number of BPL Members

Strength of the various groups ranged from four to six and the number of BPL members in the sample groups ranged from zero to six (Table 4.26). It can be observed that as the size of the groups are increasing. the chances of exclusion of BPL members will be reducing. Presence of BPL members in a group along

with APL members is a sign of absence of "economic untouchability" among the members of Kudumbashree mission in Kerala.

Table 4.26: Distribution of SHGs based on the number of BPL members (n= 40)

Strength of the group	**Strength of BPL members in the group**	**Number of groups**	**Percentage of groups**
4	*0*	5	16.67
	1	6	20
	2	5	16.67
	3	8	26.67
	4	6	20
Total number of groups in the strength category		*30*	
5	*0*	0	0
	1	1	14.29
	2	1	14.29
	3	0	0
	4	3	42.86
	5	2	28.57
Total number of groups in the strength category		*7*	
6	*0*	0	0
	1	0	0
	2	0	0
	3	2	66.67
	4	0	0
	5	0	0
	6	1	33.33
Total number of groups in the strength category		*3*	

4.2.3 Number of APL Members

Number of APL members in the sample groups ranged from zero to four (Table 4.27).

Table 4.27: Distribution of SHGs based on the number of APL members (n= 40)

Strength of the group	Strength of APL members in the group	Number of groups	Percentage of groups
4	*0*	5	16.67
	1	8	26.67
	2	5	16.67
	3	6	20
	4	6	20
Total number of groups in the strength category		*30*	
5	*0*	2	28.57
	1	3	42.86
	2	0	0
	3	1	14.29
	4	1	14.29
	5	0	0
Total number of groups in the strength category		*7*	
6	*0*	1	33.33
	1	0	0
	2	0	0
	3	2	66.66
	4	0	0
	5	0	0
	6	0	0
Total number of groups in the strength category		*3*	

4.2.4 Number of General Category Members

Number of general category members in the sample groups ranged from zero to six. (Table 4.28).

Table 4.28: Distribution of SHGs based on the number of general category members (n= 40)

Strength of the group	Strength of General Category members in the group	Number of groups	Percentage of groups
4	*0*	7	23.33
	1	1	3.33
	2	3	10
	3	4	13.33
	4	15	50
Total number of groups in the strength category		*30*	
5	*0*	3	42.86
	1	2	28.57
	2	0	0
	3	1	14.29
	4	0	0
	5	1	14.29
Total number of groups in the strength category		*7*	
6	*0*	1	33.33
	1	0	0
	2	0	0
	3	1	33.33
	4	0	0
	5	0	0
	6	1	33.33
Total number of groups in the strength category		*3*	

4.2.5 Number of OBC Category Members

Number of OBC members in the sample groups ranged from zero to five. 4.29).

Table 4.29: Distribution of SHGs based on the number of OBC members (n= 40)

Strength of the group	**Strength of OBC members in the group**	**Number of groups**	**Percentage of groups**
4	*0*	18	60
	1	4	13.33
	2	2	6.66
	3	1	3.33
	4	5	16.67
Total number of groups in the strength category		*30*	
5	*0*	2	28.57
	1	2	28.57
	2	0	0
	3	0	0
	4	1	14.29
	5	2	28.57
Total number of groups in the strength category		*7*	
6	*0*	1	3.33
	1	1	3.33
	2	0	0
	3	0	0
	4	0	0
	5	1	3.33
	6	0	0
Total number of groups in the strength category		*3*	

4.2.6 Number of SC/ST Category Members

Number of SC/ST members in the sample groups ranged from zero to five. (Table 4.30).

Table 4.30: Distribution of SHGs based on the number of SC/ST members (n= 40)

Strength of the group	Strength of SC/ST members in the group	Number of groups	Percentage of groups
4	*0*	26	86.67
	1	2	6.67
	2	0	0
	3	0	0
	4	2	6.67
Total number of groups in the strength category		*30*	
5	*0*	4	57.14
	1	1	14.29
	2	0	0
	3	1	14.29
	4	0	0
	5	1	14.29
Total number of groups in the strength category		*7*	
6	*0*	1	33.33
	1	1	33.33
	2	1	33.33
	3	0	0
	4	0	0
	5	0	0
	6	0	0
Total number of groups in the strength category		*3*	

From the above tables 4.26, 4.27, 4.28, 4.29 and 4.30, we can infer that the inclusion of BPL/APL/General Category/OBC/SC/ST members in the SHGs of Kudumbashree Mission was bound to be a chance as the size of the groups were too small, that is, only four, five or six. However, as the size of the groups increases, the chances of inclusion of more members from the lower strata of society would be boosted up.

4.2.7 Crops Cultivated by the Groups

Through the study, it could be found out that invariably all the sample SHGs were cultivating banana (Table 4.31). The varieties cultivated were mainly *Nendran, Njalipoovan, Red banana* and *Palayamkodan.* As high as 45.7 per cent of the groups were cultivating vegetables in addition to banana and 45 per cent were found to cultivate other crops like elephant foot yam, turmeric, tapioca etc. along with banana or vegetables. Adoption of this cropping pattern predominated with short duration/annual crops may be due to the fact that most of the SHG based farming were being undertaken in lands taken for annual lease and these crops can generate returns on investment made on them in a relatively short period of time.

Table 4.31: Distribution of SHGs based on the crop-wise cultivation (n= 40)

Crop	**No. of SHGs under adoption**	**Percentage (%)**
Banana	40	100
Vegetables	19	47.5
Other crops	18	45

Coming to the combination of various crops that were being cultivated, 30 per cent of the groups were cultivating banana as their sole crop (Table 4.32). A quarter (25 %) of the groups were cultivating vegetables along with banana and 22.5 per cent groups each were cultivating banana in combination with other

Fig. 17: Distribution of SHGs based on the crop-wise cultivation (n= 40)

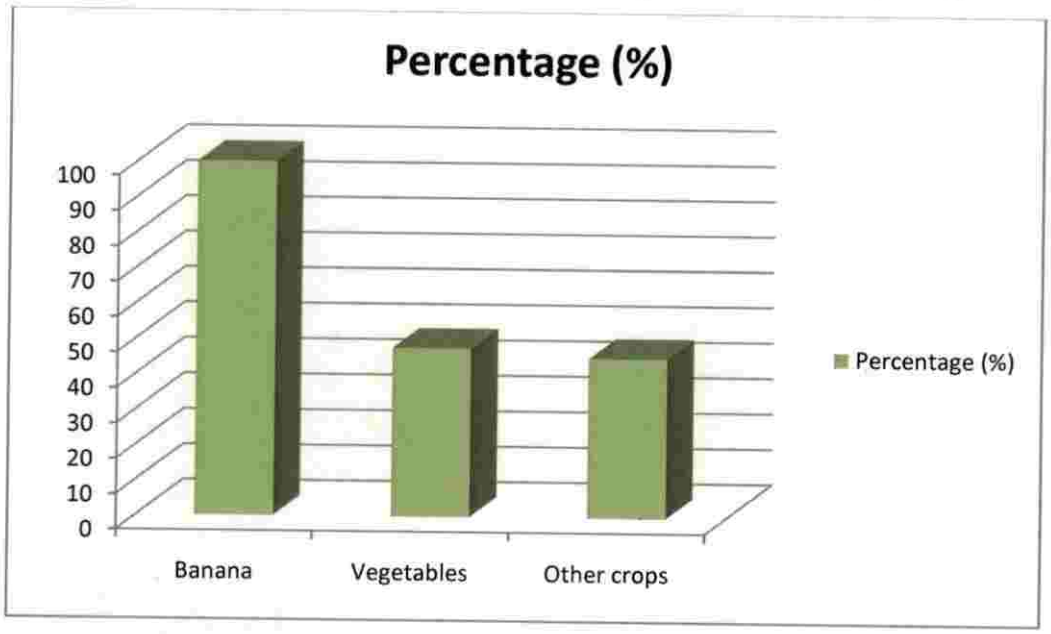
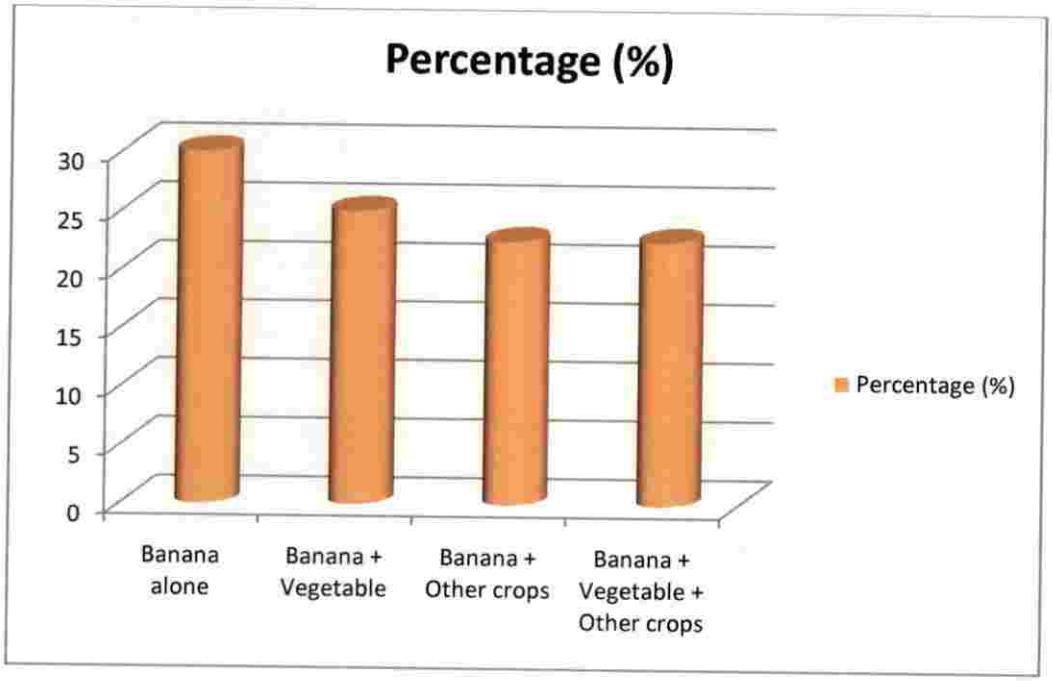


Fig. 18: Distribution of SHGs based on the crop combination-wise cultivation (n= 40)



crops and banana in combination with vegetable and other crops. This kind of intercropping practiced by majority of the SHGs might be for supplementing their income from agriculture and also for avoiding the risk of complete crop failure that is always associated with monocropping.

Table 4.32: Distribution of SHGs based on the crop combination-wise cultivation (n= 40)

Crop combination	**No. of SHGs under adoption**	**Percentage (%)**
Banana alone	12	30
Banana + Vegetable	10	25
Banana + Other crops	9	22.5
Banana + Vegetable + Other crops	9	22.5

4.2.8 Credit Status

The investigation could find out that 70 per cent of the SHGs had taken credit from nationalized banks for the purpose of raising crops while the remaining 30 per cent groups were doing agriculture using their own funds (Table 4.33). The reliance on external credit by majority of SHGs were due to the fact that they were resource poor and did not possess enough savings to rely upon for bulk expenditures that is associated with crop production for a short duration.

Table 4.33: Credit status of the SHGs (n= 40)

Credit status	**No. of SHGs**	**Percentage (%)**
Loan availed	28	70
Loan not availed	12	30

Fig. 19: Credit status of the SHGs (n=40)

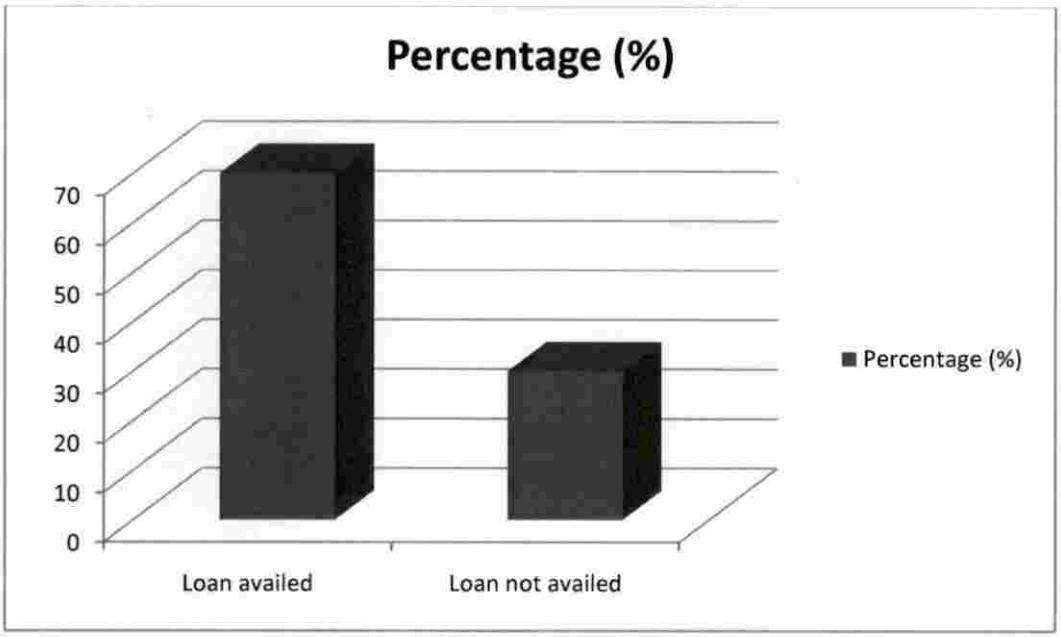
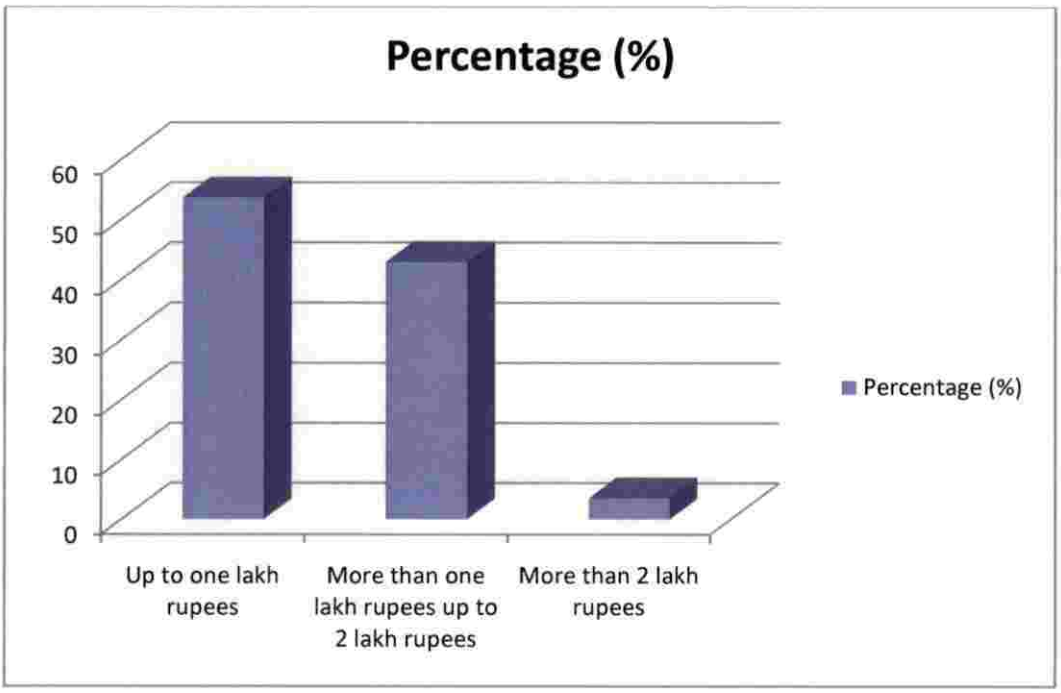


Fig. 20: Loan amount availed by the SHGs (n= 28)



4.2.9 Loan Amount Availed

The mean amount of loan availed by the groups was found to be Rs. 1,40,714. The minimum amount that was taken as loan was Rs. 50,000 and the maximum amount was Rs. 2,50,000. Of the groups that had availed credit, 50 per cent had taken an amount upto one lakh rupee while the other 50 per cent had taken amounts exceeding one lakh rupees as shown in the Table 4.34.

Table 4.34: Loan amount availed by the SHGs (n= 28)

Loan amount availed	**No. of SHGs**	**Percentage (%)**
Up to one lakh rupees	15	53.57
More than one lakh rupees up to 2 lakh rupees	12	42.86
More than 2 lakh rupees	1	3.57

4.2.10 Status of External Labour Use

The study revealed that 95 per cent of the groups used to hire external labour, especially men, for doing atleast some of the agricultural activities (Table 4.35). Those activities that require long distance travelling and strenuous physical activities were being given to men who were not at all members of the SHG.

Table 4.35: Status of external labour used by SHGs (n= 40)

Labour use status	**No. of SHGs**	**Percentage (%)**
Used external labour	38	95
Unused external labour	2	5

4.2.11 Activities Employing External Labour

The Kudumbashree based farm women were found to hire external labour and its activity based distribution is given in the Table 4.36. The activity where most number of groups engaged external labour was found to be "Land preparation". It could be observed that 42.11 per cent of the groups utilized external labour for this most tedious farm activity. Multiple agricultural activities like procuring planting materials from distant areas, fencing, transportation of produce, marketing were also undertaken by men in the case of 31.58 per cent groups.

As the SHG women were depending on external labour, any increase in labour cost will adversely affect their profitability.

Table 4.36: Distribution of SHGs based on the activities for which they hire labour (n= 38)

Activity	No. of SHGs	Percentage of SHGs
Land preparation	16	42.11
Taking furrows	2	5.26
Planting	2	5.26
Fertilizer application	2	5.26
Intercultural operations	4	10.53
Multiple agricultural activities	12	31.58

Fig. 21: Distribution of SHGs based on the activities for which they hire labour (n= 38)

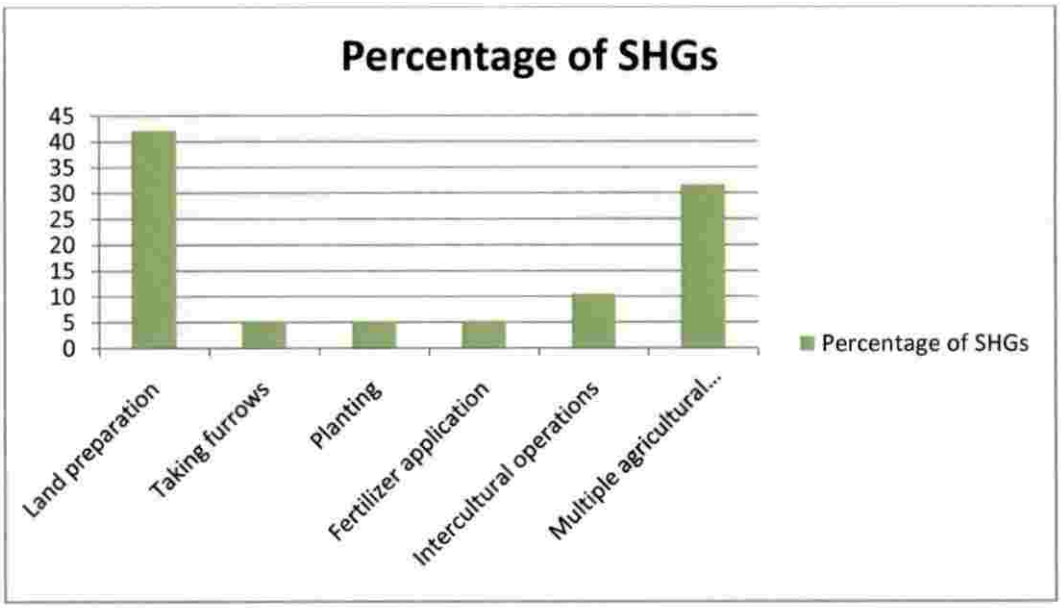
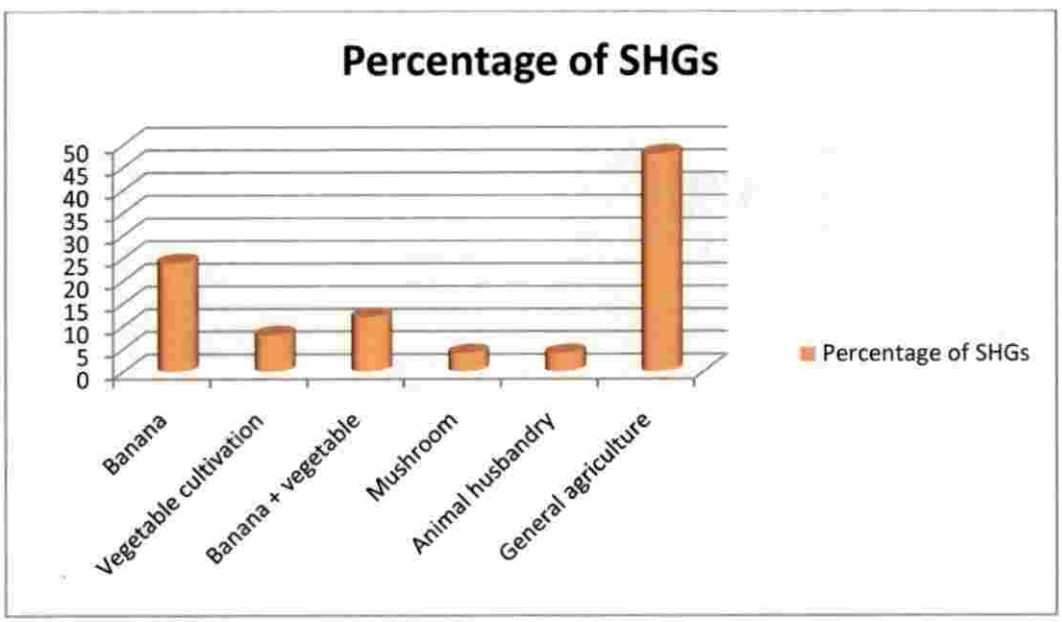


Fig. 22: Topic-wise distribution of attended trainings (n= 25)



4.2.12 Trainings Attended

Among the groups that were studied, in 25 (62.5 %) groups, atleast one of the group members had attended a minimum of one training programme. The topic-wise distribution of trainings received is given in the Table 4.37. From the table it can be seen that nearly half (48 %) of the trainings were related to general agricultural practices and nearly a quarter (24 %) of the trainings were related to banana cultivation.

Table 4.37: Topic-wise distribution of attended trainings (n= 25)

Training topic	**No. of SHGs attended it**	**Percentage of SHGs**
Banana	6	24
Vegetable cultivation	2	8
Banana + vegetable	3	12
Mushroom	1	4
Animal husbandry	1	4
General agriculture	12	48

4.2.13 Training Requirement

Majority (57.5 %) of the groups opined that they did not require any further training and they had enough knowledge regarding various agricultural activities (Table 4.38). Only 42.5 per cent groups thought that they require further training in agricultural and allied activities.

Table 4.38: Training requirement of SHGs (n= 40)

Training requirement	No. of SHGs	Percentage
Required	17	42.5
Not required	23	57.5

4.2.14 Training Areas

Those groups which thought that they required training had identified five areas where they wanted further training (Table 4.39). As much as 41.17 per cent of the groups needed training in both banana cultivation and vegetable cultivation and 23.52 per cent of the groups wanted training on vegetable cultivation alone while 17.67 per cent wanted training on banana cultivation alone.

Table 4.39: Areas identified by the SHGs for training (n= 17)

Training area	No. of SHGs	Percentage of SHGs
Banana	3	17.67
Vegetable cultivation	4	23.52
Banana + vegetable	7	41.17
General agriculture	2	11.76
Kitchen garden	1	5.88

The studies among the SHGs with respect to training revealed the fact that there exists a training gap among its members in agriculture. Only if this gap is bridged, the productivity and "agricultural efficiency" through SHG-based farming will be improved in the long run.

4.2.15 Cost of Cultivation

The cost incurred by various groups during the past one year varied from Rs. 30,000 to Rs. 4,00,000. The amount was met from own funds as well as from bank loans. On average, a group in the study area was found to spent Rs. 1,49,000 an year towards their agricultural activities. This implies that an individual group in the study area spends an amount of Rs. 408.22 per day towards their agricultural activities.

4.2.16 Current Returns

The study could find out that total returns from agriculture for each group during the last one year varied from Rs. 50,000 to Rs. 5,00,000. On average, a group in the study area was found to earn Rs. 2,14,625 from their agricultural activities. This implies that an individual group in the study area gains an amount of Rs. 588.01 per day from their agricultural activities.

The net return or profit that an individual group in the study area obtains from their agricultural activities was found to be Rs. 179.79. As the mean size of the group was found to be 4.33, an individual group member would receive an amount of Rs. 41.52 per day from group farming. Though this is a small amount when compared to the daily wage rate prevailing in the state, the income can supplement their family's total income, when received in bulk during the harvest season.

4.2.17 Previous Returns

Earnings from agriculture for each SHG during the year before the last year was also calculated. The mean return was found to be Rs. 1,93,125 and the returns varied from Rs. 50,000 to Rs. 4,50,000.

4.3 INDEX-BASED VARIABLES OF GROUPS

4.3.1 Variables Related to Economic Development

4.3.1.1 Area Cultivated

The mean area cultivated by a sample SHG was found to be 190.53 cents. The area varied from a minimum of 43 cents to a maximum of 385 cents. Majority (65 %) of the groups were found to be cultivating in an area from 100 cents to 250 cents (Table 4.40).

Table 4.40: Distribution of SHGs based on the area they cultivated (n= 40)

Area	No. of SHGs	Percentage of SHGs
Less than 100 cents	5	12.5
100-250 cents	26	65
More than 250 cents	9	22.5

4.3.1.2 Economic Motivation

The study could find that 35 per cent of the groups were having a high degree of economic motivation and wanted to maximize their economic gains through their group activities. Another 52.5 per cent of the groups possessed a medium level of economic motivation. Only 12.5 per cent of the groups possessed low level of economic motivation. This high to medium level of

economic motivation exhibited by the groups may be the reason why they were cultivating nearly two acres of land each.

Table 4.41: Distribution of SHGs based on their economic motivation (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	5	12.5
Medium	21	52.5
High	14	35

4.3.1.3 B-C Ratio

The Benefit-Cost Ratio of majority of the groups (55 %) were found to be medium (Table 4.42). As high as 97.5 per cent groups had the ratio more than one; which is an encouraging sign.

Table 4.42: Distribution of SHGs based on their Benefit-Cost Ratios (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low (up to 1.33)	8	20
Medium (1.34 – 1.61)	22	55
High (>1.61)	10	25

4.3.1.4 Increase in Income

More than three quarters of the groups showed an increase in their income over the previous year. Majority (57.5 %) of the groups recorded a medium increase in their income due to their agricultural activities (Table 4.43).

Table 4.43: Distribution of SHGs based on the increase in their income from agriculture (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	9	22.5
Medium	23	57.5
High	8	20

4.3.1.5 Credit Orientation

According to the study, majority (60 %) of the groups had a high degree of orientation towards credit (Table 4.44). That means they were willing to avail loan from formal sources and utilize the amount for constructive purposes.

Table 4.44: Distribution of SHGs based on their orientation towards credit (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	5	12.5
Medium	11	27.5
High	24	60

4.3.1.6 Employment Generation

As per the study, more than half (52.5 %) of the groups could generate 120 to 303 days of employment annually due to their agricultural activities (Table 4.45). Another quarter of the groups could generate more than 300 days of employment. So we can generalize that Kudumbashree women groups can generate a good number of day's employment in agricultural sector.

Table 4.45: Distribution of SHGs based on the employment generated due to their agricultural activities (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low (Less than 120 days)	9	22.5
Medium (120 to 303 days)	21	52.5
High (More than 303 days)	10	25

4.3.1.7 Correlation between Sub-Indicators of Economic Development

Correlation analysis was carried out between the six sub-indicators of economic development and the results are furnished in the Table 4.46.

Table 4.46: Correlation between sub-indicators of economic development

	AC	EM	BCR	IIC	CO	EG
AC	1					
EM	0.087	1				
BCR	-0.263	-0.035	1			
IIC	0.322*	0.029	0.417**	1		
CO	0.435**	0.084	-0.014	0.260	1	
EG	0.760**	0.133	-0.084	0.268	0.432**	1

* Significant at 5 per cent level

** Significant at 1 per cent level

AC- area cultivated; EM- economic motivation; BCR- benefit-cost ratio; IIC- increase in income; CO- credit orientation; EG- employment generation

The relationships between the six sub-indicators of economic development are furnished in the table 4.46. It could be found out that at 5 per cent level, there

existed a significant and positive relationship between area cultivated and increase in income. That means as the area cultivated had increased, the income also increased.

The study revealed a significant and positive relationship between area cultivated and credit orientation at 1 per cent level. This strong positive relation was most probably due to the fact that as the attitude towards credit and its availability increased, more and more of the area was brought under agriculture by the Kudumbashree groups. This is a strong indicator towards the fact that if more credit is made available to them, the women SHGs will bring more and more area under farming. The reverse situation can also hold true, that is, when the cultivated area increases, the financial requirements also increase.

Area cultivated and employment generation were found to possess a very strong and positive relationship between each other at 1 per cent level of significance. It is quite natural that more and more people will receive employment when more area is brought under farming. Hence it will be beneficial for our society in general and poor women of the state in particular if more area is brought under farming by women groups.

The variables BC ratio and increase in income showed a positive and significant relationship at 1 per cent level of significance. This trend may be due to the fact that once the fixed costs are covered, the rate of increase in income will be more than the rate of increase of variable cost incurred for farming.

The variables credit orientation and employment generation too were showing a positive and significant relationship with each other at 1 per cent level of significance. This may be due to the fact that as more credit is available, more area can be brought under agriculture and as more area is brought under agriculture, more employment opportunities will be created.

Apart from the combination of variables explained above, all other possible combinations of sub-indicators of economic development were found to have no significant relationship with one another as evident from the table 4.46.

4.3.1.8 Relative Importance of Each Sub-Indicator towards Overall Economic Development

The relative importance of each sub-indicator towards overall economic development was calculated using Principal Component Analysis and the results are given in the Table 4.47 and Table 4.48.

Table 4.47: Eigen values of the Correlation Matrix of economic development

	Eigen value	Proportion	Cumulative
1	2.32	0.3859	0.3859
2	1.40	0.2339	0.6198
3	0.98	0.1625	0.7823
4	0.66	0.1095	0.8918
5	0.46	0.0774	0.9693
6	0.18	0.0307	1.0000

Table 4.47 gives the list of eigen values of the correlation matrix for the six sub-indicators of economic development. It can be observed from the table that the eigen value No. 1 of "2.32" accounts for the maximum variation (38.59 %) in the data. This is followed by the eigen value No. 2 of "1.40" which accounts for another 23.39 per cent variation in the data. Together the two eigen values accounts for more than 60 per cent variation in the data. So the principal components corresponding to both the eigen values are taken up for the interpretation of results.

Table 4.48: Principal Components of sub-indicators of economic development #

Sub-indicator	Principal Component 1	Principal Component 2
AC	0.58*	-0.19
EM	0.13	-0.09
BCR	-0.06	0.77*
IIC	0.33	0.60
CO	0.45	0.04
EG	0.57	-0.10

* Significant/Most important

The complete set of Principal Components is attached as Appendix VIII

AC- area cultivated; EM- economic motivation; BCR- benefit-cost ratio; IIC- increase in income; CO- credit orientation; EG- employment generation

From the table 4.48, we can observe that the variable 'area cultivated' is significantly correlated with the first principal component, with a correlation value of 0.58. This indicates that the sub-indicator 'area cultivated' contributes the maximum variation to the first principal component and it is the most important sub-indicator of economic development. When the second principal component is taken up, the variable 'benefit-cost ratio' is found to be the most important. Hence it can be deduced that the economic development of SHGs were improving with an increase in the area they cultivates (AC) and their benefit-cost ratio (BCR) and vice-versa. Further we can say that, of the two significantly correlated sub-indicators of economic development, 'area cultivated' is more important to economic development when compared to 'benefit-cost ratio'. As a

result, if we want to improve the economic sustainability of Kudumbashree SHGs, we must devise strategies to augment their 'area cultivated' and 'benefit-cost ratio'.

4.3.2 Variables Related to Social Development

4.3.2.1 Transparency

The study could find that a very large per cent of the groups studied thought that their groups were functioning in a transparent manner and all the financial decisions were made only after the concurrence of all the members (Table 4.49). This high level of transparency might have improved their mutual trust and efficiency in the group's functioning.

Table 4.49: Distribution of SHGs based on the level of transparency in their agricultural activities (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	4	10
Medium	17	42.5
High	19	47.5

4.3.2.2 Equity

The level of equity seen within the SHGs was studied and the details are furnished in the Table 4.50.

Table 4.50: Distribution of SHGs based on the level of equity in their agricultural activities (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	2	5
Medium	11	27.5
High	27	67.5

As per the details furnished in the Table 4.51, it can be seen that a huge proportion (67.5 %) of the groups perceived that there existed a high level of equality within them. All the members had an equal say during decision making and this might have improved the level of involvement by each and every member in the groups' activities.

4.3.2.3 Group Leadership

The data on the study of the variable "Group Leadership" is included in the Table 4.51.

Table 4.51: Distribution of SHGs based on the extent of group leadership exhibited within them (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	6	15
Medium	18	45
High	16	40

The results of the study as given in the Table 4.51 proved that the SHGs are having an able and robust leadership and the individual members were satisfied by their respective leadership. An effective leadership is always an asset to any group especially when the times are challenging. Working within the groups in leadership positions give them enough confidence in their own leadership qualities and motivates the women to take up leadership roles even outside the Kudumbashree set up. The fact that it is the Kudumbashree women who are contesting and winning in the local body elections in Kerala in large numbers is a testimony of their leadership qualities.

4.3.2.4 Group Cohesion

The results on the studies on the variable "Group Cohesion" is given in the Table 4.52.

Table 4.52: Distribution of SHGs based on the extent of group cohesion exhibited within them (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	3	7.5
Medium	13	32.5
High	24	60

As per the study the agriculturally active women groups were a very cohesive unit (Table: 4.52). This cohesiveness is a reason why they are perceived to be successful when compared to numerous other types of groups in our society.

4.3.2.5 Accountability

The details on the level of accountability exhibited by the studied SHGs are given in the Table 4.53.

Table 4.53: Distribution of SHGs based on the extent of accountability exhibited by its members (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	1	2.5
Medium	17	42.5
High	22	55

Majority (55 %) of the SHGs opined that their members were mutually accountable to one another (Table: 4.53). This mutual accountability and commitment results in prompt completion of individual responsibilities and duties. This in turn will aid in the success of the group as a whole.

4.3.2.6 Team Spirit

More than two-third of the groups (67.5 %) had reported that their respective members possessed a high degree of team spirit and showed a sense of oneness (Table: 4.54). This spirit itself is a motivation to excel in their group activities and outshine other groups in their vicinity.

Table 4.54: Distribution of SHGs based on the extent of team spirit exhibited by its members (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	0	0
Medium	13	32.5
High	27	67.5

4.3.2.7 Group Co-operation

Majority of the studied SHGs had a high level of co-operation as shown in the Table 4.55.

Table 4.55: Distribution of SHGs based on the extent of co-operation exhibited by its members (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	4	10
Medium	11	27.5
High	25	62.5

The study could find that 62.5 per cent of the groups studied thought that their members were co-operating with one another in all their activities in very nice way (Table 4.55). This high level of group co-operation will help them to overcome problems that they could not have been tackled individually.

4.3.2.8 Correlation between sub-indicators of social development

Correlation analysis was carried out between the seven sub-indicators of social development and the results are furnished in the Table 4.56.

Table 4.56: Correlation between sub-indicators of social development

	TR	**EQ**	**GL**	**GC**	**AC**	**TS**	**CO**
TR	1						
EQ	0.447**	1					
GL	0.455**	0.613**	1				
GC	0.499**	0.512**	0.510**	1			
AC	0.444**	0.298	0.443**	0.460**	1		
TS	0.638**	0.548**	0.605**	0.462**	0.566**	1	
CO	0.464**	0.410**	0.525**	0.430**	0.691**	0.713**	1

* Significant at 5 per cent level

** Significant at 1 per cent level

TR- transparency; EQ- equity; GL- group leadership; GC- group cohesion; AC- Accountability; TS- team spirit; CO- group cooperation

There were seven sub-indicators of social development and the correlation between all of them was found out. The result is furnished in the table 4.56. There is a popular notion in our society that everything is better among Kudumbashree women and the result of the intercoorelation supports this belief.

Except the variable combination "equity-accountability", all other variables were found to have significantly affecting one another at 1 per cent level. In terms of absolute values, group cooperation is highly correlated with team spirit and accountability. It means that as the level of team spirit increases, the members of the groups tend to be more cooperative and accountable towards one another.

4.3.2.9 Relative Importance of Each Sub-Indicator towards Overall Social Development

The relative importance of each of the seven sub-indicators towards overall social development was calculated using Principal Component Analysis and the results are given in the Table 4.57 and Table 4.58.

Table 4.57: Eigen values of the correlation matrix of sub-indicators of social development

	Eigen value	**Proportion**	**Cumulative**
1	4.08	0.5830	0.5830
2	0.87	0.1243	0.7073
3	0.60	0.0853	0.7926
4	0.57	0.0811	0.8737
5	0.36	0.0520	0.9256
6	0.31	0.0437	0.9693
7	0.22	0.0307	1.0000

Table 4.57 gives the list of eigen values of the correlation matrix for the seven sub-indicators of social development. It can be observed from table that the eigen value No. 1 of "4.08" accounts for the maximum variation (58.30 %) in the data. This is followed by the eigen value No. 2 of "0.87" which accounts for another 12.43 per cent variation in the data. Together the two eigen values accounts for more than 60 per cent variation in the data. So the principal

components corresponding to both the eigen values are taken up for the interpretation of results.

Table 4.58: Principal Components of sub-indicators of social development #

Sub-indicator	Principal Component 1	Principal Component 2
TR	0.37	0.06
EQ	0.35	0.57*
GL	0.39	0.29
GC	0.35	0.27
AC	0.36	-0.55
TS	0.43*	-0.12
CO	0.40	-0.44

*Significant/Most important

The complete set of Principal Components is attached as Appendix VIII

TR- transparency; EQ- equity; GL- group leadership; GC- group cohesion; AC- accountability; TS- team spirit; CO- group cooperation

From the table 4.58, we can observe that the variable 'team spirit' is significantly correlated with the first principal component, with a correlation value of 0.43. This indicates that the sub-indicator 'team spirit' contributes the maximum variation to the first principal component and it is the most important sub-indicator of social development. When the second principal component is taken up, the variable 'equity' is found to be the most important. Hence it can be deduced that the social development of SHGs were improving with an increase in their team spirit (TS) and the equity (EQ) that is present within the group and vice-versa. Further we can say that, of the two significantly correlated sub-indicators of economic development, 'team spirit' is more important to social

development when compared to 'equity'. As a result, if we want to improve the social sustainability of Kudumbashree SHGs, we must devise strategies to augment their 'team spirit' and 'equity'.

4.3.3 Variables Related to Environmental Protection

4.3.3.1 Use of Soil Conservation Measures

The level of use of soil conservation measures by the SHGs was studied and the details are furnished in the Table 4.59.

Table 4.59: Distribution of SHGs based on their level of adoption of soil conservation measures (n= 40)

Category	No. of SHGs	Percentage of SHGs
Always	19	47.5
Sometimes	19	47.5
Never	2	5

The study could find that 47.5 per cent of the groups in the study area were always adopting soil conservation measures since they thought that a fertile soil is the base of good agricultural production (Table 4.59). Another 47.5 per cent of the groups were found to adopt soil conservation measures occasionally. Only a meager five per cent of the groups were found to have never adopted soil conservation measures.

4.3.3.2 Use of Water Conservation Measures

The results on the studies on the variable "Use of Water Conservation Measures" is given in the Table 4.60.

Table 4.60: Distribution of SHGs based on their level of adoption of water conservation measures (n= 40)

Category	No. of SHGs	Percentage of SHGs
Always	32	80
Sometimes	8	20
Never	0	0

According to the results of the study (Table 4.60), 80 per cent of the groups had always adopted water conservation measures. This is because they considered non-availability of water, especially during summer, as a serious impediment to their farming activities. Inorder to counter the scarcity of water, they always resorted to its conservation. Another 20 per cent of the groups had taken water conservation measures occasionally. Here, it is significant to notice that none of the groups had never avoided taking water conservation measures.

4.3.3.3 Avoidance of Chemical Fertilizers

The level of avoidance of chemical fertilizers by the SHGs was studied and the details are shown in the Table 4.61.

Table 4.61: Distribution of SHGs based on their level of avoidance of chemical fertilizers (n= 40)

Category	No. of SHGs	Percentage of SHGs
Always	12	30
Sometimes	22	55
Never	6	15

Results of the study on the level of avoidance of chemical fertilizers (Table 4.61) by the women groups revealed a mixed pattern. Only 30 per cent of the groups were found to always avoid chemical fertilizers for their agricultural needs. More than half of them (55 %) largely avoided chemical fertilizers but may had selectively used them if the situation arose. Relatively small percentage groups (15 %) never shyed away from using chemical fertilizers as they thought any reduction of them will reduce the groups' returns.

From the results, we can deduce that a little less than one-third (30 %) of Kudumbashree SHGs in the study area were following organic crop production practices and exclusively used organic manures.

4.3.3.4 Avoidance of Chemical Herbicides and Pesticides

The habit of various SHGs regarding avoidance of chemical herbicides and pesticides is furnished in the Table 4.62.

Table 4.62: Distribution of SHGs based on their level of avoidance of chemical herbicides and pesticides (n= 40)

Category	No. of SHGs	Percentage of SHGs
Always	11	27.5
Sometimes	20	50
Never	9	22.5

The results on the study of groups based on their level of avoidance of chemical herbicides and pesticides (Table 4.62) showed a similar pattern with their level of avoidance of chemical fertilizers. Those groups which always avoided the use of chemical insecticides, fungicides and herbicides accounted for

27.5 per cent. Half (50 %) of the groups had used them as a last resort when the situation demanded it. Only 22.5 per cent groups never avoided the use of chemical plant protection agents. That means they were following chemical-based modern agriculture.

In short, it can be concluded that a quarter of the Kudumbashree groups were following organic farming, around 20 per cent followed strict chemical-based modern agriculture and the rest followed a middle path between organic farming and modern agriculture.

4.3.3.5 Utilization of Farm Waste

The pattern of utilization of farm waste by the SHGs is shown in the Table 4.63.

Table 4.63: Distribution of SHGs based on their extent of utilization of farm waste (n= 40)

Category	No. of SHGs	Percentage of SHGs
Always	4	10
Sometimes	20	50
Never	16	40

The study could find that only a very few Kudumbashree groups were utilizing the farm wastes effectively. As evident from the table 4.63, only 10 per cent of the groups were found to utilize crop residues and other farm wastes for further crop production or income generating activities. As much as 40 per cent of the groups had never done anything good with the crop residues. Half (50 %)

of the groups had attempted their use but were not regular in their effective utilization.

4.3.3.6 Correlation between Sub-Indicators of Environmental Protection

Correlation analysis was carried out between the five sub-indicators of environmental protection and the results are furnished in the Table 4.64.

Table 4.64: Correlation between sub-indicators of environmental protection

	SCM	WCM	ACF	ACP	UFW
SCM	1				
WCM	0.469**	1			
ACF	-0.036	0.306	1		
ACP	-0.353*	-0.053	0.526**	1	
UFW	0.273	0.351*	-0.012	-0.078	1

* Significant at 5 per cent level

** Significant at 1 per cent level

SCM- adoption of soil conservation measures; WCM- adoption of water conservation measures; ACF- avoidance of chemical fertilizers; ACP- avoidance of chemical herbicides and pesticides; UFW- utilization of farm waste

The results of the correlation analysis between the sub-indicators of environmental protection are given in the table 4.64. From the results, we can observe that there exists a significant and positive relationship between adoption of water conservation measures and adoption of soil conservation measures at 1 per cent level. That means those groups which were taking water conservation measures were also taking soil conservation measures and vice-versa. This is in

agreement with the popular practice among farmers of adopting soil and water conservation measures together.

Again we can observe that there exists a significant and positive relationship between avoidance of chemical fertilizers and avoidance of chemical herbicides and pesticides at 1 per cent level. From this relationship we can infer that those groups which were avoiding chemical crop production measures were also avoiding chemical crop protection measures. It is an indication that they were following organic farming practices.

There existed a significant but negative relationship between the variables adoption of soil conservation measures and avoidance of chemical herbicides and pesticides at 5 per cent level. It means that those groups which were adopting soil conservation measures were not avoiding the use of chemical herbicides and pesticides. This is an indication that they were following chemical-based modern agriculture.

The variables adoption of water conservation measures and utilization of farm waste were also found to exhibit a positive and significant relationship with each other at 5 per cent level. We can deduce from the relation that those groups which were adopting water conservation measures may be utilizing their farm waste and crop residues for the same.

4.3.3.7 Relative Importance of Each Sub-Indicator towards Overall Environmental Protection

The relative importance of each of the five sub-indicators towards overall environmental protection was calculated using Principal Component Analysis and the results are given in the Table 4.65 and Table 4.66.

Table 4.65: Eigen values of the correlation matrix of sub-indicators of environmental protection

	Eigen value	Proportion	Cumulative
1	1.84	0.3675	0.3675
2	1.60	0.3189	0.6864
3	0.79	0.1570	0.8434
4	0.44	0.0870	0.9304
5	0.35	0.0696	1.0000

Table 4.65 gives the list of eigen values of the correlation matrix for the five sub-indicators of environmental protection. It can be observed from table that the eigen value No. 1 of "1.84" accounts for the maximum variation (36.75 %) in the data. This is followed by the eigen value No. 2 of "1.60" which accounts for another 31.89 per cent variation in the data. Together the two eigen values accounts for more than 60 per cent variation in the data. So the principal components corresponding to both the eigen values are taken up for the interpretation of results.

Table 4.66: Principal Components of sub-indicators of environmental protection#

Sub-indicator	Principal component 1	Principal component 2
SCM	0.61*	-0.001
WCM	0.52	0.40
ACF	-0.08	0.71*
ACP	-0.38	0.57
UFW	0.45	0.15

* Significant/Most important

The complete set of Principal Components is attached as Appendix VIII

SCM- adoption of soil conservation measures; WCM- adoption of water conservation measures; ACF- avoidance of chemical fertilizers; ACP- avoidance of chemical herbicides and pesticides; UFW- utilization of farm waste

From the table 4.66, we can observe that the variable 'adoption of soil conservation measures' is significantly correlated with the first principal component, with a correlation value of 0.61. This indicates that the sub-indicator 'adoption of soil conservation measures' contributes the maximum variation to the first principal component and it is the most important sub-indicator of environmental protection. When the second principal component is taken up, the variable 'avoidance of chemical fertilizers' is found to be the most important. Hence it can be deduced that the environmental protection by SHGs were improving with an improved adoption of soil conservation measures (SCM) and their increased avoidance of chemical fertilizers (ACF) and vice-versa. Further we can say that, of the two significantly correlated sub-indicators of environmental protection, 'adoption of soil conservation measures' is more important to environmental protection when compared to 'avoidance of chemical fertilizers'. As a result, if we want to improve the protection of environment by Kudumbashree SHGs, we must devise strategies to augment their 'adoption of soil conservation measures' and 'avoidance of chemical fertilizers'.

4.4 SUSTAINABLE AGRICULTURAL DEVELOPMENT

4.4.1 Economic Development of the SHGs

The extent of economic development achieved by the agriculturally active Kudumbashree SHGs in the study area were calculated and based on the values the groups were categorized as given in the Table 4.67.

Table 4.67: Distribution of SHGs based on the extent of economic development achieved by them (n=40)

Category	No. of SHGs	Percentage of SHGs
Low	10	25
Medium	20	50
High	10	25

The study could find that 50 per cent of the Kudumbashree SHGs had a medium level of economic development. Another 25 per cent of the groups had a high level of the variable. So in total three-fourth of the groups were found to exhibit medium to high level of economic development. Only a quarter numbers of groups had low economic development. The mean score for the variable was found to be 0.56.

4.4.2 Social Development of the SHGs

The extent of social development achieved by the agriculturally active Kudumbashree SHGs in the study area were calculated and based on the values the groups were categorized as given in the Table 4.68.

Table 4.68: Distribution of SHGs based on the extent of social development achieved by them (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	11	27.5
Medium	19	47.5
High	10	25

From the above table, it can be inferred that 47.5 per cent groups had medium level of social sustainability and 25 per cent had a high level of sustainability. So we can say that nearly 75 per cent of the farming SHGs had medium to high level of sustainability. Only a relatively lower percentage (27.5 %) of the groups had lower social sustainability.

4.4.3 Environmental Protection by the SHGs

Based on the extent of environmental protection attained through their agricultural activities, Kudumbashree SHGs were categorized as given in the Table 4.69.

Table 4.69: Distribution of SHGs based on the extent of environmental protection attained through their agricultural activities (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	16	40
Medium	14	35
High	10	25

Results of the study on the extent of attainment of environmental protection show that 40 per cent of the groups had performed badly in this direction. As many as 35 per cent groups had a medium performance in environmental protection. Groups with lower and medium performance towards environmental protection together formed three quarters of the groups. Only 25 per cent of the groups contributed appreciably towards environmental protection.

In short it can be concluded that though the agriculturally active Kudumbashree SHGs in the study area had reasonable economic sustainability

and social sustainability, their performance in environmental protection is a bit lower and only if they strengthen this weak link, they can become truly sustainable.

4.4.4 Correlation between Indicators of Sustainable Agricultural Development

Correlation analysis was carried out between the three indicators of Sustainable Agricultural Development and the results are furnished in the Table 4.70.

Table 4.70: Correlation between the three indicators of Sustainable Agricultural Development

	ED	**SD**	**EP**
ED	1		
SD	0.684**	1	
EP	0.424**	0.429**	1

* Significant at 5 per cent level

** Significant at 1 per cent level

ED- economic development; SD- social development; EP- environmental protection

The results of the correlation analysis between the three indicators of sustainable agricultural development show that there existed a significant and positive relationship between all the three different possible combinations of the three variables at 1 per cent level. That means as the groups were economically developing, they were developing socially too and as they develop socially, they tend to protect environment more.

4.4.5 Relative Importance of Each Indicator towards Overall Sustainability of Group Farming

The relative importance of each of the three indicators of Sustainable Agricultural Development towards overall sustainability of group farming was calculated using Principal Component Analysis and the results are given in the Table 4.71 and Table 4.72.

Table 4.71: Eigen values of the correlation matrix of indicators of Sustainable Agricultural Development

	Eigenvalue	Proportion	Cumulative
1	2.04	0.6787	0.6787
2	0.65	0.2161	0.8948
3	0.32	0.1052	1.0000

Table 4.71 gives the list of eigen values of the correlation matrix for the three indicators of sustainable agricultural development. It can be observed from table that the eigen value No. 1 of "2.04" itself accounts for more than 60 per cent (67.87 %) variation in the data. So the principal components corresponding to the first eigen value alone are taken up for the interpretation of results.

Table 4.72: Principal Components of indicators of Sustainable Agricultural Development #

Indicator	Principal Component 1
ED	0.61*
SD	0.61*
EP	0.50

* Significant/Most important

The complete set of Principal Components is attached as Appendix VIII

ED- economic development; SD- social development; EP- environmental protection

From the Table 4.72, we can observe that all the three variables, namely, economic development (ED), social development (SD) and environmental protection (EP) are significantly correlated with the first principal component, with respective correlation values of 0.61, 0.61 and 0.50. This indicates that all the three indicators of sustainable agriculture are contributing some amount of variation to the first principal component. While the indicators 'economic development' and 'social development' are influencing the variation almost equally, the influence of the indicator 'environmental protection' is comparably lesser.

It can be deduced that the sustainable agricultural development of SHGs was improving with an increase in their economic development (ED), social development (SD) and environmental protection (EP) and vice-versa. As a result, if we want to improve the agricultural sustainability of Kudumbashree SHGs, we must devise strategies to equally improve their 'economic sustainability', 'social sustainability' and 'environmental sustainability'.

4.4.6 Sustainable Agricultural Development Index (SADI)

All the studied SHGs were classified based on their sustainability indices and the results are furnished in the Table 4.73.

Table 4.73: Distribution of SHGs based on their respective sustainability indices (n= 40)

Category	No. of SHGs	Percentage of SHGs
Low	10	25
Medium	20	50
High	10	25

From the Table 4.73, it is evident that majority (50 %) of the SHGs had only medium sustainability which means their sustainability can be improved or reduced by internal or external factors. The mean of the indices of the individual SHGs, that is, Sustainable Agricultural Development Index (SADI) was found to be 0.69. The maximum value of the individual indices was 0.87 and the minimum was 0.50.

4.5 SWPC ANALYSIS

The strengths, weaknesses, potentials and challenges of SHG-based farming are given in the Table 4.74.

Table 4.74: SWPC analysis of SHG-based farming

Strengths	Weaknesses
• Closeness& unity of members • Prompt repayment of loans • Utilization of local resources • Promote the entry of women to public sphere	• Poor financial condition of groups • Lack of own land and irrigation facilities • High rate of interest for loans • Lack of advanced knowledge

• Flexibility in the working • Small size groups promotes better co-ordination between members • The trust and value associated with the name "Kudumbashree mission"	and skill for farming • Lower quality of planting materials • Non-availability of a good market • Younger generation not showing interest • Lack of close tie-up with agriculture department
Potential	**Challenges**
• Export market • Growing demand in the state for organic farm products • Establishment of small agro-based industries • Trying mixed farming by including goat and chicken • Roof top farming, crop diversification to reduce market risks • Farm mechanization	• Climatic vulnerabilities • Reducing availability of lease lands for farming • Pests and diseases • Increasing labour cost • Fluctuation in price for the produce • Wild animals like monkeys and wild boars • No support when crop is lost

4.6 CONSTRAINT ANALYSIS

4.6.1 Constraints Expressed by Individual SHG Members for Group Based Activities Including Farming

The limitations pointed out by the individual SHG members were categorized and ranked and the obtained results were as depicted in the Table 4.75.

Table 4.75: Constraints expressed by individual SHG members

Sl. No.	Constraint	No. of individuals	Rank
1.	Crop loss due to pests, diseases, wild animals and climatic vulnerabilities	154	**1**
2.	Inadequate credit facilities, lack of working capital, difficulty in getting incentives and other financial assistances during distress	151	**2**
3.	Lack of proper knowledge among members about organic crop production measures	144	**3**
4.	Perishability and lack of storage facilities	129	**4**
5.	Family problems	126	**5**
6.	Unorganized farm women and non-frequent Kudumbashree markets	121	**6**
7.	Dry spells and lack of irrigation facilities	118	**7**
8.	Lack of proper infrastructure for SHG activities	115	**8**
9.	Lack of in-house facilities to deliver the latest market price	104	**9**
10.	Small and scattered land holdings and lack of own land	94	**10**
11.	High labour cost	89	**11**
12.	Drop out of members due to marriage and employment	81	**12**
13.	Political interference	77	**13**
14.	Hesitation to take up innovative schemes	58	**14**

4.6.2 Constraints Expressed by Groups for Farming

The SHGs pointed out various difficulties that they encounter during farming and those difficulties were categorized and ranked. The details are given in the Table 4.76.

Table 4.76: Constraints expressed by groups for farming

Sl. No.	Constraint	No. of groups	Rank
1.	Heavy rain, wind and other climatic factors	33	**1**
2.	Dry spells and lack of irrigation facilities	24	**2**
3.	Pests, diseases and wild animal attack	20	**3**
4.	Difficulty in getting loans, subsidies, incentives and other financial assistances during distress	19	**4**
5.	Lack of proper marketing facilities and non-remunerative price for the produce	17	**5**
6.	Lower quality of planting materials	15	**6**
7.	Difference in opinion among group members	14	**7**
8.	High labour cost	13	**8**
9.	Lack of own land	11	**9**
10.	Lack of advanced knowledge in farming	10	**10**

4.7 SUGGESTIONS FOR IMPROVEMENT

Rather than spelling out individual ideas, a couple of comprehensive strategies are being proposed for improving the sustainability of SHG based farming. Both of them need constant hand-holding and monitoring by the Kudumbashree mission. These strategies were devised based on the five most important sub-indicators of sustainable agriculture delineated through this research namely benefit-cost ratio (BCR), increase in income (IIC), equity, avoidance of chemical fertilizers (ACF) and avoidance of chemical herbicides and pesticides (ACP). The constraints expressed by the SHGs and women and also their potentials were also kept in mind. These strategies, if adopted, will definitely bring a sea change in the complexion of group farming in the state. They are as follows:

4.7.1 Woman Farmer Producer Company (WFPC) Method

Under this method, a Woman Farmer Producer Company (WFPC) should be created at Taluk level. The company should be under the direct control of the respective District Mission. All the SHGs in the Taluk that are doing agriculture should be given shares in the company based on their performance. The company should hand-hold the groups right from identification of land for cultivation to marketing of their produce. Rather than increasing the bulk of the produce, the aim of the company must be obtaining maximum profit from what little its share holders are producing.

The WFPC should take the lands for lease on behalf of the SHGs and try to obtain an agreement with the land owner to make the land available for a period of minimum three years. The company should arrange for credit and based on the prevailing market condition and agro-climatic situation of the area, should suggest the appropriate crop and its suitable variety for cultivation. The company should do periodic soil testing and suggest appropriate packages of practices (POP) for the crop such that the produce must be "safe to eat" in all respects. It can also

arrange for various agricultural inputs in bulk so that the retail prices for them will be the least. An internal agricultural extension system must be established by the company so as to deliver latest and most appropriate technology to the women farmers. Use of agricultural machinery should be promoted by the company to reduce the use of external labour. The company can tie up with insurance companies for providing crop insurance. To the extent possible, all the subsidies and incentives must be channelized through the company such that the money is given based on the produce sold to the company rather than the extent of area cultivated by the group.

The company should establish one or more exclusive markets for its members at CDS level. The markets must be located at easily accessible areas and should have storage facilities. The company should have an advanced processing unit based on the farm products that are available in the respective taluk. The processing units must possess vehicles for periodic procurement from the company-managed markets. The CDS level market as well as the company can sell the produce after ensuring that they are "safe to eat". As value addition of agricultural produce is highly profitable, the company can venture into running canteens or snack parlours utilizing its own produce. The company should also create its own brand and actively pursue avenues for export of its branded and/or value added products. Two or three WFPCs can jointly establish permanent "Kudumbashree Bazars" in cities where the demand for "safe to eat" food is high.

4.7.2 Anand Pattern Co-operative Method

This method is neither comprehensive nor end-to-end as the WFPC method. Nevertheless, this is broad enough to ensure that the agriculturally active SHGs obtain a fair return for their produce and are not defeated in the market. Given its credibility and omnipresence in the state, Kudumbashree mission can easily emulate the three-tier co-operative model along with common branding and marketing strategies for the betterment of its farming members.

4.8 TESTING OF HYPOTHESES

The following Table 4.77 exposes the status of various null hypotheses formulated for the study.

Table 4.77: Status of various null hypotheses formulated for the study

Sl. No.	Null Hypothesis	Status
1.	The most important sub-indicator of economic development will be 'benefit-cost ratio'	R
2.	Group cooperation will be the most important sub-indicator of social development	R
3.	Avoidance of chemical herbicides and pesticides will be the most important sub-indicator of environmental protection	R
4.	Environmental protection attained through the agricultural activities of Kudumbashree SHGs will be very high	R
5.	All the three indicators of sustainable agricultural development contribute equally towards it	R
6.	Majority of the SHGs will be having medium level of sustainability towards agriculture	A
7.	Difficulty in getting loans, subsidies, incentives and other financial assistances during distress will be the most important constraint faced by the Kudumbashree groups regarding group-farming	R

A- Acceptance of null hypothesis and rejection of alternate hypothesis

R- Rejection of null hypothesis and acceptance of alternate hypothesis

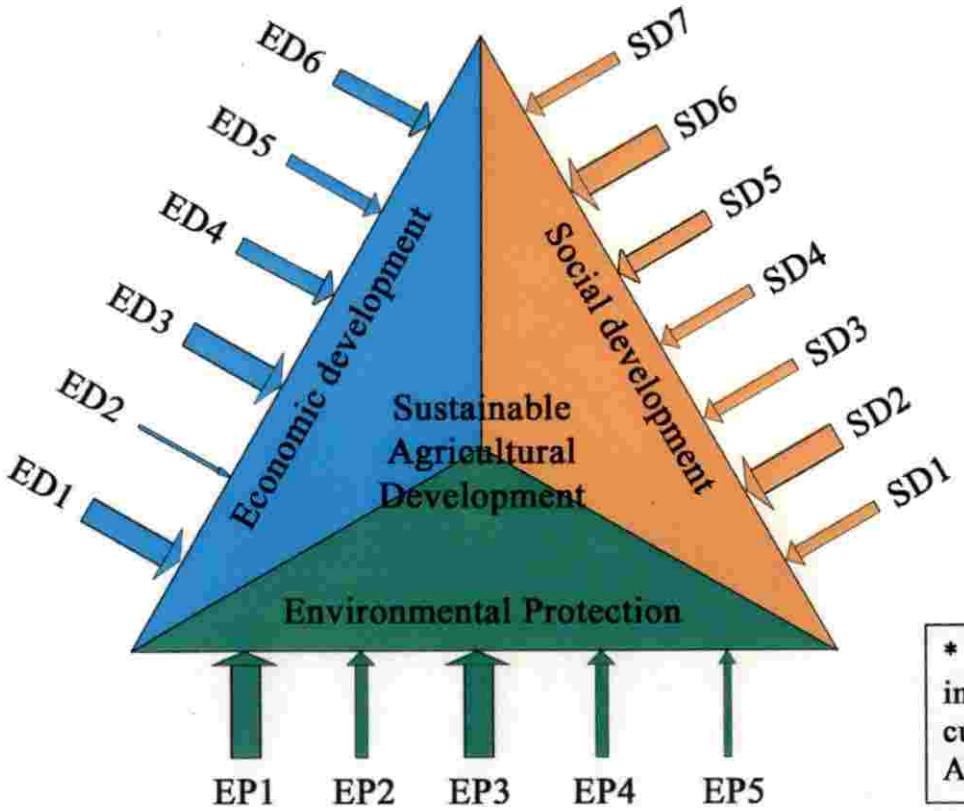
4.9 EMPIRICAL MODEL OF THE STUDY

The empirical model of the study depicting the effects of different categories of variables with Sustainable Agricultural Development is given in the Figure 23.

4.10 SUGGESTED LINES OF FUTURE RESEARCH

The present study is undertaken in Thiruvananathapuram district alone. Similar studies pertaining to the Kudumbashree Mission can be done in rest of the 13 districts also. A larger study, taking samples from each of the 1,072 CDSs of the state, can also be done in future. Further separate and detailed analysis of each of the three indicators of sustainable development, namely, economic development, social development and environmental protection can be undertaken by adding up more number of sub-indicators under each of the indicators is also possible. Detailed action plan for the establishment of woman farmer producer companies (WFPOs) or "Anand Pattern" co-operatives under Kudumbashree mission can also be formulated in future as an extension of this work.

Figure 23: Empirical model of the study



* The size of the arrow shows the relative importance of a sub- indicator towards the corresponding indicator of Sustainable Agricultural Development

ED1: Area cultivated
ED2: Economic motivation
ED3: B-C ratio
ED4: Increase in income
ED5: Credit orientation
ED6: Employment generation

SD1: Transparency
SD2: Equity
SD3: Group leadership
SD4: Group cohesion
SD5: Accontability
SD6: Team spirit
SD7: Group co-operation

EP1: Use of soil conservation measures
EP2: Use of water conservation measures
EP3: Avoidance of chemical fertilizers
EP4: Avoidance of chemical herbicides and pesticides
EP5: Utilization of farm waste

SUMMARY

CHAPTER V

SUMMARY

Kudumbashree is synonymous with the prosperity of Kerala and has been producing a lot of agricultural items. It has gained strength through the toil of women Self Help Groups in the soil. In an era when other SHGs were concentrating on small-scale industries, Kudumbashree SHGs had concentrated on agriculture and thus contributed to the food security of the state of Kerala. It could even make a lot of fallow lands in the state productive.

In the above stated context, it was highly important to assess the sustainability of the Kudumbashree model of agriculture based on women SHGs. Hence the present study entitled "Indicators of sustainable agricultural development: A multi-variate analysis among self-help groups of "*Kudumbashree Mission*" in Thiruvananthapuram district" was undertaken with the specific objective of critically analyzing the extent of attainment of the three pillars of sustainable development, namely, economic development, social development and environmental protection by the agricultural activities of the self-help groups under Kudumbashree Mission in the study area and to identify the constraints and formulate a strategy for increasing the effectiveness of the programme.

As the researcher wanted to gain familiarity and achieve new insights into the problem situation, an "Exploratory or Formulative Research Design" was employed for the study. The sustainability was studied among 40 agriculturally active SHGs. Profile characteristics of 200 women farmers were also studied. The study was undertaken in the Thiruvananthapuram district of Kerala state. There are 12 development blocks in the district and from these, five blocks were randomly

selected, namely, Parassala, Perumkadavila, Nemom, Nedumangad and Vellanad. From each of the blocks, one agriculturally active Community Development Society (CDS) was purposively selected, namely, Kunnathukal, Karode, Malayinkeezhu, Karakulam and Kattakkada. There were two categories of respondents for the study. Two hundred number of SHG based farm women formed the first category of respondents and 40 number of agriculturally active SHGs formed the second category of respondents. From each of the Community Development Society, 40 number of agriculturally active and SHG-based farm women were randomly selected. These added upto 200 individual respondents. Eight agriculturally active SHGs were also randomly selected from each of the five Community Development Societies and these added upto 40 SHGs.

Fourteen variables were used to study the individual SHG members. ANOVA was done where ever possible to find out if there existed any difference between each of the five sample CDSs for any particular variable. Seventeen independent variables related to SHGs were also studied. An index namely, Sustainable Agricultural Development Index (SADI) was developed as part of the study for exclusively measuring the sustainability of group farming by the women groups. The index covered eighteen variables related to the economic, social and environmental aspects of group farming. Principal Component Analysis (PCA) was also done using the software SAS 9.3 to find out the relative importance of each of the indicators and sub-indicators towards the sustainability of group farming. The strengths, weaknesses, potentials and challenges of SHG-based farming were also found out using SWPC analysis. The constraints faced by both individual SHG members as well as the groups as such were found out and ranked. Finally the suggestions for improvement of SHG-based farming and suggested lines of future research were also spelt out based on the results of the study and the on-field experiences of the researcher.

The salient findings of the study are given below:

5.1 Majority (75 %) of the sample SHG-based women were of middle age.

5.2 As high as 73.5 per cent of the women belonged to nuclear families.

5.3 Regarding the educational status of the SHG members, the study revealed that nearly half (49.5 %) of the respondents had studied up to secondary level.

5.4 Only a negligible number (0.5 %) of women were illiterates.

5.5 Majority (58 %) of the SHG-based women were engaged in some income generating activities other than agriculture. This included running small businesses, doing handicrafts and working in MGNREGP.

5.6 Majority (54 %) of the respondents had higher experience in SHG based activities. On an average, an SHG member was found to have 10.77 years of experience in the field.

5.7 There existed no significant difference between the five CDSs for the variable 'SHG experience'.

5.8 As many as 61 per cent of the respondents had been an office bearer of their respective SHG at some point of time.

5.9 A large majority (62.5 %) of the respondents had medium to high experience in agricultural activities. On an average, they had 7.47 years of experience in farming.

5.10 There existed a significant difference between the five CDSs for the variable "farming experience". It was found out that the farm women in Malayinkeezhu and Kattakkada were comparably less experienced while those from Kunnathukal and Karode were relatively more experienced.

5.11 Majority (44.5 %) of the women were depending on Krishibhavan for obtaining farming related information.

5.12 The study could find that majority (55.5 %) of the Kudumbashree based farm women were having a very high level of self confidence.

5.13 Majority of the respondents were having medium (41.5 %) to high (46 %) degree of innovativeness.

5.14 Majority (48 %) of the respondents had a high degree of orientation towards adopting scientific agricultural practices.

5.15 The study could find that majority (54 %) of the Kudumbashree based farm women were having a medium level of motivation to achieve their goals.

5.16 The results of the study proved that almost half (49 %) of the respondents had a medium level of motivation towards achieving maximum economic gains.

5.17 Regarding the orientation of SHG based women towards taking risks for profitable gains, the results of the study proved that a high proportion (46 %) of them were having a high risk orientation.

5.18 As the age increased, both SHG experience and farming experience also increased but innovativeness went on decreasing among the farm women.

5.19 As the SHG experience increased, farming experience also recorded an increase.

5.20 'Farming experience' was found to have a significant but negative relationship with 'self confidence' and 'achievement motivation' at 1 per cent level.

5.21 The six variables, namely, self confidence, innovativeness, scientific orientation, achievement motivation, economic motivation and risk orientation were

found to have a significant and positive relationship with one another at 1 per cent level.

5.22 The mean size of a sample group in the study area was found to be 4.33.

5.23 The inclusion of BPL/APL/General Category/OBC/SC/ST members in the SHGs of Kudumbashree Mission was bound to be a chance as the size of the groups were too small, that is, only four, five or six. However, as the size of the groups increases, the chances of inclusion of more members from the lower strata of society would be boosted up.

5.24 Invariably all the sample SHGs was cultivating banana. The varieties cultivated were mainly *Nendran, Njalipoovan, Red banana* and *Palayamkodan.* Around 45.7 per cent of the groups were cultivating vegetables in addition to banana and 45 per cent were found to cultivate other crops like elephant foot yam, turmeric, tapioca etc. along with banana or vegetables.

5.25 Thirty per cent of the groups were cultivating banana as sole crop. It could be observed that 25 per cent groups were cultivating vegetables along with banana and 22.5 per cent groups each were cultivating banana in combination with other crops and banana in combination with vegetable and other crops.

5.26 The investigation could find that 70 per cent of the SHGs had taken credit from nationalized banks for the purpose of raising crops while the remaining 30 per cent groups were doing agriculture using their own funds.

5.27 The mean amount of loan availed by the groups was found to be Rs. 1,40,714. The minimum amount that was taken as loan was Rs. 50,000 and the maximum amount was Rs. 2,50,000. Of the groups that had availed credit, 50 per cent had taken an amount upto one lakh rupee while the other 50 per cent had taken amounts exceeding one lakh rupees.

5.28 The study could find that 95 per cent of the groups used to hire external labour, especially men, for doing atleast some of the agricultural activities. The activity where most number of groups engaged external labour was found to be "Land preparation".

5.29 In 62.5 per cent groups, atleast one of the group members had attended a minimum of one training programme. Nearly half (48 %) of the trainings were related to general agricultural practices and nearly a quarter (24 %) of the trainings were related to banana cultivation.

5.30 Majority (57.5 %) of the groups opined that they did not require any further training and they had enough knowledge regarding various agricultural activities. Only 42.5 per cent groups thought that they require further training in agricultural and allied activities.

5.31 As high as 41.17 per cent of the groups demanded training in both banana cultivation and vegetable cultivation. 23.52 per cent of the groups wanted training on vegetable cultivation alone while 17.67 per cent wanted training on banana cultivation alone.

5.32 On average, a group in the study area was found to spent Rs. 1,49,000 towards their agricultural activities over a mean farm area of 190.53 cents.

5.33 On average, a group in the study area was found to earn Rs. 2,14,625 from their agricultural activities.

5.34 The mean area cultivated by a sample SHG was found to be 190.53 cents. The area varied from a minimum of 43 cents to a maximum of 385 cents. Majority (65 %) of the groups were found to be cultivating in an area from 100 cents to 250 cents.

5.35 The study could find that more than half (52.5 %) of the groups possessed a medium level of economic motivation and wanted to maximize their economic gains through their group activities.

5.36 The BC ratio of majority of the groups (55 %) was found to be medium. 97.5 per cent groups had the ratio more than one; which is an encouraging sign.

5.37 Nearly eighty per cent of the groups showed an increase in their income over the previous year. Majority (57.5 %) of the groups recorded a medium increase in their income due to their agricultural activities.

5.38 According to the study, majority (60 %) of the groups had a high degree of orientation towards credit. That means they were willing to avail loan from formal sources and utilize the amount for constructive purposes.

5.39 As per the study, more than half (52.5 %) of the groups could generate 120 to 300 days of employment annually due to their agricultural activities. Another quarter of the groups could generate more than 300 days of employment. So we can generalize that Kudumbashree women groups were found to generate a higher number of man-days in agricultural sector.

5.40 It could be found that at 5 per cent level, there existed a significant and positive relationship between area cultivated and increase in income. That means as the area cultivated had increased, addition in the income was also increased.

5.41 The study revealed a significant and positive relationship between area cultivated and credit orientation at 1 per cent level. This strong relation was most probably due to the fact that the need for credit increased with more and more area being brought under agriculture by the Kudumbashree groups. This is a strong indicator towards the fact that if more credit is made available to them, the women SHGs will bring more and more area under farming.

5.42 Area cultivated and employment generation were found to possess a very strong and positive relationship between each other at 1 per cent level of significance. It is quite natural that more and more people will receive employment when more area is brought under farming. Hence it will be beneficial for our society in general and poor women of the state in particular if more area is brought under farming by women groups.

5.43 The variables B-C ratio and increase in income showed a positive and significant relationship at 1 per cent level of significance. This means that as the income from farming increased, benefits from the same was also increased. This trend may be due to the fact that once the fixed costs are covered, the rate of increase in income will be more than the rate of increase of variable cost incurred for farming.

5.44 The variables credit orientation and employment generation too were showing a positive and significant relationship with each other at 1 per cent level of significance. This may be due to the fact that as more credit is available, more area can be brought under agriculture and as more area is brought under agriculture, more employment opportunities will be created.

5.45 The study revealed that the economic development of SHGs was improving with an increase in the area cultivated and benefit-cost ratio and vice-versa. They were the most important sub-indicators of economic development. As a result, if we want to improve the economic sustainability of Kudumbashree SHGs, we must devise strategies to augment their 'area cultivated' and 'benefit-cost ratio'.

5.46 The study could find that a very large per cent of the groups studied thought that their groups were functioning in a transparent manner and all the financial decisions were made only after the concurrence of all the members.

5.47 A huge proportion (67.5 %) of the groups perceived that there existed a high level of equality within them and all the members had an equal say during decision making.

5.48 The results of the study proved that the SHGs were having an able and robust leadership and the individual members are satisfied by their respective leadership.

5.49 As per the study the agriculturally active women groups were a very cohesive unit.

5.50 Majority (55 %) of the SHGs opined that their members were mutually accountable to one another to a medium level.

5.51 More than two-third of the groups (67.5 %) had reported that their respective members possessed a high degree of team spirit and showed a sense of oneness.

5.52 The study could find that a huge majority of the groups studied were of the opinion that their members were co-operating with one another in all their activities in very nice way.

5.53 Of all the seven sub-indicators of social development, 'team spirit' is the most important one followed by 'equity'. As a result, if we want to improve the social sustainability of Kudumbashree SHGs, we must devise strategies to improve the degree of team spirit among its members and the level of equity between them.

5.54 The study could find that 47.5 per cent of the groups in the study area were always adopting soil conservation measures since they thought that a fertile soil is the base of good agricultural production. Another 47.5 per cent of the groups were found to adopt soil conservation measures occasionally. Only a meager five per cent of the groups were found to have never adopted soil conservation measures.

5.55 According to the results of the study, 80 per cent of the groups had always adopted water conservation measures. This is because they considered non-

availability of water, especially during summer, as a serious impediment to their farming activities. Inorder to counter the scarcity of water, they always resorted to its conservation. Another 20 per cent of the groups had taken water conservation measures occasionally. Here, it is significant to notice that none of the groups had never avoided taking water conservation measures.

5.56 Results of the study on the level of avoidance of chemical fertilizers by the women groups revealed a mixed response. Only 30 per cent of the groups were found to always avoid chemical fertilizers for their agricultural needs. More than half of them (55 %) largely avoided chemical fertilizers but may had selectively used them if the situation arose. Relatively small percentage groups (15 %) never shyed away from using chemical fertilizers as they thought any reduction of them will reduce the groups' returns.

5.57 The results on the study of groups based on their level of avoidance of chemical herbicides and pesticides showed a similar pattern with their level of avoidance of chemical fertilizers. Those groups which always avoided the use of chemical insecticides, fungicides and herbicides accounted for 27.5 per cent. Half (50 %) of the groups had used them as a last resort when the situation demanded it. Only 22.5 per cent groups never avoided the use of chemical plant protection agents. That means they were following chemical-based modern agriculture.

5.58 A quarter of the Kudumbashree groups were following organic farming, around 20 percent followed strict chemical-based modern agriculture and the rest followed a middle path between organic farming and modern agriculture.

5.59 The study could find out that only a very few Kudumbashree groups were utilizing the farm wastes effectively. Only 10 per cent of the groups were found to utilize crop residues and other farm wastes for further crop production or income generating activities. 40 per cent of the groups had never done anything good with

the crop residues. Half (50 %) of the groups had attempted their use but were not regular in their effective utilization.

5.60 A significant and positive relationship between adoption of water conservation measures and adoption of soil conservation measures at 1 per cent level was observed as per the study. That means those groups which were taking water conservation measures were also taking soil conservation measures and vice-versa.

5.61 Again the study revealed a significant and positive relationship between avoidance of chemical fertilizers and avoidance of chemical herbicides and pesticides at 1 per cent level. From this relationship we can infer that those groups which were avoiding chemical crop production measures were also avoiding chemical crop protection measures. It is an indication that they were following organic farming practices.

5.62 The study could find a significant but negative relationship between the variables adoption of soil conservation measures and avoidance of chemical herbicides and pesticides at 5 per cent level. It means that those groups which were adopting soil conservation measures were using chemical herbicides and pesticides. This is an indication that they were following chemical-based modern agriculture.

5.63 The variables adoption of water conservation measures and utilization of farm waste were also found to exhibit a significant and positive relationship with each other at 5 per cent level.

5.64 The sub-indicator 'adoption of soil conservation measures' contributes the maximum variation to the first principal component and it is the most important sub-indicator of environmental protection. Also it can be deduced that the environmental protection by the SHGs was improving with an increase in their degree of avoidance of chemical fertilizers (ACF). As a result, if we want to improve sustainable environmental protection during the agricultural activities of Kudumbashree SHGs,

we must devise strategies to discourage them from the application of all sorts of chemicals for agriculture.

5.65 The study could find that 50 per cent of the Kudumbashree SHGs had a medium level of economic development. Another 25 per cent of the groups had a high level of the variable. So in total three-fourth of the groups were found to exhibit medium to high level of economic development. Only a quarter numbers of groups had low economic development. The mean score for the variable was found to be 0.56.

5.66 The results of the study showed that 47.5 per cent groups had medium level of social sustainability and 25 per cent had a high level of sustainability. So we can say that nearly 75 per cent of the farming SHGs had medium to high level of sustainability. Only a relatively lower percentage (27.5 %) of the groups had lower social sustainability.

5.67 Results of the study on the extent of attainment of environmental protection showed that 40 per cent of the groups were not paying any attention in this regard. Only 25 per cent of the groups contributed appreciably towards environmental protection.

5.68 It could be concluded that though the agriculturally active Kudumbashree SHGs in the study area had reasonable economic sustainability and social sustainability, their performance in environmental protection was a bit lower and only if they strengthen this weak link, they can become truly sustainable.

5.69 The result of the correlation analysis between the three indicators of sustainable agricultural development revealed that there existed a significant and positive relationship between all the three variables at 1 per cent level. That means as the groups were economically developing, they were developing socially too and as they develop socially, they tend to protect environment more.

5.70 The sustainability of agricultural development of SHGs was improving with an increase in their economic development (ED), social development (SD) and environmental protection (EP) and vice-versa. As a result, if we want to improve the agricultural sustainability of Kudumbashree SHGs, we must devise strategies to equally improve their 'economic sustainability', 'social sustainability' and 'environmental sustainability'.

5.71 The Sustainable Agricultural Development Index (SADI) for the studied sample was found to be 0.69. The maximum value of the individual indices was 0.87 and the minimum was 0.50.

5.72 Crop loss due to pests, diseases, wild animals and climatic vulnerabilities was the foremost constraint expressed by the respondents of the study.

5.73 The study recommends establishment of 'Woman Farmer Producer Companies' (WFPC) at taluk level under the direct control of the respective District Missions or adoption of 'Anand Pattern Co-operative Method' as two viable strategies for improving the sustainability of agricultural activities performed under Kudumbashree mission.

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APPENDICES

Appendix – I

Letter to Kudumbashree Mission

KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF AGRICULTURE
Department of Agricultural Extension
VELLAYANI - 695 522
THIRUVANANTHAPURAM

☎ (O) 0471 2384625

No: Ext. 05/2015 Date: 18.06.2015

From

Professor & Head

To

The District Mission Co.Ordinator
Kudumbashree Mission
Pattom, Thiruvananthapuram

Sir,

Sub: Secondary data collection for Ph.D work requesting – reg.

Ref: Arising.

Mr. Chinchu.V.S. (2011-21-111), Ph.D student of this department is doing research on the topic " Indicators of sustainable agricultural development: A multi-variate analysis among self-help groups of *"Kudumbashree Mission"* in Thiruvananthapuram district. He require some secondary data from you office for his study. Hence I request you to provide him with the relevant secondary data.

DEPARTMENT OF AGRL. EXTENSION
VELLAYANI P.O
Pin-695522
COLLEGE OF AGRICULTURE

Yours faithfully,

(Professor & Head)

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Appendix – II

Covering letter and rating schedule for relevancy rating

KERALA AGRICULTURAL UNIVERSITY

Department of Agricultural Extension,
College of Agriculture, Vellayani

No.Ext 5/2015

Dt. 28-04-2015

From,

Dr.V.B.Padmanabhan,
Professor & Major Advisor

Sir/ Madam,

Mr. Chinchu V S, Ph.D scholar of this Department is undertaking a study entitled "Indicators of sustainable agricultural development: A multi-variate analysis among self-help groups of "*Kudumbashree Mission*" in Thiruvananthapuram district" as partial fulfillment of his academic programme, under my guidance. The major objectives of his study are critical analysis of the extent of attainment of the three pillars of sustainable development, namely, economic development, social development and environmental protection by the agricultural activities of the self-help groups under Kudumbashree Mission in the study area as well as the analysis of the personal variables of the respondents.

By examining similar studies and discussion with extension scientists, the universe of sub-indicators/variables pertaining to the respective indicator (pillar) are prepared and listed below. Considering your high academic qualifications and vast experience, I am happy to seek your valuable judgment on the relevancy of these components. Please give your judgment on the relevancy of the personal variables of the respondents too.

Kindly record your valuable judgment by putting tick mark (√) in the appropriate column. If you feel any more important sub-indicators/variables, kindly add the same with your judgment.

The schedule duly filled shall be returned at your earliest convenience.

Soliciting your kind co-operation.

Yours faithfully,

Dr.V.B.Padmanabhan

Sl. No.	Sub-indicator	More relevant	Relevant	Less relevant
A.	**Items that point towards economic development of a *farm group***			
1.	Economic motivation: Group's orientation towards maximizing economic gains from their activities (farming)			
2.	Area cultivated: Refers to the total area being cultivated by an individual group			
3.	B-C ratio: Ratio of total benefits and total cost of cultivation of the group			
4.	Increase in income: Refers to the increase in total earnings of the group due to farm activities over the past two years			
5.	Attempts for value addition: Refers to the efforts taken by the group to add value to their farm produce			
6.	Minimum wages: Pooled wage rate received as group for the farm work undertaken			
7.	Credit orientation: Orientation of the group to avail and utilize credit			
8.	Employment generation: Refers to the extent to which the agricultural activities of SHGs generated additional employment opportunities			
9.	Direct contact with consumers			
10.	Any other (please specify) :			
B.	**Items that point towards social development of a *farm group***			
1.	Transparency: The extent to which the activities of the group are open and clear to the members of the group			
2.	Equity: How far the group approach minimizes or eliminates inequalities in the distribution of production inputs and outputs among the members			
3.	Group leadership: The effectiveness of the group's leader in promoting the stability and success of the group			
4.	Interdependence of members: The extent to which members are dependent on each other for the effective functioning of the group			
5.	Group cohesion: Refers to the degree to which the group members are affiliated to one another and are motivated to remain in the group			

6.	Accountability: The extent to which the members are answerable for performance of responsibility over achievement of objectives as agreed upon previously			
7.	Team spirit: The attitude of the group members and the extent to which joint action behaviour is exhibited by them through co-ordinated efforts to achieve common goals			
8.	Group co-operation: The tendency among group members to associate and work with other members of the group during the planning and execution of the group activities			
9.	Need satisfaction: Achieving individual member's need and requirements by the group within a stipulated time			
10.	Group interaction: The tendency of members to get in touch with other members of the group and freely mix with them without any formality or inhibition			
11.	Any other (please specify) :			
C.	**Items whose adoption point towards environmental protection by a *farm group***			
1.	Use of soil conservation measures			
2.	Use of water conservation measures			
3.	Use of bio-dynamic agricultural practices			
4.	Avoidance of chemical fertilizers			
5.	Avoidance of plastics in agriculture			
6.	Avoidance of chemical herbicides and pesticides			
7.	Utilization of farm waste			
8.	Any other (please specify) :			
D.	**Personal variables of the *individual SHG-based woman* member**			
1.	Age: The number of calendar years completed by the respondent at the time of enquiry			
2.	Literacy status: The level of literacy possessed by the individual			
3.	Occupational status: Any activity in which a person was engaged to achieve a standard of living			
4.	Marital status: Whether married, unmarried or widow			
5.	Family type: Means the category of family in which the respondent resides permanently based on the number of family members			
6.	Educational status: Operationalised as the level of formal education possessed by the respondent			
7.	Family annual income: The gross earnings of the respondent and her family obtained from both agricultural and related occupations			

	for a period of one year			
8.	Farming experience: The total number of completed years of experience acquired in agriculture at the time of enquiry			
9.	SHG experience: Refers to the number of completed years of working in SHG at the time of enquiry			
10.	Nature of SHG membership: The role played by the respondent throughout her career in the self help group			
11.	Information seeking behaviour: The sources used by the respondent to receive information regarding agriculture			
12.	Self confidence: The extent of faith an SHG member possess in her ability, initiative and zeal to achieve the goal			
13.	Scientific orientation: The degree to which a farmer is oriented to use the scientific methods in decision making in farming and allied activities			
14.	Marketing ability: The capacity or tendency of individual woman to identify the market trend to sell the produce for greater returns			
15.	Economic motivation: Motivation in occupation with the aim of profit maximization			
16.	Achievement motivation: A desire for excellence for an individual in order to attain a sense of personal accomplishment			
17.	Innovativeness: The degree to which an individual is relatively earlier in adopting new ideas than other members of the social system			
18.	Training undergone: Number of agriculture based trainings that the respondent had received at the time of enquiry			
19.	Risk orientation: The degree to which the woman member was oriented towards encountering risks and uncertainty in farming and adopting new ideas for better returns			
20.	Any other (please specify) :			

Appendix – III

Selected list of variables based on relevancy rating

Sl. No	Sub-indicator	Relevancy Index
A.	**Items that point towards economic development of a farm group**	
1.	Economic motivation	86.67
2.	Area cultivated	82.22
3.	B-C ratio	84.44
4.	Increase in income	82.22
.5.	Credit orientation	80.00
6	Employment generation	80.00
B.	**Items that point towards social development of a farm group**	
1.	Transparency	80.00
2.	Equity	82.22
3.	Group leadership	80.00
4.	Group cohesion	82.22
5.	Accountability	86.67
6.	Team spirit	84.44
7.	Group co-operation	84.44
C.	**Items whose adoption point towards environmental protection by a farm group**	
1.	Use of soil conservation measures	82.22
2.	Use of water conservation measures	84.44
3.	Avoidance of chemical fertilizers	88.89
4.	Avoidance of chemical herbicides and pesticides	100

5.	Utilization of farm waste	80
D.	**Personal variables of the individual SHG-based woman member**	
1.	Age	80.00
2.	Occupational status	82.22
3.	Family type	80.00
4.	Educational status	88.89
5.	Farming experience	82.22
6.	SHG experience	88.89
7.	Nature of SHG membership	80.00
8.	Information seeking behaviour	82.22
9.	Self confidence	91.11
10.	Scientific orientation	84.44
11.	Economic motivation	84.44
12.	Achievement motivation	80.00
13.	Innovativeness	82.22
14.	Risk orientation	80.00

Appendix – IV

Interview Schedule for Individual SHG Woman

Kerala Agricultural University

Department of Agricultural Extension

College of Agriculture, Vellayani

1.	Name	:	
2.	Age	:	
3.	Address	:	
4.	Number of family members	:	
5.	Name of the group	:	
6.	Name of the ward	:	
7.	Ward number	:	
8.	Name of the panchayath/CDS	:	
9.	Name of the block	:	
10.	Educational status	:	
11.	Occupations other than farming	:	
12.	Number of years since started working under Kudumbashree	:	
13.	Had you ever performed the role of President/Secretary/Representative in your group?	:	
14.	How many years since you have started doing farming actively?	:	
15.	From where do you get information regarding agriculture?	:	

16. Self-confidence

Please indicate your extent of agreement / disagreement to the following statements by putting tick mark (√) in the appropriate response:

SA – Strongly agree, A – Agree, UD – Undecided, DA – Disagree, SDA – Strongly disagree

Sl. No.	Statement	SA	A	UD	DA	SDA
1.	I feel no obstacle can stop me from achieving my final goal					
2.	I am generally confident in whatever I do					
3.	I am bothered by inferiority feelings					
4.	I am not interested to do things at my own initiative					
5.	I usually work out things for myself rather than get someone to show me					
6.	I get discouraged easily					
7.	Life is a struggle for me most of the time					
8.	I find myself worrying about something or other					

17. Innovativeness

When would you prefer to adopt an improved agricultural practice?

Responses	
As soon as it is brought to my notice	
After I had seen it adopted successfully by other members	
Prefer to wait and take my own time	

18. Scientific orientation

Please indicate your extent of agreement / disagreement to the following statements by putting tick mark (√) in the appropriate response:

SA – Strongly agree, A – Agree, UD – Undecided, DA – Disagree, SDA – Strongly disagree

Sl. No.	Statement	SA	A	UD	DA	SDA
1	New methods of farming give better results to a farmer than old methods					
2	The way of farming followed by forefathers is the best way of farming even today					
3	Even a farmer with lots of experience should use new methods of farming					
4	A good farmer experiments with new ideas in farming					
5	Though it takes time for a farmer to learn new methods in farming, it is worth the efforts					
6	Traditional methods of farming have to be changed in order to raise the level of living of a farmer					

19. Achievement motivation

Please indicate your extent of agreement / disagreement to the following statements by putting tick mark (√) in the appropriate response:

a. Success bring belief or further determination and not just pleasant feelings

Strongly agree / Agree / Undecided / Disagree/ Strongly Disagree

b. How much do you agree to say that our efforts are directed towards avoiding failure?

Strongly agree / Agree / Undecided / Disagree/ Strongly Disagree

c. How often do you seek opportunity to excel?

Nearly always/ Frequently / Half the time/ Seldom/ Hardly ever

d. Would you hesitate to undertake something meritoruous?

Hardly ever / Seldom / Half the time / Frequently / Nearly always

e. How many situations do you think you will succeed in doing as well as you can?

Most / Many / Some / Few / Very Few

20. Economic motivation

Here are some statements representing the individual's orientation towards the achievement of maximum economic ends. Please indicate your extent of agreement / disagreement to the following statements by putting tick mark (√) in the appropriate response:

SA – Strongly agree, A – Agree, UD – Undecided, DA – Disagree, SDA – Strongly disagree

Sl. No.	Statement	SA	A	UD	DS	SDA
1.	A farmer should work towards larger yields and economic profits					
2.	The most successful farmer is the one who makes the most profit					
3.	A farmer should try any new farming idea which may earn him more money					
4.	A farmer should grow cash crops to increase monetary profits in comparison to growing of food crops for home consumption					
5.	It is difficult for the farmer's children to make good start unless he provides him with economic assistance					
6.	A farmer must earn his living but most important thing in life cannot be defined in economic terms					

21. Risk orientation

Please indicate your extent of agreement / disagreement to the following statements by putting tick mark (√) in the appropriate response:

SA – Strongly agree, A – Agree, UD – Undecided, DA – Disagree, SDA – Strongly disagree

Sl. No	Statement	SA	A	UD	DA	SDA
1	A farmer should grow more number of crops to avoid greater risks involved in growing one / two crops					
2	A farmer should take more of chance in making a big profit to be constant with smaller but less risky profits					
3	A farmer who is willing to take greater risks than the average farmer actually does better financially					
4	It is good for a farmer to take risk when he known his chance of success in fairly high					
5	It is better for a farmer not to try new farming methods unless mostly other farmers have used it with success					
6	Trying an entirely and new method in farming by a farmer involved risks but it is worth it					

22. Constraint analysis

Please note down the difficulties that you are facing while working in SHGs, especially regarding agriculture:

1)

2)

3)

4)

23. Suggestions for improvement

Please state your suggestions for the improvement of agriculture through Kudumbashree Mission:

1)

2)

3)

4)

5)

Appendix – V

Malayalam Interview Schedule for Individual SHG Woman

കേരള കാർഷിക സർവ്വകലാശാല

വിജ്ഞാന വ്യാപന വിഭാഗം, കാർഷിക കോളേജ്, വെള്ളായണി

സംഘകൃഷി ചെയ്യുന്ന വനിതകൾക്ക് വേണ്ടിയുള്ള ചോദ്യാവലി

1.	പേര്	:	
2.	വയസ്	:	
3.	വിലാസം	:	
4.	കുടുംബാംഗങ്ങളുടെ എണ്ണം	:	
5.	ഗ്രൂപ്പിന്റെ പേര്	:	
6.	വാർഡിന്റെ പേര്	:	
7.	വാർഡ് നമ്പർ	:	
8.	പഞ്ചായത്തിന്റെ പേര്	:	
9.	ബ്ലോക്കിന്റെ പേര്	:	
10.	വിദ്യാഭ്യാസം	:	
11.	കൃഷി അല്ലാതെ ചെയ്യുന്ന മറ്റു തൊഴിലുകൾ	:	
12.	എത്രവർഷമായി താങ്കൾ കുടുംബശ്രീയിൽ പ്രവർത്തിക്കുന്നു	:	
13.	താങ്കൾ താങ്കളുടെ ഗ്രൂപ്പിൽ പ്രസിഡന്റ്/സെക്രട്ടറി/പ്രതിനിധി സ്ഥാനങ്ങൾ വഹിച്ചിട്ടുണ്ടോ ?	:	
14.	എത്രവർഷമായി കൃഷിപ്പണി പൂർണ്ണ തോതിൽ ചെയ്യാൻ തുടങ്ങങ്ങിയിട്ട്	:	
15.	കൃഷിയെക്കുറിച്ചുള്ള കൂടുതൽ വിവരങ്ങൾ എവിടെ നിന്നാണ് താങ്കൾക്ക് ലഭിക്കുന്നത്	:	

16. ആത്മവിശ്വാസം

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	ശക്തമായി അനുകൂലിക്കുന്നു	അനുകൂലിക്കുന്നു	അഭിപ്രായമില്ല	വിയോജിക്കുന്നു	ശക്തമായി വിയോജിക്കുന്നു
1.	എന്റെ ലക്ഷ്യം നേടുന്നതിൽ നിന്നും ഒരു തടസത്തിനും എന്നെ പിന്തിരിക്കാനാവില്ല					
2.	എന്തു ചെയ്യുമ്പോഴും എനിക്ക് ആത്മവിശ്വാസം തോന്നാറുണ്ട്					
3.	മറ്റുള്ളവരുടെ മുന്നിൽ ചെറുതാണ് എന്ന തോന്നൽ എനിക്ക് ഉണ്ടാകാറുണ്ട്					
4.	എന്റെ സ്വന്തം താല്പര്യത്തിന്റെ പുറത്ത് പുതിയ പുതിയ കാര്യങ്ങൾ ചെയ്യാൻ എനിക്ക് തോന്നാറില്ല					
5.	സാധാരണയായി മറ്റുള്ളവർ ചെയ്യുന്നത് കണ്ടുനില്ക്കാതെ സ്വയം കാര്യങ്ങൾ ഞാൻ ചെയ്യാറുണ്ട്					
6.	ഞാൻ പെട്ടെന്ന് നിരുത്സാഹപ്പെടാറുണ്ട്					
7.	മിക്ക സമയത്തും ജീവിതം എനിക്കൊരു സമരമാണ്					
8.	ഏതെങ്കിലും ഒരു കാര്യത്തെക്കുറിച്ച് ഞാൻ എപ്പോഴും ആശങ്കപ്പെടാറുണ്ട്					

17. സർഗ്ഗാത്മകത

ഒരു പുതിയ കാർഷിക മുറ നിങ്ങൾ എപ്പോഴാണ് ചെയ്യുന്നത് ?

പ്രതികരണം		
1.	അതിനെക്കുറിച്ച് മനസിലാക്കിയ ഉടൻ	
2.	മറ്റുള്ളവർ അത് വിജയകരമായി ചെയ്യുന്നത് കണ്ട ശേഷം	
3.	വളരെ നാളുകൾക്കുശേഷം	

18. ശാസ്ത്രാവബോധം

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	ശക്തമായി അനുകൂലിക്കുന്നു	അനുകൂലിക്കുന്നു	അഭിപ്രായമില്ല	വിയോജിക്കുന്നു	ശക്തമായി വിയോജിക്കുന്നു
1.	പുതിയ കൃഷി മുറകൾ പഴയവയെക്കാൾ ഉദ്പാദനം നല്കുന്നു					
2.	മുതുമുത്തച്ഛൻമാർ ഉണ്ടാക്കിയ കൃഷിമുറകളാണ് ഇന്നും ഏറ്റവും മികച്ചത്					
3.	എത്ര പരിചയ സമ്പന്നനായ കർഷകനായാലും പുതിയ കൃഷി മുറകൾ പരീക്ഷിക്കണം					

4.	ഒരു നല്ല കർഷകൻ കൃഷിയിലെ നവീനവും ശാസ്തീയവുമായ പദ്ധതികൾ പരീക്ഷിക്കാറുണ്ട്					
5	പുതിയ കൃഷിമുറകൾ പഠിച്ചെടുക്കാൻ സമയം എടുക്കുമെങ്കിലും അത് ഒരിക്കലും പാഴാവില്ല					
6	കർഷകന്റെ ജീവിത നിലവാരം ഉയരണമെങ്കിൽ പഴയ കൃഷിമുറകൾ മാറിയേ തീരൂ					

19. **ലക്ഷ്യം നേടാനുള്ള പ്രചോദനം**

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

1. സന്തോഷത്തിനപ്പുറം, വിജയം കൂടുതൽ കാര്യങ്ങൾ ചെയ്യാനുള്ള ആത്മവിശ്വാസം നല്കുന്നു.

ശക്തമായി അനുകൂലിക്കുന്നു	അനുകൂലിക്കുന്നു	അഭിപ്രായമില്ല	വിയോജിക്കുന്നു	ശക്തമായി വിയോജിക്കുന്നു

2 പരാജയം ഒഴിവാക്കാനാണ് നമ്മുടെ ഓരോ പ്രവർത്തിയും എന്നു പറയുന്നതിനോട് നിങ്ങളുടെ അഭിപ്രായം എന്താണ് ?

ശക്തമായി അനുകൂലിക്കുന്നു	അനുകൂലിക്കുന്നു	അഭിപ്രായമില്ല	വിയോജിക്കുന്നു	ശക്തമായി വിയോജിക്കുന്നു

3 മികവ് കാട്ടാനുള്ള അവസരം നിങ്ങൾ എത്രമാത്രം അന്വേഷിക്കാറുണ്ട് ?

എപ്പോഴും	വല്ലപ്പോഴും	അവസരം ഇങ്ങോട്ടു വരുമ്പോൾ	അവസരം ഇങ്ങോട്ടു വന്നാലും ചിലപ്പോൾ മാത്രം	ഒരിക്കലുമില്ല

4 മികച്ച എന്തെങ്കിലും ചെയ്യാൻവേണ്ടി നിങ്ങൾ അറച്ചു നില്ക്കാറുണ്ടോ ?

ഒരിക്കലുമില്ല	ഒന്നുരണ്ടു പ്രാവശ്യം	പകുതി സമയത്തും	മിക്കപ്പോഴും	എപ്പോഴും

5 എത്രയൊക്കെ അവസരങ്ങളിലാണ് നിങ്ങൾക്ക് ഏറ്റെടുത്ത കാര്യം നന്നായി ചെയ്യാൻ കഴിയും എന്ന് തോന്നുന്നത് ?

എപ്പോഴും	വല്ലപ്പോഴും	അവസരം ഇങ്ങോട്ടു വരുമ്പോൾ	അവസരം ഇങ്ങോട്ടു വന്നാലും ചിലപ്പോൾ മാത്രം	ഒരിക്കലുമില്ല

20 സാമ്പത്തികാഭിവൃദ്ധി പ്രചോദനം

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	ശക്തമായി അനുകൂലിക്കുന്നു	അനുകൂലിക്കുന്നു	അഭിപ്രായമില്ല	വിയോജിക്കുന്നു	ശക്തമായി വിയോജിക്കുന്നു
1.	കൂടുതൽ വിളവിനും ലാഭത്തിനും വേണ്ടിയാവണം ഒരു കർഷകൻ എപ്പോഴും ശ്രമിക്കേണ്ടത്					
2.	ഏറ്റവും കൂടുതൽ ലാഭം ഉണ്ടാക്കുന്ന കർകനാണ് ഏറ്റവും വിജയിയായ കർഷകൻ					
3.	കൂടുതൽ ലാഭം തരുന്ന ഏതൊരു കൃഷിമുറയും ഒരു കർഷകൻ പരീക്ഷിക്കണം					
4.	ഭക്ഷ്യവിളകളെക്കാൾ കൂടുതലായി നാണ്യ വിളകളാണ് ഒരു കർഷകൻ കൃഷി ചെയ്യേണ്ടത്					
5.	സാമ്പത്തികാഭിവൃദ്ധി ഉണ്ടെങ്കിൽ മാത്രമേ ഒരു കർഷകന്റെ കുട്ടിയ്ക്ക് പുരോഗതി ഉണ്ടാകൂ					

6.	കൃഷിയിൽ നിന്ന് ലാഭം ഉണ്ടാക്കണമെങ്കിലും പണം അല്ല ജീവിതത്തിലെ ഏറ്റവും പ്രധാനപ്പെട്ട കാര്യം					

21. സാഹസികത്വം

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	ശക്തമായി അനുകൂലിക്കുന്നു	അനുകൂലിക്കുന്നു	അഭിപ്രായമില്ല	വിയോജിക്കുന്നു	ശക്തമായി വിയോജിക്കുന്നു
1.	ഒന്നോ രണ്ടോ വിളകൾ കൃഷി ചെയ്യുന്നതിനു പകരം ഒരു കർഷകൻ പല പല വിളകൾ ഒരുമിച്ച് കൃഷി ചെയ്യേണ്ടതാണ്					
2	കൂടുതൽ ലാഭവും കൂടുതൽ പ്രശ്നങ്ങളും നേരിടാവുന്ന കൃഷികളെക്കാൾ കുറഞ്ഞ ലാഭവും കുറഞ്ഞ പ്രശ്നങ്ങളും ഉള്ള കൃഷികളാണ് ഒരു കർഷകൻ ചെയ്യേണ്ടത്					
3	കൂടുതൽ ലാഭവും കൂടുതൽ പ്രശ്നങ്ങളും ഉള്ള കർഷകൻ കൂടുതൽ സാമ്പത്തികാഭിവൃദ്ധി നേടുന്നു					
4	വിജയ സാധ്യത കൂടുതൽ ഉള്ളപ്പോൾ പ്രശ്നങ്ങൾ ഉള്ള കൃഷികൾ ചെയ്യാം					
5	മറ്റുള്ളവർ ചെയ്തു വിജയിക്കുന്നതു കണ്ട ശേഷം അല്ലാതെ പ്രശ്ന സാധ്യത ഉള്ള കൃഷികൾ ചെയ്യണ്ട					

6	സമൂലം ആധുനികമായ ഒരു കൃഷിമുറ അനുവർത്തിക്കുന്നത് അപകടമാണെങ്കിലും അത് ചെയ്യുന്നത് നല്ലതാണ്					

22. സംഘകൃഷിയുടെ പോരായ്മകൾ നിങ്ങളുടെ അഭിപ്രായത്തിൽ എന്തൊക്കെയാണ് ?

1)

2)

3)

4)

23. സംഘകൃഷി മെച്ചപ്പെടുത്താനായി എന്തൊക്കെ നിർദ്ദേശങ്ങൾ നിങ്ങൾക്ക് തരാനുണ്ട് ?

1)

2)

3)

4)

5)

Appendix – VI

Interview Schedule for SHGs

Kerala Agricultural University

Department of Agricultural Extension

College of Agriculture, Vellayani

Interview schedule for collecting information from SHGs

1.	Name of the group	:		
2.	Affiliation number	:		
3.	Registration day	:		
4.	Ward number	:		
5.	Name of the ward	:		
6.	Name of the panchayath/CDS	:		
7.	Name of the block	:		
8.	Name of the group president	:		
9.	Address	:		
10.	Name of the group secretary	:		
11.	Address	:		
12.	Members	1 2 3 4		Age
13.	Total number of members	:		
14.	BPL members	:		

15.	APL members	:	
16.	General members	:	
17.	O.B.C members	:	
18.	SC/ST members	:	
19.	Crops cultivated	:	
20.	Bank from which loan was availed	:	
21.	Account No:	:	
22.	Loan amount	:	
23.	Had you availed external labour for undertaking atleast some of the farm activities?	:	
24.	If 'YES', which all?	:	
25.	Trainings attended by the group members	:	
26.	Do you need further trainings?	:	
27.	If 'YES', in which all areas?		
28.	What are the strengths of 'group farming' in your opinion?		
29.	What are the weaknesses of 'group farming' in your opinion?		
30.	What are the potentials of 'group farming' in your opinion?		
31.	What are the challenges to 'group farming' in your opinion?		

Economic Development

1. Area cultivated by the group :

2. Economic motivation

Please indicate your agreement or disagreement to the following statements:

Sl. No.	Statement	Agree	Undecided	Disagree
1.	The group should work hard for economic profit			
2.	Though everything in life cannot be achieved through money, it is a critical factor for good living			
3.	All we want from our job is to make just a reasonable living for our families			
4.	We would work hard without rest inorder to earn maximum money for the group and family			
5.	In addition to our routine practices we like to take up some other enterprises to earn more money			
6.	Self employment is important to us to earn reasonable amount and not to depend on anybody			

3. Total cost of cultivation for the past one year :

4. Total returns from farming for the past one year :

5. Income from farming in the year before the last year :

6. Credit orientation

Kindly indicate your responses in appropriate column

SA- Strongly Agree A- Agree UD- Undecided DA- Disagree SDA- Strongly Disagree

Sl. No.	Statement	SA	A	UD	DA	SDA
1.	Credit can be availed for non-productive purposes					
2.	It is easy to obtain credit from banks					
3.	We feel more happy to approach banks/societies for credit than individual money-lenders					
4.	The credit availed by our group had been used only for productive purposes					

7. Employment generation

Kindly indicate how many man days/year of employment was generated due to your agricultural activities during the past one year :

Social Development

8. Transparency

Kindly indicate your response to the following statements in appropriate columns

A- Always ST- Sometimes N- Never

Sl. No.	Statement	A	ST	N
1.	Venue, date and time of the group meeting is announced earlier			
2.	Members of the group have a clear idea about the activities of the group			
3.	The group publishes the details of the various aspects of its functioning			
4.	The reports of evaluation is open to all			

9. Equity

Please indicate the extent of your agreement or disagreement to the following statements

SA- Strongly Agree A- Agree UD- Undecided DA-Disagree SDA- Strongly Disagree

Sl. No.	Statement	SA	A	UD	DA	SDA
1.	The members in the group have equal opportunity in planning					
2.	The decisions made are largely influenced by the elite and influential members					

3.	The profit got is equally shared among all the members of the group					
4.	The major portion of the financial assistance received is grabbed by influential members					

10. Group leadership

Indicate your response to the following statements in appropriate columns

A- Always ST- Sometimes N- Never

Sl. No.	Statement	A	ST	N
1.	Our leader take lead role in the functioning of the group			
2.	Our leader try to reach a consensus among members			
3.	Our leader try to get more and more information for effective group action			
4.	Our leader try to motivate the members of the group			
5.	The members of our group accept the opinion of our leader			

11. Group cohesion

Indicate your response to the following statements in appropriate columns

A- Always ST- Sometimes N- Never

Sl. No.	Statement	A	ST	N
1.	The SHG to which we belong functions properly			

2.	Almost all the members of the group take part actively in planning, production and marketing			
3.	Differences in opinion are common during the group decision making			
4.	Members of the group exhibit mutual trust			
5.	Since the differences in opinion exceeds its limit, it becomes difficult to arrive at a wise decision			

12. Accountability

Please indicate your response to the following statements in appropriate columns

A- Always ST- Sometimes N- Never

Sl. No.	Statement	A	ST	N
1.	We have a system to audit the accounts by an external agency			
2.	The members are bound to implement the group activities			
3.	The detailed report on the sub-committees' achievement will be presented in the group for discussion			
4.	We have a procedure system to monitor the group and sub-group activities			

13. Team spirit

Please indicate the extent of your agreement or disagreement to the following statements

SA- Strongly Agree A- Agree UD- Undecided DA- Disagree SDA- Strongly Disagree

Sl. No.	Statement	SA	A	UD	DA	SDA
1.	Members are ready to forgo their personal interest while working in the group					
2.	Members can overcome the constraints faced more effectively as a team than at individual level					
3.	Activities with the co-ordination and support of the team are executed successfully					
4.	More production can be achieved by working as a team					

14. Group co-operation

Indicate your response to the following statements in appropriate columns

A- Always ST- Sometimes N- Never

Sl. No.	Statement	A	ST	N
1.	Members of our group co-operate with each other in taking decisions			
2.	Members of our group co-operate with each other in implementing the decisions			
3.	Members of our group co-operate with each other in collecting the necessary input for cultivation			
4.	Members of our group co-operate with each other in marketing the produce			
5.	Members of our group co-operate with each other in maintaining team spirit among each other			

Environmental Protection

15. Adoption of eco-friendly practices

Items whose adoption point towards environmental protection by the farm group are given below. Please indicate how far your group has been using them in your field by putting tick mark (√) in the appropriate column:

Sl. No.	Practice	Continued use	Occasionally practiced	Never practiced
1.	Use of soil conservation measures			
2.	Use of water conservation measures			
3.	Avoidance of chemical fertilizers			
4.	Avoidance of chemical herbicides and pesticides			
5.	Utilization of farm waste			

16. Suggestions for improvement

Please state your suggestions for the improvement of agriculture through Kudumbashree Mission:

1)

2)

3)

4)

5)

Appendix – VII

Malayalam Interview Schedule for SHGs

കേരള കാർഷിക സർവ്വകലാശാല

വിജ്ഞാന വ്യാപന വിഭാഗം, കാർഷിക കോളേജ്, വെള്ളായണി

എസ്.എച്ച്.ജി ഗ്രൂപ്പുകൾക്ക് വേണ്ടിയുള്ള ചോദ്യാവലി

1.	ഗ്രൂപ്പിന്റെ പേര്	:		
2.	അഫിലിയേഷൻ നമ്പർ	:		
3.	രജിസ്ട്രേഷൻ ദിനം	:		
4.	വാർഡ് നമ്പർ	:		
5.	വാർഡിന്റെ പേര്	:		
6.	പഞ്ചായത്തിന്റെ പേര്	:		
7.	ബ്ലോക്കിന്റെ പേര്	:		
8.	ഗ്രൂപ്പ് പ്രസിഡന്റിന്റെ പേര്	:		
9.	വിലാസം	:		
10.	ഗ്രൂപ്പ് സെക്രട്ടറിയുടെ പേര്	:		
11.	വിലാസം	:		
12.	അംഗങ്ങൾ 1 2 3 4	:		വയസ്
13.	ആകെ അംഗങ്ങൾ	:		
14.	ബി. പി. എൽ അംഗങ്ങൾ	:		
15.	എ. പി. എൽ അംഗങ്ങൾ	:		
16.	ജനറൽ അംഗങ്ങൾ	:		
17.	ഒ.ബി.സി. അംഗങ്ങൾ	:		
18.	എസ്.സി.എസ്.റ്റി. അംഗങ്ങൾ	:		
19.	വിളകൾ	:		

20.	വായ്പ എടുത്ത ബാങ്ക്	:	
21.	അക്കൗണ്ട് നമ്പർ	:	
22.	വായ്പ തുക	:	
23.	കൂലിക്ക് ആൾക്കാരെവച്ച് ചില കൃഷിപ്പണികളെങ്കിലും ചെയ്യേണ്ടി വരാറുണ്ടോ	:	
24.	ഉണ്ടെങ്കിൽ അവ ഏതെല്ലാം	:	
25.	പങ്കെടുത്തിട്ടുള്ള പരിശീലന പരിപാടികൾ	:	
26.	ഏതെങ്കിലും കാർഷിക പ്രവർത്തനങ്ങളിൽ പരിശീലനം ആവശ്യമുണ്ടോ ?	:	
27.	ഉണ്ടെങ്കിൽ അവ ഏതെല്ലാം	:	
28.	സംഘകൃഷിയുടെ മെച്ചങ്ങൾ നിങ്ങളുടെ അഭിപ്രായത്തിൽ എന്തൊക്കെയാണ് ?	:	
29.	സംഘകൃഷിയുടെ പോരായ്മകൾ നിങ്ങളുടെ അഭിപ്രായത്തിൽ എന്തൊക്കെയാണ് ?	:	
30.	ഇനി എന്തൊക്കെ സംഘപ്രവർത്തനങ്ങൾ ചെയ്യാം എന്ന് നിങ്ങൾ വിചാരിക്കുന്നു?	:	
31.	സംഘകൃഷിക്ക് ഭീക്ഷണിയായി നിങ്ങൾ എന്തൊക്കെ കാണുന്നു?	:	

സാമ്പത്തിക വികസനം

1. **സംഘത്തിന്റെ കൃഷിയിടത്തിന്റെ വിസ്തൃതി :**

2. **സാമ്പത്തികാഭിവൃദ്ധി ഉത്തേജനം**

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	അനുകൂലം	അഭിപ്രായമില്ല	പ്രതികൂലം
1.	സാമ്പത്തികാഭിവൃദ്ധിക്കു വേണ്ടി സംഘം കഠിനാധ്വാനം ചെയ്യണം			
2.	പണം കൊണ്ട് എല്ലാം നേടാനാവില്ല എങ്കിലും നല്ലൊരു ജീവിതത്തിന് പണം അത്യാവശ്യമാണ്.			
3.	ഞങ്ങളുടെ കുടുംബത്തിന് അത്യാവശ്യത്തിന് ജീവിച്ചു പോകാനുള്ള ആ തുക മാത്രമേ ഞങ്ങൾ സംഘകൃഷിയിലൂടെ ആഗ്രഹിക്കുന്നുള്ളൂ.			
4.	വിശ്രമമില്ലാതെ പണിയെടുത്ത് പരമാവധി പണം സമ്പാദിക്കാൻ ഞങ്ങൾ ശ്രമിക്കാറുണ്ട്.			
5.	കൃഷി അല്ലാതെ മറ്റ് പ്രവർത്തികളിലും കൂടുതൽ പണം ലഭിക്കാൻ വേണ്ടി ഞങ്ങൾ ഏർപ്പെടാറുണ്ട്			
6.	സ്വന്തംകാലിൽ നില്ക്കാനും കൂടുതൽ പണം സമ്പാദിക്കാനും സ്വയം തൊഴിൽ കണ്ടെത്തുന്നത് നല്ലതാണ്.			

3. കഴിഞ്ഞ ഒരു വർഷത്തെ കൃഷിച്ചെലവ് :
4. കഴിഞ്ഞ ഒരു വർഷത്തിൽ കൃഷിയിൽ നിന്ന് ലഭിച്ച വരുമാനം :
5. കഴിഞ്ഞതിന്റെ മുൻപത്തെ വർഷം കൃഷിയിൽനിന്ന് ലഭിച്ച വരുമാനം :

6. വായ്പയോടുള്ള കാഴ്ചപ്പാട്

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	വളരെ അനുകൂലം	അനുകൂലം	അഭിപ്രായമില്ല	പ്രതികൂലം	വളരെ പ്രതികൂലം
1.	ഉദ്പാദന പരമല്ലാത്ത കാര്യങ്ങൾക്കുവേണ്ടി വായ്പ വാങ്ങാവുന്നതാണ്.					
2.	ബാങ്കുകളിൽ നിന്നും വായ്പ ലഭിക്കാൻ എളുപ്പമാണ്.					
3.	വായ്പ്യ്ക്ക്വേണ്ടി ബാങ്കുകളെ/സൊസൈറ്റികളെ സമീപിക്കുന്നത് സ്വകാര്യവ്യക്തികളെ സമീപിക്കുന്നതിനെക്കാലും സന്തോഷമുള്ള കാര്യമാണ്.					
4.	ഞങ്ങളുടെ ഗ്രൂപ്പ് എടുത്തിട്ടുള്ള വായ്പകൾ ഉല്പാദനപരമായ കാര്യങ്ങൾക്കുവേണ്ടി മാത്രമേ ഉപയോഗിച്ചിട്ടുള്ളു.					

7. തൊഴിൽ ഉദ്പാദനം

വർഷത്തിൽ എത്ര ദിവസം നിങ്ങൾ സംഘമായി കൃഷിപ്പണി ചെയ്യാറുണ്ട് ?

സാമൂഹിക വികസനം

8. സുതാര്യത

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	എപ്പോഴും	വല്ലപ്പോഴും	ഒരിക്കലുമില്ല
1.	ഗ്രൂപ്പ് മീറ്റിംഗിന്റെ സ്ഥലവും സമയവും ദിവസവും നേരത്തെ തന്നെ അറിയിക്കാറുണ്ട്.			
2.	ഗ്രൂപ്പിന്റെ പ്രവർത്തനങ്ങളെക്കുറിച്ച് സംഘാംഗങ്ങൾക്ക് വ്യക്തതയുണ്ട്.			
3.	ഗ്രൂപ്പിന്റെ പ്രവർത്തനങ്ങളെക്കുറിച്ചുള്ള രേഖകൾ പരസ്യപ്പെടുത്താറുണ്ട്.			
4.	പ്രവർത്തന രേഖകൾ എല്ലാവർക്കും പരിശോധിക്കാവുന്നതാണ്.			

9. തുല്യത

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	ശക്തമായി അനുകൂലിക്കുന്നു	അനുകൂലിക്കുന്നു	അഭിപ്രായമില്ല	എതിർക്കുന്നു	ശക്തമായി എതിർക്കുന്നു
1.	ആസൂത്രണത്തിൽ സംഘാംഗങ്ങൾക്കെല്ലാം തുല്യ പ്രാധാന്യം ഉണ്ട്.					
2.	സ്വാധീനവും സാമ്പത്തികവും ഉള്ള അംഗങ്ങളാണ് തീരുമാനങ്ങളെ സ്വാധീനിക്കുന്നത്					

3.	എല്ലാ അംഗങ്ങൾക്കും തുല്യമായിട്ടാണ് ലാഭം വീതിക്കുന്നത്					
4.	സ്വാധീനമുള്ള അംഗങ്ങൾ സാമ്പത്തിക സഹായങ്ങൾ കൂടുതലായി പിടിച്ചുവാങ്ങാറുണ്ട്.					

10. സംഘ നേതൃത്വം

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	എപ്പോഴും	വല്ലപ്പോഴും	ഒരിക്കലുമില്ല
1.	എല്ലാ പ്രവർത്തനങ്ങളിലും ഞങ്ങളുടെ നേതാവ് മുന്നിട്ടിറങ്ങാറുണ്ട്.			
2.	എല്ലാ കാര്യങ്ങളിലും ഒരു അഭിപ്രായ സമന്വയം ഉണ്ടാക്കാൻ ഞങ്ങളുടെ നേതാവ് ശ്രമിക്കാറുണ്ട്.			
3.	ഗ്രൂപ്പ് പ്രവർത്തനങ്ങൾ മെച്ചപ്പെടുത്താൻവേണ്ടി ഞങ്ങളുടെ നേതാവ് കൂടുതൽ അറിവ് സമ്പാദിക്കാറുണ്ട്.			
4.	സംഘാംങ്ങളുടെ പ്രവർത്തന മികവിനായി അവരെ നേതാവ് ഉത്തേജിപ്പിക്കാറുണ്ട്.			
5.	സംഘാംഗങ്ങൾ നേതാവിന്റെ തീരുമാനങ്ങൾ അംഗീകരിക്കാറുണ്ട്.			

11. ഒരുമ

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	എപ്പോഴും	വല്ലപ്പോഴും	ഒരിക്കലുമില്ല
1.	ഞങ്ങളുടെ സംഘം നന്നായി പ്രവർത്തിക്കുന്നുണ്ട്.			

2.	ആസൂത്രണത്തിലും, ഉല്പാദനത്തിലും വിപണനത്തിലും എല്ലാ അംഗങ്ങളും സജീവമായി പങ്കെടുക്കാറുണ്ട്			
3.	ഗ്രൂപ്പ് തീരുമാനങ്ങളെടുക്കുമ്പോൾ സംഘത്തിൽ അഭിപ്രായവ്യത്യാസങ്ങൾ ഉണ്ടാകാറുണ്ട്.			
4.	ഞങ്ങൾ പരസ്പാരം വിശ്വസിക്കാറുണ്ട്.			
5.	അഭിപ്രായ വിത്യാസങ്ങൾ രൂക്ഷമായതിനെത്തുടർന്ന് നല്ലൊരു തീരുമാനം എടുക്കാൻ ബുദ്ധിമുട്ടാറുണ്ട്.			

12. ഉത്തരവാദിത്വം

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	എപ്പോഴും	വല്ലപ്പോഴും	ഒരിക്കലുമില്ല
1.	പുറമേയുള്ള ഒരാളേക്കൊണ്ട് ഞങ്ങളുടെ അക്കൗണ്ടുകൾ പരിശോധിപ്പിക്കാറുണ്ട്.			
2.	കൂട്ടായ പ്രവർത്തനങ്ങളിൽ ഏർപ്പെടുന്നതിന് ഓരോ അംഗത്തിനും ബാധ്യതയുണ്ട്			
3.	ഉപസമിതികളുടെ പ്രവർത്തന റിപ്പോർട്ട് വിശദമായ ചർച്ചകൾക്കായി അവതിരിപ്പിക്കാറുണ്ട്.			
4.	സംഘത്തിന്റേയും ഉപസംഘത്തിന്റേയും പ്രവർത്തനങ്ങൾ പരിശോധിക്കാൻ ഒരു രീതി ഞങ്ങൾക്കുണ്ട്.			

13. സംഘാവേശം

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	ശക്തമായി അനുകൂലിക്കുന്നു	അനുകൂലിക്കുന്നു	അഭിപ്രായമില്ല	എതിർക്കുന്നു	ശക്തമായി എതിർക്കുന്നു
1.	സംഘത്തിനുവേണ്ടി അംഗങ്ങൾ വ്യക്തിതാത്പര്യം ഉപേഷിക്കാറുണ്ട്					
2.	ഒറ്റയ്ക്ക് പ്രതിസന്ധികൾ തരണം ചെയ്യുന്നതിനെക്കാൾ ഫലപ്രദമായി അംഗങ്ങൾക്ക് കൂട്ടായി അവ തരണം ചെയ്യാൻ സാധിക്കാറുണ്ട്.					
3.	സംഘത്തിലെ എല്ലാവരുടേയും ഒത്തൊരുമയും പിന്തുണയും ഉള്ള പ്രവർത്തനങ്ങൾ വിജയകരമായി പൂർത്തീകരിക്കാൻ സാധിക്കാറുണ്ട്.					
4.	കൂട്ടായി പ്രവർത്തിക്കുമ്പോൾ കൂടുതൽ ഉൽപാദനം ലഭിക്കാറുണ്ട്.					

14. സംഘസഹകരണം

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	എപ്പോഴും	വല്ലപ്പോഴും	ഒരിക്കലുമില്ല
1.	തീരുമാനങ്ങൾ എടുക്കുമ്പോൾ സംഘാംഗങ്ങൾ സഹകരിക്കാറുണ്ട്.			
2.	തീരുമാനങ്ങൾ നടപ്പിലാക്കുമ്പോൾ സംഘാംഗങ്ങൾ സഹകരിക്കാറുണ്ട്.			
3.	കൃഷിക്കാവശ്യമായ സാധനങ്ങൾ സംഘടിപ്പിക്കുമ്പോൾ സംഘാംഗങ്ങൾ സഹകരിക്കാറുണ്ട്.			
4.	വിപണന സമയത്ത് സംഘാംഗങ്ങൾ സഹകരിക്കാറുണ്ട്.			
5.	സംഘത്തിനുള്ളിലെ ആവേശം നിലനിർത്താൻ വേണ്ടി സംഘാംഗങ്ങൾ സഹകരിക്കാറുണ്ട്.			

15. പരിസ്ഥിതി സൗഹൃദ കൃഷിമുറകൾ

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളെക്കുറിച്ചുള്ള നിങ്ങളുടെ അഭിപ്രായം ദയവായി അടയാളപ്പെടുത്തുക

നം.	വാക്യം	സ്ഥിരമായി ചെയ്യാറുണ്ട്	ഒന്നുരണ്ടു തവണ ചെയ്തിട്ടുണ്ട്	ഒരിക്കലും ചെയ്തിട്ടില്ല
1.	മണ്ണു സംരക്ഷണ പ്രവർത്തനങ്ങൾ			
2.	ജല സംരക്ഷണ പ്രവർത്തനങ്ങൾ			
3.	രാസവളങ്ങൾ ഒഴിവാക്കൽ			
4.	രാസ കള – കീട നാശിനികൾ ഒഴിവാക്കൽ			
5.	കൃഷി അവശിഷ്ടങ്ങളുടെ ഫലപ്രദമായ വിനിയോഗം			

16. സംഘകൃഷി മെച്ചപ്പെടുത്താനായി എന്തൊക്കെ നിർദ്ദേശങ്ങൾ നിങ്ങൾക്ക് തരാനുണ്ട് ?

1)

2)

3)

4)

5)

Appendix - VIII

Detailed PCA data

1. Overall Economic Development

Principal Components sub-indicators of economic development (Detailed Table 4.48)

Sub-indicator	Prin1	Prin2	Prin3	Prin4	Prin5	Prin6
AC	0.580732	-.184545	-.130343	-.295685	-.047843	0.722485
EM	0.133626	-.086719	0.985306	-.018484	-.045146	0.037645
BCR	-.055375	0.766877	0.089175	0.040727	0.550778	0.309622
IIC	0.333035	0.599437	-.016159	-.243613	-.634786	-.259231
CO	0.454241	0.038025	-.044331	0.886712	-.063034	-.004680
EG	0.569720	-.097735	-.044778	-.254880	0.534218	-.559919

AC- area cultivated; EM- economic motivation; BCR- benefit-cost ratio; IIC- increase in income; CO- credit orientation; EG- employment generation

2. Overall social development

Principal Components of sub-indicators of social development (Detailed Table 4.58)

Sub-indicator	Prin1	Prin2	Prin3	Prin4	Prin5	Prin6	Prin7
TR	0.365264	0.054640	0.625773	-.556768	-.168720	0.216452	0.294442
EQ	0.351742	0.571022	-.287048	-.031841	0.576994	0.358152	0.074879
GL	0.385510	0.284545	-.424990	0.089345	-.757754	0.039536	0.077861
GC	0.354364	0.270123	0.507927	0.631338	0.043939	-.369893	-.078306
AC	0.361834	-.554270	0.035195	0.343359	0.005914	0.625165	-.227730
TS	0.425082	-.118380	-.117275	-.405464	0.099267	-.374269	-.690801
CO	0.396296	-.442478	-.269096	0.011398	0.229349	-.394441	0.605339

TR- transparency; EQ- equity; GL- group leadership; GC- group cohesion; AC- Accountability; TS- team spirit; CO- group cooperation

3. Overall Environmental Protection

Principal Components of sub-indicators of environmental protection (Detailed Table 4.66)

Sub-indicator	Prin1	Prin2	Prin3	Prin4	Prin5
SCM	0.605803	-.000988	-.379781	0.697588	0.046254

Sub-indicator	Prin1	Prin2	Prin3	Prin4	Prin5
WCM	0.524422	0.397078	-.190565	-.587216	0.431478
ACF	-.080363	0.704882	-.229702	-.010094	-.666197
ACP	-.381433	0.569389	0.198163	0.401874	0.574050
UFW	0.453911	0.145828	0.852889	0.083332	-.195794

SCM- adoption of soil conservation measures; WCM- adoption of water conservation measures; ACF- avoidance of chemical fertilizers; ACP- avoidance of chemical herbicides and pesticides; UFW- utilization of farm waste

4. **Principal Components of indicators of Sustainable Agricultural Development (Detailed Table 4.72)**

Eigenvectors			
	Prin1	**Prin2**	**Prin3**
ED	0.610220	-.362750	0.704304
SD	0.611758	-.349106	-.709843
EP	0.503372	0.864024	0.008883

ED- economic development; SD- social development; EP- environmental protection

INDICATORS OF SUSTAINABLE AGRICULTURAL DEVELOPMENT: A MULTI-VARIATE ANALYSIS AMONG SELF-HELP GROUPS OF "*KUDUMBASHREE MISSION*" IN THIRUVANANTHAPURAM DISTRICT

by

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ABSTRACT OF THE THESIS

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ABSTRACT

The study entitled "Indicators of sustainable agricultural development: A multi-variate analysis among self-help groups of "*Kudumbashree Mission*" in Thiruvananthapuram district" was undertaken with the specific objective of critically analyzing the extent of attainment of the three pillars of sustainable development, namely, economic development, social development and environmental protection by the agricultural activities of the self-help groups under Kudumbashree Mission in the study area and to identify the constraints and formulate a strategy for increasing the effectiveness of the programme.

Exploratory or Formulative Research Design was employed for the study. The sustainability was studied among 40 agriculturally active SHGs. Profile characteristics of 200 women farmers were also studied. The study was undertaken in the Thiruvananthapuram district of Kerala state. Out of the 12 development blocks in the district, five blocks were randomly selected, namely, Parassala, Perumkadavila, Nemom, Nedumangad and Vellanad. From each of the blocks, one agriculturally active Community Development Society (CDS) was purposively selected, namely, Kunnathukal, Karode, Malayinkeezhu, Karakulam and Kattakkada. There were two categories of respondents for the study. Two hundred number of SHG-based farm women formed the first category of respondents and 40 number of agriculturally active SHGs formed the second category of respondents. From each of the Community Development Society, 40 number of agriculturally active and SHG-based farm women were randomly selected. These added upto 200 individual respondents. Eight agriculturally active SHGs were also randomly selected from each of the five Community Development Societies and these added upto 40 SHGs.

Fourteen variables were used to study the individual SHG members. ANOVA was done where ever possible to find out if there existed any difference between each of the five sample CDSs for any particular variable. Seventeen independent variables

related to SHGs were also studied. An index namely, Sustainable Agricultural Development Index (SADI) was developed as part of the study for exclusively measuring the sustainability of group farming by the women groups. The index covered eighteen variables related to the economic, social and environmental aspects of group farming. Principal Component Analysis (PCA) was also done using the software SAS 9.3 to find out the relative importance of each of the indicators and sub-indicators towards the sustainability of group farming. The strengths, weaknesses, potentials and challenges of SHG-based farming were also found out using SWPC analysis. The constraints faced by both individual SHG members as well as the groups as such were found out and ranked. Finally the suggestions for improvement of SHG-based farming and suggested lines of future research were also spelt out based on the results of the study and the on-field experiences of the researcher.

The study could find out that majority of the sample SHG-based women were of middle aged and were having nuclear families and secondary education. They were engaged in some income generating activities other than agriculture. They had good experience in both SHG based activities and in agricultural activities. Krishibhavan was found to be the most prominent information source for those women. The SHG-based women were found to possess a good level of self confidence, innovativeness, scientific orientation, achievement motivation, economic motivation and risk orientation. It was observed that as they grew older, both SHG experience and farming experience increased but their level of innovativeness went on decreasing.

Regarding the SHGs, the study revealed that their mean size was 4.33 and had a mixed population of BPL members, APL members, general category members, OBC members and SC/ST members. Invariably all the sample SHGs were cultivating banana and 70 per cent of the groups were cultivating two or more crops. Also 70 per cent of the groups had availed loans with a mean amount of Rs. 1,40,714.

As high as 95 per cent of the groups used to hire external labour especially for initial land preparation. The mean area cultivated by a sample SHG was found to be 190.53 cents.

On economic front, all the groups were found to have a high degree of economic motivation. The BC ratio of majority of the groups was found to be medium. Eighty per cent of the groups showed an increase in their income over the previous year and also could generate a good number of day's employment in agricultural sector. As the area cultivated had increased, addition in the income and employment generation were also found to increase. The study elucidated area cultivated (AC) and benefit-cost ratio (BCR) as the most important sub-indicators of economic development. On social front, the study revealed that majority of the groups were possessing a high transparency, equity, leadership, cohesiveness, accountability, team spirit and co-operation with 'team spirit' followed by 'equity' as the most important sub-indicators of social sustainability of Kudumbashree SHGs. Regarding environmental protection, 'adoption of soil conservation measures' and 'avoidance of chemical fertilizers' were found to be the most important sub-indicators affecting environmental sustainability. A quarter of the Kudumbashree groups were found to follow organic farming, around 20 per cent followed strict chemical-based modern agriculture and the rest followed a middle path between organic farming and modern agriculture.

The Sustainable Agricultural Development Index (SADI) for the studied sample was found to be 0.69. It could be concluded that though the agriculturally active Kudumbashree SHGs in the study area had reasonable economic sustainability and social sustainability, their performance in environmental protection was a bit lower and only if they strengthen this weak link, they can become truly sustainable. Crop loss due to pests, diseases, wild animals and other climatic factors was the foremost constraint expressed by the respondents of the study.

The study recommends establishment of 'Woman Farmer Producer Companies' (WFPC) at taluk level under the direct control of the respective District Missions or adoption of 'Anand Pattern Co-operative Method' as two viable strategies for improving the sustainability of agricultural activities performed under Kudumbashree mission.