EXPLORATORY STUDY ON ORGANIC FARMING AMONG SMALLHOLDER FARMERS

By

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(2016-11-039)

THESIS

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DECLARATION

I, Visakha T (2016-11-039) hereby declare that the thesis entitled **"Exploratory study on organic farming among smallholder farmers"** is a bonafide record of research done by me during the course of research and that it has not previously formed the basis for the award to me of any degree, diploma, fellowship or other similar title, of any other University or Society.

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CERTIFICATE

Certified that this thesis **'Exploratory study on organic farming among smallholder farmers'** is a record of research work done independently by **Visakha .T (2016-11-039)** under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma, fellowship or associate ship to her.

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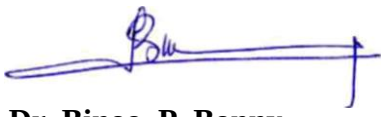

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AFFECTIONATELY DEDICATED TO
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INTRODUCTION

CHAPTER I

INTRODUCTION

Organic farming is a holistic system for managing production that promotes and enhances the health of agro-ecosystems including biodiversity, biological cycles and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking account the sustainable agricultural systems require regional conditions. These are accomplished with its use, where feasible, the agronomic, biological and mechanical methods to fulfil some specific function within the framework, as opposed to the use of synthetic materials (FAO, 1999).

The history of agriculture in India dates back to almost 10,000 year's .Our ancestors not only considered agriculture as a source of livelihood but it was a way of life and spirituality. However, the Green Revolution has revolutionized the subsistence means of nearly two-thirds of the total economy in the course of agriculture industry development. This elevated the status of India being a begging bowl to one of the pioneer nations in India. Though its green revolution has proved a boon to hungry India, it has created severe consequences for our ecosystem and its sustainability. The agricultural sector of India is very important and is considered the backbone of the Indian economy. Agriculture is the backbone of livelihood for almost 58 per cent of the Indian population (APEDA, 2017). Agriculture meets the basic needs of India's growing population, with 67 percent of our population and 55 percent of the total workforce dependent on agriculture and other allied sectors. The sector shares 17.4 per cent of Domestic Product (GDP) as per the 2015-2016 economic survey. Despite this, it is facing various constraints such as fragmentation of landholding, low productivity and conversion of agricultural land to non-agricultural uses.

Modernisation of agricultural sector has caused a threat to agricultural biodiversity which is an important aspects of crop genetic diversity .The natural

ecosystem which was dominated by several thousand species of flora and fauna was replaced with monocultures of crops overtime. Accordingly, agricultural development used that and homogenized of the world's ecosystem. Quite a lot alternative farming systems have evolved from the hunting and harvesting stage to the current industrial agriculture, which is geared towards ecological prediction. These farming system were include agro ecology, organic farming, permaculture, biodynamic agriculture, etc. While analysing all these developments from different parts of the world Organic farming appears to be an alternative to compacting the negative impacts of green revolution technologies in India.

Organic farming is considered to have originated in Asia, where agriculture was not just a profession, but a way of life. The first scientific approach to organic farming can be dated back to the Vedas of the 'Later Vedic Period, i.e.1000BC-600'BC (Randhawa, 1986 and Pereira, 1993). However, Albert Howard, a British botanist, is often referred to as the father of modern organic farming. He worked in India from 1905 to 1924 and regarded traditional Indian farming practices superior to conventional agricultural practices. In this book He documented his research and further developments of these practices in his book, 'An Agricultural Testament'. Lady Eve Balfour in 1939 launched the Hughley Experiments on farmland in England to compare organic and conventional farming and based on her experiences published a book, 'Living Soil'. Rudolf Steiner in 1940 in Germany developed a system of biodynamic agriculture and introduced trademark 'Demeter' for the food produced on biodynamic farms. Masanobu Fukuoka, a microbiologist in Japan, developed a radical no-till organic system for growing grains, now known as 'Fukuoka Farming'. The term 'organic' in relation to farming for the first time was used by Lord North Bourne (1940) in his book 'Look to the Land' in which he stated, "The farm itself should have a biological completeness, it must be a living entity, it must be a unit which has within itself a balanced organic life".

Rodale, in the 1950s, popularized the term and methods of organic farming especially through the promotion of organic gardening in the US. In 1962, Rachel Carson, a prominent scientist, and naturalist published 'Silent Spring' describing

the ill effects of pesticides, particularly DDT on the environment and launched a worldwide environmental movement. In the 1970s, the global movements concerned with pollution and environmental degradation started laying more emphasis on organic farming and their efforts culminated in the establishment of the International Federation of Organic Agriculture Movements (IFOAM, 1972) in France. In 1975, Fukuoka released the book ‘One Straw Revolution’ which had a wide-ranging impact on the agricultural world The foundation of modern organic farming was laid by the establishment of the National Program for Organic Production (NPOP) 2001, followed by the National Project for Organic Farming and the Organic Farming Network during 2004, which aims to promote sustainable production, environmental conservation, reduction of the use and import of agrochemicals.The National Organic Standards have been developed under this program. Criteria for Accreditation of Certification Bodies, Accreditation and Process Inspection and Certification Procedures were also established commenced .During 2002-03, the agriculture department of the State of Kerala has worked to promote organic farming. The Department formed a cell to encourage sustainable agriculture and organic farming in the following year. Two brands have also been launched, namely 'Kerala Organic' and 'Kerala Naturals,' to market organic agricultural products (Balachandran, 2004).

Marketing of organic products is also taking place in a number of locations, such as 'KADS Open Market in Thodupuzha, Organic Bazaar in Thiruvananthapuram, Ecoshops in Thrissur and Kozhikode, and Jaiva Krishi Sevana Kendram in Kannur. Women's self-help groups as under "Kudumbasree" and "Janasree" are encouraged to grow organic vegetables and run "Organic Markets" successfully. Understanding growing demands, private entrepreneurs have also entered the organic food business. The exceptionally rich soil and climactic factors of Kerala contribute it to be an ideal distinction for the growth and establishment of organic farming especially in agricultural and horticultural crops like spices, plantations and medicinal crops of the world prefer to opt for organics and eco-friendly products. There are a number of ongoing initiatives in Kerala. An

initiative to make the state of Kerala fully organic had begun with the formulation of a draft policy in 2003.

1.1 World Organic farming scenario

Currently, there are 57.8 million hectares under organic management in 178 countries around the world, which is 1.2 per cent of the world's agricultural land. The regions with the largest organic agricultural land area are Oceania (27.3 m ha), Europe (13.5 m ha) and Latin America (7.1 m ha). Australia has the highest organic farmland, followed by Argentina and the United States. The percent area under organic farming is the highest in Liechtenstein (37.7%) followed by French Polynesia (31.3%) and Samoa (22.4%). India has the largest number of organic producers (8, 350, 00) followed by Uganda (2, 103, 52) and Mexico (2, 100, 00). The major driving force in the promotion of organic farming is the demand for organic foods. The global sales of organic products reached 89.7 billion USD in 2016 from 17.9 billion USD in 2000. The largest consumer of products is limited states followed by Germany and France where as Switzerland holds for the highest per capita consumption followed by Denmark and Sweden (Willer and Julia, 2018). In resonance with the global trends, the area under organic cultivation in India has also increased to 5.71 million ha during 2015-16.

1.2 Status of organic farming in India (2015-16)

The total area under organic farming	5.71 million ha
The cultivated area under organic farming	1.49 million ha
Wild forest area under organic farming	4.22 million ha
Number of organic producers (2016)	8,35,000(Highest in the world)
States having the highest area under organic farming	Madhya Pradesh
Organic production	1.35 million ton
Organic exports	2,63,683 ton (298 million USD)
Topmost exported organic item	Oilseeds
Largest contributed organic product in the global market	Cotton

(APEDA2017)

1.3 Smallholders

Smallholder is a marginal and sub-marginal farm household which owns or cultivates less than 2 hectares of land (Agriculture Census, 2010-2011). The Kerala government defined smallholder farmers as those who own less than 1 acre. They have a substantial share in the farming sector in Kerala. It is focused on the family oriented motives promoting stabilization of farm household system which utilizes the family as labour force and in turn the family consumes apart of the produces and the rest is marketed .Though the recent trend towards organic agriculture fetches high prices for the organically produced goods. Agriculture the market, smallholder farmers are not really able to make use of the opportunities as they are unorganized. There is a need to manage smallholder farmers in order to improve their marketing efficiency, which will help to increase their income. Prior research on aspects of smallholder organic farming is limited.

1.4 Objectives of the study

This study was formulated in this backdrop with the following specific objectives:

1. To identify the components of organic farming in the selected organic homesteads.
2. Identify the marketing channels utilized by farmers and work out their marketing efficiency.
3. Analyse the biodiversity in the selected organic homesteads
4. Explore the constraints experienced by farmers
5. Arrive at suggestions for promoting organic farming in the state.

1.5 Scope of the study

The present study aimed to analyse the components of selected organic homesteads for Malappuram district of Kerala. The study highlighted the marketing of organic produce, marketing channels utilized by farmers, biodiversity in homesteads, constraints faced by the farmers in the organic

Homesteads and finally came up with suggestions for promoting organic farming in the state. As there are few studies looking into the specific aspects of organic homesteads this study will throw light into the practical scenario the farmers are experiencing. It will help in new policy development or improvisations in existing policy and also for devising development schemes for the benefit of homestead based organic farming.

1.6 Limitations of the study

This study is an M. Sc. (Ag) work, and hence has its inherent limitations of time frame, funds, and sample size. However, all possible efforts have been taken to do a comprehensive study, paying maximum justice to the objectives at hand. The researcher being a single student had limitations for extensive travel too, by way of time availability and access.

REVIEW OF LITERATURE

CHAPTER II
REVIEW OF LITERATURE

Reviewing the literature is one of the important components in a scientific research, which discusses the published information about a topic by providing an in depth knowledge about the subject. Reviewing the previous works related to the field of study helps the researcher to identify the disparity between the currently available knowledge and areas that require further research. This allows the researcher to choose an appropriate research method to conduct the study, taking into consideration all the limitations of the previous studies and choosing suitable variables and statistical tools for the interpretation. In this chapter, a systematic review of literature is done under the following sub-heads:

2.1 Concept of Organic farming
2.2 Definition of Organic farming
2.3 Principles of Organic farming
2.4 Components of selected organic homesteads
2.5 Definition of Smallholders
2.6 Diversity indices of organic homesteads
2.7 Marketing channel and marketing efficiency of the farmers
2.8 Constraints faced by the organic farmers

2.1 Concept of Organic Farming

Organic farming is an agricultural method that promotes crop production through management practices for instance tillage, crop rotation ,avoiding the usages of synthetic fertilizer and pesticides and the use of recycled organic matter (Manures and crop residues) (Anonymous, 1996a).

Ghosh (1999) described the concepts of organic farming in detail stating that organic farming in farming in the spirit relationship between different components of ecosystem he emphasized that the foundation stone of organic agriculture his in

the totally of the association between the soil, flora, and fauna within soil as well as on side the soil along which waste products generated during the farming process. The apex animal in the system the human beings also contribute as a link in this relationship

Singh and Shekhawat (2000) stated that even though organic farming to emerging as a trend in developing countries like organic farming and its concepts act dubious to farmers. In India, it implies the use of organic manures and so no use of synthetic fertilizers and chemical fertilizers. Which was the conventional method of farming in India before green revolution.

FAO (2001) defined organic agriculture as holistic food production management systems, which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological and mechanical methods, as opposed to using synthetic materials, to fulfil any specific function within the system.

Chaudhary (2002) stated that the term of organic farming refers to the concept of the farm as an organism in which all the components parts, the soil minerals, organic matter, microorganisms, insects, plants, animals and humans interact to create a coherent whole. According to him, the farm is considered as a system which involves components along with their interaction with external factors like climate, environment, and socio economics conditions rather than likely considered as individual enterprises.

Bhattacharya and Krishna (2003) stated that organic farming is not of recent origin in India. It dates back to period of ancient time during Indus valley civilization and its mention about Rigveda, Atharvaveda and Kautilya's Arthashastra. There was use of green manures, oil cakes and animal excreta.

Patra *et al*., (2004) emphasized that the main aim of organic farming is achieving sustainability in crop production along with a closed nutrient cycles which maintain soil fertility as well as the wellbeing of the farm animals where synthetic chemicals are avoided.

Even though organic farming in gaining importance worldwide, most of the people misunderstand organic farming for the traditional agriculture, biodynamic agriculture, permaculture etc. Some other category believe that the utilisation of organic manures and alternative methods of instead using synthetic fertilizers/pesticides are distinguishing features of organic farming (Bhattacharyya and Chakraborthy, 2005).

Organic agriculture is generally regarded as knowledge based rather than input intensive agriculture because it focuses on creating a closed system of input generation either from within the farm or from locally available resources (Das, 2007)

Considering the foresaid concepts it can be indicated that nature of organic agriculture is conservative

2.2 Definitions of organic farming

Organic farming is a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additive. To the maximum extent, feasible on rely crop rotations, crop residues, animal manures, legumes, green manures, off- farm organic wastes and to supply plant nutrients and to control insects, weeds and other pests (Lampkin, 1990)

Organic farming is a farming of integration of biological, cultural and natural inputs including integrated disease and pest management practices. It not only advocates for stopping or restricting the use of chemical fertilizers, pesticides, herbicides and other agrochemicals but it relays on the importance of agriculture which create balance of ecology and micro environment suitable for health and

growth of soil micro-flora, plants, animals, farm workers and finally the vast population which consume the farm produce (Harendar *et al.,* 1996).

Organic farming can be defined as an approach to agriculture where the aim is to create integrated, humane, environmentally and economically sustainable agricultural production system which maximize reliance on farm derived system renewable resources and the management of ecological and biological process and interactions. (Senthilkumar and Vadivel, 2001).

According to Sharma (2001) defined as a production system which avoids the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives

Babalad (2007) the multidimensional role of organic farming as organic agriculture protects water supply, enriches the soil, encourages bio-diversity, reduce the toxic bodies, employs sound cultural production practices, replaces synthetic fertilizers, chemicals and pesticides, enhances the inherent fertility and biological life to built in soil, improves water quality, provide attentive care for farm animals, handle the agricultural products without the use of extraneous synthetic additives

From the above definitions by different authors it is revealed that organic farming system avoids chemicals and uses locally available resources for sustainability.

2.3 Principles of organic farming

Francis Blake (1987) the principles of organic agriculture aims to be in harmony rather than in conflict with natural systems. The powers of nature are harnessed and developed to their fullest extent, rather than dominated. It adopts an approach that minimizes the use of non-renewable forms of energy, organic food aims to be of optimum nutritional value. The organic world strives to be localized. Local markets, decentralized systems of distribution and processing are sought. Organic agriculture does not pollute the environment.

The principles of organic farming lie in the maintenance of soil fertility through careful husbandry, the recycling of agricultural wastes, avoidance or reduction of external inputs and the use of natural forms of pest management and weed control (Goldsmith and Hildeyard, 1996).

The principles of organic culture were established and approved by the general assembly of International Federations of Organic Agriculture Movements (IFOAM) in September, 2005.

The principles of organic farming aim at inspiring and describing the organic movement and its purpose across the globe. There are four main principles of organic agriculture as recommended as follows:

The principles of health -Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible

The principle of ecology - Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.

The principle of fairness- Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities

The principle of care - Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment

Shiva (2004) Organic Farming is based on principles of agro-ecology. These include are improvement and maintenance of agro-ecosystem by conserving soil, water and biodiversity, preventing exploitation and pollution of natural resources, reducing the consumption of non-renewable energy sources, producing nutritious and high quality products, conserving the indigenous technical knowledge and traditional farming systems.

2.4 Components of selected organic homesteads

John (1997) comprehensively defined as a home garden functional and self-sustaining farm unit which consists of a crops and multipurpose trees, with or without animals/poultry/ apiculture, owned and primarily managed by the farm family, with the objectives of satisfying the basic family needs and producing marketable surplus for the purchase of non-producible items.

Homestead cultivation is cultivation as it focuses only on the immediate surroundings of the home that produces essential food items using mainly organic manures provided by livestock whose milk and meat provide rich nutritional security to the households (Ali *et al*., 2005)

Apart from the economic benefit conferred from homestead farming, social and environmental benefits are also highly appreciated. (Galhena *et al.*, 2013).

The social benefits include enhancing food and nutritional security in many socioeconomic and political situations, improving family health and human capacity, empowering women, promoting social justice and equity, and preserving indigenous knowledge and culture (Mitchell and Hanstad, 2004).

2.5 Smallholders

Smallholder is a marginal or sub marginal farmer who owns or cultivates less than 2 hectares of land (Agriculture Census, 2010-2011).

Government of Kerala defined smallholder farmers as those who own less than 1 acre. They are characterized by family focused motives such as favoring the stability of the farm household system, using mainly family labor for production and using part of the produce for family consumption.

Gupta (2015) pointed that no organic farmer has ever committed suicide in India and smallholders who take to organic farming are stably able to save their crops, despite vagaries of the weather and market instability.

2.6 Diversity Indices

Diversity Indices are used to assess the level of biodiversity in systems. It can expressed as a function of scale, where α-diversity represents diversity within a single community or ecosystem (such as home garden) and β-diversity represents the diversity among communities along an environmental gradient such as ecosystems of Kerala.

Diversity refers to many different species and their interactions, occurring in small space at one time (Hammer,1991) and this definition holds the concept of diversity in home gardens as there is great diversity of interactions taking place vertically, horizontally and temporarily within one garden, often less than one hectare (Zemede,1997:Millat-e-Mustafa,1998)

Brookfield (2001) indicated that home-gardens are the valuable sources of agro biodiversity notably with regard to plant diversity.

According to Shaw (2003) the concept of diversity contains two elements: richness and balance; the first and most understand able measurement to make its species richness (i.e. the total number of species with in the sample) which is a valid index of diversity and the other indices of diversity also constructed as a degree of the evenness with which species are distributed.

Species richness

The Margalef richness index adjusts the number of species sampled in an area by the log of total number of individual sampled, summed over species. The higher the Margalef index, the richer would be the species diversity of the population.

Margalef index = (S-1)/ln (N)

Where S is the number of species, and

N is the total number of individuals in the sample

The species richness of perennials as indicated by the Margalef index was greater in the home gardens in the flat land category (2.87) as there were more

number of species was observed in the home gardens in moderate and steep slope land categories. The fact that there was no greater difference in Margalef indices for perennials in the home gardens across land categories of home garden (Varghese and Balasubramanyan, 1998).

Krishnapriya (2013) observed that low elevation lands region recorded the highest species richness of species. This was followed by highland and midland in which only slight difference was there, Mean index of 1.56.

Species diversity

The Shannon-Weiner Index is the most commonly used diversity indicator in plant communities, and it takes a value of zero when there is only one species in a community, and a maximum value when all species are present in equal abundance.

The following equation from Krebs (1985) which was used for this study, looks at the diversity of those species in the garden that are grown on an annual or perennial basis.

$$H = \sum_{i=1}^{s} -(pi * \ln pi)$$

Where H is the Shannon-Weiner Diversity Index, the proportion of species i relative to the total number of species is calculated and multiplied by the natural logarithm of this proportion. The resulting product is summed across species and multiplied by –1.

The Shannon Wiener index were used to evaluate diversity per home garden and ranged from 0.76 to 3.01 with a mean value of 2.05 ± 0.07 indicating a medium evenly distributed diversity of sampled tree species.

Shannon-wiener and Margalef indices for perennial species in home gardens in three slope categories were identified with the exception of weed and ornamental species. The highest Shannon –Weiner index (1.77) was found in the

steep land category due to more uniform distribution of perennial species (Senanayake *et al*., 2009).

2.7 Marketing Efficiency and Marketing Details of Farmers

Ramakumar (2001) computed the marketing efficiency of marketing channels by ranking different performance indicators, which are marketing costs and margins of intermediaries, producer's share in consumer's rupee and rate of return

Ogunleye and Oladeji (2007) identified that, the cocoa producers selected their marketing channel based on the terms of payment, price, location of the market, cost of conveyance and grading practices

Martey *et al*., (2012) observed that, the farmers chose the marketing channel based on the information available about the channel. Producers were more actively involved in marketing when they had access to transportation facility either owned or hired.

In a study conducted by Dastagiri *et al* ., (2013) it was concluded that highest marketing efficiency was observed in direct producer to consumer channel. Marketing efficiency was adversely effected by marketing cost, marketing margin, transport cost and labour whereas open market price, volume of the produce handled and net price received promote marketing efficiency. They also emphasize that government should formulate specific marketing models for promoting efficient marketing of horticulture produce.

Nadikha (2017) observed that the grade 1 mangoes of both channel 1 and channel 2 were having marketing efficiency 0.14. Grade 3 mangoes were mainly sold locally. For processing, marketing of mangoes directly to local market was observed to be efficient (0.4) than that involving to many intermediaries as it affected the efficiency of marketing channel.

2.8 Constraints experienced by the organic farming

Sherief (1998) studied the major constraints confronted by homestead organic farmers in adopting the resource sustaining agricultural practices. He observed that lack of information, low output along with high cost of organic inputs and labour, recurrent incidence of pests and diseases, skilled labour requirement, lack of credit facilities as well as government and low premium price for organic products were found to be the major constraints faced by the homestead respondents in the adoption of resource sustaining agricultural practices.

Along with above constraints Manjusha (1999) reported that high transport charges and inadequate marketing facilities also form a part of constraints in homestead bitter gourd cultivation.

Ranganatha *et al* ., (2001) observed that the 60 percent of the small farmers practicing organic farming experience more cost and risk involvement in getting and transporting organic manures. Lack of organic production package, lack of knowledge on crop rotation, resource management and alternative control of pest and diseases were also faced by this farmers.

Balachandran (2004) reported that problems of faced organic farming for climate change, erratic rains, scarcity of good quality indigenous seeds, artificially created price slump during harvest season that forces small scale farmer to sell their produce at low price and lack of market facilities. Government should focus on providing financial support during transition period to organic farming from conventional practice and consumer awareness regarding organically produced goods.

Badodiya *et al.*, (2011) stated that major constraint faced by organic farmers was high cost of production due to high cost for inputs. They recorded lack of quality inputs and difficulty in adopting organic practices as the major constraints faced by organic farmers.

Joseph (2016) found that major constraints of organic farming are poor quality of organic inputs, lack of availability of alternate plant protection materials, unavailability of organic inputs in time, high incidence of pest, disease and weeds, high cost of production and low market price.

Indu (2015) major constraints faced by the farmers were inadequate Government Support, lack of awareness of consumers and producers, output marketing problems, shortage of bio-mass, Inadequate supporting infrastructure, high input costs, marketing problems of organic Inputs, lack of financial support, low yields, inability to meet the export demand

Sreejith (2016) reported that major issue faced by organic farmers were unavailability of exclusive market for organic produce, low productivity, and unawareness of organic standards.

Aulakh and Ravisankar (2017) observed that lack of awareness about organic products among the consumers and organic agricultural practices, the farmers are not aware of the bio fertilizers, bio pesticides and organic standards, organized marketing mechanism with price premium for organic products, unable to market their organic produce.

METHODOLOGY

CHAPTER III

METHODOLOGY

The chapter consists of all the research process measures that have helped me tackle the research issue. It describes and clarifies methods used to measure dependent and independent variables, as well as the protocols followed for data collection and analysis. In brief, investigation methodology is a detailed investigative action plan that is summarized under the following headings:

The chapter includes

3.1 Research design of the study

3.2 Locale of the study

3.3 Selection of respondents

3.4 Selection of variables

3.5 Operationalization of variables

3.6 Measurement of variables

3.7 Tools for data collection

3.8 Statistical framework for analysis of data

3.1 Research design of the study

Kothari and Garg (1985) defined research design as the conceptual structure within which research is conducted, It constitutes the blueprint for the collection, measurement, and analysis of data. The design of research utilised in this study is exploratory in nature. An exploratory research design is conducted when there are only a few or no earlier studies carried out related to a particular research problem.

The methodology used for the study at different stages of data collection and analysis are explained below

3.2 Locale of the study

2 blocks of Malappuram district were randomly selected for conducting the study

3.2.1 Description of the study area

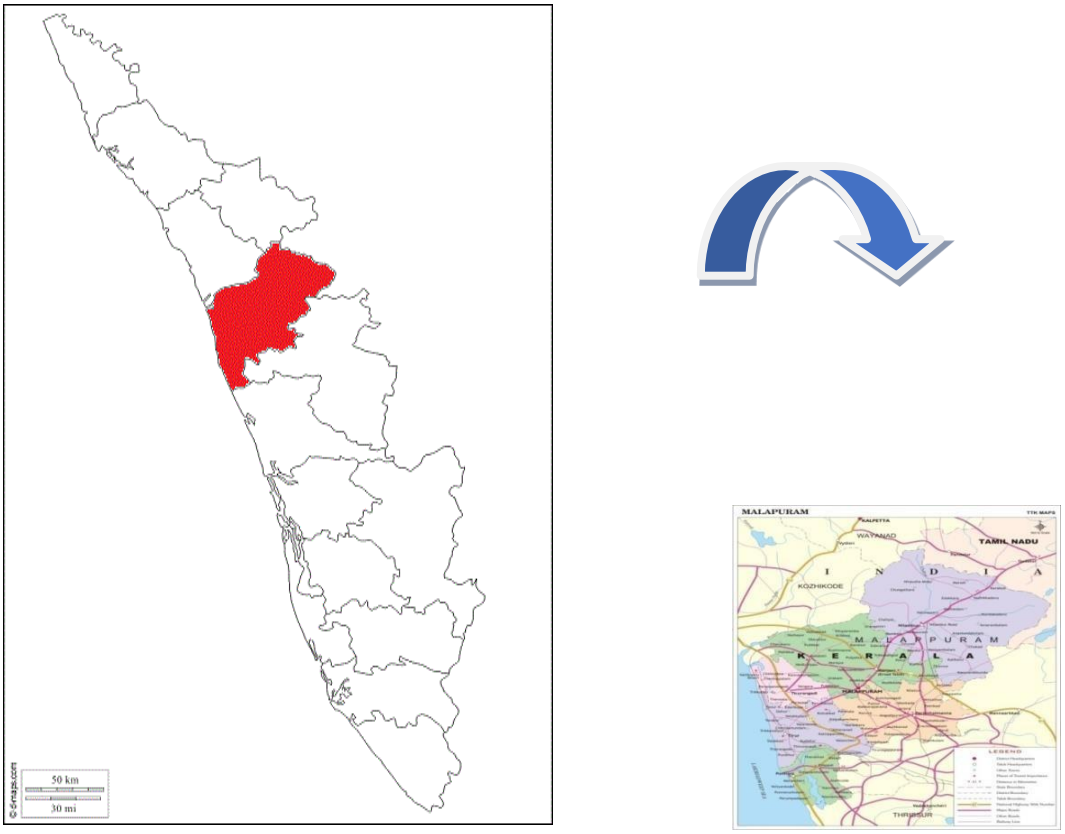
Malappuram District was formed on 16th of June 1969 with the Nilgiris of Tamilnadu in the east, the Arabian Sea in the west, Kozhikode and Wayanad districts in the north and Palakkad and Thrissur district in the south. The district is 9.13% of the total area of the state and ranks 3rd in the state Malappuram is located among the mountains of the Western Ghats, It is covered with small beautiful mountains of lush greenery, bonded with several freshwater streams flowing through the city bestows a harmony of natural beauty. Kadalundi Puzha, a major river in Kerala is flowing around the city. The city has a population density of 2,083 per square kilometer (5,390 per square mile). (As per the 2011 census). The district between latitude 75' to 77' east longitude and 10' to 12' north latitude, in the geographical map. The district has a total area of 3,550 square kilometers.

3.2.2 Topography

The location of Malappuram Districts is 75' to 77' east longitude and 10' to 12' north latitude, in the geographical mark. It consist of three natural division, low land, midland and highland. The low land stretches along the seacoast, the midland in the center and the highland region towards the east and north-eastern parts.

3.2.3 Biodiversity

The district have a total forest area of 758.8684 Square km, out of which 325.3261 Square km is reserve forests and 433.5423 Square Km is vested forests. The major forest area is concentrated in Nilambur and Wandoor blocks and Melattur in the Western Ghats. Of the forest 80 per cent the important trees are Teak, Rosewood, Venteak, Choropin, Mahogany etc. Bamboo hills are extensively grown in all parts of the forest. The district also has several man-made plantations, mainly of Teak.The social forestry division promotes the planting of trees outside forestlands, for protecting natural forests. About 50 Acres of Mangroves forest is spread over Kadalundi Estuary in Vallikkunnu Grama Panchayath in Malappuram district.



Kerala state **Malappuram district**

Fig 1. Map showing the study area of Malappuram District in Kerala

3.2.4 Selection of respondents

Thirty organic homesteads from the district of Malappuram were selected randomly using criterion that the farmer should be members of the organic farmer association of district. The case study approach was followed to thoroughly analyze in depth the socio economic features of the farmers and farms, biodiversity in the farms and constraints experienced by farmers

3.3 Selection of variables

The following variables were selected based on the specific objectives of the study and available literature reviewed. The selected variables were categorised to dependent and independent variable.

Table 1: Summary list of variables and their measurement procedure

Sl. No	Variables	Measurement of procedure
Independent variables		
1	Age	Government of India (GoI) Census report 2011
2	Education	Trivedi (1963) with modification
3	Source of income	Arbitary scale
4	Annual income	Arbitary scale
5	Experience farming	The scale used by Jayasree (2004) was adopted
7	Organic farming experience	The scale used by Jayasree (2004) was adopted
8	Farm size	Government of India (GoI) Census report 2011
9	Family size	Scale used by Allan (2004) with suitable modifications
10	Organizational membership	Scale used by Nadhika (2017) suitable modifications
11	Marketing channel	Scale used developed for study
12	Marketing function	Scale used by Nadhika (2017) suitable modifications
Dependent variables		
13	Marketing efficiency	Shepherd's method
14	Biodiversity index	Margalef index and Shannon-weiner index

3.4 Operationalization of variables

The operational definition of a variable is the specific way in which it is conceptualized in the study

3.4.1 Age

Age was operationalized as the number of calendar years completed by the respondent at the time of the investigation. The respondents were classified into three categories namely young, middle and aged based on census report (2011) of Government of India.

Table: 2 Classification of respondents based on age

Sl.no	Category	Score
1	Young (<35 years)	1
2	Middle-aged (35-55 years)	2
3	Aged(>55 years)	3

3.4.2 Educational qualification

Educational qualification is operationally defined as the level of education attained by the respondent at the time of the interview. The scoring procedure of Trivedi (1963) with appropriate modification was used in this study to measure the educational qualification of the respondents. The education was categorized into 5 categories viz, primary education, high school, plus two, graduate and post graduate. The education of the respondents was measured in terms of frequency and percentage.

Table 3: Education qualification scoring procedure

Sl.no	Category	Score
1	Primary	1
2	High school	2
3	Plus two	3
4	Graduate	4
5	Postgraduate	5

3.4.3 Source of income

It is operationally defined as the line of work that the respondent undertakes which accounts for the major source of income. It was measured based on the procedure given by Nadhika (2017) with appropriate modifications for the present study.

Table 4 Source of income scoring procedure

Sl.no	Category	Score
1	Agriculture	1
2	Agriculture +business	2
3	Agriculture+ government	3
4	Agriculture +retired	4
5	Agriculture + others	5

3.4.4 Annual income

Annual income is operationally defined as the remuneration that the respondent receives from farming in an acre. Scoring procedure followed was adopted with slight modification, as given below.

Table: 5 Annual income scoring procedure

Sl. no	Category	Score
1	Less than 75000 (low income)	1
2	1,50,000 (medium income)	2
3	More than 200000 (high income)	3

3.4.5 Farming Experience

The farming experience was operationally defined as the number of years the respondent had engaged in farming activities at the time of the investigation. The scoring procedure used by Jayasree (2004) was adopted**.**

Table: 6 Farming Experience scoring procedure

Sl .no	Category	Score
1	Less than 5 years (Low)	1
2	5-10 years (Medium)	2
3	More than 10 years (High)	3

3.4.6 Experience in organic farming

Experience in organic farming was operationally defined as the number of years the respondent had engaged himself in organic farming practices until the time of data collection. The scoring procedure used by Jayasree (2004) was adopted.

Table: 7 Experience in the organic farming scoring procedure

Sl .no	Category	Score
1	Less than 5 years (Low)	1
2	5-10 years (Medium)	2
3	More than 10 years (High)	3

3.4.7 Family size

This refers to the numbers of members of either sex living in a household/family dependent on the head of the family. The scoring procedure followed by Allan (2004) was adopted in this investigation as shown below.

Table: 8 Scoring procedure of family size

Sl .no	Category	Score
1	1-4 (Small)	1
2	5-7 (Medium)	2
3	8-10 (High)	3

3.4.8 Farm size

Farm size was operationalized as the area of cultivable land owned by the farmer based on the farmers categorized into three different groups .In agreement with the distribution of small and marginal farmers in Kerala Scoring procedure followed by GOI (2011). The data is presented in the form of frequency and percentage.

Table: 9 Farm size scoring procedure

Sl .no	Category	Score
1	Marginal below 1ha	0
2	Small farmers 1-2 ha	1
3	Semi medium farmers(2-4 ha)	2

3.4.9 Organizational membership

It is operationally defined as the enrolment status of respondents in various organizations. Here, the respondents are allowed to choose multiple responses from among the options given. The options given include Farmer Producer Organization (FPO), cooperative society, arts' club, other organizations, and no membership. It was measured based on the procedure given by Nadhika (2017) with appropriate modifications for the present study.

Table: 10 Organizational membership scoring procedure

Sl .no	Category	Score
1	Never	0
2	Frequently	1
3	Always	2

3.4.10 Marketing channel

A marketing channel is operationally defined as the pathway by which the respondents market their produce. Here, the respondents are allowed to choose multiple responses from among the options given. The options comprise of contracting, through Govt agency Horticorp, co-operative society, retailers, consumers, and others.

Table: 11 Marketing channel scoring procedure

Sl No	Category	Scores
1	Yes	0
2	No	1

3.4.11 Marketing functions

It is operationally defined as the activities carried out by the respondents while marketing the produce. Here the respondents are allowed to choose multiple responses from among the options given. The options encompass packing, loading and unloading, transportation

Table: 12 Marketing function scoring procedure

Sl No	Category	Scores
1	Yes	0
2	No	1

3.4.12 Types of inputs used any

Here, the respondents are allowed to choose multiple responses from among the options given. The options given include the type of inputs that are like urea, potash, Muriate of potash, factomphos, other input.

Table: 13 Types of inputs used scoring procedure

Sl .no	Category	Score
1	Never	0
2	Frequently	1
3	Always	2

3.4.13 Components of organic farming selected organic homesteads

Organic farming components are Bulky organic manures, Green manure crops, organic pesticides, Crop rotation, concentrated organic manures, crop residues management, bio fertilizer, bio control agent, Liquid organic manure followed by frequency of use scoring procedure.

Table: 14 Components of organic farming selected organic homestead

Sl .no	Category	Score
1	Never	0
2	Frequently	1
3	Always	2

3.5. Measurement of the dependent variable

3.5.1 Marketing efficiency

Marketing efficiency can be refered to the ratio of output to input. It was measured using the shepherd's method, where marketing efficiency was determined by comparing the efficiency of the alternative marketing channels.

Shepherd's Method

Shepherd has suggested that the ratio of the total value of goods marketed to the marketing cost may be used as a measure of efficiency and vice versa. The problem concerned with the measurement of value-added can be eliminated using this method.

Shepherd's formula not explicitly take into account the net margins retained by the intermediaries and net price received by the farmers in assessing the marketing efficiency. Shepherd's formula assumes that marketing cost itself includes some fair margins of intermediaries are excessive, it is argued that these should not be treated as a part of marketing cost

$$ME = \frac{V}{I} - 1$$

Where: ME =Marketing efficiency

V= value of goods purchased (consumer price)

I = Total marketing cost (i.e., Cost+Margins)

Limitations of this method are that it does not take into considerations the price received by the farmer

3.5.2 Diversity of organic homesteads

Species richness

The margalef richness index adjusts the number of species sampled in an area by the log of the total number of individuals sampled, summed over species. The higher the margalef index, the richer would be the species diversity of the population.

Margalef index = (S-1)/ln (N)

Where S is the number of species, and N is the total number of individuals in the sample

Species diversity

The Shannon-Weiner Index is the most commonly used diversity indicator in plant communities, and it takes a value of zero when there are only one species in a community, and maximum value when all species are present in equal abundance. The following equation from Krebs (1985) which was used for this study, looks at the diversity of those species in the garden that are grown on an annual or perennial basis.

$$H = \sum_{i=1}^{s} -(pi * \ln pi)$$

Where H is the Shannon-Weiner Diversity Index, the proportion of species i relative to the total number of species is calculated and multiplied by the natural logarithm of this proportion. The resulting product is summed across species and multiplied by –1.

3.6 Tools used for data collection

An interview schedule was drafted based on the objectives of the study in consultation with experts. Appropriate modifications were made based on their suggestions and the final interview schedule was made in English. Primary data collection was done through individual farm visits. Secondary data collection was done from research papers, official records of Krishi Bhavan and other publications.

3.7. Statistical methods used to analyze data

The data collected were scored and analyzed using Statistical Package for Social Sciences (SPSS version 21). The statistical tests used for analysis and interpretations include:

3.7.1 Descriptive statistics

The distribution of respondents with respect to different variables was calculated using percentages and frequencies. The independent variables were then tabulated using cross Tables.

3.7.2 Margalef Index

Margalef index = (S-1)/ln (N), Where S is the number of species, and N is the total number of individuals in the sample

3.7.3 Shannon-Weiner Index

$$H = \sum_{i=1}^{s} -(pi * \ln pi)$$

Where H is the Shannon-Weiner Diversity Index, the proportion of species i relative to the total number of species is calculated and multiplied by the natural logarithm of this proportion. The resulting product is summed across species and multiplied by –1.

3.7.4 Mann-Whitney U test

The distinctive characters of the two groups of respondents based on block-wise Group I with respondents having Nilambur block and Group II Wandoor Block were analysed for statistical significance using the Mann Whitney U test.

3.7.5 Correlation analysis

The correlation coefficient was worked out to measure the degrees of relationship between independent variables and dependent variables.

3.7.6 Garrett Ranking

In this method, the rank assigned to different constraints were transformed into percentage using the formula:

$$\text{Percent position} = \frac{100\,(RIJ - 0.5)}{NJ}$$

Where R_{ij} is the rank for i^{th} constraint by the j^{th} individual

N_j is the number of constraints ranked by the j^{th} individual

The rank obtained is an interval on a scale where its midpoint denotes the interval; hence 0.5 is subtracted from each rank. Using the Garrett Table, the percent position obtained is changed into the score (Garrett and Woodworth, 1969). The mean score was determined from the score obtained for each constraint and they are ranked according to the mean score.

Plate 1:Homestead gardens during field visit

RESULTS AND DISCUSSION

CHAPTER IV

RESULTS AND DISCUSSION

This chapter focuses on the results derived from the study, by using suitable statistical tools and following appropriate research methodology. The results derived from the study are discussed in line with the objectives of the study under the following sub-heads.

4.1 Socioeconomic variables of farmers

4.2 Components of organic farming in selected organic homesteads

4.3 Diversity of organic farming in homesteads

4.4 Marketing channels utilized by the farmers

4.5 Constraints faced by the farmers.

4.6 Suggestions for promoting organic farming in the state

4.1 Socio-economic variables of farmers

This section presents the distribution of farmers according to their profile. The profile characteristics of farmers include socio-economic characters, farm characteristics, organizational membership and marketing channels of organic farmers. Descriptive statistics was used to measure these variables.

4.1.1 Age

The distribution of farmers according to age is presented in Table 15 and fig: 2 Farmers were categorized into young, middle and late adulthood categories and it was noticed that nearly three-fourth (66.7%) of the farmers belonged to late adulthood category followed by middle (30%) and young (3.3%) groups. The average age of smallholder farmers was found to be 55 years.

Table: 15 Distribution of respondents according to their age (n=30)

Category	Frequency	Percent
Young (<35 years)	1	3.3
Middle aged (35-55 years)	9	30
Late adulthood(>55 years)	20	66.7
Total	**30**	**100**

Mean: 2.57 **S.D: .568**

The above findings implies that the majority of the respondents in the study belonged to senior group. This finding is in accordance with Swota *et al.*, (2008) who indicated that the farmers above age 51 years are actively involved in farming operations, around the world. The trend shows that the youth are not ready to venture into this field. Youth usually prefer to move on to more remunerative occupations. The senior and middle-aged farmers dominated incase of homesteads respondents. It can be contributed to the social factor that the senior-most in the home generally regarded to be head of the family. A similar result was reported by Thasneem (2016).

4.1.2 Education

From the results Table 16 and fig.3 it clear that 46.7 percent of the smallholder farmers had high school education, 30 percent of the farmers had primary school education, 10 percent of farmers were graduates and few farmers,ie,3 percent were with post-graduation. Thus it can be inferred that more than 70 percent of the homestead farmers had educational status from school to college level .This result is a reflection of the privileged literacy rate of Kerala state .The result was in accodents with the research carried out by Thomas (2004) and Jayawardhana (2007)

Table 16. Distribution of respondents according to their educational status (n=30)

Category	Frequency	Percentage
Primary	9	30
High school	14	46.7
Plus two	3	10
Graduate	3	10
Postgraduate	1	3.3
Total	**30**	**100**

Mean:2.17 **S.D :1.053**

4.1.3 Source of income

Table 17 and Fig:4 indicate that the greater no of the respondents (56.7 %) undertook agriculture as the major source of income and 16.7 percent of the respondents were doing agriculture along with a business.13.3 percent of respondents practiced agriculture along with a govt job. 3.3 percent were engaged in agriculture, post-retirement and agriculture was practiced along with other services by 10 percent of respondents. Majority of farmers considered agriculture as their primary occupation. Most of them practiced organic farming.

Table: 17 Distribution of respondents based on source of income (n=30)

Category	Frequency	Percentage
Agriculture	17	56.7
Agriculture + business	5	16.7
Agriculture +govt job	4	13.3
Agriculture + retired	1	3.3
Agriculture +others	3	10
Total	**30**	**100**

Mean:1.90 **S.D:1.322**

4.1.4 Farming Experience

The experience of farmers was measured in terms of the number of years a farmer had been engaged in agriculture-related activities. Farming experience is represented in Table 18 and fig: 5 which indicates that nearly three fourths (73.33%) of the smallholder farmers had long term farming experience of more than 10 years which was followed by 26.7 percent of the farmers with short term farming experience. The average farming experience of the farmers was 10.43 years. Traditional farmers who were previously engaged in farming activities were found to continue farming and the young farmers were not found to venture into this field. Most of the traditional farmers who still preferred to concentrate on agriculture attributed their decision to their commitment to agriculture.

Table:18 Distribution of respondents based on their farming experience (n=30)

Category	Frequency	Percentage
Less than 5 years (Low)	0	0
5-10 years (Medium)	8	26.7
More than 10 years (High)	22	73.3
Total	**30**	**100**

Mean :2.67 **S.D :.547**

4.1.5 Organic Farming Experience

Experience in organic farming was defined in terms of the number of years since they had actively started organic agriculture. The organic farming experience was represented in Table 19 and fig: 6 in which the results show that nearly three-fourths (76.7%) of the smallholder farmers had medium level of experience in organic farming followed by 20 percent with high level of experience and 3.3 percent of the smallholder farmers had low level of experience in organic farming. The average experience in organic farming was 5.16 years.

Table: 19 Distribution of respondents based on their organic farming experience (n=30)

Category	Frequency	Percentage
Less than 5 years (Low)	1	3.3
5-10 years (Medium)	23	76.7
More than 10 years (High)	6	20
Total	**30**	**100**

Mean: 2.20 S.D :.484

4.1.6 Annual income

Farmers were categorized into the low, middle, and high-income categories based on their annual income, It can be observed from the results Table 20 and fig:7 that more than half (43.34%) of the smallholder farmers belonged to medium income group followed by 33.33 percent and 23.33 percent of farmers belonging to low and high-income groups, respectively. Average annual income of the farmers was found to be Rs.231666.

Table: 20 Distribution of respondents based on their Annual income (n=30)

Category	Frequency	Percentage
Less than 75000 (low income)	10	33.34
1,50,000 (medium income)	13	43.33
More than 300000 (high income)	7	23.33
Total	**30**	**100**

Mean: 1.90 S.D:1.363

4.1.7 Family Size

The distribution of smallholder farmers according to the family size is presented in Table 21 which revealed that majority (76.7 %) of the organic farmers belonged to medium family i.e. 5-7 members with 1-4 members followed by (20 %) and only one farmer was found with large family size i.e. 8-10 members. Average family size of the farmers was found to be four.

Table: 21 Distribution of respondents based on their Family size (n=30)

Category	Frequency	Percent
1-4 (Small)	6	20
5-7 (Medium)	23	76.7
8-10 (High)	1	3.3
Total	**30**	**100**

Mean: 1.7 **S.D:0.466**

4.1.8 Organizational membership

The social networking of the respondents is determined using the organizational membership status. Results from table 22

Farmer producer company- A very few (3.3 percent) were regular member of farmer producer company and the majority had no membership 96.7 percent of farmers .Farmers club – a very few (3.3 per cent) were regular members of farmers club and the majority had no membership (96.7). About 50 percent of farmers were utilizing regular membership in co-operative society, 13.3 percent utilized it rarely and 36.7 percent had no membership at all. Among arts club, a majority (56.7 %) were utilizing membership regularly followed by 26.7 percent other membership followed by ADC, A-grade vegetable cluster group. Whereas, 33.3per cent and a few (10 %) were found utilizing sometimes only.

Table: 22 Distribution of respondents based on their organizational membership (n=30)

Category	Frequency use					
	Regularly		Sometimes		Never	
	F	%	F	%	F	%
FPO	1	3.3	0	0	29	96.7
Farmers club	1	3.3	0	0	29	96.7
Co-operative society	15	50	4	13.3	11	36.7
Arts club	17	56.6	10	33.3	3	10
Other	8	26.7	0	0	22	73.3

4.1.2 Farm related variables of farmers

The findings related to farm related variables of farmers such as farm size , support provided by the govt and marketing function are given below.

4.1.2.1 Farm size

Farm size was operationalized as the area of cultivable land owned by the farmer based on the farmers categorized into five different groups such as shown in table 23 and fig : 8 .In agreement with the distribution of small and marginal farmers in Kerala as well as the country as a whole, 56.7 percent of the farmers were found to be small farmers and 33.3 percent as marginal farmers with below 1ha .semi medium farmers with farm size as 10 percent.

Table: 23 Distribution of respondents based on their farm size (n=30)

Category	Frequency	Percent
Marginal below 1ha	10	33.3
Small farmers 1-2 ha	17	56.7
Semi medium farmers(2-4 ha)	3	10
Total	**30**	**100.0**

4.1.2.2 Support provided by the government

Institutions were found to provide farmers with a subsidy to promote organic agriculture. The table shows the extent to which farmers received a subsidy for organic agricultural practices. Majority of the farmers (66.7 percent) have availed subsidy for conversion to organic farming Table: 24

Table: 24 Distribution of respondents based on their support provided by Government (n=30)

Category	Frequency	Percentage
Not availed	10	33.33
Availed	20	66.7
Total	**30**	**100**

Mean: 1.22 **S.D: .47**

4.1.2.3 Marketing channel

Studies on the distribution of the marketing channels revealed that majority (46.7 per cent) of the farmers were selling their organic produce directly to consumers, followed by 30 percent who relied on govt agency for marketing their produce. 16.7 percent were selling their produce to organic retail shops .Table: 25 and Fig: 9

Table: 25 Distribution of respondents based on the marketing channel utilized by them (n=30)

Category	Frequency	Percentage
Organic Retailer shop	5	16.7
Co-operative society	2	6.7
Govt agency –Ada market, Horticorp	9	30
Consumer	14	46.7
Total	**30**	**100**

4.1.2.4 Marketing function

With respect to marketing functions, it was observed that transportation was the major marketing function carried out by a greater number of respondents (60 percent)**,** packing is another function of respondents (30 percent) Table: 26 and fig: 10

Table: 26 Distribution of respondents based on their marketing function (n=30)

Category	Frequency	Percentage
Transportation	18	60
Packing	9	30
Unloading and Loading	3	10
Total	**30**	**100**

Mean : 1.5 **S.D:0.687**

4.1.2.5 Volume of produce marketed

Table: 27 Indicates that 33.3 percent of the respondents were selling 20 to 40 percent of their produce. 26.7 percent of respondents were selling less than 20 percent of their produce. 23.3 percent of respondents were selling 40-50 percentage of their produce and 16.67 percent of the respondents were selling more than 50 percent of their produce.

Table: 27 Volume of products marketed by the respondent (N=30)

Volume of produce marketed	Frequency	Percentage
<20% percent	8	26.7
20-40 percent	10	33.3
40-50 percent	7	23.3
<50 percent	5	16.7
Total	**30**	**100**

4.1.2.6 Types of inputs used

Results from table 28 reveal that among the inputs doesn't use of Muriate of potash (100 percent) and other inputs (100 percent). Occasionally used inputs were Urea, Potash, and Factomphos.

Table:28 Distribution of respondents based on their type of inputs used (n=30)

Inputs	Frequency use					
	Regularly		Sometimes		Never	
	F	%	F	%	F	%
Urea	0	0	3	10	27	90
Potash	0	0	1	3.3	29	93.3
MOP	0	0	0	0	30	100
Factomphos	0	0	4	13.3	26	86.7
Others	0	0	0	0	30	100

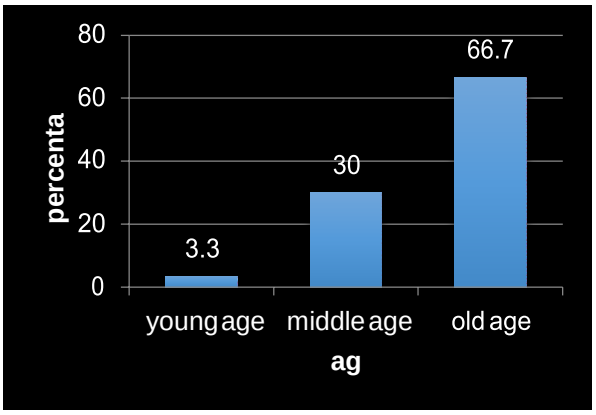


Figure:2 Distribution of respondents based on their age

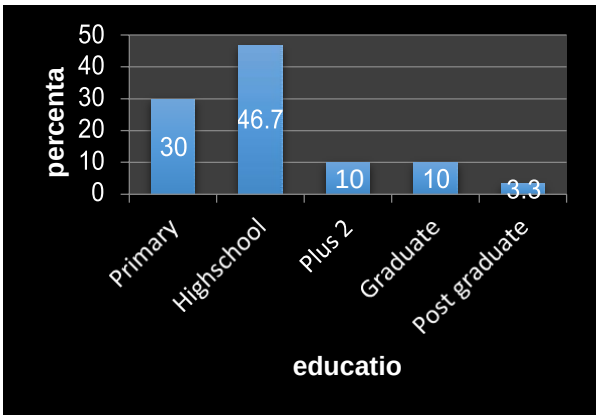


Figure:3 Distribution of respondents based on their education

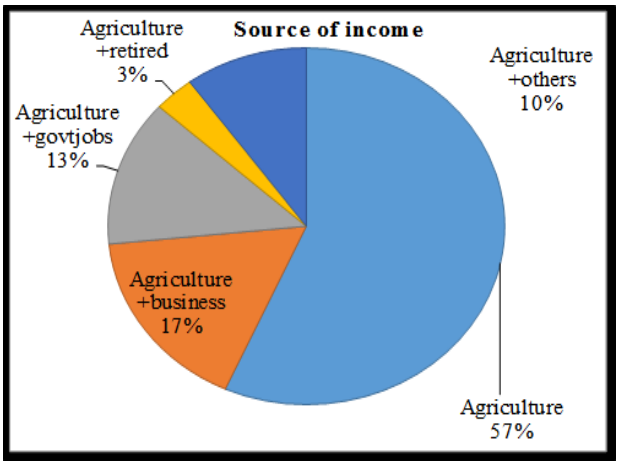


Figure: 4 Distribution of respondents based on their source of income

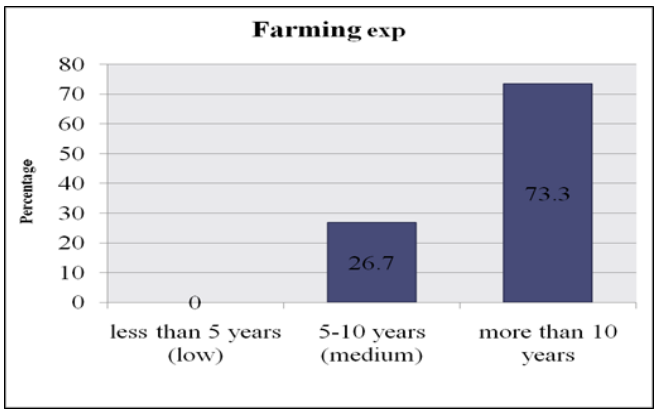


Figure :5 Distribution of respondents based on their farming experience

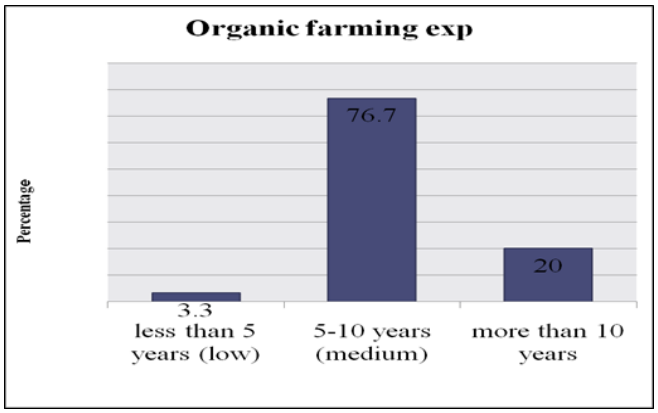


Figure: 6 Distribution of respondents based on their organic farming experience

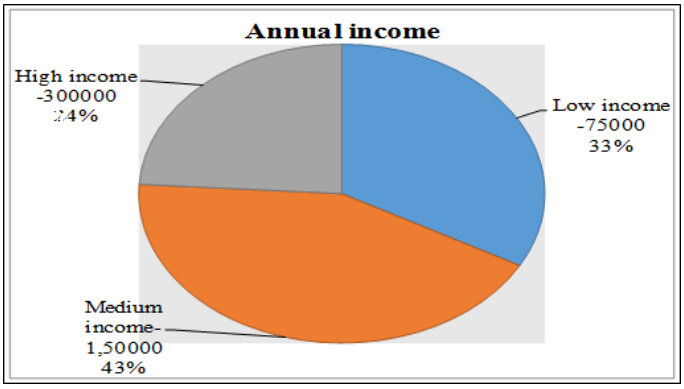


Figure: 7 Distribution of respondents based on their Annual income

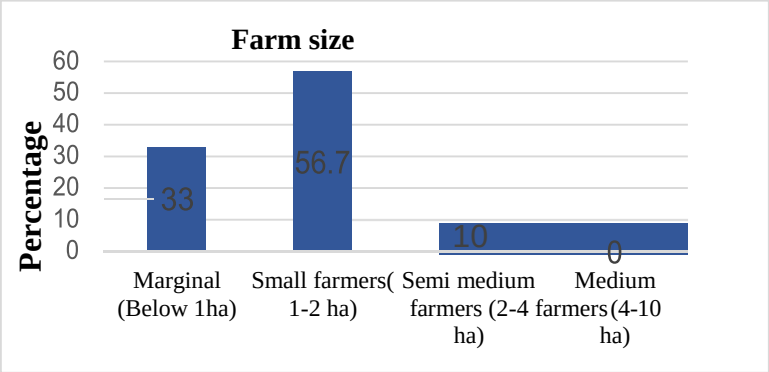


Figure: 8 Distribution of respondents based on their farm size

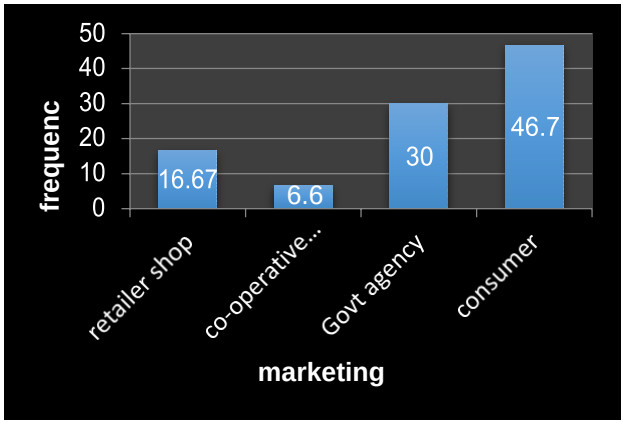


Figure : 9 Distribution of respondents based on their marketing channel

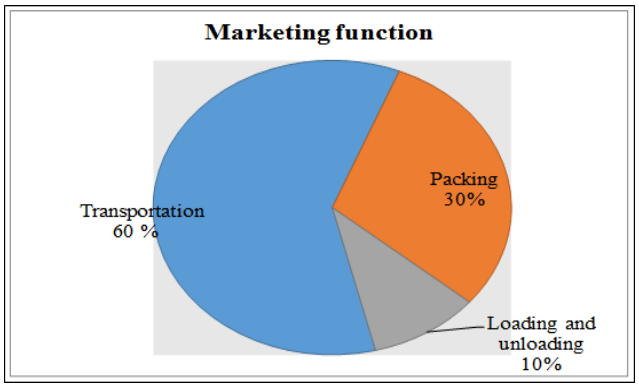


Figure: 10 Distribution of respondents based on their marketing function

4.2 Components Of organic farming Selected organic homesteads

Table: 29 Components of Organic Farming Selected Organic Homesteads (n=30)

Inputs	**Frequency use**					
	Regularly		**Sometimes**		**Never**	
	F	**%**	**F**	**%**	**F**	**%**
Bulky organic manures						
Farm yard manure	**24**	**80**	5	16.7	1	3.3
Poultry manure	**23**	**76.7**	5	16.7	2	6.7
Goat manure	**16**	**53.3**	7	23.3	7	23.3
Compost	**15**	**50**	5	16.7	10	33.3
Green manure crops						
Sunhemp	3	10	**13**	**43.3**	**14**	**46.7**
Daincha	4	13.3	10	33.3	**16**	**53.33**
Green leaf manure						
Glyricidia	9	30	9	30	**12**	**40**
Concentrated organic manures						
Neem cake	**20**	**66.7**	6	20	4	13.3
Ground nut cake	**16**	**53.3**	12	40	2	6.67
Bone meal	**10**	**33.3**	6	20	7	23.3
Liquid organic manures						
Jeevamrutham	**14**	**46.7**	7	23.3	9	30
Kunapajalam	11	**36.7**	10	33.3	9	30
Fish amino acid	**12**	**40**	10	33.3	8	26.7

Panchagagavya	**14**	**46.7**	4	13.3	12	40
Organic pesticides						
Chilly –garlic extract	**16**	**53.3**	3	10	11	36.7
Tobacco decoction	**18**	**60**	7	23.3	5	16.7
Neem oil garlic extract	**12**	**40**	9	30	9	30
Bordeaux mixture	5	16.67	6	20	**19**	**63.3**
Biofertizer						
Azolla	**11**	**36.7**	9	30	10	33.7
Bio control agent						
Pseudomonas	**13**	**43.3**	8	26.7	9	30
Trichoderma	**15**	**50**	6	20	9	30
Mycorrhiza	**11**	**36.7**	9	30	10	33.3
Traps						
Yellow trap	7	23.3	7	23.3	**16**	**53.3**
Thulasi trap	8	26.7	6	20	**16**	**53.3**
Pheromone trap	11	36.7	4	13.3	**15**	**50**
Crop rotation	10	33.33	**12**	**40**	8	26.7
Thulasi trap	8	26.7	6	20	**16**	**53.3**
Crop rotation	10	33.33	**12**	**40**	8	26.7
Crop residue management	8	26.7	**15**	**50**	7	23.3
Other enterprises						
Livestock	**24**	**80**	5	16.7	1	3.3
Poultry	**23**	**76.7**	5	16.7	2	6.7
Pisciculture	**16**	**53.3**	7	23.3	7	23.3

The data compiled in the table 29 shows the components of organic farming in selected homesteads. The components of organic farming practices were categorized into regular, sometimes and never, based on the frequency of use. The data from Table 29 revealed that 80.00 percent, 76.7 percent and 53.3 percent, 50 percent of the respondent's regularly used bulky organic manures like FYM, poultry manure, goat manure, and vermicompost or coir pith compost respectively.

The green manure crops like sunhemp was used sometimes by 43.3percent for vegetables and 46.7 percent of the respondents never used it. Daincha was used sometimes by 33.3 percent and 53.3 percent never used it. The table revealed that in the case of concentrated organic manures , Neem cake, groundnut cake, and bone meal was used by 66.7 percent, 53.3 percent and 33.3 percent respectively.Liquid organic manure like jeevmrutham, panchagavya, fish amino acid, kunapajalam was used by 46.7 percent, 36.7 percent, 40 percent, and 43.3 percent respectively.

The frequency of using biocontrol agents like Pseudomonas, Trichoderma and VAM were 43.3 percent, 50 percent, and 36.7 percent respectively. Crop rotation was regularly done by 33.3 percent respondents while 40 percent respondents only practiced it sometimes. Crop residue management was adopted sometimes by 50 percent respondents. In the case of organic pesticides, 53.3 percent, 60 percent and 40 percent of respondents regularly used chilly garlic extract, tobacco decoction, and neem oil emulsion respectively.63.3 percent of respondents never used Bordeaux mixture at all.

Frequency use of components of organic farming used to 80.00 percent, 76.7 percent and 53.3 percent, 50 percent of the respondent's regularly used other enterprises are livestock , poultry and pisciculture .

4.3 Homesteads based on Temporal, And Scalar Dimension

Measurement of diversity indices based on the biodiversity components of selected homesteads in terms of species richness and diversity index are worked out in the study .The results are well explained below.

4.3.1 The measure of species richness

Species richness is a measure of the number of species found in a sample higher the margalef index, the richer would be the species diversity of the population. The values were for given the table: 30

Table 30: Measure of species richness

No. of homesteads	Margalef index (Nilambur block)	Margalef index (Wandoor blocks)
1	1.43	1.96
2	1.72	2.16
3	1.62	1.82
4	2.37	2.26
5	2.35	1.56
6	2.3	1.59
7	2.36	2.58
8	2.1	1.46
9	2.12	2.21
10	1.745	1.9
11	1.87	1.33
12	1.59	1.05
13	1.6	2.07
14	2.05	1.55
15	2.23	1.59

4.3.1.1 Mean of margalef index values of species richness

Table: 31 Mean index of margalef index

Block	Mean index
Nilambur	1.96
Wandoor	1.80

The results of species richness in organic homestead gardens of different regions in Malappuram district are represented in Table:30 and table:31 representing mean indices. Nilambur block the highest richness of species followed by Wandoor with slight differences.

4.3.2 Shannon-Wiener index of diversity

Table: 32 Shannon –wiener index of Nilambur block (n=15)

Shannon –Wiener index	Total no .of species	Total no of Individual species
0.962	23	164
0.368	24	178
0.89	22	164
0.62	33	164
0.89	29	230
0.89	29	148
0.91	26	104
0.94	29	118
0.83	24	175
0.91	25	126
0.91	25	92
0.84	26	196
0.33	33	216
0.22	24	254
0.56	29	256

Table: 33 Shannon –wiener index of Wandoor block

Shannon – Wiener index	Total no .of species	Total no of Individual species
0.63	23	164
0.92	24	178
0.93	22	164
0.93	33	164
0.89	29	230
0.96	29	148
0.605	26	104
0.90	29	118
0.94	24	175
0.98	25	126
0.73	25	92
0.93	26	196
0.96	33	216
0.89	24	254
0.83	29	256

Table: 34 Mean index of Shannon –wiener index

Block	Mean index
Nilambur	0.73
Wandoor	0.86

The results of species diversity in homestead gardens of different regions in Malappuram district are represented in Table: 32, Table: 33 and Table: 34. Wandoor block in general recorded the highest diversity of species this was followed by Nilambur .

4.3.3 Species diversity in organic homesteads garden

The common plants found in organic homesteads of Malappuram district are listed in Table:35 along with their scientific names.

Table : 35 Common plants found in organic homesteads of Malappuram district

Sl No.	CommonName	Scientific name	Family
Timber Trees			
1	Mahagoni	*Swietenia mahogany*	Meliaceae
2	Matti	Terminalia elliptica	Combretaceae
3	Manjadi tree	*Adenanthera pavonina*	Fabaceae
4	Elanji	*Mimusops elengi*	Sapotaceae
5	Bamboo	*Bambusa arundinacea*	Gramineae
6	Neem tree	*Azadirachta indica*	Meliaceae
7	Teak	*Tectona grandis*	Verbenaceae
8	Ambayam	*Spondias mangifera*	Anacardiaceae
9	Ayani	*Artocarpus hirsute*	Moraceae.
10	Venga	*Pterocarpus marsupium*	Leguroinosae
11	Nellikka	*Emblica Officinalis*	Phyllanthaceae
12	Rakthachandanam	*Pterocarpus santalinus*	Fabaceae
13	Irul	*Xylia xylocarp*	Cesalpineaceaee
14	Arjun	*Terminalia arjuna*	Combretaceae
15	Mylanchi	*Lawsonia inermis*	Lythraceae
Fruits			
16	Banana	*Musa spp*	Musaceae
17	Mango	*Mangifera indica*	Anacardiaceae
18	Jack	*Artocarpus heterophyllus*	Moraceae
19	Papaya	*Carica papaya*	Caricaceae
20	West Indian cherry	*Malpighia punicifolia*	Malpighiaceae
21	Pomegranate	*Punica granatum*	Punicaceae
22	Egg fruit	*Leucuna nervosa*	Sapotaceae
23	Rambuttan	*Nephelium lappaceum*	Sapindaceae
24	Pine apple	*Ananas comosus*	Bronieliaceae
25	Guava	*Psidium guajava*	Myrtaceae
26	Sapota	*Achras Sapota*	Sapotaceae
27	Breadfruit	*Artocarpus altilis*	Moraceae
28	Champa	*Syzygium spp*	Myrtaceae
29	Cashewnut	*Anacardium occidentale*	Anacardiaceae
30	Lime	*Citrus aurantifolia*	Rutaceae
31	Custardapple	*Annona squamosa*	Annonaceae
32	Tamarind	*Tamarindus indica*	Leguminosae
33	Garcinia	*Garcinia spp.*	Guttiferae
Vegetables			

34	Ash Gourd	*Benincasa hispida*	Cucurbitaceae
35	Brinjal	*Solanum melongena*	Solanaceae
36	Tomato	*Lycopersicon esculentum*	Solanaceae
37	Amaranthus	*Amaranthus spp.*	Amaranthaceae
38	Snake Gourd	*Trichosanthes cucumerina*	Cucurbitaceae
39	Bhindi (Okra)	*Abelmoschus esculentus*	Malvaceae
40	Bitter gourd	*Momordica charantia*	Cucurbitaceae
41	Cucumber	*Cucumis sativus*	Cucurbitaceae
42	Drumstick	*Moringa pterygosperma*	Moringaceae
43	Chekkurmanis	*Sauropus androgynus*	Euphorbiaceae
44	Pumpkin	*Cucurbita pepo*	Cucurbitaceae
45	Curry leaf	*Murraya koenigii*	Rutaceae
46	Ridge gourd	*Luffa acutangula*	Cucurbitaceae
47	Cauliflower	*Brassica oleracea*	Brassicaceae
48	Cabbage	*Brassica oleracea*	Brassicaceae
Cereals			
49	Rice	*Oryza sativa*	Poaceae
Pulses			
50	Cowpea	*Vigna unguiculata*	Fabaceae
51	Bengal gram	*Vigna spp*	Fabaceae
Oil yielding crops			
52	Coconut	*Cocos nucifera*	Palmae
Spices and condiments			
53	Pepper	*Piper nigrum*	Piperaceae
54	Chilli	*Capsicum spp*	Solanaceae
55	Nutmeg	*Myristica Fragrans*	Myrtaceae
56	Cinnamon	*Cinnamomum zeylanicum*	Lauraceae
57	Ginger	*Zingiber officinale*	Zingiberaceae
58	Rubber	*Hevea brasiliensi*	Euphorbiaceae
59	Arecanut	*Areca catechu*	Palmae
60	Coffee	*Coffea spp.*	Rubiaceae
61	Cocoa	*Theobroma cacao*	Sterculiaceae
Green manures			
62	Calopogonium	*Calamburgiu monoideism*	Leguminosae
63	Crotalaria	*Crotalaria striata*	Leguminosae
64	Gliricidia	*Gliricidia maculata*	Leguminosae
Fodder			
65	Guinea grass	*Megathrysus maximum*	Gramineae
66	Napier grass	*Pennisetum purpureum*	Gramineae

Ornamental plants			
67	Rose	*Rosa chinensis*	Rosaceae
68	Jasmine	*Jasminum sp*	Oleaceae
69	Nambiar vattom	*Tabarnemontana sp*	Apocynaceae
70	Cassia	*Cassia fistula*	Fabaceae
71	Ixora	*Ixora coccinea*	Rubiaceae
72	Parijathakam	*Nyctanthes arbor-tristis L*	Oleaceae
73	Chembarathi	*Hibiscus rosasinensis*	Malvaceae
Tuber crops			
74	Tapioca	*Manihot esculenta*	Euphorbiaceae
75	Koova	*Maranta arundinacea*	Euphorbiaceae
76	Yam	*Dioscoea sp*	Dioscoreaceae
77	Ginger	*Zingiber officinale*	Zingiberaceae
78	Turmeric	*Curcuma longa*	Zingiberaceae
79	Amorphophallus	*Amorphophallus titanium*	Araceae
Medicinal plants			
80	Thulasi	*Ocimum sanctum*	Lamiaceae
81	Ashokam	*Saraca asoka*	Fabaceae
82	Aadalodakam	*Adhatodavasica Nees.*	Acanthaceae
83	Brahmi	*Bacopa monnieri*	Plantaginaceae
84	Kattarvaazha	*Aloe vera*	Aspholdaceae
85	Panikoorkka	*Plectranthus barbatus*	Lamiaceae
86	Raamacham	*Chrysopogon zizanoides*	Poaceae

The study assessed the diversity of plants in homesteads. Eighty-six plants were identified which are very commonly seen in the study area including both 7 ornamental plants and medicinal plants ,6 tuber crops ,18 fruits,15 timber trees ,15 vegetables,4spices and condiments,3 green manure crops, fodder crops,1 oil yielding crops ,2 cereals and 1 Pulses ,4 other crops etc .

4.3.4 Temporal dimensions of biodiversity of organic homesteads

Perennials:Mango,Jack,Papaya,Pomegranate,Bamboo,Sapota,Guava,Drumstick,Custard apple, Coconut ,Pepper, Lime, Rubber, Nutmeg, Cocoa, Tamarind, Arecanut, Teak

Seasonal: Banana, Cowpea, Marigold, Cauliflower, Brinjal, Tomato, Amaranthus, Chilly, Rose, Jasmine, Tapioca

It was clear that perennials were predominantly more in homesteads and seasonal crops were comparatively less.

4.4 Marketing of major crops

Agricultural marketing involves all the activities concerned with the movement of produce from the farm to the ultimate consumer through different marketing channels. At each stage of marketing expenditure is incurred towards the operations carried out and the intermediaries or the person involved fixes a certain amount of profit or margin.

4.4.1 Marketing channel

The chain of intermediaries through whom the commodity moves from the producer to the consumer constitutes the marketing channel. It could be understood from that the intermediaries functioning in the marketing of major crops in Malappuram region were, govt agencies – Horticorp, co-operative society, and retailers. The four marketing channels identified in Malappuram region were

Major crops are identified channels are

1) Chilly and cowpea

Marketing channel 1:

Marketing channel II

Marketing channel III

2) Amaranthus

Marketing channel :I

Marketing channel :II

3) Bittergourd

Marketing channel :I

Marketing channel :II

Marketing channel :III

4) Banana

Marketing channel :I

Marketing channel :II

Marketing channel :III

4.4.2 Marketing efficiency for different marketing channels

The major crops marketed in the study area vegetables and banana. Vegetables studied were chilli, bitter gourd, cowpea and Amaranthus. Crop wise, chilly channel I had the highest marketing efficiency of 20 while it was lowest in channel III (10.7).The marketing margin was highest in channel III (Rs.2.5 /Kg) whereas it was zero in a channel I as the farmers were directly selling to consumers in this channel. The share of marketing margin in consumer price ranged from 4.25 per cent in channel III (govt agency).

In the case of cowpea, channel I had the highest marketing efficiency of 30 while it was lowest in channel II (8.69). Even though there were no intermediaries between farmer and consumer in channel I .The marketing margin was highest in channel II (Rs.1.75 /Kg) whereas it was zero in the channel I as the farmers were directly selling to consumers in this channel.

In the case of Amaranthus, channel I had the highest marketing efficiency of 22.5 while it was lowest in channel II (7.27). Even though there were no intermediaries between farmer and consumer in channel I.. The marketing margin was highest in channel II (Rs.1.75 /Kg) whereas it was zero in the channel I as the farmers were directly selling to consumers in this channel.

In case of bitter gourd, channel I had the highest marketing efficiency of 24 while it was lowest in channel II (10.47). Even though there were no intermediaries between farmer and consumer in a channel I The marketing margin was highest in channel III (Rs.2.25 /Kg) whereas it was zero in a channel I as the farmers were directly selling to consumers in this channel .

In the case of channel I had the highest marketing efficiency of 18 while it was lowest in channel II (7.6). The marketing margin was highest in channel III (Rs.2.25 /Kg) whereas it was zero in a channel I as the farmers were directly selling to consumers in this channeL

Table: 36 Marketing cost, marketing margin, price Spread and efficiency in different marketing channels of chilly

Particulars	**Channel I**	**Channel II**	**Channel III**
Price realized by the farmer (Rs/kg)	40	55	45
Marketing cost	2	2	1.5
Net price received farmer	38	53	43.5
Purchasing price of the retailer	0	55	0
The cost incurred by the retailer			
Loading and unloading	0	1	0
Gunny bag	0	0.75	0
Transportation charges	0	1.5	0
Marketing cost	0	3.25	0
Margin	0	1.75	0
Purchasing price of govtagency-horticorp	0	0	45
Loading and unloading	0	0	1.5
Transportation	0	0	1.25
Marketing cost	0	0	2.75
Marketing margin	0	0	2.25
Consumer price	**40**	**60**	**50**
Total marketing cost	2	5.25	4.25
Marketing margin	0	1.75	2.25
Price spread	2	7	6.5
Consumer's rupees share in producer share	**95**	**88**	**89**
Shephered index	**20**	**11.42**	**10.7**

Table: 37 Marketing cost, marketing margin, price Spread and efficiency in different marketing channels of cowpea

Particulars	**Channel I**	**Channel II**	**Channel III**
Price realized by the farmer (Rs/kg)	60	45	40
Marketing cost	2	2	2
Net price received farmer	58	43	38
Purchasing price of the retailer	0	45	0
The cost incurred by the retailer			
Loading and unloading	0	1.25	0
Packing	0	1	0
Transportation charges	0	1.5	0
Marketing cost	0	3.75	0
Margin	0	1.25	0
Purchasing price of govtagency-horticorp	0	0	40
Loading and unloading	0	0	1.5
Transportation	0	0	1.25
Marketing cost	0	0	2.75
Marketing margin	0	0	2.25
Consumer price	**60**	**50**	**45**
Total marketing cost	2	5.75	4.75
Marketing margin	0	1.25	2.25
Price spread	2	7	7
Consumer's rupees share in producer share	**96**	**86**	**84**
Shephered index	**30**	**8.69**	**9.4**

Table: 38 Marketing cost, marketing margin, price Spread and efficiency in different marketing channels of Amaranthus

Particulars	**Channel I**	**Channel II**
Price realized by the farmer (Rs/kg)	40	35
Marketing cost	2	0.50
Net price received farmer	38	34.50
Purchasing price of the retailer	0	35
The cost incurred by the retailer		
Loading and unloading	0	1.25
Packing	0	0.50
Transportation charges	0	1.50
Marketing cost	0	3.25
Margin	0	1.75
Consumer price	**45**	**50**
Total marketing cost	2	3.75
Marketing margin	0	1.75
Price spread	2	5.5
Consumer's rupees share in producer share	84	86
Shephered index	22.5	7.27

Table: 39 Marketing cost, marketing margin, price Spread and efficiency in different marketing channels of Bitter Gourd

Particulars	**Channel I**	**Channel II**	**Channel III**
Price realized by the farmer (Rs/kg)	60	50	45
Marketing cost	2.5	1.5	1.75
Net price received farmer	57.5	48.5	43.25
Purchasing price of the retailer	0	50	0
The cost incurred by the retailer			
Loading and unloading	0	1.25	0
Packing	0	1	0
Transportation charges	0	1.5	0
Marketing cost	0	3.75	0
Margin	0	1.25	0
Purchasing price of govt agency-co-operative society	0	0	
Loading and unloading	0	0	1.5
Transportation	0	0	1.25
Marketing cost	0	0	2.75
Marketing margin	0	0	2.25
Consumer price	**60**	**55**	**50**
Total marketing cost	2.5	5.25	4.5
Marketing margin	0	1.25	2.25
Price spread	2.5	6.5	6.75
Consumer's rupees share in producer share	**96**	**88**	**86**
Shephered index	**24**	**10.47**	**11.11**

Table: 40 Marketing cost, marketing margin, price Spread and efficiency in different marketing channels of banana

Particulars	**Channel I**	**Channel II**	**Channel III**
Price realized by the farmer (Rs/kg)	40	35	45
Marketing cost	2.5	1.5	1.75
Net price received by farmer	37.5	33.5	43.25
Purchasing price of the retailer	0	35	0
The cost incurred by the retailer			
Loading and unloading	0	1.25	0
Packing	0	1	0
Transportation charges	0	1.5	0
Marketing cost	0	3.75	0
Margin	0	1.25	0
Purchasing price of govtagency-co-operative society	0	0	
Loading and unloading	0	0	1.75
Transportation	0	0	1
Marketing cost	0	0	2.75
Marketing margin	0	0	2.25
Consumer price	**45**	**40**	**50**
Total marketing cost	2.5	5.25	4.5
Marketing margin	0	1.25	2.25
Price spread	2.5	6.5	6.75
Consumer's rupees share in producer share	**83**	**83**	**87**
Shephered index	**18**	**7.6**	**11.11**

Note: Figures in parentheses indicate total marketing cost, margin and price spread expressed as a percent of the respective consumer price

4.5 Constraints faced by the farmers

The farmers faced several problems during organic farming. The constraints were listed out in the interview schedule and the respondents were asked to rank it during the survey. Using Garret ranking technique, the ranks were then converted into the mean score to identify the major constraints.

Table: 41 Constraints faced by the farmers

Sl no	Constraints	Mean score	Rank
1	Lack of premium price for organic produce	70.9	1
2	Less market price	67.76	2
3	Lack of crop insurance	65.4	3
4	Wild animal attack	63.96	4
5	Low yield	63.06	5
6	High wage and labour shortage	62.96	6
7	High pest and disease infestations	60	7
8	Lack of training	59.43	8
9	High cost of organic inputs	56.56	9
10	Difficulty in selling the produce	55.5	10
11	High production risk	55.13	11
12	Natural calamity	49.76	12

The major constraints identified were lack of premium price for organic produce, less market price, lack of crop insurance, wild animal attack, low yield, high wages and labor shortage and pest and disease problems. Joseph (2016) And Sreejith (2016) also identified similar constraints among organic farmers.

4.6 Correlation analysis

The correlation analysis revealed that out of 7 independent variables, two variables namely source of income, annual income had higher positive correlation with biodiversity index of organic homesteads.

Table: 42 Correlation analysis between biodiversity index of organic homestead farmers about independent variables

Sl.no	Independent variable	Correlation coefficient (r)
1	Education	.171
2	Source of income	.421*
3	Farm size	-.386*
4	Annual income	.516**
5	Family size	.032
6	Farming experience	.015
7	Organic farming experience	-.318*

Correlation is significant at the 0.05 level (2-tailed).*

Correlation is significant at the 0.01 level (2-tailed).**

4.7 Results of Mann Whitney U test

The respondents were categorized into two groups, group I and group II based on the Blocks. Group I comprised of the respondents in Nilambur block and group II comprised of respondents from Wandoor block. Mann Whitney U test was carried out to find the difference in attributes between the two groups. The result obtained was as follows:

Table:43 Comparison of two groups using the Mann Whitney U test

Variables	Mean rank		U	Sig
	Group I	Group II		
Age	13.33	17.67	80.000	.124
Education	19.67	11.33	50.000**	.005
Experience	18.47	12.53	68.000	.055
Annual Income	19.90	11.10	46.500**	.004
Family Size	13.00	18.00	75.00*	.034
Agri Credit	18.50	12.50	67.5*	.022
Govt Support	16.50	14.50	97.500	.150

*** Significance 0.05 % Level and ** 0.1 percent level**

The data showed that seven variables were age, education, the experience of farming, annual income, family size, agricultural credit, govt support. A comparative study between the farmers from two block revealed that education and annual income were significantly different of these two blocks of farmers.

4.8 Suggestions for promotions of organic farming

- Awareness programs for consumers
- Conducting training and exposure field visits
- Development of model organic farms with institutional support
- Provide financial incentives for promoting organic faming
- Ensuring quality organic manure at reasonable price
- Enhancing the supportive role in government marketing of organic practices
- Technical support in establishing organic kitchen gardens in homesteads
- Organic certification
- Marketing aspects of organic farming should be studied in detail

SUMMARY

CHAPTER V

SUMMARY

Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biological diversity, biological cycles, and biological activity of soil. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. There are a number of ongoing initiatives in Kerala. A draft policy was framed in 2003 with a motive to convert Kerala into a fully organic state.

The study was conducted with the purpose to identify the components of organic farming in the selected organic homesteads, identify the marketing channels utilized by farmers and work out their marketing efficiency, analyze the biodiversity in the selected organic homesteads, explore the constraints experienced by farmer andto suggest measures to encourage organic farming in Kerala state.

The research was carried out in Malappuram district of Kerala state. Comprising of Nilambur and Wandoor block with a sample size of thirty organic homesteads using Random sampling techniques. Data were collected by using structured interview schedules and direct observation. and from secondary sources of information, krishibhavan , other publications

Biodiversity index based on species richness and species diversity obtained from the survey and interviews were formulated. Measures of marketing efficiency was calculated using shepherd approach and the efficiency in marketing by the farmers was analyzed.

The comparison of two groups of respondent farmer was carried out by Mann Whitney U test. Statistical Package for Social Sciences (SPSS version 21) was used to tabulate, analyze and interpret the data. The statistical tests used for the analysis and interpretation of data included; percentage analysis, frequency, correlation analysis and Mann Whitney U test.

The salient findings of the study were;

Socioeconomic variables of farmers

- Nearly two-thirds (66.7%) of the farmers belonged to late adulthood category followed by middle (30%) and young (3.3%) groups. The average age of smallholder farmers was found to be 55 years.
- That 46.7 percent of the smallholder farmers has completed high school, whereas 30 percent of the farmers had primary school education, 10 percent of farmers were graduates and few farmers, ie, 3 percent were with post-graduation. And about one-third (46.7) of the farmers were high school.
- The majority of the respondents (56.7 %) undertook agriculture as the major source of income and 16.7 percent of the respondents were doing agriculture along with a business.13.3 percent of respondents practiced agriculture along with a govt job. 3.3 percent were engaged in agriculture, post-retirement and agriculture was practiced along with other services by 10 percent of respondents.
- Nearly three fourth (73.33%) of the smallholder farmers had long term farming experience of more than a period of 10 years followed by 26.7 percent of the farmers with short term farming experience, respectively. The average farming experience of the farmers was 10.43 years.
- Nearly three-fourths (76.7%) of the smallholder farmers had medium level of experience in organic farming followed by 20 percent with high level of experience and 3.3 percent of the smallholder farmers had low level of experience in organic farming. The average experience in organic farming was 5.16 years.
- Almost half (43.34%) of the smallholder farmimg community belonged to medium income group followed by 33.33 percent and 23.33 percent of farmers belonging to low and high-income groups, respectively. An average annual income obtained by these farmers was identified to be Rs.231666.

- The farmers showed regularity in organizational membership primarily in arts club (56.7 %) followed by co-operative society (50 %), coconut board (13.3%) and farmers club (3.3%)
- In agreement with the distribution of small and marginal farmers in Kerala as well as the country as a whole, 56.7 percent of the farmers were found to be small farmers and 33.3 percent as marginal farmers with below 1ha .semi medium farmers with farm size as 10 percent.
- Majority of the farmers (66.6 %) have availed of the subsidy for conversion to organic farming
- It reveal that majority (46.7 per cent) of the farmers were selling their organic produce directly to consumers, followed by 30 percent who relied on govt agency for marketing their produce. 16.7 percent were selling their produce to organic retail shops.
- It was observed that transportation was the major marketing function carried out by a greater number of respondents (60 percent).
- One-third (33.3 per cent) of the respondents were selling 20 to 40 percentage of their produce
- Majority of the respondents does not use of Muriate of potash ,Urea,factomphos

Components of organic farming in selected homesteads

- The majority of farmers 80.00 per cent, 76.7. per cent and 53.3 per cent, 50 percent of the respondents contacts regularly bulky organic manures like FYM, poultry manure , goat manure and vermi compost or coir pith compost respectively.
- The green manure crops like sun hemp were sometimes 43.3 percent used by the respondents. Daincha were sometimes 33.3 percent used by the respondents.
- 66.7 percent 53.33 and 33.3 percent of the respondents use organic farming practices regularly concentrated organic manures like Neem cake, groundnut cake and bone meal respectively

- Liquid organic manure are like Jeevmrutham, Panchagavya ,Fish amino acid ,Kunapajalam, frequency use of regularly contact of respondents are 46.7 percent ,36.7 percent ,40 percent and 43.3 per cent respectively .
- The bio control agents like Pseudomonas, Trichoderma and VAM frequency use of regularly contact of respondents are 43.3 percent, 50 percent, and 36.7 per cent respectively.
- The Crop rotation components of organic farming frequently sometimes use respondents are 40 percent, 33.3 percent regularly. Crop residue management were using sometimes 50 percent for components of organic farming
- The organic pesticides like chilly- garlic extract, tobacco decoction , neem oil garlic emulsion ,Bordeaux mixture frequency of use regularly respondents are 53.3 percent ,60 percent ,40 percent respectively . Bordeaux mixture never used respondents (63.3 per cent).
- Other enterprises are livestock, poultry, Pisciculture etc

Biodiversity in the selected organic homesteads

- The results of species richness in organic homestead gardens of different regions in Malappuram district are Nilambur block in general recorded the highest richness of species this was followed by Wandoor.
- Nilambur block in general recorded the highest diversity of species this was followed by Wandoor
- The study also assessed the diversity of plants in homesteads. Eighty-seven plants were identified which are very commonly seen in the study area including both 7 ornamental plants and medicinal plants ,6 tuber crops ,18 fruits,15 timber trees ,15 vegetables,4spices and condiments,3 green manure crops, fodder crops, 1 oil yielding crops , 2 cereals and 1 Pulses ,4 other crops etc .
- Perennials:Mango,Jack,Papaya,Pomegranate,Bamboo,Sapota,Guava,Drumstick,Custard apple, Coconut ,Pepper, Lime, Rubber, Nutmeg, Cocoa, Tamarind, Arecanut, Teak

- Seasonal: Banana, Cowpea, Marigold, Cauliflower, Brinjal, Tomato, Amaranthus, Chilly, Rose, Jasmine, Tapioca

  It was clear that perennials were predominantly more homesteads and seasonal crops are comparatively less.

Marketing channels utilized by farmers and their marketing efficiency.

- The major crops marketed in the study area vegetables and banana.
- Vegetables studied were chilli, bitter gourd, cowpea and Amaranthus. In the case of cowpea highest marketing efficiency was recorded in channel I (Producer–consumer) whereas the lowest was in channel II (Producer-retailer-consumer)
- In the case of bitter gourd highest marketing efficiency was recorded in channel I (Producer – consumer) and lowest was marked in channel II (Producer-retailer- consumer),
- In the case of chilli highest marketing efficiency was recorded in channel I (Producer – consumer) whereas in channel III the lowest was observed (Producer-Govt agency (horticorp) – consumer)
- In amaranthus highest marketing efficiency of was recorded in channel I (Producer – consumer) and lowest was channel II (Producer-retailer-consumer)
- In the case of banana highest marketing efficiency was in recorded in channel I (Producer – consumer) whereas the channel II recorded lowest marketing efficiency (Producer-retailer-consumer)

Results of Man-whitney U Test

- A comparative study between the farmers from two block revealed that education and annual income were significantly different of these two blocks of farmers.

Correlation analysis

- The correlation analysis revealed that 7 out of independent variables. Source of income, annual income had showed higher positive correlation with biodiversity index of organic homesteads

Constraints faced by the farmers

- Major constraints by the organic farmers are lack of premium price for organic produce, lack market price, lack of crop insurance, wild animal attack, low yield, high labor charges and labor shortage ,high pest and disease infestation

Suggestions for promotions of organic farming

1. Awareness programs to be conducted for the producers and consumers
2. Capacity building programs for interested farmers with exposure visits will be very helpful
3. Development of model organic farms with institutional support
4. Providing financial incentives for promoting organic faming
5. Steps to enhance availability of quality organic inputs
6. The supportive role of government should be strengthened in marketing of organic produce
7. Encouragement should be given for setting up of organic kitchen garden in homesteads
8. Premium price for organic produce should be ensured
9. Organic certification should be made user friendly and easy.
10. Formation of organic farmer groups should be encouraged.

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APPENDICES

APPENDICES

KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF HORTICULTURE
VELLANIKKARA

DEPARTMENT OF AGRICULTURAL EXTENSION

EXPLORATORY STUDY ON ORGANIC FARMING AMONG THE SMALLHOLDER FARMERS

Survey-questionnaire for farmers:

1. Socio economic profile of farmers

1. Name :
2. Address:
3. Gender :
4. Phone number:
5. Age :
6. Educational qualification:

Class	Up to 9th	SSLC	Pre-degree	Graduate	Diploma	Post graduate	Others
Score	1	2	3	4	5	6	7

7. Farming experience (in years): Experience in organic farming:
8. Annual income:

Income	<25000	25000-50000	50000-75000	75000-100000	100000-200000	>200000
Score	1	2	3	4	5	6

9. Farm size

Type of land	Owner (acres)	Leased land(acres)	Leased out(acres)
Dry land			
Wetland			
Total			

10. Irrigation: Pond well canal
11. Type of farm: Homestead/Integrated farming /mixed cropping/Mono cropping

2. Family details

Sl No	Name	Gender (M/F)	Relationship with respondent	Age	Education	Occupation		Annual income	
						Primary	Secondary	Primary	Secondary

*A- Agriculture, E- Employed, SE- Self-employed, NE- Non employed, S- Student

3. Farm details

Crop components

Sl. No.	Crop cultivated	Variety	Area (acre)	Production
	Seasonal crops (specify)			
a.				
b.				
	Perennial crops (specify)			
a.				
b.				

Animal component

Sl. No.	Component	Breed	Number
1.	Cow		
2.	Goat		
3.	Poultry		
4.	Honey bee		
5.	Fish		
6.	Others (specify)		

Value addition

Sl. No.	Item	Product	Additional income
1.			
2.			

4. Components of organic farming in selected organic homesteads

Sl no	Item	Frequency of use					Quantity	Crops to which used
		Always	Frequently	occasionally	sometimes	Rarely		
1	Compost							
2	Green manures							
3	Green leaf manures							
4	Concentrated organic manures							
5	Bulky organic manures							
6	Crop rotation							
7	Crop residues management							
8	Bio fertilizers							
9	Liquid organic manure							

5. Use of organics fertilizer:

Sl.no	Organic fertilizer	Source	Dosage	Cost	Labour cost
1	Cow dung				
2	Biogas slurry				
3	Vermi compost				
4	Coir pith compost				
5	Green leaf manures				
6	Bone meal				
7.	Chicken manures				
8.	Goat manures				
9	Ash				
10.	Others specify				

6. Use of organics in plant protection

Sl.no	Organics used	Source	Dosage	Purchase of value	Cost	Type of use	Labour cost
1	Bordeaux mixture						
2	Neem oil garlic emulsion						
3	Neem seed extract						
4	Neem cake						
5	Trichoderma						
6	Pseudomonas						
7	Any traps						
8	Others (specify)						

7. Type of chemicals used if any

Sl no	Item	Frequency of use				
		Always	Frequently	Occasionally	Sometimes	Rarely
1	Urea					
2	Potash					
3	MOP					
4	18:18:18					
	Others					

8. Biodiversity components in homesteads

Based on spatial

a) Courtyard region

Sl no.	Crop species	No. of sp /area	Age	Use

b) Mid region

Sl no.	Crop species	No of sp/area	Age	Use

c) Outer region

Sl no	Crop species	No of sp/ area	Age	Use

Based on temporal

A) During one year how many crop species are raised ?
B) What are the crop that
C) Are grown and how many species ?

Based on scalar

Crop	**Variety**	**Number**
Banana		
Coconut		
Pepper		
Vegetables		
Fruits		
Arecanut		
Any other (specify)		

Species diversity

Shannon –weiner index(species diversity)	Total number of species	Total number of individual species

Species richness

Margalef index (species richness)	Number of species sampled in an area	Total number of individual samples

9. **Have you availed any agricultural credit support?** ***If yes, specify***

Sl. No.	**Crops**	**Purpose for which credit is availed**	**Amount**	**Credit criteria**	**Source of credit**
1.	Paddy				
2.	Coconut				
3.	Banana				
4.	Vegetables				
5.	Others(specify)				

10. Are you member of any cluster? If so specify

Sl no	Cluster	Crops cultivated	Nature of support	Assistance

11. Are you a member of organisation?

Sl o	Item	Member /official	Frequency of contact				
			Always	Frequently	occasionally	sometimes	Rarely
1	Farmer producer organisation (FPO)						
2	Cooperative society						
3	Arts club						
4	Other organisation						
5	No Membership						

12. What all are the support provided for Government?

Sl .No	Type of support	Quantity /value

13. Marketing details

Total quantity produced:
Quantity retained for family consumption:
Quantity retained for on-farm uses:
Total marketed quantity:
Name of the nearest primary market:
Distance:
Name of the nearest wholesale or secondary market:
Distance
Method of sale:

Sl.No	Method of sale	Quantity	Price/unit
1	Village trader		
2	Commission agent/brokers		
3	Primary/retail market		
4	Secondary/wholesale market		
5	Direct sale to consumers		
6	Other modes (specify)		

Do you know through which channel your produce will reach to ultimate consumers?

a. Channel 1 – Producer – village trader – wholesaler – retailer – consumer
b. Channel 2 – Producer – wholesaler – retailer – consumer
c. Channel 3 – Producer – village trader – retailer – consumer
d. Others

14. Marketing cost incurred:

a. Transportation cost
b. Commission/brokerage
c. Storage cost
d. Loading and unloading
e. Packing cost
f. Post-harvest handling
g. Distribution cost
h. Other costs of marketing
i. Total marketing cost

15 .Constraints experienced by farmers:

EXPLORATORY STUDY ON ORGANIC FARMING AMONG SMALLHOLDER FARMERS

By

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(2016-11-039)

ABSTRACT OF THE THESIS

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2021

ABSTRACT

Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems.

The study was formulated with objectives to identify the components of organic farming in the selected organic homesteads, identify the marketing channels utilized by farmers and work out their marketing efficiency, analyze the biodiversity in the selected organic homesteads, explore the constraints experienced by farmer and formulate suggestions for promoting organic farming in the state.

The study was conducted in Malappuram district of Kerala state. comprising of Nilambur and Wandoor blocks with a sample size of 30 organic homesteads picked out using random sampling techniques. Data were collected by using structured interview schedules and direct observation.

The results revealed that components of organic farming in the selected homesteads were use of bulky organic manure, concentrated organic manure, green leaf manure, green manure crops, bio fertilizer, liquid organic manure, traps, bio control agents and organic pesticides.

The study assessed the diversity of plants in organic homesteads. Nilambur block recorded the higher diversity (0.84) followed by Wandoor block (0.73). Nilambur block recorded the higher species richness (1.96) followed by Wandoor block (1.80).

The major crops marketed in the study area vegetables and banana. Vegetables studied were chilli, bitter gourd, cowpea and Amaranthus. In the case of cowpea highest marketing efficiency was recorded in channel I (Producer –consumer) and lowest in channel II (Producer-retailer-consumer) ,whereas bitter gourd highest marketing efficiency was recorded in channel I (Producer – consumer) and lowest in channel II (Producer-retailer- consumer), in the case of chilli highest marketing efficiency was recorded in channel I (Producer – consumer) and lowest in channel III (Producer-Govt agency (horticorp) – consumer), In amaranthus highest marketing efficiency of was recorded in channel I (Producer – consumer) and lowest in channel II (Producer-retailer-consumer) . In the

case of banana highest marketing efficiency was in recorded in channel I (Producer – consumer) and lowest in channel II (Producer-retailer-consumer) .

Source of income, annual income had showed higher positive correlation with biodiversity index of organic homesteads. A comparative study between the farmers from two blocks revealed that education and annual income were significantly different of these two blocks of farmers.

The major constraints faced by farmers were lack of premium price for organic produce, less market price, lack of crop insurance, wild animal attack, low yield, high wages, and labour shortage and pest and disease problems.

Suggestions brought forth by the study for promoting organic farming are designing implementing awareness programs for the consumers, development of model organic farms with institutional support, providing financial incentives for promoting organic farming, ensuring availability of quality organic manure at reasonable price, enhancing the supportive role in government marketing of organic produce and encouraging setting up of organic kitchen garden in homesteads, organic certification More studies on organic farming especially on the marketing aspects are needed to develop viable solutions for the challenges faced by the promoting system.