# ANALYSIS OF ORGANIC FARMING PRACTICES IN VEGETABLE CULTIVATION IN THIRUVANANTHAPURAM DISTRICT

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**KERALA, INDIA**

## DECLARATION

I hereby declare that this thesis entitled "**Analysis of organic farming practices in vegetable cultivation in Thiruvananthapuram district**" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title, of any other university or society.

Vellayani,
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## CERTIFICATE

Certified that this thesis entitled **"Analysis of organic farming practices in vegetable cultivation in Thiruvananthapuram district"** is a record of research work done independently by **Mr. D. Jaganathan**. **(2002-11-28)** under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to him.

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*Dedicated to*

# *My Evergreen*

# Amma & Appa

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# *Introduction*

# 1. INTRODUCTION

> Nature and man are interdependent; protection of the environment will be in the interest of man himself.
>
> – Mahatma Gandhi

Organic farming is an age old practice of natural farming which avoids use of chemical fertilizers and pesticides. Scientists have realized that the green revolution with intensive inputs use has reached a plateau and is now sustained with diminishing return and falling dividends. Nevertheless the intensive use of chemical fertilizers and pesticides has not only polluted soil, water and environment but has also caused several health hazards to human beings. So a natural balance needs to be maintained at all costs for existence of life and prosperity. The obvious choice for that would be reintroduction of organic farming without compromising agriculture production (Laxmi, 1997). Organic farming is the backbone of sustainable agriculture (Anandha *et al*., 2002).It is environment friendly, ecologically balanced and socially accepted.

Vegetables are the natural sources of protective food as they supply nutrients, vitamins and minerals. In a country like India where the population is predominantly vegetarian, it is necessary to increase the production and consumption of vegetables (Indira, 2004).

India has achieved spectacular production level in vegetables, with an estimated production of about 93.92 million tonnes which is 13.5 per cent of the world production (Mathura, 2003). India is the second largest producer of vegetables next to China. In the next decade it is supposed that there will be increased area under vegetable crops as vegetable farming is about 4-5 times more profitable than cereals and other field crops with more employment opportunities (Ajay, 2002).

India has also emerged as one of the major vegetable exporting countries. During 2000-2001, Rs.582.31 crores has been realized with the export of fresh and processed vegetables (Mathura, 2003).

Organic farming has been systematically followed on a large scale in the developed countries. Unfortunately in India though there is a potential for adopting organic farming system it is not taking place on a large scale due to various factors. There are consumers who are eager to pay premium price for organically produced commodities even in India. If India taps the potential in the area of organically produced vegetables, it will emerge as a major vegetable exporter to the developed countries, which will bring huge export earnings. Chemical-free vegetables, which are standardized, have more demand from the developed high-income countries due to health considerations (Rajendran and Kumara, 2000).

The important vegetable crops in Kerala include bittergourd (*Momordica charantia*), cowpea (*Vigna unguiculata*), snakegourd (*Trichosanthes anguina*), oriental pickling melon (*Cucumis melo* var. conomon) ashgourd (*Benincasa hispida*), amaranthus (*Amaranthus* sp.), bhindi (*Abelmoschus esculentus*) and pumpkin (*Cucurbita moschata*) (Gopalakrishnan, 1997).

Organic farming in Kerala is mostly in a traditional stage, but there is a distinct movement among the farmers as well agriculture experts and scientists in favour of ecological farming. Advocates of ‘less chemical-more natural’ are on the increase. There is considerable consumer awareness about the dangers of pesticide poisoning and hybrid crops and fertilizer residues in food. Farmers are finding it profitable to return to traditional farming- if they are to farm at all (Balachandran, 2004).

Vegetable growers in Kerala and other states have started to reduce the use of chemicals in vegetable cultivation. Realizing the export potential in Kerala, Agricultural Export Zone (AEZ) programme

has been started in which emphasis is placed on production of quality and hygienic vegetables. The Kerala State Department of Agriculture has started advocating organic farming practices on major crops like vegetables. Whether these organic farming practices received good attention by the vegetable growers or not? This formed the nucleus of this research programme with the following specific objectives.

**Objectives**

1. To study the profile characteristics of vegetable growers
2. To study the extent of awareness about organic farming practices in vegetable cultivation
3. To find out the extent of knowledge about organic farming practices in vegetable cultivation
4. To study the attitude towards organic farming practices in vegetable cultivation
5. To study the extent of adoption of organic farming practices in vegetable cultivation
6. To find out the relationship between awareness, knowledge, attitude and adoption of organic farming practices with their profile characteristics
7. To identify the constraints in the adoption of organic farming practices and to suggest solutions to them

**Scope of the Study**

The study will be of great help to the Kerala State Department of Agriculture and other Development Departments for the formulation and implementation of various developmental programmes and schemes on organic farming practices. Information on the extent of awareness, knowledge, attitude and adoption of organic farming practices by vegetable growers will reveal the efficacy of the ongoing activities for

popularizing organic farming practices. The study will help the development officers to modify their strategies to motivate vegetable growers to adopt organic farming practices and to overcome the constraints.

This study would be of immense help for the planners, administrators, researchers and extension functionaries to develop and implement suitable policies and strategies for sustainable agricultural development in Kerala and India.

**Limitations**

The study forms a part of the Master's degree programme of the student researcher and hence it has all the limitations of time, money and other resources. Consequently, the researcher was unable to extend the study to all parts of the state.

No human effort is free from limitations. This study is no exception. However, sincere attempts have been made to carry out the research as systematically as possible.

**Presentation of the thesis**

Besides the present introduction chapter, the second chapter namely theoretical orientation deals with the review of selected important and related studies in the field of present investigation. Third chapter presents the methodology used in the study. Location of the study area, sampling procedure followed, quantification of variables selected for the study and statistical techniques employed are dealt within this chapter. Fourth chapter contains results and discussion of the study. The last chapter summarizes the study with implications and suggestions for future research. The appendices and abstract of the thesis are given at the end.

# *Theoretical orientation*

# 2. THEORETICAL ORIENTATION

The researchers recently have been paying serious attention to the need and importance of organic farming practices, as it is an important aspect of sustainable agriculture. The present research programme is the first of its kind in analysing organic farming practices in vegetable cultivation in Kerala. Hence, only a few research findings are available in this emerging field. Keeping this in view, a comprehensive review of the previous research studies related to the topic has been done in accordance with the objectives of the present study and is presented under the following sub headings.

## 2.1 CONCEPT OF ORGANIC FARMING

Singh and Shekhawat (2000) reported that organic farming means farming in the spirit of organic relationship and the concept of organic farming is dubious to the farmers of developing countries. In India, it implies the use of organic manures and no use of synthetic fertilizers and chemical pesticides.

Chaudhary (2002) stated that the term organic farming is not directly related to the type of inputs used but refers to the concept of the farm as an organism in which all the component parts like, the soil minerals, organic matter, micro organisms, insects, plants, animals and humans interact to create a coherent whole. Organic farming is focused on the whole farm system and its interaction with climate, environment, social and economic conditions, rather than considering the farm a comprised of individual enterprises (Fig. 1).

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

Patra *et al*. (2004) reported that organic farming is a paradigm shift from conventional centralized to strategic holistic approach. In the concept, the main aim of organic farming remains sustaining crop productivity, achieving a closed nutrient cycle in the farm maintaining soil fertility and animal welfare and in doing so, synthetic chemicals whether fertilizer or plant protectant are not supposed to be used. Cultivation of less susceptible varieties with suitable crop rotation and using beneficial species and mechanical measures for plant culture is the key component of plant protection, nutritional requirement is made through organic means.

Based on the above concepts it can be concluded that organic farming is conservation of nature.

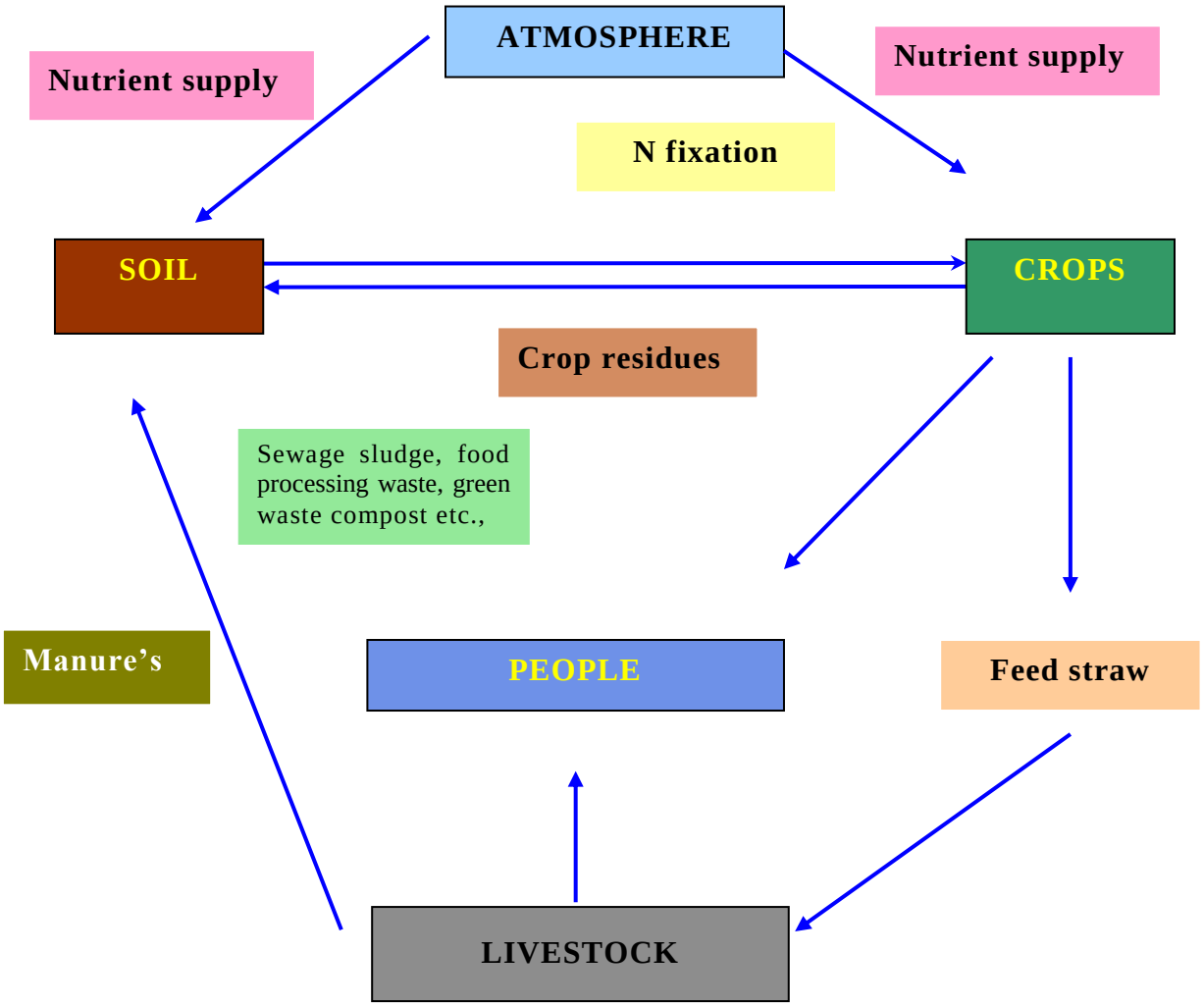



**Fig.1. Organic farming – A closed system (Chaudhary, 2002)**

## 2.2 DEFINITION OF ORGANIC FARMING

U.S. Department of Agriculture has defined organic farming as a "system that is designed and made to produce agricultural products by the use of methods and substances that maintain the integrity of organic agricultural products until they reach the consumer". This is accomplished by using where possible, cultural, biological and mechanical methods, as opposed to using substances to fulfill any specific fluctuation within the system so as to maintain long term soil biological activity, ensure effective pest management, recycle wastes to return nutrients to the land, provide attentive care for farm animals and handle the agricultural products without the use of extraneous synthetic additives or processing in accordance with the act and the regulations in this part (USDA,1980).

Organic farming is a production system, which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent feasible, organic farming systems rely upon crop rotations, crop residues, animal manures, legumes, green manures, off-farm organic wastes, mechanical cultivation, mineral bearing rocks and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients and to control insects, weeds and other pests (Lampkin, 1990).

Organic agriculture is a unique production management system which promotes and enhances agro eco-system health, including bio-diversity, biological cycles and soil biological activity and this is accomplished by using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off -farm inputs (FAO, 1993).

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, weedicides and other chemicals but it emphasizes the need for farming which should create an ecological

balance and a 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 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 Hileyard, 1996).

Organic farming is defined as a ‘holistic management system, which promotes and improves the health of the agro-system related to biodiversity, nutrient bio-cycles and soil microbial and biochemical activities. Organic farming emphasizes management practices involving substantial use of organic manures and green manures (Gaur, 2001).

Organic farming can be defined as an approach to agriculture where the aim is to create integrated, humane, environmentally and economically sustainable agricultural production systems which maximize reliance on farm derived renewable resources and the management of ecological and biological processes and interactions, so as to provide acceptable levels of crop, livestock and human nutrition, protection from pests and diseases and an appropriate return to the human and other resources employed (Senthilkumar and Vadivel, 2001).

Organic farming is a production system which favours maximum use of organic materials (crop residues, animal wastes, legumes and off-farm organic wastes, growth regulators, bio-pesticides etc.) and discourages use of synthetically produced agro-inputs for maintaining soil productivity and fertility and pest management under conditions of sustainable natural resources and healthy environment (Dahama, 2003).

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

## 2.3 OBJECTIVES OF ORGANIC FARMING

According to Blake (1987) the objectives of organic agriculture are

i) 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.
ii) It adopts an approach that minimizes the use of non renewable forms of energy
iii) Organic food aims to be of optimum nutritional value
iv) The organic world strives to be localized. Local markets, decentralized systems of distribution and processing are sought
v) Organic agriculture does not pollute the environment.

As embodied in the International Federation of Organic Agriculture Movement (IFOAM) basic standards for organic agriculture and food processing, the principal aims of organic farming are:

i) To produce food of high nutritional quality in sufficient quantity.
ii) To interact in a constructive and life enhancing way with natural systems and cycles.
iii) To encourage and enhance biological cycles within the farming system, involving microorganisms, soil flora and fauna, plants and animals.
iv) To maintain and increase long-term fertility of soils.
v) To prepare the healthy use and proper care of water, water resources and all life therein.
vi) To help in the conservation of soil and water.
vii) To use as far as possible, renewable resources in locally organized agricultural systems.
viii) To work with materials and substances this can be reused or recycled either on the farm or elsewhere.

ix) To give all livestock life conditions which allow them to perform the basic aspects of their innate behaviour.

x) To minimize all forms of pollution that may result from agricultural practices.

xi) To maintain the genetic diversity of the agricultural system and it's surroundings including the protection of plant and wildlife habitats.

xii) To allow everyone, involved in organic production and processing, a quality of life that conforms to the human rights charter, to cover their basic needs and obtain an adequate return and satisfaction from their work including a safe working environment.

xiii) To consider the wider social and ecological impact of the farming system.

xiv) To produce non-food products out of renewable resources, which are fully bio-degradable. (Angelina, 1997).

## 2.4 NEED FOR ORGANIC FARMING

Organic farming is the need in the present day context of serious threat to our ecology and environment. Great harm is being caused due to large scale pollution of our soil, water and air, which have resulted in degradation and loss of these natural resources and a declining trend has set in the productivity of our soils. Chemical agriculture with a heavy dependence on fertilizers and pesticides is affecting the quality and safety of produce and well being of humanity. For a sound future, organic farming offers a dynamic interaction between soil, plants, animals, humans, ecosystem and environment (Daniel, 1996).

The excessive use of pesticides in vegetable cultivation not only poses serious health problems to the farmers and the soil, but the residues affect the consumers as well. In spite of using pesticides the estimated loss in yields due to pests and diseases ranges from 20 to 40

per cent. The World Health Organization (WHO) standards of terminal pesticide residue level vary between 0.05 ppm for hard vegetables to 0.001 ppm for leafy vegetables. However, studies showed that the pesticide residue level in India is more than 0.05 ppm. It is alarming to find that most of the contaminated samples were found to be loaded with hard to degrade and highly toxic pesticides such as DDT and BHC (Brindha *et al.*, 1999).

Since many of the vegetables are taken raw or half cooked, indiscriminate use of chemicals and pesticides resulting in high residues cause serious health problems (Prabhakar, 1999).

Chemicals save the crops from their enemies, at the same time they also kill many predators, insects and bio-agents acting as bio-pesticides and biofertilizers. The indiscriminate use of pesticides has led to serious consequences like harmful residues, pest resistance to pesticides, pest resurgence and outbreak of secondary pests. The residual effect of some herbicides inhibits nodulation of legume crops. In many case, the toxins of pesticides and herbicides are absorbed by plants and passed into the food chain. The honeybees, nature's pollinating agents have become rare as a result of wide spread use of pesticides (Sreekrishna, 1999).

India has succeeded in green revolution with the introduction of high yielding varieties of various crops and by following intensive cultivation practices with the use of fertilizers, pesticides, fungicides and other inputs. All these agro chemicals are produced from non-renewable fossil fuel. In future, diminishing availability of these inputs may not only cost heavily on our foreign exchange but also limit agricultural production (Bai and Suresh, 2000).

The food containing pesticides and other chemicals are increasingly made obvious by many research studies revealing the presence of pesticides poisoning and 20,000 people die every year due to

toxic effects of these chemicals worldwide but the crop loss due to pests is still 15,000 crores, apart from killing a portion of the human population (Sharma, 2002).

The plants absorb all the nutrients in the ionic forms irrespective of the sources through which they are supplied. The nutrients supplied through organic and inorganic sources don't behave or interact differently within the plant after being absorbed by the plants. But they differ only in their relative availability for crop uptake. The nutrients supplied through organic manures would become available for crop uptake slowly and gradually but would be available for longer duration due to slow decomposition of the organic manures and gradual release of the nutrients. It is true that the quality of the agricultural produces, particularly of vegetables and fruits improve when the nutrients are supplied through organic manures than when supplied through fertilizers. This is because of the supply of enzymes, hormones, growth regulators etc. (Kumaraswamy, 2003).

In India the demand for organic produce increases year after year particularly in international trade market. Organic produce will help us to avoid the dumping of thousand tonnes of agro chemicals every year and will give us residue free food, save environment from pollution and provide better living standards (Sujit, 2003).

The greatest challenge facing the nation in the coming years is to provide safe food for the growing population in the country. In this regard, organic farming which is a holistic production management system for promoting and enhancing health of agro-eco system, has gained wide recognition as a valid alternative to conventional food products and ensures safe food for human consumption (Bhattacharyya and Krishna, 2003).

The prolonged use of chemicals on soils has resulted in human health hazards and pollution of air and water systems. The development

of resistance among pests, pathogens and weeds to chemicals has become a menace. Hence there is a vital need for revolution through organic farming to ensure food security and safety environment (Krishnaswamy, 2003).

Organic farming is the only way farmers can escape from the vicious cycle of debt and a negative economy. It is growing everywhere, because consumers don't want to be poisoned with toxic residues from agrochemicals. It is also necessary from the point of view of small producers (Vandana, 2003).

The above findings indicated that the need for organic farming is mainly to avoid pesticide residues, to earn export potential and to conserve the nature. Hence the organic farming practices in vegetable cultivation were selected for this study.

## 2.5 PROMOTERS OF ORGANIC FARMING IN KERALA

In Kerala many agencies, policies and programmes are promoting organic farming in various crops. They are given below.

### 2.5.1 Government of Kerala

The State government is planning to float a marketing company under the Department of Agriculture to give farmers the much needed edge to market their produce under brand names "Kerala Organic" (100 per cent organic) and "Kerala Natural" (those produced through good agricultural practices) in the national and international markets by eliminating intermediaries. The company will have apex bodies in all districts with three collection centres under each of them. The farmers will be paid on the spot itself (Paul, 2004).

### 2.5.2 Peekay Tree Crops Development Foundation (PTCDF)

PTCDF at Cochin, promoting sustainable agriculture through 'Tree World' the monthly newsletter and other publications including books which contain articles on organic agriculture, vermiculture,

traditional Indian agriculture, some case studies of organic farmers from different parts of India. It provides data on yield returns, techniques used for maintaining soil fertility, etc. (Thampan, 1995).

### 2.5.3 NGOs in Organic Farming

Malanad Development Society (MDS), Peermade Development Society (PDS) and ECOFARM are the NGOs promoting organic farming in Kerala. They publish a monthly "Jaiva Karshaka Prakruthy". The magazine regularly publishes articles on organic farming, natural living, environmental protection, etc., (Mathew, 1997).

### 2.5.4 Kerala Organic Farmers Association

Kerala Jaiva Karshaka Samithi was formed in 1992 with the chief objective to promote organic agriculture in Kerala (Neelamkavil, 1997).

### 2.5.5 Vegetable and Fruit Promotion Council, Keralam (VFPCK)

VFPCK, a state government sponsored company is promoting organic farming in a big way. The council had reached an understanding with the Dutch agency 'Foodcert' to secure certification for organically produced vegetables and fruits. The Dutch agency would help in training farmers and officials to improve quality and determine the new standards. The council is taking steps to reduce the use of pesticides and fungicides.

### 2.5.6 POABS Organic estate

The 1000 acre Seethargundu estate, Nelliyampathy is one of the largest organic multi-crop plantations in world. It uses the latest organic technology and intelligent agricultural methods to produce the finest quality produce, maximized yields, maintain soil fertility, retain water and control pests all using the strictest hygienic practices and without any chemicals.

## 2.6 ORGANIC FARMING PRACTICES

The organic farming practices listed by Khan *et al*. (1996) are given below.

1. Timely preparation of soil to a fine tilth with 2–3 ploughing to remove all debris, stubble and stone to avoid infestation of ants and termites. However, minimum tillage is considered as an important component of organic gardening.
2. Use of organic manure as basal dose at the rate of 25–38 tonnes/ha for vegetables through farm yard manure, poultry manure, fish manure, and sheep compost. Use of organic cakes from neem, groundnut, pongamia and castor become imperative.
3. Raising of green manure crops like sesbania or daincha and incorporating into the soil, besides using biomass of other plant species.
4. Choice of varieties of vegetables based on climate and market preference adopting optimum spacing and timely planting, raising seedlings with enough organic manures and bio-fertilizers and using only vigorous seedlings for better establishment, growth and yield. Use of bio-fertilizers like azospirillum and phosphobacteria or mycorrhiza as 25 per cent substitute for nitrogen and phosphorus requirements is a necessity.
5. Use of locally available mulching materials or polythene sheets to reduce moisture loss and minimize weed growth.
6. Use of disease resistant varieties of vegetables, which suit the eco-system, controlling weeds and removing all infested parts with pests and diseases and raising trap plants to attract insects and to follow crop rotation.

Singh and Shekhawat (2000) reported the organic farming practices

i. Soil fertility is maintained through cultivation of legumes, green manuring, crop rotations, inter and mixed cropping including legumes.
ii. Incorporation of organic materials or crop residues, application of farm yard manure and compost.
iii. Application of bio-fertilizers like azospirillum, rhizobium etc.
iv. Pest and diseases control is achieved mainly through a choice of appropriate variety, balanced crop rotation, mechanical cultivation procedure, protection of natural enemies of pests, release of predators and parasites and using botanical and biological pest control methods.
v. Conservation of soil, water, flora and fauna including natural vegetation and wild life
vi. Organic farming emphasizes on observance of International Labour Organization conventions of labour welfare and other rules relating labour welfare and women's and children's rights

## 2.7 STUDIES ON ORGANIC FARMING PRACTICES

Deshpande and Potdar (1990) revealed that an organic farmer from Dharwad district used Agnihotra ash to protect seeds from seed borne fungal and bacterial pathogens.

Studies on ecological farming in south India showed that ecological farms produce similar levels of output as that of conventional farms (Werf *et al*., 1992).

Krishnamurthi *et al.* (1995) stressed that the shelf life of fruits and vegetables increased when grown with the application of vermicompost.

Nandini *et al*. (1996) stated that the indigenous soil and water conservation practices followed by the farmers include summer ploughing, manuring, construction of bunds and stone walls, growing of

cover crops, intercropping, vegetative cover, agave planting and digging trenches around tree crops.

Gangadharappa and Shivamurthy (1997) found that neem kernel extract and agave extract were used against the pests of vegetables by majority of farmers.

Vivekanandan (1997) reported that the application of neem based products to prevent pest attack in Bengalgram was a practice in Tamil Nadu.

The study on the cost benefit analysis, impact of organic farming on yield, soil, income and expenditure, ecology, debt. health etc., of the 300odd organic farmers of Pudukkottai district, Tamil Nadu, revealed that despite the infancy stage of organic farming, the results are encouraging. The cost benefit ratio of some crops is already higher for organic farming. The yield did not show much difference in comparison with that of conventional agriculture (Margasagayam and Norman, 1997).

Manjusha (1999) observed that the important eco-friendly practices as identified by the farmers in bittergourd cultivation were soaking of seeds in water, burning of dry leaves and twigs, spraying leaf extracts as repellants for control of pests, use of banana fruit trap and application of neem cake, farmyard manure and green leaf manure.

Sathyanarayana (1999) stressed on the need for studies to establish crop selection, crop rotation, companion cropping, organic weedicides and pesticides, demonstrations on recycling, *in situ* composting and other practices to convince farmers of the feasibility of such organic farming actions.

Majjusha (2000) observed that the important eco-friendly practices as perceived by the farmers in cowpea cultivation were drying of pods for four to six days, basal application of cattle manure or poultry manure, ploughing the land after adding lime, application of neem cake, groundnut cake and bone meal twenty days after sowing and covering the plants with nets in order to protect the plants from birds.

Ramesh and Santha (2001a) conducted a study on adoption of organic farming practices in paddy. They reported that majority of the respondents had adopted the organic farming practices.

## 2.8 PROFILE CHARACTERISTICS OF VEGETABLE GROWERS

### 2.8.1 Age

Santhasheela (1999) reported that 23 per cent of the brinjal growers belonged to young age group followed by middle (43.33%) and old age (33.67%) groups respectively.

Majjusha (2000) reported that more than 50 per cent of vegetable growers came under the age group below forty-four.

Jahagirdar and Sundarasamy (2002) revealed that majority of the tomato growers (54%) were old followed by middle age (30%) and young (16%) respectively.

Suthan (2003) observed that nearly 50 per cent of vegetable growers belonged to middle-age group.

Fayas (2003) reported that majority of the vegetable growers belonged to medium category of 35 to 50 years of age.

Kamalakkannan (2003) stated that most of the commercial vegetable growers (75%) belonged to medium group with respect to age.

### 2.8.2 Education

Pochiah *et al*. (1993) stated that most of the vegetable growers (43.3%) had primary school level followed by high school (20.8%), middle school (13.4%) and collegiate (5.6%) levels of education with 17 per cent of illiterates.

Alagirisamy (1997) indicated that majority of the vegetable growers (52.5%) were educated up to middle school followed by secondary school (29.16%) and primary school (18.34%) education. No one was an illiterate.

Santhasheela (1999) reported that 40 per cent of the tomato growers had low level of education followed by 26.67 and 33.33 per cent who had medium and high levels of education respectively.

Majjusha (2000) revealed that majority of the cowpea growers (72.5%) were having secondary school level education.

Jahagirdar and Sundarasamy (2002) reported that 44 per cent of the tomato growers had primary school education and only four per cent were illiterate.

Kamalakkannan (2003) observed that majority of the vegetable growers (70%) belonged to medium level of education.

Suthan (2003) reported that 42.67 per cent of the vegetable growers were literates.

**2.8.3 Experience in vegetable cultivation**

Pochiah *et al*. (1993) stated that majority of the vegetable growers (55.8%) had medium level of experience followed by low (24.2%) and high (20 %) levels of experience.

Alagirisamy (1997) observed that most of the vegetable growers (91.66%) possessed more than ten years of experience followed by 8.34 per cent of farmers with five to ten years of experience in vegetable cultivation.

Santhasheela (1999) revealed that 26.7 per cent of the brinjal growers had low level of experience followed by 50 and 23.3 per cent who had medium and high levels respectively.

Sreedaya (2000) and Kamalakkannan (2003) concluded that majority of the vegetable growers 70 and 68.75 per cent respectively belonged to medium group with respect to experience in vegetable cultivation.

Suthan (2003) reported that 40 per cent of the farmers had six to ten years of experience in vegetable cultivation.

Fayas (2003) revealed that about 75 per cent of respondents had more than twenty years of experience in vegetable cultivation.

### 2.8.4 Area under Vegetable Cultivation

Majjusha (2000) reported that about 38 per cent of the farmers had cultivated cowpea in an area of more than 30 cents.

Sreedaya (2000) stated that majority of the vegetable growers (70%) had medium level of area under vegetable cultivation.

Fayas (2003) stated that majority of the farmers (84.4%) had medium level of area under vegetable cultivation.

Suthan (2003) reported that 37.33 per cent of the respondents' area under vegetable cultivation was up to 0.25 acres.

Priya (2003) reported that 85 percent of the vegetable growers had medium level of area under vegetable cultivation.

Balachandran (2004) observed that majority of organic farmers (53%) were small and marginal farmers with land holding up to 2 acres.

### 2.8.5 Livestock Possession

Helen (1990) reported that majority of the small farm families possessed medium level of livestock possession.

Natarajan (1991) stated that majority of the farmers had low level of livestock possession.

Karthikeyan (1994) reported that a higher percentage of respondents had livestock possession worth Rs.5001 to 10,000.

Sriram (1997) revealed that one third of the farmers owned livestock worth Rs.5001 to 10,000.

Sherief (1998) reported that majority of the farmers had low level of livestock possession.

### 2.8.6 Mass Media Exposure

Kumar (1994) revealed that most of the soya farmers (73.33%) had medium degree of mass media exposure whereas 14.17 per cent of the farmers had low and 7.5 per cent had high degree of exposure.

Sriram (1997) found that nearly half of the cotton growers possessed medium level of mass media exposure.

Santhasheela (1999) reported that 16.67 per cent of beans growers had low level of mass media exposure followed by 63.33 and 20 per cent who had medium and high levels of mass media exposure.

Allan (2000) revealed that majority of the medicinal plant cultivators were having low mass media exposure.

Suthan (2003) stated that majority of the vegetable growers (65.33%) had high level of mass media exposure.

### 2.8.7 Extension Orientation

Syamkumar (1999) observed that nearly two third of the respondents had low level of extension orientation.

Manjusha (1999) indicated that less than fifty per cent (47.5%) of the bittergourd farmers had high level of extension orientation.

Majjusha (2000) reported that more than 50 per cent of the cowpea growers had high level of extension orientation.

Manoj (2000) observed that 48.57 per cent of the farmers had high level of extension orientation.

Parvathy (2000) reported that 53 per cent of rural women were found to have high level of extension orientation.

Suthan (2003) revealed that most of the vegetable growers (60%) had high level of extension orientation.

### 2.8.8 Economic Motivation

Krishnakumar (1996) observed that about two thirds of the respondents (66%) had medium level of economic motivation followed

by low and high levels of economic motivation to the extent of 19 and 15 per cent respectively.

Sriram (1997) observed that majority of the farmers (58.34%) had medium level of economic motivation followed by high and low levels.

Majjusha (2000) reported that majority of the cowpea growers were having high economic motivation.

Sreedaya (2000) stated that majority of the vegetable growers (61 %) had high level of economic motivation followed by medium (27%) and low level (12%) of economic motivation respectively.

Fayas (2003) stated that majority of the vegetable growers (86%) had medium level of economic motivation.

Suthan (2003) reported that more than half of the vegetable growers (57.33 %) had high level of economic motivation.

Priya (2003) indicated that majority of the vegetable growers (92%) had medium level of economic motivation.

**2.8.9 Training Attended**

Sivaprasad (1997) reported that majority of the respondents (78%) had high level of training.

Shaju (1998) observed that majority of the farmers (70%) had low level of training.

Lakshmi (2000) revealed that more than half of the respondents did not attend any training programme related to watershed management.

Parvathy (2000) observed that majority of rural women (66.3%) and women office bearers (70%) had medium level of training.

Meera (2001) reported that majority of the respondents (86.66%) had low level training.

Parthasarathi and Santha (2002) reported that the knowledge level of trained farmers was much higher on biological and physical methods of pest control, identification of pests and predators and on economic threshold levels.

Priya (2003) stated that nearly 95 per cent of farmers were in the high category in the case of training.

**2.8.10 Innovativeness**

Alagirisamy (1997) concluded that 40 per cent of the vegetable growers had medium level of innovativeness followed by 35.83 and 24.17 per cent with low and high levels respectively.

Marimuthu (1998) observed that most of the banana farmers (54.17%) had medium level of innovativeness followed by low (28.33%) and high (17.50 %) levels.

Sreedaya (2000) indicated that majority of the vegetable growers (63%) had medium level of innovativeness.

Suthan (2003) reported that majority of the vegetable growers (60%) had high level of innovativeness.

Fayas (2003) revealed that majority of the vegetable growers had medium level of innovativeness.

Priya (2003) stated that 97.50 per cent of the vegetable growers had high level of innovativeness.

**2.8.11 Risk Orientation**

Krishnakumar (1996) concluded that majority of the respondents (71%) had medium level of risk orientation.

Santhasheela (1999) observed that one fifth of the tomato growers had low level of risk orientation followed by 46.67 and 33.33 per cent who had medium and high levels of risk orientation respectively.

Majjusha (2000) observed that equal percentage of the cowpea growers had high and low risk orientation.

Sreedaya (2000) reported that majority of the vegetable growers (66%) had low risk orientation followed by equal percentage of respondents (17%) with medium and high risk orientation.

Fayas (2003) reported that 90 per cent of the vegetable growers had medium level of risk orientation.

Suthan (2003) concluded that 58.67 per cent of the vegetable growers had high risk orientation.

### 2.8.12 Market Perception

Nizamudeen (1996) revealed that more than two third of the respondents had low level of market perception.

Sreedaya (2000) reported that farmers were aware of the different market trends and marketing channels through their credit market farmers, field staff, market information centre and above all frequent meetings at the field centre. She also reported that 56 per cent of the farmers had low level of market perception followed by medium (30%) and high level (14%).

Fayas (2003) stated that 89 per cent of the vegetable growers had high level of market perception.

Suthan (2003) reported that more than half of the respondents (54.67%) had high market perception.

### 2.8.13 Self Confidence

Nizamudeen (1996), Varma (1996) and Sangeetha (1997) reported that majority of the respondents' belonged to high group with respect to self-confidence.

Parvathy (2000) revealed that more than 75 per cent of the rural women exhibited medium level of self-confidence and 80 per cent of women office bearers had high self-confidence.

Jyothish (2000) reported that majority of the respondents had high self-confidence.

Meera (2001) observed that maximum number of respondents (75.83%) were in the high category with respect to self-confidence.

Geetha (2002) revealed that majority of the respondents' belonged to high category with respect to self-confidence.

Suthan (2003) indicated that 73.33 per cent of the vegetable growers had high self-confidence.

### 2.8.14 Environmental Orientation

Naidu (1993) observed optimal use of environmental resources as the key word for development as otherwise it would tell upon the basic life support system of our planet so that the progress of mankind and preservation of ecology go hand in hand.

Nair (1994) emphasized in his essay on "environment and development" that we are in need of a system which endeavors to create a way of thinking, requiring people to overcome prejudice and to develop an open way of looking at things around them. Thus the individuals and the community would gain awareness of the environment and require the needed skills to solve the problems.

Sreevalsan (1995) reported that nearly two-third of the farmers were less environmentally oriented.

It is very clear from the above studies that the profile characteristics of respondents varied with situation. But it is fact that these characteristics influence the innovation, programme or any development activity. Hence in this study also an attempt was made to study the profile characteristics of vegetable growers.

## 2.9 EXTENT OF AWARENESS ABOUT ORGANIC FARMING PRACTICES

According to dictionary of behavioural sciences, awareness means being conscious of something, perceiving and taking account of some event, occasion, experience or object.

Lionberger (1960) defined awareness as the first knowledge about an idea, product or practice. At the awareness stage, a person has only general information about it.

Sriram (1997) reported that majority of the farmers (59.16%) had medium level of awareness followed by high (25.84%) and low levels (18%) of awareness about eco-friendly agricultural practices in cotton cultivation.

Veluswamy (1997) stated that among the three bio-control methods for cotton pests, NPV spray was well known to 92.5 per cent of respondents followed by *Trichogramma chilonis* and *Crysopa* sp. with 90 and 67.5 per cent of respondents respectively.

Sumathi and Alagesan (1998) revealed that cent percent of respondents were aware about summer ploughing, timely and synchronized sowing of groundnut, destruction of alternate host plants, removal of residues and destruction of pests of all stages.

Kavitha (1998) reported that 75 per cent of the farmers were aware about pungam, thumbai and adathoda leaves as green leaf manure and 75 per cent of the farmers were aware about the use of pungam oil against pests.

Sudhakar (1998) observed that cent percent of the farmers were aware about crop rotation, intercropping and use of light trap. Fifty per cent of respondents belonged to high level of awareness followed by medium (41.66 %) and low (8.3%) level categories.

Thyagarajan and Ramanathan (2001) pointed out that most of the rice farmers had medium level of awareness about the recommended bio-fertilizer practices.

Kella and Iqbal (2002) reported that 65 per cent of respondents had high awareness about indigenous farm practices.

Sheela and Netaji (2002) revealed that cent per cent of the vegetable growers were aware about the ill effects to the health of human beings due to continuous application of chemicals.

The above studies revealed the importance of awareness of the farmers about different farming practices. Awareness about a programme

or practice is important for its acceptance. So awareness of vegetable growers about organic farming practices was studied.

## 2.10 EXTENT OF KNOWLEDGE ABOUT ORGANIC FARMING PRACTICES

English and English (1958) defined knowledge as the body of understood information possessed by an individual by a culture.

Rogers and Shoemaker (1971) opined that knowledge of innovations could create motivation for their adoption.

Alagirisamy (1997) inferred that majority of the vegetable growers (61.67%) possessed medium level followed by high (21.67%) and low levels (16.66%) of knowledge on cauliflower cultivation.

Kavitha (1998) observed that majority of the paddy growers (50.83%) had medium level of knowledge about neem as botanical input.

Manoj (1998) found that 59 per cent of the commercial vegetable growers had medium level of knowledge about improved plant protection measures.

Venkatachalam (1999) revealed that majority of the cotton farmers had medium to high level of knowledge about the use of bio- control agents.

Majjusha (2000) reported that 40 per cent of the respondents possessed high knowledge and 48 per cent possessed low knowledge about the farmers' practices in cowpea cultivation.

Ramesh and Santha (2001b) observed that majority of the rice farmers had high knowledge about organic farming practices especially on water management, land preparation and storage practices.

Kella and Iqbal (2002) stated that nearly half of the respondents had high knowledge about indigenous farm practices.

Kamalakkannan (2003) reported that 61.25 per cent of the respondents had medium knowledge followed by 21.25 and 17.50 per

cent with low and high knowledge respectively on improved cultivation practices in vegetable cultivation.

Fayas (2003) revealed that majority of the vegetable growers (75.60 %) had medium level of knowledge in vegetable cultivation.

The above studies showed that the knowledge level of farmers about an information or technology varied under different situation. It is a fact that proper knowledge about an information or technology is an indication for its effective transfer. Hence in this study also an attempt has made to assess the knowledge of vegetable growers about organic farming practices

## 2.11 ATTITUDE TOWARDS ORGANIC FARMING PRACTICES

Allport (1935) defined attitude as a mental and neural state of readiness organized through experience exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related.

Thurstone (1946) defined attitude as the degree of positive or negative affect associated with some psychological object towards which people can differ in varying degrees.

Krech and Crutchfield (1948) defined attitude as an enduring organization of motivational, emotional, perceptual and cognitive process with respect to some aspect of the individual's world.

Katz and Scotland (1959) stated that attitude is a tendency or disposition to evaluate an object or the symbol of that object in a certain way.

According to Sharma (1972) attitude means a personal disposition, which impels an individual to react to some objects or situations.

Dahama (1976) opined that attitudes are learned responses and since they are always found in relation to object, ideas and persons, they play an important role in determining human behaviour.

Blair (1978) defined attitude is a predisposition to respond to a certain set of facts.

Kuppusamy (1984) stated that attitudes are learned in the course of life experience which make the individual behave in characteristic ways towards persons, objects or issues to which they get related.

Shilaja (1990) reported that majority of the farm women possessed a favourable attitude towards mixed farming.

Lekshmi (1995) observed that almost half of the respondents (49.20 %) had high level of attitude towards social forestry programme followed by low (40.8%) and medium levels (10%) of attitude.

According to Rajendralal (1997) any development programme aimed at the welfare of the people, calls for maximum people's participation to achieve this participation, the beneficiaries should have a positive attitude towards the development programmes.

Sriram (1997) observed that majority of the cotton farmers (65.50 %) had favourable attitude towards eco-friendly agricultural practices followed by most favourable (17.50 %) and less favourable (17%) attitude.

Syamkumar (1999) observed that about 53 per cent of farmers had unfavourable attitude towards rice cultivation.

Suthan (2003) reported that 60 per cent of the farmers had low attitude towards scientific agricultural practices in vegetable cultivation.

The views of the above studies revealed that the attitude of farmers towards an object, practice, programme etc. varied with situation. It can be concluded that favourable attitude towards a development activity, practice or innovation is a prime requirement for its increased participation and success. So in this study also attitude towards organic farming practices was considered to be important.

## 2.12 EXTENT OF ADOPTION OF ORGANIC FARMING PRACTICES

Wilkening (1952) postulated that adoption of innovation as a process composed of learning, deciding and acting over a period of time. The adoption or a decision to act has a series of actions and thought decisions.

Chatopadhyaya (1963) considered adoption behaviour as a stage in the adoption process where decision making is complete regarding the use of a practice and actions with regard to such a decision commences.

Rogers and Shoemaker (1971) defined adoption as a decision to make use of the innovation. They considered adoption as a decision to continue full use of an innovation at the best course of action.

Iqbal *et al*. (1996) reported that use of NPV to control the pests of cotton was adopted by majority of small farmers (82.98%) with high level of adoption than medium farmers (50%) and big farmers (46.15%). They also reported that use of locally designed light traps was adopted by 74.47 per cent of small, 58.82 per cent marginal and 38.56 per cent of big farmers.

Jayaraj (1997) indicated that majority of the farmers (60.83%) had low level of adoption while less percentage had medium (20%) and high (19.17%) level of adoption of bio-pesticides.

Sriram (1997) reported that summer ploughing, variety selection, seasons, synchronized plantings, hand/mechanical weeding and mechanical control of pests were adopted cent percent by all the farmers. He also reported that 30.83 per cent of farmers have adopted the introduction of bio-control agents in their field and 61.67 per cent of the farmers adopted the use of botanical pesticides and 10.83 per cent of farmers used to conserve natural enemies.

Velusamy (1997) revealed that nearly two-third of the cotton growers adopted Nuclear polyhydrosis virus spray for control of *Heliothis* sp. followed by *Trichogramma* sp. by 40 per cent of farmers.

Kavitha (1998) concluded that majority of the respondents (67.50%) had medium level of adoption of neem technologies, followed by 16.67 per cent and 15.83 per cent of farmers who had low and high levels of adoption.

Sumathi and Alagesan (1998) reported that big farmers had better adoption than the small and marginal farmers. They also concluded that summer ploughing, destruction of alternate host plants and destruction of all residues of groundnut were adopted by all the respondents.

Venkatachalam (1999) revealed that 42.50 per cent of the cotton growers had low level of adoption followed by medium (35%) and high (22.5%) levels of adoption towards bio-control agents.

Majjusha (2000) reported that about 53 per cent of the farmers belonged to low category and 38 per cent of the farmers were in the high category with respect to adoption of efficient farmers' practices in cowpea cultivation.

Mercykutty and Ranjan (2000) stated that 78.12 per cent of farmers had used bio-fertilizers in vegetable cultivation.

Ramesh and Santha (2001) revealed that adoption level of farmers was higher in all the organic farming practices in paddy especially in water management, land preparation and storage practices.

Kella and Iqbal (2002) observed that 20.83 per cent of the respondents had high level adoption of indigenous farm practices.

Kamalakkannan (2003) revealed that majority of the commercial vegetable growers (65%) had medium level of adoption of recommended technologies followed by 16.25 and 18.75 per cent of farmers belonged to low and high adoption categories respectively.

Priya (2003) reported that in vegetable cultivation organic farming was being adopted at an increased level and organic fertilizers were considered as key for quality maintenance of products than chemical fertilizers.

In the light of the above explanations and findings, adoption level of farmers varied with situation. High adoption is the ultimate goal of any innovation. Hence in this study also adoption of organic farming practices by vegetable growers was studied.

## 2.13 RELATIONSHIP OF PROFILE CHARACTERISTICS OF VEGETABLE GROWERS WITH THEIR AWARENESS, KNOWLEDGE, ATTITUDE AND ADOPTION OF ORGANIC FARMING PRACTICES

### 2.13.1 Relationship between the Characteristics of Respondents and Their Extent of Awareness

The research findings pertaining to the relationship of characteristics of respondents with their awareness are presented in Table 1. It could be understood that some of the socio-economic and psychological variables seem to be critical and significant with respect to awareness levels of respondents.

The variables such as education, experience in vegetable cultivation, mass media exposure, economic motivation, innovativeness and risk orientation could be considered as crucial ones needing further probe and analysis.

No closely related study to these variables like training attended, market perception and environmental orientation could be reviewed. However it is assumed that these variables have influence on awareness about organic farming practices in vegetable cultivation.

### 2.13.2 Relationship between the Characteristics of Respondents and Their Extent of Knowledge

The research findings pertaining to the relationship of characteristics of respondents with their knowledge are presented in Table 2. Some of the socio-economic and psychological variables seem to be critical and significant with respect to knowledge levels of respondents.

Table 1. Relationship between the characteristics of respondents and their extent of awareness

| Author | Year | Age | Education | Experience in vegetable cultivation | Area under vegetable cultivation | Live stock possession | Mass media exposure | Extension orientation | Economic motivation | Training attended | Innovativeness | Risk orientation | Market perception | Self confidence | Environmental orientation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sajeevchandran | 1989 | NES | - | - | - | - | - | - | PS | - | PS | PS | - | - | - |
| Rani | 1991 | PS | PS | - | - | - | - | - | - | - | - | - | - | - | - |
| Nelson | 1992 | - | - | - | - | - | - | - | NS | - | PS | - | - | - | - |
| Santha | 1992 | NS | NS | NS | - | - | PS | - | - | - | - | - | - | - | - |
| Gangadharan | 1993 | NES | PS | - | - | - | - | - | PS | - | PS | PS | - | - | - |
| Kathiravan | 1994 | - | - | NS | - | NS | - | NS | NS | - | - | NS | - | - | - |
| Sriram | 1997 | NES | PS | NS | NS | NS | PS | - | NS | - | NS | PS | - | - | - |
| Sherief | 1998 | NS | NS | - | - | NS | PS | - | - | - | - | - | - | - | - |
| Syamkumar | 1999 | PS | PS | PS | - | - | PS | PS | PS | - | - | PS | - | PS | - |

PS – Positively significant

NES – Negatively significant

NS – Non significant

Table 2. Relationship between the characteristics of respondents and their extent of knowledge

| Author | Year | Age | Education | Experience in vegetable cultivation | Area under vegetable cultivation | Live stock possession | Mass media exposure | Extension orientation | Economic motivation | Training attended | Innovativeness | Risk orientation | Market perception | Self confidence | Environmental orientation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gangadharan | 1993 | NES | PS | - | - | - | - | - | PS | - | PS | PS | - | - | - |
| Manju | 1996 | NS | PS | NS | NS | - | - | NS | NS | - | NS | NS | - | - | - |
| Sathiyaseelan | 1996 | PS | NS | - | - | - | NS | - | NS | - | NS | - | - | - | - |
| Preetha | 1997 | NS | NES | PS | NS | - | PS | NS | NS | - | NS | PS | - | - | - |
| Manjusha | 1999 | NS | PS | NS | NS | - | - | NS | NS | - | NS | NS | - | - | - |
| Majjusha | 2000 | NES | PS | NES | NS | - | PS | PS | NS | - | NS | PS | - | - | - |
| Manoj | 2000 | NS | PS | NS | NS | - | PS | PS | PS | - | PS | PS | - | - | - |
| Allan | 2000 | PS | NS | PS | PS | - | PS | PS | - | - | - | - | - | - | - |
| Venkatesan | 2000 | NS | NS | PS | - | - | - | - | - | - | PS | - | - | - | - |

PS – Positively significant

NES – Negatively significant

NS – Non significant

The variables such as education, experience in vegetable cultivation, mass media exposure, extension orientation, economic motivation, innovativeness and risk orientation showed positively significant relationship with the extent of knowledge of respondents and could be considered as crucial ones needing further probe and analysis.

No literature on the relationship of variables like livestock possession, training attended, market perception, self-confidence and environmental orientation with the extent of knowledge about organic farming practices could be reviewed. But it is assumed that these variables have influence on knowledge about organic farming practices in vegetable cultivation.

### 2.13.3 Relationship between the Characteristics of Respondents and Their Attitude

The research findings pertaining to the relationship of characteristics of respondents with their attitude are presented in Table 3 which reveals some of the socio-economic and psychological variables seem to be critical and significant in respect of attitude of respondents.

The variables such as education, mass media exposure, extension orientation, economic motivation, innovativeness, risk orientation and self-confidence showed positively significantly relationship with the extent of attitude of respondents and could be considered as crucial ones needing further probe and analysis.

There is lack of information on the relationship of variables like training attended, market perception and environmental orientation with the attitude of respondents. But it is assumed that these variables have influence on attitude about organic farming practices in vegetable cultivation.

Table 3. Relationship between the characteristics of respondents and their attitude

| Author | Year | Age | Education | Experience in vegetable cultivation | Area under vegetable cultivation | Live stock possession | Mass media exposure | Extension orientation | Economic motivation | Training attended | Innovativeness | Risk orientation | Market perception | Self confidence | Environmental orientation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sajeevchandran | 1989 | NES | PS | - | - | - | PS | - | PS | - | PS | - | - | - | - |
| Natarajan | 1991 | PS | PS | - | - | - | - | PS | - | - | - | - | - | - | - |
| Gangadharan | 1993 | NES | PS | - | - | - | - | - | PS | - | PS | PS | - | - | - |
| Varma | 1996 | NES | PS | - | - | - | PS | - | PS | | PS | PS | - | PS | |
| Sriram | 1997 | NES | PS | NS | NS | NS | PS | - | NS | - | PS | PS | - | - | - |
| Rajendralal | 1997 | NS | PS | - | - | - | - | - | - | - | - | - | - | - | - |
| Syamkumar | 1999 | NS | PS | NES | - | - | NS | PS | NS | - | NS | NS | - | PS | |
| Parvathy | 2000 | NS | NS | - | - | - | NS | NS | PS | - | PS | - | - | PS | |

PS – Positively significant

NES – Negatively significant

NS – Non significant

### 2.13.4 Relationship between the Characteristics of Respondents and Their Extent of Adoption

The research findings pertaining to the relationship of characteristics of respondents with their adoption are presented in Table 4. It could be understood that some of the socio-economic and psychological variables seem to be critical and significant with respect to adoption levels of respondents.

The variables such as education, mass media exposure, extension orientation, economic motivation, innovativeness and risk orientation showed positively significant relationship with the extent of adoption of respondents and could be considered as crucial ones needing further probe and analysis.

No closely related study to these variables like training attended, market perception, self confidence and environmental orientation could be reviewed. However it is assumed that these variables have influence on adoption of organic farming practices in vegetable cultivation.

## 2.14 CONSTRAINTS IN THE ADOPTION OF ORGANIC FARMING PRACTICES

Puzari (1994) reported that non-availability of seeds of recommended varieties in time, lack of awareness of newly evolved varieties, lack of conviction of the utility and importance of the scientific nursery bed preparation to produce quality vegetable seedlings, non-availability of pesticides and plant protection equipments and lack of awareness of pesticides and their proper use, lack of awareness of recommended dose of fertilizers, lack of irrigation facilities and non-availability of storage and market facilities as major constraints in vegetable production.

Bonny and Prasad (1996) inferred that majority of the commercial vegetable growers had rated inadequate market facility as the most important constraint experienced by them in marketing of vegetables.

Table 4. Relationship between the characteristics of respondents and their extent of adoption

| Author | Year | Age | Education | Experience in vegetable cultivation | Area under vegetable cultivation | Live stock possession | Mass media exposure | Extension orientation | Economic motivation | Training attended | Innovativeness | Risk orientation | Market perception | Self confidence | Environmental orientation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Karthikeyan | 1994 | PS | NS | PS | PS | PS | PS | PS | - | - | - | - | - | - | - |
| Manju | 1996 | NS | NS | NS | NS | - | - | NS | NS | - | NS | NES | - | - | - |
| Krishnakumar | 1996 | PS | PS | PS | - | - | PS | PS | PS | - | | PS | - | - | - |
| Sujatha | 1996 | NS | PS | - | - | - | - | - | PS | - | PS | PS | - | - | - |
| Sriram | 1997 | NES | PS | NS | NS | NS | PS | - | PS | - | PS | PS | - | - | - |
| Preetha | 1997 | NS | NS | NS | NS | | | NES | NS | - | NS | PS | - | - | - |
| Sudhakar | 1998 | - | PS | NS | - | - | PS | PS | PS | - | PS | PS | - | - | - |
| Manjusha | 1999 | NS | NS | NS | NS | - | - | PS | NS | - | NS | NS | - | - | - |
| Majjusha | 2000 | NS | PS | NS | NS | - | PS | PS | NS | - | NS | NS | - | - | - |
| Manoj | 2000 | NS | NS | PS | PS | - | - | NS | PS | | PS | NS | - | - | - |
| Venkatesan | 2000 | NS | NS | NS | - | - | - | - | - | - | | PS | - | - | - |

PS – Positively significant

NES – Negatively significant

NS – Non significant

Jabbar (1996) revealed that the most important constraint in using vegetable production technologies were uneconomic holding size, inadequacy of capital and increased cost of plant protection chemicals.

Iqbal *et al*. (1996) stated that lack of adequate knowledge on natural predators and parasites, non-availability of NPV for effective biological control, laboriousness involved in the preparation of poison baits and high cost of labour to take up mechanical methods of handpicking were the major constraints in the adoption of IPM practices for cotton.

Alagirisamy (1997) reported that fluctuations in market price, inadequate supply of inputs, non-availability of labour during peak season, inadequate credit facilities, major incidence of pests and diseases, high cost of inputs, inadequate information about latest technologies and inadequate transport facilities were the major constraints faced by vegetable growers.

Sriram (1997) stated that scarcity of labour, lack of assured irrigation, lack of technical guidance on the use of bio-control agents, non-availability of inputs, lack of knowledge to identify pests and diseases and difficulty in maintaining the pheromone traps were considered as major constraints faced by farmers in the adoption of eco-friendly agricultural practices.

Manju (1997) identified 47 indigenous practices among vegetable growers of Thrissur district. The most important constraints identified by the farmers in the use of indigenous technologies were emergence of new pests and diseases (98 %), increased pests and diseases (88 %) and low productivity (86 %).

Sherief (1998) reported that lack of information, low yield, high cost of organic inputs, high labour cost, problem of pests and diseases, skilled labour requirement, lack of credit facilities, lack of government support, low premium for organic products and lack of extension support

were found to be the major constraints faced by the homestead respondents in the adoption of resource sustaining agricultural practices.

Manoj (1998) reported that the important constraints perceived by the vegetable farmers were increased cost of plant protection chemicals, difficulty in preparation and application, difficulty in selection of alternate chemicals, inadequacy of capital, non-availability of labour and lack of knowledge about technology.

Manjusha (1999) reported that incidence of pests and diseases, labour scarcity, non-availability of inputs, weather problems, uneven production, unawareness of plant protection measures, high cost of inputs, high labour charges, inadequate credit facilities, high transport charges and inadequate marketing facilities were the most important constraints in bittergourd cultivation.

Majjusha (2000) reported that incidence of pests and diseases, labour scarcity and uneven production were the major production constraints experienced by majority of the respondents and high labour charges, high cost of material inputs and price fluctuation of the produce were the major economic constraints in cowpea cultivation.

Ranganatha *et al.* (2001) observed that more cost and risk involvement in getting organic manures (vermicompost, oil cakes, etc.) transportation of green manures, lack of ready packages for growing rice organically and lack of knowledge on crop rotation, water management and biological control of pests and diseases were the major constraints faced by 60 per cent of the small farmers.

Resmy *et al*. (2001) revealed that the farmers were not adopting the sustainable practices in coconut and banana due to lack of knowledge, technical guidance and lack of information sources.

Ongunsumi *et al*. (2002) observed that non-availability of inputs, transportation and finance and lack of market information were expressed as major important constraints in cowpea cultivation.

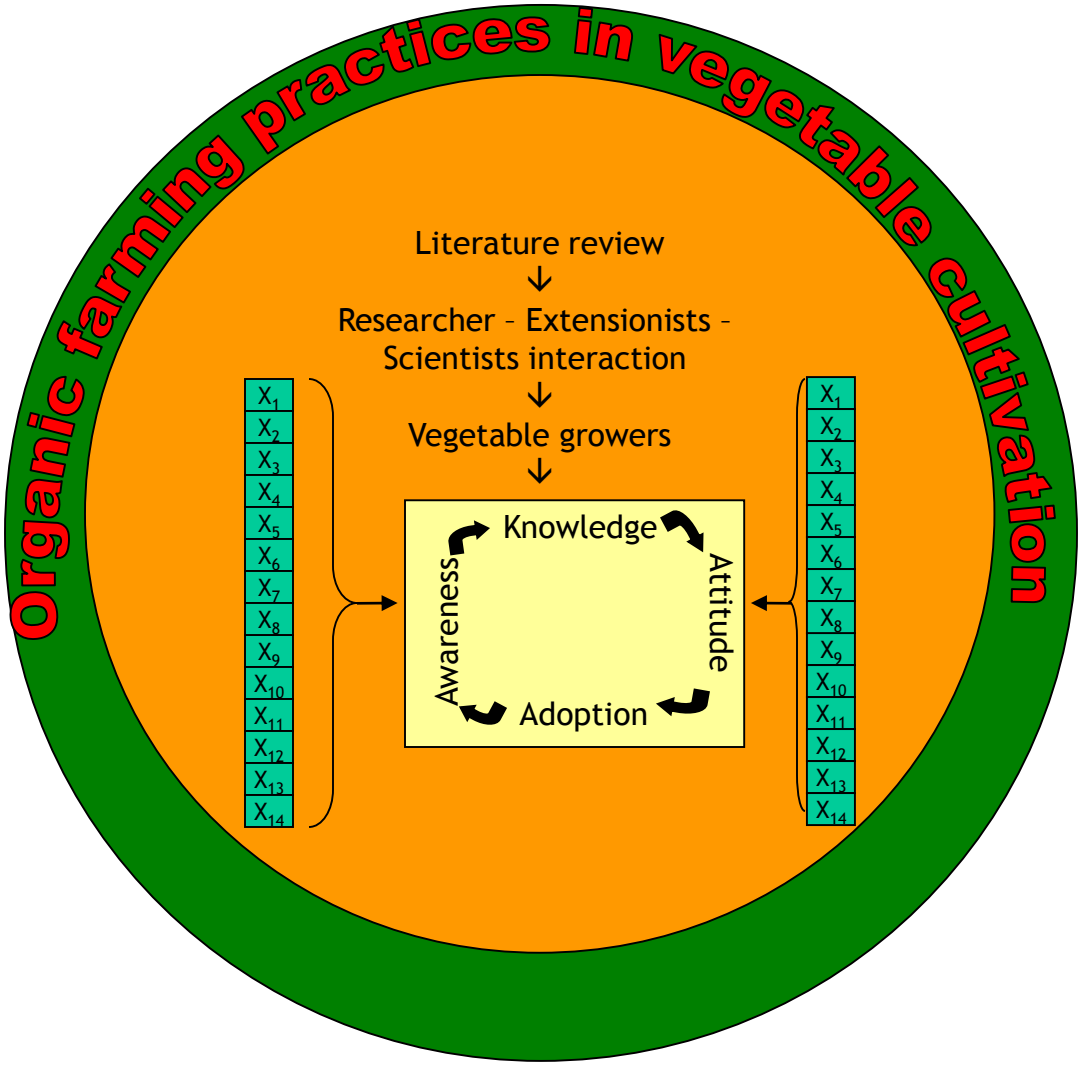
Balachandran (2004) reported that climatic changes, erratic rains, unavailability of labour and high labour wage rate, pests and disease infestations, unavailability of good indigenous seeds, artificially created price slump in the harvest season forces small scale farmer to sell at under price, lack of support during transition to organic farming and lack of market facilities/consumer awareness regarding organic produce were major problems faced by the farmers' in organic farming.

The above studies revealed that constraints in the adoption of different farming practices varied with crops, time, place etc. It is clear from the findings that problems like non-availability of inputs, high cost of inputs, lack of knowledge, incidence of pests and diseases and lack of credit facilities were reported by many researchers. Hence constraints in the adoption of organic farming practices were studied to know the importance.

## 2.15 CONCEPTUAL FRAMEWORK OF THE STUDY

A conceptual model of the study has been framed based on the objectives set forth for the study, the concepts theoretically derived from the review of literature and the factors influencing the awareness, knowledge, attitude and adoption of organic farming practices selected by discussion with experts.

The framework is expected to facilitate theoretical and empirical analysis of the awareness, knowledge, attitude and adoption of the respondents. It depicts the major objective of analysing the organic farming practices in vegetable cultivation. It also explains the wide spectrum of profile characteristics of respondents (independent variables) that influence the awareness, knowledge, attitude and adoption (dependent variables) of organic farming practices (Fig.2).




$X_1$-Age
$X_2$-Education
$X_3$-Experience in vegetable cultivation
$X_4$-Area under vegetable cultivation
$X_5$-Livestock possession
$X_6$-Mass media exposure
$X_7$-Extension orientation
$X_8$-Economic motivation
$X_9$-Training attended
$X_{10}$-Innovativeness
$X_{11}$-Risk orientation
$X_{12}$- Market perception
$X_{13}$-Self confidence
$X_{14}$-Environmental orientation

**Fig. 2. Conceptual frame work of the study**

# *Methodology*

# 3. METHODOLOGY

In accordance with the objectives of the study the research methodology adopted is presented under the following heads.

3.1 Research design

3.2 Locale of the study

3.3 Selection of respondents

3.4 Identification of organic farming practices in vegetable cultivation

3.5 Operationalisation and measurement of independent variables

3.6 Operationalisation and measurement of dependent variables

3.7 Constraints in the adoption of organic farming practices as perceived by the vegetable growers

3.8 Methods used for data collection

3.9 Statistical tools used for analysis

## 3.1 RESEARCH DESIGN

Research design is the entire process of planning and carrying out research. Kerlinger's (1978) defined "Research design is the plan, structure and strategy of investigation so as to obtain answers to research questions and to control variance". The plan is the overall scheme or programme of research.

For this study, ex-post facto design was used. This is systematic empirical enquiry in which the scientist does not have direct control over the variables because their manifestations have already occurred or because they are inherently not manipulatable.

## 3.2 LOCALE OF THE STUDY

### 3.2.1 Selection of the District

Thiruvananthapuram district was selected purposively due to the following the reasons

i) More number of agencies were involved in the promotion of organic farming, both technically and economically in this district.

ii) There are several progressive farmers who follow organic farming practices including those who have won the Harithamitra award for the best fruit – vegetable grower in the state.

iii) The vegetables especially from Thiruvananthapuram fetch higher price in the foreign market as per the opinion of the exporting agency.

iv) The field centres of VFPCK are the best among the centres in the state

v) VFPCK is conducting several Participatory Technology Development (PTD) experiments in this district.

vi) Being the first systematic study of this kind conducted in the state, it was convenient to select an area in the vicinity of College of Agriculture, Vellayani to get the benefits of its infrastructure and other resources.

### 3.2.2 Selection of Blocks and Krishibhavans

Thiruvananthapuram district comprises of 12 Community Development Blocks (CDB) with 84 panchayat units. Each of the panchayat has a Krishibhavan (Agricultural office) which functions as a nodal agency for agricultural development of that panchayat. From these 12 blocks, four blocks which were having maximum area under vegetable cultivation were selected. The blocks selected were Parassala, Aryancode, Pallichal and Neyyattinkara. The krishibhavan which had maximum area

under vegetable cultivation was selected from each block. The selected Krishibhavans were Chenkal, Perumkadavila, Kalliyoor and Venganoor respectively (Appendix III). The map showing the location of the study is presented in Fig. 3.

## 3.3 SELECTION OF RESPONDENTS

List of farmers who cultivated vegetables especially amaranthus, cowpea, bhindi, cucumber, bittergourd, snakegourd and ash gourd was collected from the krishibhavans. Farmers were selected by using proportionate random sampling method. It was decided to have the sample size of 100 for the study.

$$Qi = \frac{Ai}{B} \times N$$

Where, Qi = Number of respondents to be selected from $i^{th}$ Krishibhavan

Ai = Total number of respondents in the $i^{th}$ Krishibhavan

B = Total number of respondents in the four Krishibhavans

N = Sample size

| **Sl. No.** | **Krishibhavan** | **Total number of vegetable growers** | **Selected respondents** |
|---|---|---|---|
| 1 | Chenkal | 103 | 20 |
| 2 | Perumkadavila | 107 | 20 |
| 3 | Kalliyoor | 152 | 30 |
| 4 | Venganoor | 153 | 30 |
| | Total | 515 | 100 |

Accordingly 20, 20, 30 and 30 respondents were selected from the four Krishibhavans of Chenkal, Perumkadavila, Kalliyoor and Venganoor respectively.

## 3.4 IDENTIFICATION OF ORGANIC FARMING PRACTICES IN VEGETABLE CULTIVATION

As there was no standardised package for organic farming practices, an explorative methodology was employed to identify the organic farming practices in vegetable cultivation.

The selection of organic farming practices was done in two stages. In the first stage, 30 organic farming practices were identified based on review of literature and in consultation with experts of various fields in agriculture.

In the second stage, 40 scientists representing different disciplines in agriculture comprising Agronomy, Olericulture, Soil Science and Agricultural Chemistry, Agricultural Extension and other related fields were requested to serve as judges to indicate the degree of relevance of these organic farming practices in vegetable cultivation on a three point continuum of most relevant, relevant and least relevant.

The degree of relevance was quantified by assigning a score of 3 for the most relevant, 2 for the relevant and 1 for the least relevant. The total score of all judges for each organic farming practice was arrived at and the mean value was also calculated. The overall mean of organic farming practices was also worked out. The organic farming practices which were having a mean value more than the overall mean were selected. The mean values of twenty organic farming practices were found to be more than overall mean and they were selected for the study (Appendix II).

The mean values of organic farming practices were used as weightage for calculating the adoption index of the vegetable growers.

## 3.5 OPERATIONALISATION AND MEASUREMENT OF INDEPENDENT VARIABLES

Based on the objectives, review of literature, discussion with experts and observation made by the researcher, a list of personal and socio-psychological characteristics were identified along with their operational definitions and sent to 40 judges for eliciting their relevancy on a three point continuum ranging from most relevant to least relevant (Appendix I).

The scores were assigned as follows:

| **Response** | **Score** |
|---|---|
| Most relevant | 3 |
| Relevant | 2 |
| Least relevant | 1 |

The total score obtained for each variable was worked out. The variables having a score value of 75 per cent and above were selected. Thus the personal and socio-psychological variables selected were:

1. Age
2. Education
3. Experience in vegetable cultivation
4. Area under vegetable cultivation
5. Livestock possession
6. Mass media exposure
7. Extension orientation
8. Economic motivation
9. Training attended
10. Innovativeness

11. Risk orientation
12. Market perception
13. Self confidence
14. Environmental orientation

### 3.5.1 Age

This was operationally defined as the number of years the respondent has actually completed at the time of interview.

The respondents were classified into three categories, namely, young, middle and old as followed by Sherief (1998)

| **Category** | **Age** |
|---|---|
| Young | ≤ 34 years |
| Middle | 35 - 44 years |
| Old | ≥ 45 years |

### 3.5.2 Education

Education was operationalised as the extent of formal education acquired by the respondent. It was measured by assigning scores for different levels of education. The categorization of the respondents and the corresponding scores are given below as followed by Majjusha (2000).

| **Level of education** | **Score** |
|---|---|
| Illiterate | 0 |
| Primary school | 1 |
| Secondary school | 2 |
| Collegiate | 3 |

### 3.5.3 Experience in Vegetable Cultivation

It was defined as the total number of years the respondent has been engaged in vegetable cultivation. The scoring procedure adopted by Sreedaya (2000) was used. The scoring pattern is given below:

| Sl. No. | Experience | Score |
|---|---|---|
| 1 | Upto 5 years | 1 |
| 2 | 6 to 10 years | 2 |
| 3 | 11 to 25 years | 3 |
| 4 | Above 25 years | 4 |

### 3.5.4 Area under Vegetable Cultivation

This was measured as the extent of area under vegetable cultivation in cents. The scoring pattern was employed in this case as done by Fayas (2003).

| Sl. No. | Size of holding | Score |
|---|---|---|
| 1 | Upto 25 cents | 1 |
| 2 | 26 to 50 cents | 2 |
| 3 | 51 to 1 acre | 3 |
| 4 | 1.01 to 2 acres | 4 |
| 5 | Above 2 acres | 5 |

### 3.5.5 Livestock Possession

This referred to the number of animals possessed by an individual. The value of various livestock items was calculated and the total value of all the livestock was taken as a measure. The respondent's livestock possession was categorized into the following intervals as given by Sriram (1997).

| Sl. No. | Value (in Rs.) | Score |
|---|---|---|
| 1 | ≤ 5000 | 1 |
| 2 | 5001 – 10,000 | 2 |
| 3 | 10,001 – 15,000 | 3 |
| 4 | 15,001 – 20,000 | 4 |
| 5 | 20001 and above | 5 |

### 3.5.6 Mass Media Exposure

Mass media exposure referred to the degree to which the different mass media, namely, radio, television, newspaper, magazines, bulletins, books and films were utilized by the farmers for getting information about different organic farming practices in vegetable cultivation. The scale used here was developed by Lakshmi (2000). The frequency of exposure to mass media was measured as shown below:

| Frequency of exposure | Score |
|---|---|
| Regularly | 2 |
| Occasionally | 1 |
| Never | 0 |

The score range was between 14 and 0.

### 3.5.7 Extension Orientation

This referred to the extent of contact, the farmer had with different extension agencies and also his participation in union activities or programmes like meetings, seminars etc. organized by these agencies and personnel. The scale used here was developed by Manoj (2000).

The response for contact of a farmer with different extension personnel was measured as follows.

| Response | Score |
|---|---|
| Regularly | 2 |
| Occasionally | 1 |
| Never | 0 |

The total score was obtained by adding up all the scores for different extension activities.

The extension participation was measured by summing up the scores obtained by a farmer for his participation in various extension activities. The scores were assigned to the respondents as follows.

| Response | Score |
|---|---|
| Regularly | 2 |
| Occasionally | 1 |
| Never | 0 |

The total score was obtained by adding up the scores for all extension activities. The scores for extension orientation for a respondent was arrived at by adding up the scores for extension contact and extension participation.

### 3.5.8 Economic Motivation

This referred to the extent to which a farmer was oriented towards profit maximization and relative value he places on monetary gains

The scale adopted by Sreedaya (2000) was used to measure economic motivation with slight modification. The scale consisted of six statements of which the fifth and the sixth were negative. Each statement was provided with five point continuum, namely, strongly agree, agree, undecided, disagree and strongly disagree with scores of 4, 3, 2, 1 and 0 for positive statements and 0, 1, 2, 3 and 4 for negative statements. The summation of the scores for all the statements formed the score for economic motivation. The score range was between 24 and 0.

### 3.5.9 Training Attended

This was defined as the number of trainings in various organic farming activities undergone by the respondent during the last three years. The scoring procedure followed by Meera (2001) was used with slight modification.

| Sl. No. | Trainings undergone | Score |
|---|---|---|
| 1 | No training | 0 |
| 2 | One training | 1 |
| 3 | Two trainings | 2 |
| 4 | Three/more trainings | 3 |

The score range was between three and zero.

### 3.5.10 Innovativeness

This was defined as the degree to which the respondent was relatively earlier in adopting new ideas.

The scoring procedure followed by Priya (2003) was used to measure innovativeness with slight modification. In this procedure a

question was asked as to when the farmer would like to adopt an organic farming practice. The response was scored as follows.

| Sl. No. | Response | Score |
|---|---|---|
| 1 | As soon as it is brought to my knowledge | 3 |
| 2 | After I had seen other farmers tried successfully in their farms | 2 |
| 3 | I prefer to wait and take my own time | 1 |
| 4 | I am not interested in adopting organic farming practices | 0 |

### 3.5.11 Risk Orientation

This was operationalised as the degree to which the farmer is oriented towards encountering risks and uncertainty in adopting organic farming practices and he exhibits courage to face problems of risk. The scale followed by Majjusha (2000) was used to measure risk orientation with slight modification.

The scale consisted of six statements of which two statements were negative. The respondents were rated on a five point continuum with scores 4,3, 2, 1 and 0 for their responses strongly agree, agree, undecided, disagree and strongly disagree respectively. For the negative statements, the scoring procedure was reversed. The scores obtained on each statement were cumulated to obtain the total score. Thus the maximum score that could be obtained by a respondent was 24 and the minimum zero.

### 3.5.12 Market Perception

This was defined as the capacity of the respondent to identify the market trend to sell the produce for greater returns.

The scale followed by Fayas (2003) was used to measure market perception with slight modification. The method consisted of scoring the

responses obtained to selective questions presented to the respondents to elicit their perception of the market for the produce. The questions and the scoring procedure adopted were as follows.

1. Do you think that a farmer will be able to sell vegetables at a higher demand if he increases the quality by adopting organic farming practices?

   Yes – 1

   No – 0

2. How much price the vegetables cultivated following organic farming practices will fetch, compared to those raised under conventional methods?

   Low price – 0

   Same price – 1

   High price – 2

3. How difficult it will be to dispose off the vegetables cultivated following organic farming practices?

   Very difficult – 0

   Difficult – 1

   Easy – 2

   Very easy – 3

The score range was between six and zero.

**3.5.13 Self Confidence**

This was operationally defined as the extent of feeling about one's own powers, abilities and resourcefulness to perform any activity which the farmer desires to undertake.

Self confidence was measured using the scale followed by Geetha (2002). The scale consisted of eight statements. The respondents were asked to state their response on a five point continuum ranging from always, most often, often, occasionally and never with the scores of 4, 3, 2, 1 and 0 respectively for the positive statements. The scoring procedure was reversed in the case of negative statements. Total score was obtained by summing of all the scores for each statement. The score range was between 32 and 0.

### 3.5.14 Environmental Orientation

This was operationalised as the degree to which a farmer was concerned about his environment.

The scale developed by Sreevalsan (1995) was used in this study. The scale consisted of six statements and the respondents were asked to state their agreement or disagreement to each of the statements and scores of one and zero were assigned for agree and disagree respectively. The responses were summed up to obtain the environmental orientation score. The score range was between six and zero.

## 3.6 OPERATIONALISATION AND MEASUREMENTS OF DEPENDENT VARIABLES

### 3.6.1 Extent of Awareness about Organic Farming Practices

Awareness was operationalised as the extent to which respondents were familiar with the organic farming practices in vegetable cultivation. Gangadharan (1993), Sriram (1997) and Sherief (1998) measured awareness on a two point continuum namely ‘aware’ and ‘not aware’. In this study, the respondents were asked to indicate the degree of awareness about twenty organic farming practices on a three point continuum of not aware, partially aware and aware and scores of 0, 1 and 2 were given respectively. The awareness scores for all the organic farming practices

were summed up to arrive at the overall awareness score of the respondent. Awareness index was calculated using the formula.

$$\text{Awareness Index} = \frac{\text{Respondent's score}}{\text{Maximum possible score}} \times 100$$

Awareness was also used as an independent variable for testing its relationship with knowledge, attitude and adoption.

**3.6.2 Extent of knowledge about Organic Farming Practices**

In the present study, knowledge refers to the extent of information possessed by the respondent about organic farming practices in vegetable cultivation. .

Nachiappan and Srinivasamurthy (1976) used the teacher made test to find out the knowledge levels of small farmers with respect to farm technology. They calculated knowledge index by the following formula.

$$\text{Knowledge index} = \frac{\text{Actual score obtained}}{\text{Maximum score alloted}} \times 100$$

Gangadharan (1993) measured knowledge of the respondents about improved agricultural practices in pepper cultivation based on teacher made test.

Majjusha (2000) measured knowledge of the respondents about farmers' practices in cowpea cultivation based on teacher made test.

Similarly, teacher made test was used in this study to measure knowledge about organic farming practices in vegetable cultivation.

A set of 30 statements reflecting the knowledge of the respondents about organic farming practices were selected based on review of literature and discussion with experts in the Department of Agricultural

Extension and other related fields. Sixteen statements were later discarded due to ambiguity and duplication. Finally fourteen statements were selected for the test. A score of 'one' was assigned to the correct answer and 'zero' to wrong answer. The sum of scores obtained for all items indicated the knowledge score of a respondent. Thus the maximum knowledge score that could be obtained by a respondent was 14 and the minimum zero. Based on the knowledge score, knowledge index was calculated using the following formula.

$$\text{Knowledge Index} = \frac{\text{Respondent's total score}}{\text{Maximum possible score}} \times 100$$

Knowledge was also used as an independent variable for testing its relationship with attitude and adoption.

### 3.6.3 Attitude towards Organic Farming Practices

The term attitude refers to the degree of positive or negative affect towards a psychological object. The focus of the study is on organic farming practices in vegetable cultivation. To measure the degree of the farmer's like or dislike towards organic farming practices, an attitude scale was constructed by following the method of Likert summated ratings suggested by Edwards(1969).

**a) Collection of items**

All possible statements which will discriminate the positive and negative attitudes of the farmers towards organic farming practices were collected from relevant literature and also by having discussion with experts from Kerala Agricultural University and State Department of Agriculture. The statements were edited following the procedure suggested by Edwards (1969). A total of 50 statements were selected.

**b) Selection of items**

These statements were given to 30 experts in Kerala Agricultural University to test their relevancy to be included in the scale. The responses were collected on a five point continuum of most relevant, more relevant, relevant, less relevant and least relevant. The scores were given as 5, 4, 3, 2 and 1 respectively. The total score for each statement given by the expert was calculated. The statements were ranked in descending order based on their scores. From these, 30 statements with highest scores were selected and subjected to item analysis. The procedure suggested by Edwards (1969) was followed.

**c) Item scoring**

The statements were administered to 40 farmers of non-sample area selected randomly. They were asked to respond to each statement in terms of their own agreement or disagreements on a five point continuum, namely, strongly agree, agree, undecided, disagree and strongly disagree. The scores were given as 4, 3, 2, 1 and 0 for positive statements and reverse for the negative statements. The total score for each of the respondent was the sum of all the items.

**d) Item evaluation**

The subjects were then arranged in an array based on the total score obtained by them. Twenty five per cent of respondents with higher total scores and 25 per cent of respondents with lower total scores were selected from among the respondents. These two groups formed the criterion groups. To evaluate individual statement the critical ratio namely t–value which is a measure of the t unit to which a given statement differentiate between high and low group of respondents for each statement was calculated.

For calculation of‘t’ value the following formula was used.

$$t = \frac{\overline{X}_H - \overline{X}_L}{\sqrt{\frac{\Sigma(X_H - \overline{X}_H)^2 + \Sigma(X_L - \overline{X}_L)^2}{n(n-1)}}}$$

Where, $\Sigma (X_H - \overline{X}_H)^2 = \Sigma X_H^2 - \frac{(\Sigma X_H)^2}{n}$

$$\Sigma (X_H - \overline{X}_L)^2 = \Sigma X_L^2 - \frac{(\Sigma X_L)^2}{n}$$

$X_H$ = The mean score of a given statement for the high group

$X_L$ = The mean score of the same statement for the low group

n = The number of subjects

The statements with highest 't' value (*i.e.,* more than 1.75) were selected for the attitude items. Thus the attitude scale consisted of sixteen items which were finally included in the study.

**Scoring Techniques**

The items on the attitude scale were provided with five point continuum, namely, strongly agree, agree, undecided, disagree and strongly disagree with scores of 4, 3, 2, 1 and 0 respectively for the positive statements and 0, 1, 2, 3 and 4 for negative statements. The attitude score of the respondents could be obtained by summing up the scores for all the items in the scale.

**Reliability of the Scale**

A scale is said to be reliable when it will consistently produce the same or similar results, when applied to the same sample at different time. Here the reliability was tested by means of split half method.

The scale was administered to 30 non-sample respondents each and was divided into two halves based on odd and even number of statements. The total scores obtained for odd and even numbered items were subjected

to correlation analysis. The correlation value obtained was 0.923 which was found to be significant at one per cent level. Since the ‘r’ value was more than 0.8, the scale was considered to be reliable.

**Validity of the scale**

The developed scale was tested for content validity. The main criterion of content validity is how well the contents of the scale represent the subject matter under study. Since the items selected were from the universe of content, it was ensured that the items covered all aspects of organic farming practices in vegetable cultivation.

**Administering the scale**

The final scale which measured attitude of the vegetable growers towards organic farming practices consisted sixteen statements. Each statement was noted on a five point continuum as strongly agree, agree, undecided, disagree and strongly disagree with scores of 4, 3, 2, 1 and 0 respectively for positive statements (1, 2, 4, 7, 9, 10, 13 and 15). The scoring was reversed in the case of negative statements (3, 5, 6, 8, 11, 12, 14 and 16). The score was obtained for each item and summed up to get the attitude score of a farmer. The maximum score was 64 and the minimum was 0.

Attitude was also used as an independent variable for testing its relationship with the adoption.

### 3.6.4 Extent of Adoption of Organic Farming Practices

In this study, adoption meant the degree to which a farmer had actually adopted an organic farming practice. The extent of adoption of organic farming practices in vegetable cultivation was measured by means of an adoption index developed for the study.

Sriram (1997) and Vijayalayan (2001) used an index to measure the extent of adoption of eco-friendly agricultural practices in cotton and rice farmers respectively.

In this study, the procedure followed by Sriram (1997) was used to measure the extent of adoption of organic farming practices with slight modification. After perusal of relevant literature and based on the discussion with the scientists and the extension workers, 20 organic farming practices were identified in vegetable cultivation.

The practices differed in their contribution to yield and environmental safety. So equal value for all practices was not meaningful. Hence a method was adopted for assigning weightages to the practices as explained in the chapter 3.4. The weightages of organic farming practices is given in Appendix II.

The farmers' responses were divided into three categories namely, adopted, partially adopted and not adopted. The score of 2, 1and 0 were assigned respectively to each item in accordance with the response of the farmer and they were multiplied with the respective practice weightage. The total adoption index for each farmer was calculated using the following formula.

$$\text{Adoption index} = \frac{\text{Respondent's total score}}{\text{Total possible score}} \times 100$$

Respondent's total score = Total number of practices adopted by a farmer, multiplied by the respective practice weightage and summated

Total possible score = Total number of practices recommended multiplied by the respective practice weightage and summated

## 3.7 CONSTRAINTS IN THE ADOPTION OF ORGANIC FARMING PRACTICES AS PERCEIVED BY THE VEGETABLE GROWERS

Based on the review of relevant literature and discussions with the experts of both State Department of Agriculture and Kerala Agricultural University, the constraints faced by vegetable growers were collected separately. The important constraints in the adoption of organic farming practices by the vegetable growers were finally selected and these constraints were enlisted in the interview schedule.

The responses to each constraint was obtained on a three point continuum, namely, most important, important and least important. In order to rank the constraints, a cumulative index was calculated. For this, weightages of 3, 2 and 1 were given to the responses most important, important and least important respectively.

The frequency of responses under each category was multiplied with the corresponding weightage and added to get a cumulative index for the particular constraint. The ratio between the cumulative index and the frequency of responses for each constraint was worked out. Based on the ratio, the constraints were ranked in each case. The solutions of the most important constraint were also recorded.

## 3.8 METHODS USED FOR DATA COLLECTION

Taking into consideration of the scope and objectives of the study, a draft interview schedule was prepared after perusal of available literature and through consultation with experts in the field of extension education and other related fields. After incorporating their suggestions, a well-structured interview schedule was finalized in English and translated to Malayalam for collecting data from the farmers.

Interview schedule was field tested with vegetable growers in a non-sample area by the researcher. The experiences gained by the researcher during the test were of great help in making the questions more

clear, free from ambiguity and to use simple language. Necessary changes were incorporated in the interview schedule. The final version of the interview schedule is given in Appendix IV. The data were collected from 100 vegetable growers through personal interview by the researcher using the final interview schedule. Non-participant observation technique was also followed for data collection.

## 3.9 STATISTICAL TOOLS USED FOR ANALYSIS

The data collected from the respondents were scored, tabulated and analysed using suitable statistical methods. The statistical analysis was done using computer facilities available at the College of Agriculture, Vellayani.

Keeping in view the objectives of the study and amenability, the data were subjected to different statistical tools. These tests included mean, standard deviation, percentage, coefficient of variation and critical difference which were used in comparison of different categories and frequencies. The other statistical tools like analysis of variance, correlation coefficient and stepwise regression were also used in analysing the data. A brief description of the tools used is given below.

### Mean

The mean scores for all the variables were worked out to make suitable comparisons wherever necessary.

### Percentage Analysis

Percentage analysis was done to make simple comparison wherever necessary.

### Analysis of Variance

To test the significance of difference among the farmers of different panchayats with respect to the independent and dependent variables included in the study.

**Correlation Analysis**

Correlation coefficient is a measure of the relationship between two variables. The correlation coefficient was worked out to measure the relationship between the dependent variables and the independent variables.

**Stepwise Regression Analysis**

This was done to identify the variables having more influence on the dependent variable and for elimination of unimportant variables.

# *Results and Discussion*

# 4. RESULTS AND DISCUSSION

The findings of the present study have been highlighted in tune with the objectives. They are described under the following heads.

4.1 Profile characteristics of the vegetable growers

4.2 Awareness of vegetable growers about organic farming practices

4.3 Knowledge of vegetable growers about organic farming practices

4.4 Attitude of vegetable growers towards organic farming practices

4.5 Adoption of organic farming practices by the vegetable growers

4.6 A comparative analysis of independent variables and dependent variables of vegetable growers

4.7 Relationship between the characteristics of the vegetable growers with the extent of awareness, knowledge, attitude and adoption

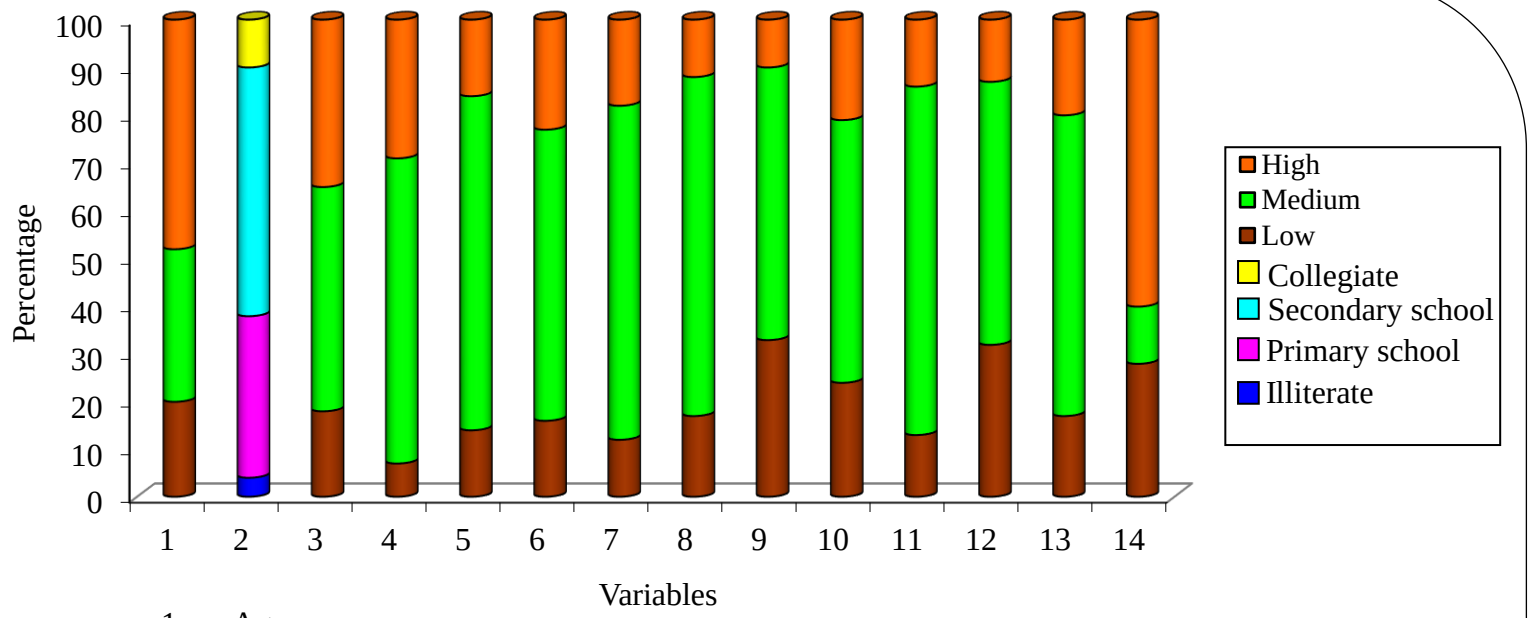
4.8 Models evolved for the study

4.9 Stepwise regression analysis for predicting the variables influencing adoption

4.10 Constraints in the adoption of organic farming practices and suggestions for overcoming them

## 4.1 PROFILE CHARACTERISTICS OF THE VEGETABLE GROWERS

A clear understanding of the socio-economic and psychological characteristics of the respondents would enable the investigator to interpret the data. For this purpose fourteen variables were selected and included in the study. The profile characteristics of the respondents are presented in Fig.4 and discussed below.




1 Age
2 Education
3 Experience in vegetable cultivation
4 Area under vegetable cultivation
5 Livestock possession
6 Mass media exposure
7 Extension orientation
8 Economic motivation
9 Training attended
10 Innovativeness
11 Risk orientation
12 Market perception
13 Self confidence
14 Environmental orientation

**Fig. 4. Profile characteristics of vegetable growers**

### 4.1.1 Age

Table 5. Distribution of vegetable growers according to their age

(n = 100)

| Sl. No. | Category | Frequency | Percentage |
|---|---|---|---|
| 1 | Young age ≤ 34 | 20 | 20 |
| 2 | Middle age 35-44 | 32 | 32 |
| 3 | Old age ≥ 45 | 48 | 48 |

From the table it is observed that majority of the vegetable growers (48 %) belonged to old age category and middle age category (32 %). Only 20 per cent belonged to young age group.

Vegetable cultivation has been the primary occupation of the farmers in the study area. So it is natural to find middle and old age group of farmers cultivating vegetables.

A similar result was reported by Jahagirdar and Sundarasamy (2002) and Fayas (2003).

### 4.1.2 Education

Table 6. Distribution of vegetable growers according to their education

(n = 100)

| Sl. No. | Category | Frequency | Percentage |
|---|---|---|---|
| 1 | Illiterate | 4 | 4 |
| 2 | Primary school | 34 | 34 |
| 3 | Secondary school | 52 | 52 |
| 4 | Collegiate | 10 | 10 |

Table 6 reveals that almost all the vegetable growers (96 %) were literate and illiterates were only four per cent. The higher literacy rate in

the state is reflected in the results of the study. A similar result was reported by Ramachandran (1997), Sriram (1997) and Sherief (1998).

### 4.1.3 Experience in Vegetable Cultivation

Table 7. Distribution of vegetable growers according to their experience in vegetable cultivation

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low <Mean-SD | <2.27 | 18 | 18 |
| 2 | Medium Mean ± SD | 2.27-3.93 | 47 | 47 |
| 3 | High >Mean +SD | >3.93 | 35 | 35 |

Mean: 3.10 SD: 0.83

From the table it is observed that majority of the vegetable growers (47 %) were having medium level of experience followed by high (35 %) and low level (18 %) of experience because of the reason that vegetable cultivation has been the primary occupation in the study area.

A similar result was reported by Santhasheela (1999) and Kamalakkannan (2003).

### 4.1.4 Area under Vegetable Cultivation

Table 8. Distribution of vegetable growers according to their area under vegetable cultivation

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <1.95 | 7 | 7 |
| 2 | Medium | 1.95-3.95 | 64 | 64 |
| 3 | High | >3.95 | 29 | 29 |

Mean: 2.95 SD: 1.00

It is clear from the table that majority of the vegetable growers (64 %) belonged to medium category with respect to area under vegetable cultivation followed by high category (29 %). Only seven per cent belonged to low category. This was because the profit from vegetable cultivation was higher and the high experience in vegetable cultivation.

The study derived support from the finding of Fayas (2003).

### 4.1.5 Livestock Possession

Table 9. Distribution of vegetable growers according to their livestock possession

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <0.46 | 14 | 14 |
| 2 | Medium | 0.46-3.24 | 70 | 70 |
| 3 | High | >3.24 | 16 | 16 |

Mean: 1.85 SD: 1.39

A perusal of the table reveals that majority of the vegetable growers (60 %) had medium livestock component along with agriculture and 14 per cent of the respondents belonged to low category. Only 16 per cent of the respondents were found to have high livestock component. It was interesting to note that organic vegetable cultivation and animal husbandry were the two sides of the same coin and were inseparable.

The result was in line with the finding of Helen (1990) and was in contrast with the finding of Sherief (1998).

### 4.1.6 Mass Media Exposure

Table 10. Distribution of vegetable growers according to their mass media exposure

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <6.02 | 16 | 16 |
| 2 | Medium | 6.02-10.82 | 61 | 61 |
| 3 | High | >10.82 | 23 | 23 |

Mean: 8.42 SD: 2.40

From the table it is discerned that 61 per cent of the respondents belonged to medium category with respect to mass media exposure followed by high (23 %) and low (16 %) category. This was because of high literacy level and majority of farm families subscribed one newspaper, possessed radio and television.

This finding was in agreement with that of Kumar (1994) and Sriram (1997).

### 4.1.7 Extension Orientation

Table 11 Distribution of vegetable growers according to their extension orientation

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <6.98 | 12 | 12 |
| 2 | Medium | 6.98-12.54 | 70 | 70 |
| 3 | High | >12.54 | 18 | 18 |

Mean: 9.76 SD: 2.78

The data in table shows that majority of the vegetable growers (70 %) had medium extension orientation followed by high (18 %) and low levels (12 %) of extension orientation. Since the selected respondents were members of VFPCK and State Department of Agriculture they were having frequent contact with the officials of these organizations and were participating in the activities of these organizations.

This finding was in line with Manjusha (1999) and in contrast with Suthan (2003).

### 4.1.8 Economic Motivation

Table 12. Distribution of vegetable growers according to their economic motivation

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <11.86 | 17 | 17 |
| 2 | Medium | 11.86-17.64 | 71 | 71 |
| 3 | High | >17.64 | 12 | 12 |

Mean: 14.75 SD: 2.89

From the table, it is inferred that a higher percentage of the vegetable growers (71 %) had medium level of economic motivation. Vegetables produced from the study area were being exported to foreign countries because of good quality. So their main motive was to harvest good quality vegetables from their available land utilizing organic farming practices.

A similar trend was also emphasized by Krishnakumar (1996), Sriram (1997) and Fayas (2003).

### 4.1.9 Training Attended

Table 13. Distribution of vegetable growers according to training attended

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <0.15 | 33 | 33 |
| 2 | Medium | 0.15-2.11 | 57 | 57 |
| 3 | High | >2.11 | 10 | 10 |

Mean: 1.13 SD: 0.98

From the perusal of table, it is observed that 57 per cent of the vegetable growers had medium level of training followed by low level (33 %) of training. Only 10 per cent of the farmers had high level of training. The medium level of extension orientation might have been the reason for the medium level of training attended by the respondents.

A similar trend was reported by Parvathy (2000).

### 4.1.10 Innovativeness

Table 14. Distribution of vegetable growers according to their innovativeness

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <1.30 | 24 | 24 |
| 2 | Medium | 1.30-2.66 | 55 | 55 |
| 3 | High | >2.66 | 21 | 21 |

Mean: 1.98 SD: 0.68

It is clear from the table that majority of the vegetable growers (55 %) had medium innovativeness. Twenty four per cent of the respondents had low innovativeness and 21 per cent of the respondents belonged to high category.

Farmers adopted the organic farming practices with the technical assistance provided by officials of VFPCK, extension workers of State Department of Agriculture and scientists of Kerala Agricultural University. The innovative spirit of the farmers also increased due to medium level of mass media exposure.

This finding was in line with that of Alagirisamy (1997), Marimuthu (1998) and Fayas (2003).

### 4.1.11 Risk Orientation

Table 15. Distribution of vegetable growers according to their risk orientation

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <13.45 | 13 | 13 |
| 2 | Medium | 13.45-19.05 | 73 | 73 |
| 3 | High | >19.05 | 14 | 14 |

Mean: 16.25 SD: 2.80

From the table, it is clear that almost three fourth of the vegetable growers (73 %) had medium level of risk orientation followed by high (14 %) and low (13 %) levels.

Risk taking behaviour was essential for the adoption of organic farming practices in vegetable cultivation. Farmers also had to spend more on inputs for getting more output. Farmers had to take certain amount of risks in cultivating vegetables. All these factors contributed to medium level of risk orientation.

A similar result was reported by Krishnakumar (1996), Santhasheela (1999) and Fayas (2003).

### 4.1.12 Market Perception

Table 16. Distribution of vegetable growers according to their market perception

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <2.28 | 32 | 32 |
| 2 | Medium | 2.28-5.04 | 55 | 55 |
| 3 | High | >5.04 | 13 | 13 |

Mean: 3.66 SD: 1.38

From the perusal of table, it is observed that 55 per cent of the vegetable growers had medium level of market perception followed by low (32 %) and high levels (13 %).

The respondents might have been concerned with the production of non-hazardous, eco-friendly, safe and hygienic vegetables rather than the prices that they will fetch in the market.

This was in contrast with the findings of Suthan (2003) and Fayas (2003).

### 4.1.13 Self Confidence

Table 17. Distribution of vegetable growers according to their self confidence

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <17.02 | 17 | 17 |
| 2 | Medium | 17.02-23.90 | 63 | 63 |
| 3 | High | >23.90 | 20 | 20 |

Mean: 20.46 SD: 3.44

The table is depicted that 63 per cent of the vegetable growers had medium level of self confidence followed by high (20 %) and low levels (17 %).

It was essential that the self confidence of respondents was very important to adopt organic farming practices because of high risk involved. A similar result was reported by Parvathy (2000).

### 4.1.14 Environmental Orientation

Table 18. Distribution of vegetable growers according to their environmental orientation

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | < 4.06 | 28 | 28 |
| 2 | Medium | 4.06-5.84 | 12 | 12 |
| 3 | High | > 5.84 | 60 | 60 |

Mean: 4.95 SD: 0.8 9

It was very happy to note that more than half of the respondents (60%) had high environmental orientation followed by low (28 %) and medium levels (12%) because of the reason that they had high level of education and mass media exposure.

## 4.2 AWARENESS OF VEGETABLE GROWERS ABOUT ORGANIC FARMING PRACTICES

In this section, the extent of awareness of farmers about various organic farming practices in vegetable cultivation was discussed.

Studying the knowledge, attitude and adoption levels of vegetable growers were the important objectives of this study. Hence as a pre-requisite, it would be desirable to know their extent of awareness.

Table 19. Distribution of vegetable growers according to their awareness index about organic farming practices

(n=100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <66.47 | 10 | 10 |
| 2 | Medium | 66.47-87.22 | 73 | 73 |
| 3 | High | >87.22 | 17 | 17 |

Mean: 76.85 SD: 10.37

From the above table, it is observed that 73 per cent of the vegetable growers had medium level of awareness followed by high (17%) and low levels (10%) (Fig. 5).

Majority of the vegetable growers were educated and had high mass media exposure. Besides, the State Department of Agriculture promoted organic farming practices through various extension techniques. In addition, VFPCK officials also influenced the farmers' awareness about organic farming practices by conducting training programmes.

Due to indiscriminate use of chemical pesticides and fertilizers continuously the farmers burnt their fingers and they were pushed to poverty. This necessitated them to look for proper guidance from extension staff which ultimately resulted in increased awareness levels.

Mass media namely newspapers, radio and television also played a vital role in creating awareness among farmers about organic farming practices. All these factors put together would have influenced in medium and high level of awareness.

A similar result was reported by Santha (1992), Kathiravan (1994), Lekshmi (1995) and Sriram (1997).

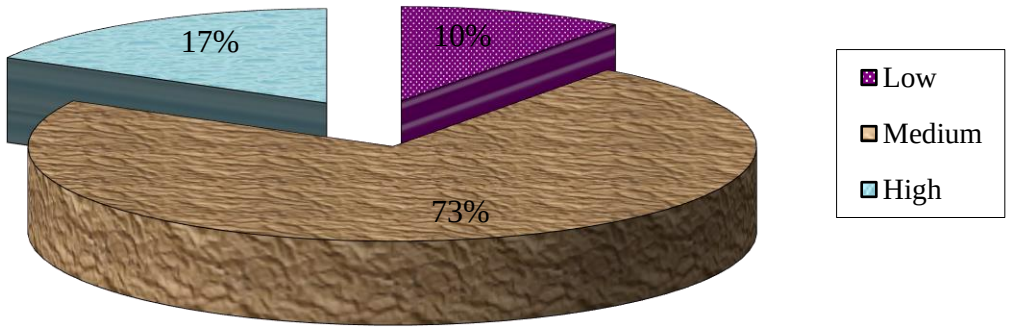



**Fig. 5. Distribution of vegetable growers according to their awareness index about organic farming practices**

**Practice wise extent of awareness**

Table 20. Awareness of the vegetable growers about organic farming practices (n=100)

| Sl. No. | Organic farming practices | Aware (%) | Partially aware (%) | Not aware (%) |
|---|---|---|---|---|
| 1 | Summer ploughing | 82 | 13 | 5 |
| 2 | *In situ* incorporation of crop residues | 90 | 6 | 4 |
| 3 | Raising green manure and incorporation | 87 | 4 | 9 |
| 4 | Selection of good seeds | 85 | 3 | 12 |
| 5 | Resistant / tolerant variety | 64 | 8 | 28 |
| 6 | Seed treatment with biofertilizers | 40 | 12 | 48 |
| 7 | Application of FYM | 93 | 7 | - |
| 8 | Application of vermicompost / compost | 76 | 10 | 14 |
| 9 | Application of poultry manure | 81 | 8 | 11 |
| 10 | Application of oil cakes | 73 | 13 | 14 |
| 11 | Timely irrigation | 95 | 5 | - |
| 12 | Crop rotation | 84 | 6 | 10 |
| 13 | Intercropping system | 90 | 4 | 6 |
| 14 | Mulching | 89 | 3 | 8 |
| 15 | Hand/mechanical weeding | 93 | 7 | - |
| 16 | Collection and destruction of pests (egg, larvae and pupae) and disease affected plants | 88 | 4 | 8 |
| 17 | Use of light traps | 50 | 30 | 20 |
| 18 | Ash/cowdung slurry spray | 66 | 20 | 14 |
| 19 | Use of botanical pesticides | 73 | 15 | 12 |
| 20 | Conservation of natural enemies | 76 | 14 | 10 |

From the table, it is clear that organic farming practices like summer ploughing, *in situ* incorporation of crop residues, raising green manure and incorporation, selection of good seeds, application of FYM, application of poultry manure, timely irrigation, crop rotation, intercropping system, mulching, hand/mechanical weeding, collection and destruction of pests (egg, larvae and pupae) and disease affected plants were well known to the farmers ranging from 80 to 95 per cent.

Majority of the vegetable growers had high experience in vegetable cultivation and they were made aware of organic farming practices by the extension personnel and neighbourhood farmers who had high exposure to mass media. Apart from these, VFPCK conducted training programmes on organic farming. These might have been the factors responsible for increased awareness level.

Practices like resistant/tolerant variety, application of vermicompost /compost, application of oil cakes, ash/cowdung slurry spray, use of botanical pesticides and conservation of natural enemies were known to the farmers to the extent of 64 to 76 per cent.

Majority of the farmers were the members of VFPCK. It provided them an opportunity to mingle with and discuss the new technologies during meetings and group discussions. Besides, the State Department of Agriculture organized field visits, demonstrations and farm advisory services on vegetable cultivation. This created awareness among the farmers to become aware of the latest techniques. The scientists from Kerala Agricultural University also participated in the question and answer sessions and influenced the farmers' decision favourably towards organic farming practices. All these factors might have contributed to 64 to 76 per cent level of awareness.

Seed treatment with biofertilizers and use of light traps were known to the farmers to the extent of 40 and 50 per cent respectively.

Seed treatment with biofertilizers had not been popularized on a large scale to the farmers. One probable reason could be non-visible and non-observable nature of biofertilizers and their non-availability.

Light traps were being recommended for the monitoring and control of pests. Only 50 per cent of farmers were aware because of the reason that pest control was less when compared to other methods. All these points would have resulted in making low level awareness about these two practices.

It is clear from the findings that majority of the vegetable growers had medium level of awareness about organic farming practices.

## 4.3 KNOWLEDGE OF VEGETABLE GROWERS ABOUT ORGANIC FARMING PRACTICES

Table 21. Distribution of vegetable growers according to their knowledge index about organic farming practices

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <42.80 | 12 | 12 |
| 2 | Medium | 42.80-72.37 | 70 | 70 |
| 3 | High | >72.37 | 18 | 18 |

Mean: 57.58 SD: 14.77

Table reveals that majority of the vegetable growers (70 %) had medium level of knowledge followed by high (18 %) and low (12 %) levels of knowledge about organic farming practices in vegetable cultivation (Fig. 6). The awareness about organic farming practices had led to developing an interest in gathering more information. The modern communication technologies available and the recent positive support given in this field by the government and its agencies might have helped the vegetable growers to know more about organic farming practices. High

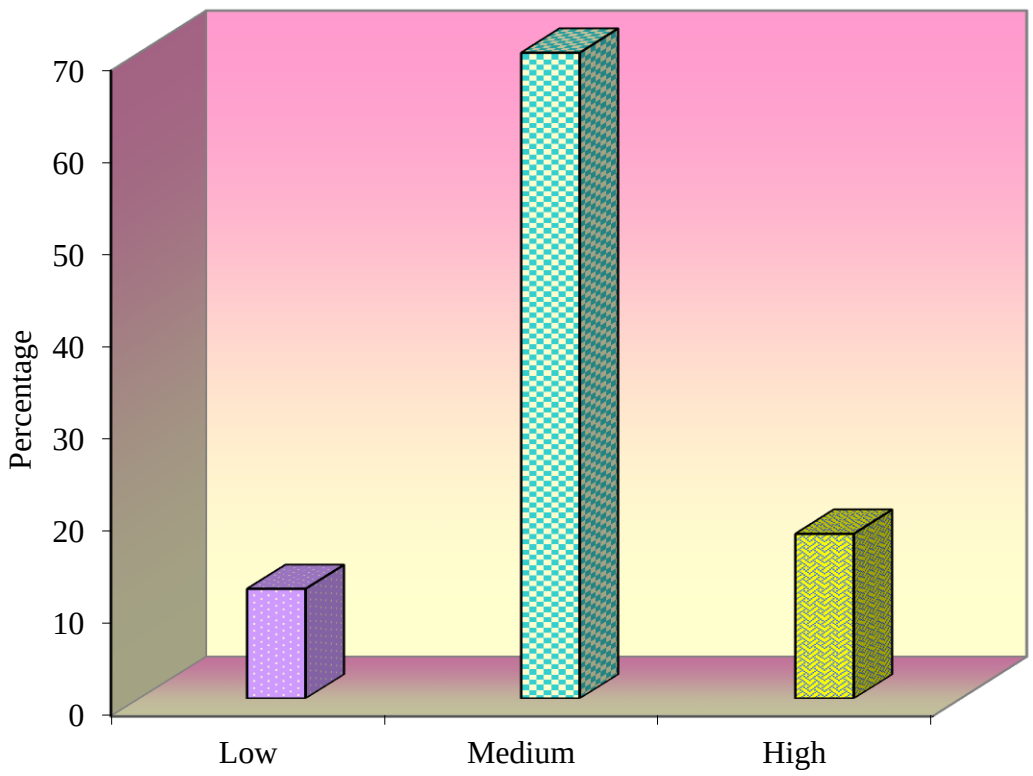



**Fig. 6. Distribution of vegetable growers according to their knowledge index about organic farming practices**

level education and exposure to mass media sources might have broadened their knowledge on organic farming practices. Training conducted by VFPCK might have also influenced the knowledge level of farmers.

The finding was in agreement with the earlier findings of Alagirisamy (1997), Manoj (1998), Kamalakkannan (2003) and Fayas (2003).

It is observed that majority of the vegetable growers belonged to medium category with respect to knowledge about organic farming practices.

## 4.4 ATTITUDE OF VEGETABLE GROWERS TOWARDS ORGANIC FARMING PRACTICES

Farmers' attitude towards organic farming practices was studied by developing a new scale and the findings are given in Table.

Table 22. Distribution of the vegetable growers according to their attitude towards organic farming practices (n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Less favourable | <34.31 | 22 | 22 |
| 2 | Favourable | 34.31 – 49.49 | 64 | 64 |
| 3 | Most favourable | >49.49 | 14 | 14 |

Mean: 41.90 SD: 7.59

From the table it is clear that majority of the vegetable growers (64 %) had a favourable attitude towards organic farming practices followed by less favourable (22 %) and most favourable (14 %) attitude (Fig. 7).

The awareness and knowledge about organic farming practices might have led them to develop an interest towards organic farming

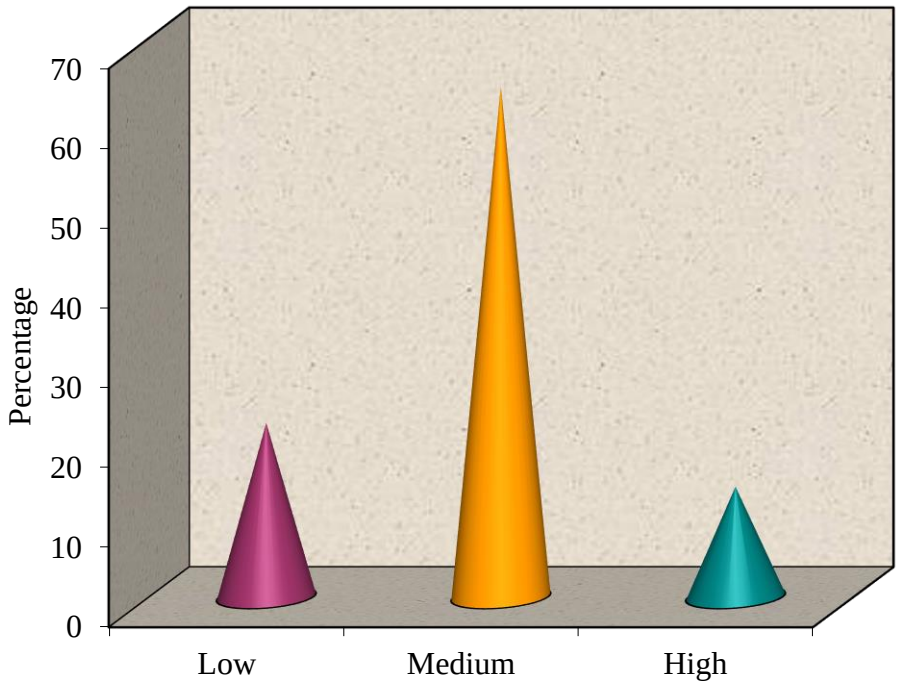



**Fig. 7. Distribution of vegetable growers according to their attitude towards organic farming practices**

practices. The results born out of the intensive research in Kerala Agricultural University and disseminated in scientists' meet, research council and extension council meetings also proved the worthiness of organic farming practices.

The recommendations of the meetings got translated into action in the field through the staff of State Department of Agriculture by giving them training. During monthly workshops and meetings, messages related to organic farming practices were finalized and disseminated among the farmers to create a favourable attitude.

Publishing articles in newspapers and broadcasting and telecasting lessons on organic farming practices through All India Radio, Doordarshan and Asianet, besides training by VFPCK officials, acted as catalysts in the forming of favourable attitude towards organic farming practices.

Indiscriminate use of pesticides and fertilizers resulted in resurgence of pests and pollution of soil, water and air. Low application of organic manures and high use of chemicals in vegetable cultivation had affected the soil fertility status and resulted in the yield decline of the crops and poor quality of vegetables over the past few years. This also would have influenced the farmers' attitude favourably.

All the above factors might have made the farmers to develop a favourable attitude towards organic farming practices. This was in agreement with the findings of Kathiravan (1994), Velusamy (1996) and Sriram (1997).

It is inferred from the findings that majority of the vegetable growers had favourable attitude towards organic farming practices.

## 4.5 ADOPTION OF ORGANIC FARMING PRACTICES BY THE VEGETABLE GROWERS

Table 23. Distribution of vegetable growers according to their adoption index of organic farming practices

(n = 100)

| Sl. No. | Category | Score range | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Low | <56.30 | 19 | 19 |
| 2 | Medium | 56.30-85.0 | 64 | 64 |
| 3 | High | >85.0 | 17 | 17 |

Mean: 70.65 SD: 14.35

From the Table 19, 21 and 22 it could be observed that majority of the vegetable growers had medium level of awareness, knowledge and favourable attitude respectively towards organic farming practices. Probably these would have motivated the farmers to adopt organic farming practices to medium level of adoption (64 %) followed by low (19%) and high levels (17 %) as could be seen from the Table 23 and Fig. 8.

The positive trend towards organic farming practices by majority of the vegetable growers was to be explained by the following factors.

Vegetable cultivation was the main occupation in the study area. Thiruvananthapuram district was identified as one of the potential areas with reference to vegetable cultivation. Since farmers wanted to increase the standard of living by earning more, they preferred vegetable cultivation. Vegetable cultivation sustained a considerable number of families because it was both labour and capital intensive.

Having decided to grow vegetables, the farmers opted for adoption of organic farming practices to avoid environmental pollution, soil

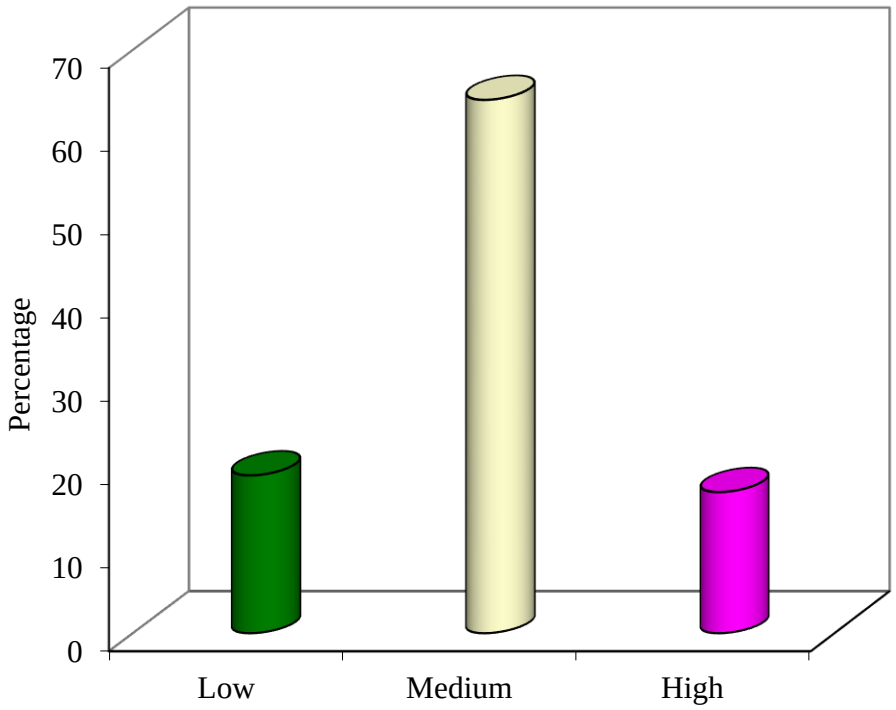



**Fig. 8. Distribution of vegetable growers according to their adoption index of organic farming practices**

degradation and the expenditure incurred on chemical control of pests and diseases.

The finding was in agreement with the findings of Sathiyanarayanan (1991), Snehalatha (1991), Sundarambal (1994) and Sriram (1997).

**Practice-wise extent of adoption**

The frequency distribution of vegetable growers on practice wise extent of adoption of organic farming practices is discussed below.

Table 24. Adoption of organic farming practices by the vegetable growers

(n = 100)

| Sl. No. | Organic farming practices | Adopted (%) | Partially adopted (%) | Not adopted (%) |
|---|---|---|---|---|
| 1 | Summer ploughing | 80 | 10 | 10 |
| 2 | *In situ* incorporation of crop residues | 85 | 3 | 12 |
| 3 | Raising green manure and incorporation | 64 | 2 | 34 |
| 4 | Selection of good seeds | 75 | 8 | 17 |
| 5 | Resistant/tolerant variety | 20 | 4 | 76 |
| 6 | Seed treatment with biofertilizers | 15 | 10 | 75 |
| 7 | Application of FYM | 88 | 5 | 7 |
| 8 | Application of vermicompost/ compost | 68 | 9 | 23 |
| 9 | Application of poultry manure | 70 | 5 | 25 |
| 10 | Application of oil cakes | 69 | 10 | 21 |

Table 24 Continued

| Sl. No. | Organic farming practices | Adopted (%) | Partially adopted (%) | Not adopted (%) |
|---|---|---|---|---|
| 11 | Timely irrigation | 90 | 5 | 5 |
| 12 | Crop rotation | 83 | 5 | 12 |
| 13 | Intercropping system | 90 | 2 | 8 |
| 14 | Mulching | 80 | 5 | 15 |
| 15 | Hand/mechanical weeding | 90 | 6 | 4 |
| 16 | Collection and destruction of pests (egg, larvae and pupae) and disease affected plants | 86 | 6 | 8 |
| 17 | Use of light traps | 35 | 16 | 49 |
| 18 | Ash/ cowdung slurry spray | 63 | 18 | 19 |
| 19 | Use of botanical pesticides | 68 | 12 | 20 |
| 20 | Conservation of natural enemies | 65 | 14 | 21 |

Most of the reasons discussed under awareness, knowledge and attitude sections towards organic farming practices hold good for adoption also. From the Table 11, it could be observed that organic farming practices like summer ploughing, *in situ* incorporation of crop residues, application of FYM, timely irrigation, crop rotation, intercropping system, mulching, hand / mechanical weeding, collection and destruction of pests (egg, larvae and pupae) and disease affected plants were adopted by the farmers to the extent of 80 to 95 per cent.

Summer ploughing was ascertained from the farmers that they were practising it for taking up of sowing. The farmers came to know that summer ploughing also led to the destruction of eggs, larvae of the pests, apart from making the soil to a fine tilth for increasing the soil fertility and good germination.

*In situ* incorporation of crop residues was practised during off season. This practice served two purpose according to the farmers, i) field sanitation, ii) increase in the soil fertility. As per the advice of the extension workers and researchers, the farmers were practicing it.

Most of the farmers in the study area had medium and high level livestock component. The cow dung collected from the shed is either spread to the vegetable crops or kept in heap or in pit. Cow dung was used for vegetable cultivation either as fresh or as dried.

Timely irrigation was practised by many vegetable growers because irrigation was very important as far as vegetable cultivation was concerned. Availability of water throughout the year also made the farmers to irrigate the field regularly.

Regarding crop rotation, vegetable growers were found to cultivate vegetables and tapioca on the same land in the combination of amaranthus-cowpea-tapioca. They were not attacked by the pests as they did not have common pests.

It was noticed that intercropping was practised by most of the vegetable growers as they were aware about the advantages of it. Mostly cowpea was used as an intercrop for amaranthus. Some farmers were using green amaranthus as an intercrop for red amaranthus to avoid the spreading of leaf spot diseases.

It was observed that most of the vegetable growers were practising mulching to prevent evaporation of soil moisture, enhance soil life, reduce

weed growth and reduce the erosion. For this purpose they used tapioca wastes, dry coconut leaves, roots and other crops residues.

Weeds were unwanted plants that competed with the vegetable crops. Normally three to four weeding operations were undertaken by the vegetable growers for which hand hoes and spade were mostly used. Hand weeding was also practised. The respondents also revealed that no weedicides were used by them.

Likewise, collection and destruction of pests (egg, larvae and pupae) and disease affected plants included collection of pests as and when noticed. Most of the vegetable growers were aware about the symptoms of diseases and hence they removed the disease affected plants and destroyed them.

Practices like raising green manure and incorporation, selection of good seeds, application of vermicompost/ compost, application of poultry manure, application of oil cakes, ash/cowdung slurry spray, use of botanical pesticides and conservation of natural enemies were adopted by the vegetable growers to the extent of 63 to 75 per cent.

Raising green manure crops and their incorporation has been practised by the farmers. Commonly grown green manure crops are sunhemp (*Crotalaria juncea*) and daincha (*Sesbania aculata*). The seeds of these species are available through Krishibhavans at reduced rate along with other subsidies which might be the reason for adoption. Green manures increased nutrient levels and improve the fertility of the soil.

Selection of good seeds was the very important practice because seed was the source for everything. So the vegetable growers mostly purchased the seeds from College of Agriculture, Vellayani or from some private companies.

The compost prepared by using earthworms is called vermicomposting. Farmers prepared compost with the household wastes such as the vegetables, food, papers or other crop residues. Technical difficulty in the preparation of compost was one of reason why only 68 per cent of farmers adopted it. It is good for vegetable crops not only for increasing the yield but also for improving the shelf life of the produce.

Poultry manure, eventhough lesser in quantity was available in almost all the houses of vegetable growers, where poultry was integrated with agriculture. Improper collection and untreated application of this manure was noticed. It is a good source of nutrient, particularly for vegetables because of high instant nitrogen.

According to vegetable growers, application of oil cakes like neem cake, groundnut cake, gingelly cake etc. considerably reduced pests and diseases in vegetables. This might be due to the enhanced growth of beneficial microorganisms.

As far as ash/cowdung slurry spray was concerned, the extension workers felt that such practice could promoted due to its simplicity.

Farmers were using the plant based preparations made from neem (*Azadirachta indica*), tobacco (*Nicotiana tabacum*), sweet flag (*Acorus calamus*), vasake (*Adathoda vasica*) and viter (*Viter negunto*). Preparations like neem kernel decoction, neem oil, tobacco decoction were found to have insecticidal or repellent effect against pests.

Regarding conservation of natural enemies in the field, the farmers resorted to indiscriminate use of pesticides during the last decade. It had resulted in resurgence of pests and also affected the natural enemies like damselflies, dragonflies, tiger beetles and spiders in the field. The vegetable growers had not been specifically trained in conservation of natural enemies by the extension workers. But they were aware about the practice.

Practices like resistant/tolerant variety, seed treatment with biofertilizers and use of light traps were adopted to the extent of 15-38 per cent.

Resistant / tolerant variety was adopted by only 20 per cent of vegetable growers because of the reason that non-availability resistant/tolerant varieties for all pests and diseases. Farmers were also not aware about it.

The practice of seed treatment with biofertilizers was found to be non-observable. Again farmers were not exposed to the utility of the biofertilizers like Azospirillum, Rhizobium, Phosphobacteria and Mycorhiza. Biofertilizers were also not produced locally. These might have been the reasons for low adoption.

Light traps were used to monitor and control the pests. The farmers were not convinced about this practice due to the non-observable nature and slow impact on control of pests. That was why only 35 per cent of farmers adopted the practice.

It is noticed from the results that majority of the vegetable growers belonged to medium category with respect to adoption of organic farming practices.

## 4.6 COMPARATIVE ANALYSIS OF THE INDEPENDENT VARIABLES AND DEPENDENT VARIABLES OF VEGETABLE GROWERS

The data of the fourteen independent variables and four dependent variables were subjected to ANOVA to find out the spatial disparity among the four panchayats, namely, Chenkal, Perumkadavila, Kalliyoor and Venganoor. The mean values and F values are presented in Table 25.

Table 25. Comparative analysis of the independent variables and dependent variables of vegetable growers

| Sl. No. | Variables | Mean values | | | | CD |
|---|---|---|---|---|---|---|
| | | Chenkal(n=20) | Perumkadavila (n=20) | Kalliyoor (n=30) | Venganoor (n=30) | |
| Independent variables | | | | | | |
| 1 | Age | 46.15 | 47.90 | 44.56 | 42.23 | NS |
| 2 | Education | 1.80 | 1.65 | 1.43 | 1.70 | NS |
| 3 | Experience in vegetable cultivation | 3.25 | 3.25 | 2.96 | 3.03 | NS |
| 4 | Area under vegetable cultivation | 2.75 | 2.10 | 3.00 | 2.93 | NS |
| 5 | Livestock possession | 2.05 | 1.60 | 1.60 | 2.13 | NS |
| 6 | Mass media exposure | 8.64 | 8.89 | 7.93 | 8.43 | NS |
| 7 | Extension orientation | 8.39 | 9.45 | 9.86 | 10.76 | 1.702*<br>1.554•<br>1.390♦ |
| 8 | Economic motivation | 14.35 | 14.15 | 14.70 | 15.46 | NS |
| 9 | Training attended | 1.40 | 0.70 | 1.20 | 1.16 | NS |
| 10 | Innovativeness | 2.10 | 1.85 | 2.00 | 1.96 | NS |
| 11 | Risk orientation | 14.60 | 16.75 | 15.96 | 17.30 | 1.692*<br>1.544•<br>1.381♦ |
| 12 | Market perception | 3.25 | 3.45 | 4.13 | 3.60 | NS |
| 13 | Self confidence | 20.05 | 20.20 | 19.10 | 22.26 | 2.058*<br>1.879•<br>1.680♦ |
| 14 | Environmental orientation | 5.60 | 4.85 | 5.13 | 4.73 | 0.605*<br>0.552•<br>0.494♦ |
| Dependent variables | | | | | | |
| 1 | Awareness | 76.67 | 75.12 | 77.40 | 77.40 | NS |
| 2 | Knowledge | 59.08 | 54.44 | 56.26 | 59.90 | NS |
| 3 | Attitude | 40.90 | 42.45 | 41.83 | 42.26 | NS |
| 4 | Adoption | 73.15 | 65.37 | 66.54 | 67.93 | NS |

*CD 1 = Chenkal and Perumkadavila, •CD 2 = Chenkal or Perumkadavila with Kalliyoor or Venganoor, ♦CD 3 = Kalliyoor and Venganoor

Among the fourteen independent variables studied, significant variation was noticed among the respondents of Chenkal, Perumkadavila, Kalliyoor and Venganoor panchayats in their characteristics like extension orientation, risk orientation, self confidence and environmental orientation. A higher proportion of respondents in Venganoor were found to have a high level of extension orientation, risk orientation and self confidence when compared to the respondents of Chenkal, Perumkadavila and Kalliyoor.

A possible reason for high extension orientation in Venganoor might be due to the high level of education and mass media exposure and the presence of College of Agriculture, Vellayani in the vicinity.

Risk orientation and self confidence were also higher in Venganoor. This is because of the high level of education, mass media exposure and extension orientation and due to the better financial position of the respondents as observed by the researcher.

Environmental orientation was higher in Chenkal. A possible reason might be due to the high level of education and training attended by the respondents. The respondents were also much aware about the environmental health.

From the table 25, it is clear that there was no significant variation in the case of awareness, knowledge, attitude and adoption of organic farming practices among the respondents in Chenkal, Perumkadavila, Kalliyoor and Venganoor.

## 4.7 RELATIONSHIP BETWEEN THE CHARACTERISTICS OF THE VEGETABLE GROWERS WITH THE EXTENT OF AWARENESS, KNOWLEDGE, ATTITUDE AND ADOPTION

The socio-economic and psychological characteristics of vegetable growers played a vital role in determining their awareness, knowledge attitude and adoption of organic farming practices. Correlation analysis

was employed to assess the relationship of characteristics of respondents with their awareness, knowledge, attitude and adoption of organic farming practices. The correlation coefficients were worked out and the significance was tested by comparing with the table values. The results are presented below.

### 4.7.1 Relationship between the Characteristics of Vegetable Growers and Awareness about Organic Farming Practices

From the Table 26, it is observed that out of the fourteen independent variables studied, education, mass media exposure, training attended, innovativeness, market perception, self confidence and environmental orientation showed significant and positive relationship with awareness (Fig. 9).

It was found that education had significant and positive relationship with awareness about organic farming practices due to the fact that higher the education better would be the awareness. Education holds the key to unlock all mental barriers. It also resulted in the desired changes in human behaviour. A similar trend was observed by Rani (1991), Gangadharan (1993), Sriram (1997) and Syamkumar (1999).

A significant and positive relationship existed between mass media exposure and awareness. Mass media play a vital role in the dissemination of information about organic farming practices. High literacy rate and well established information network would have contributed to make the farmers aware of the organic farming practices. Similar finding was also reported by Santha (1992), Sriram (1997), Sherief (1998) and Syamkumar (1999).

Training attended showed significant and positive relationship with awareness due to fact that more the training, more would be the awareness about organic farming practices. Respondents had the opportunity to

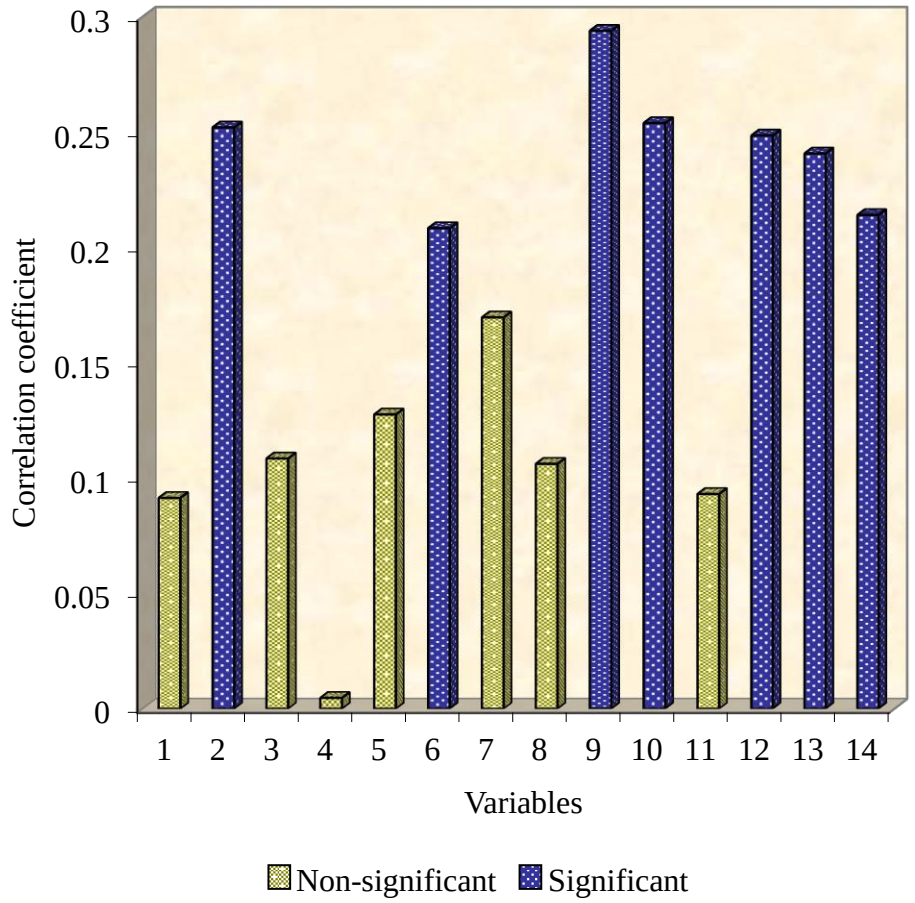
Table 26. Relationship between the characteristics of vegetable growers and awareness about organic farming practices

| Sl. No. | Independent variables | Correlation coefficient (r) |
|---|---|---|
| 1 | Age | 0.0913 NS |
| 2 | Education | 0.2520** |
| 3 | Experience in vegetable cultivation | 0.1084 NS |
| 4 | Area under vegetable cultivation | 0.0047 NS |
| 5 | Livestock possession | 0.1275 NS |
| 6 | Mass media exposure | 0.2083* |
| 7 | Extension orientation | 0.1696 NS |
| 8 | Economic motivation | 0.1061 NS |
| 9 | Training attended | 0.2939** |
| 10 | Innovativeness | 0.2539* |
| 11 | Risk orientation | 0.0930 NS |
| 12 | Market perception | 0.2485* |
| 13 | Self confidence | 0.2407* |
| 14 | Environmental orientation | 0.2140* |

* Significant at 5 per cent level,

** Significant at 1 per cent level

NS – Non significant




| | | | |
|---|---|---|---|
| 1 | Age | 8 | Economic motivation |
| 2 | Education | 9 | Training attended |
| 3 | Experience in vegetable cultivation | 10 | Innovativeness |
| 4 | Area under vegetable cultivation | 11 | Risk orientation |
| 5 | Livestock possession | 12 | Market perception |
| 6 | Mass media exposure | 13 | Self confidence |
| 7 | Extension orientation | 14 | Environmental orientation |

**Fig. 9. Relationship between the characteristics of vegetable growers and extent of awareness about organic farming practices**

attend the training and this would have contributed to the positive relationship.

Innovativeness was found to have a significant and positive relationship with awareness. Innovativeness is the tendency of the farmer to be ready to take any new idea. So it played a vital role in influencing the awareness. Similar finding was reported by Sajeevchandran (1989), Nelson (1992) and Gangadharan (1993).

Market perception exhibited a significant and positive relationship with awareness. This might be due to the fact that marketing the produce is the ultimate motive of the farmer. So market perception led to more awareness about organic farming practices.

Self confidence had a significant and positive relationship with awareness. It was essential for cultivation of vegetables following organic farming practices, because of the high risks involved. Sudden hike in input costs, incidence of pests and diseases were risky ventures. Thus for more awareness about organic farming practices self confidence was important. A Similar finding also reported by Syamkumar (1999).

Significant and positive relationship existed between environmental orientation and awareness. Concern about the environmental health might have led to high level of awareness about the organic farming practices.

### 4.7.2 Relationship between the Characteristics of Vegetable Growers and Knowledge about Organic Farming Practices

Knowledge about organic farming practices of vegetable growers had significant and positive relationship with education, training attended, innovativeness, risk orientation, self confidence, environmental orientation and awareness as presented in Table 27 and Fig. 10.

High educational status of the respondents might have contributed to the higher knowledge level of the farmers who sought new information

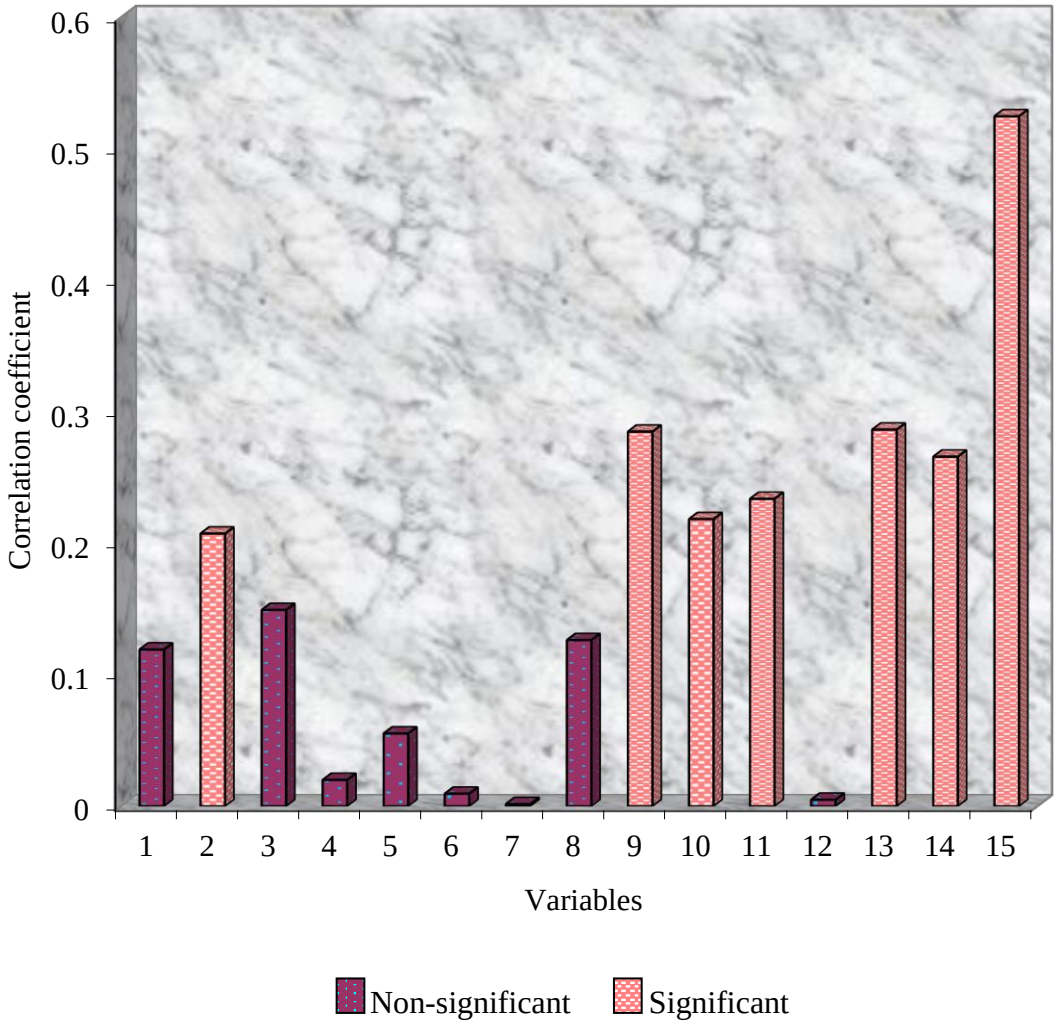
Table 27. Relationship between the characteristics of vegetable growers and knowledge about organic farming practices

| Sl. No. | Independent variables | Correlation coefficient (r) |
|---|---|---|
| 1 | Age | 0.1191 NS |
| 2 | Education | 0.2073* |
| 3 | Experience in vegetable cultivation | 0.1492 NS |
| 4 | Area under vegetable cultivation | 0.0200 NS |
| 5 | Livestock possession | 0.0553 NS |
| 6 | Mass media exposure | 0.0095 NS |
| 7 | Extension orientation | 0.0016 NS |
| 8 | Economic motivation | 0.1263 NS |
| 9 | Training attended | 0.2848** |
| 10 | Innovativeness | 0.2183** |
| 11 | Risk orientation | 0.2337** |
| 12 | Market perception | 0.0049 NS |
| 13 | Self confidence | 0.2863** |
| 14 | Environmental orientation | 0.2658** |
| 15 | Awareness | 0.5246** |

* Significant at 5 per cent level,

** Significant at 1 per cent level

NS – Non significant




| | | | |
|---|---|---|---|
| 1 | Age | 8 | Economic motivation |
| 2 | Education | 9 | Training attended |
| 3 | Experience in vegetable cultivation | 10 | Innovativeness |
| 4 | Area under vegetable cultivation | 11 | Risk orientation |
| 5 | Livestock possession | 12 | Market perception |
| 6 | Mass media exposure | 13 | Self confidence |
| 7 | Extension orientation | 14 | Environmental orientation |
| | | 15 | Awareness |

**Fig. 10. Relationship between the characteristics of vegetable growers and extent of knowledge about organic farming practices**

from various sources like mass media and interaction with scientists and other farmers. Similar result was reported by Gangadharan (1993), Manju (1996), Manjusha (1999), Majjusha (2000) and Manoj (2000).

There was a significant and positive relationship between training attended and knowledge of vegetable growers. This might be due to the training attended by the farmers as well as interaction with farmers who were interested in the organic farming practices. It might also have been possible that they would have interacted with other farmers more frequently which have helped to exchange ideas and information among them.

A significant and positive relationship existed between innovativeness and knowledge. A farmer with more innovativeness would have been curious enough to use all organic farming practices relatively earlier than others. So farmers would have been always ready to accept the technologies without any bias and prejudice. Hence innovativeness would have influenced the knowledge about organic farming practices. A similar result was reported by Gangadharan (1993), Manoj (2000) and Venkatesan (2000).

Risk orientation was found to have a significant and positive relationship with knowledge. This could be due to farmers' willingness to take risk was sure to adopt organic farming practices and this would have increased their knowledge. A similar finding was reported by Gangadharan (1993), Preetha (1997), Majjusha (2000) and Manoj (2000).

Self confidence had significant and positive relationship with knowledge. This might have been due to the reason that farmers had faith in themselves and high esteem to face any challenge on farm front. Hence self confidence would have influenced the knowledge about organic farming practices.

Farmers who had high environmental orientation might have preferred to try organic farming practices, even before they were convinced of their merits. Hence environmental orientation exhibited a significant and positive relationship with knowledge about organic farming practices.

Awareness showed a significant and positive relationship with knowledge. Awareness about organic farming practices was a pre-requisite for having high level of knowledge, attitude and adoption. So more awareness might have led to high level of knowledge.

### 4.7.3 Relationship between the Characteristics of Vegetable Growers and Attitude towards Organic Farming Practices

The success of any agricultural technology mostly depends upon the favourable attitude of the farmers. Hence the relationship between the attitude and the characteristics of vegetable growers was studied and is presented in Table 28 and Fig. 11.

From the table, it could be observed that seven variables, namely, mass media exposure, innovativeness, market perception, self confidence, environmental orientation, awareness and knowledge showed a significant and positive relationship with attitude towards organic farming practices.

Mass media exposure had a significant and positive relationship with attitude. Mass media were capable of changing the farmers' attitude towards organic farming practices favourably by way of frequent reinforcement of the technologies through various mass media like radio, television, newspapers etc. This might have been the reason that mass media influenced the attitude towards organic farming practices. A similar result was reported by Sajeevchandran (1989), Varma (1996) and Sriram (1997).

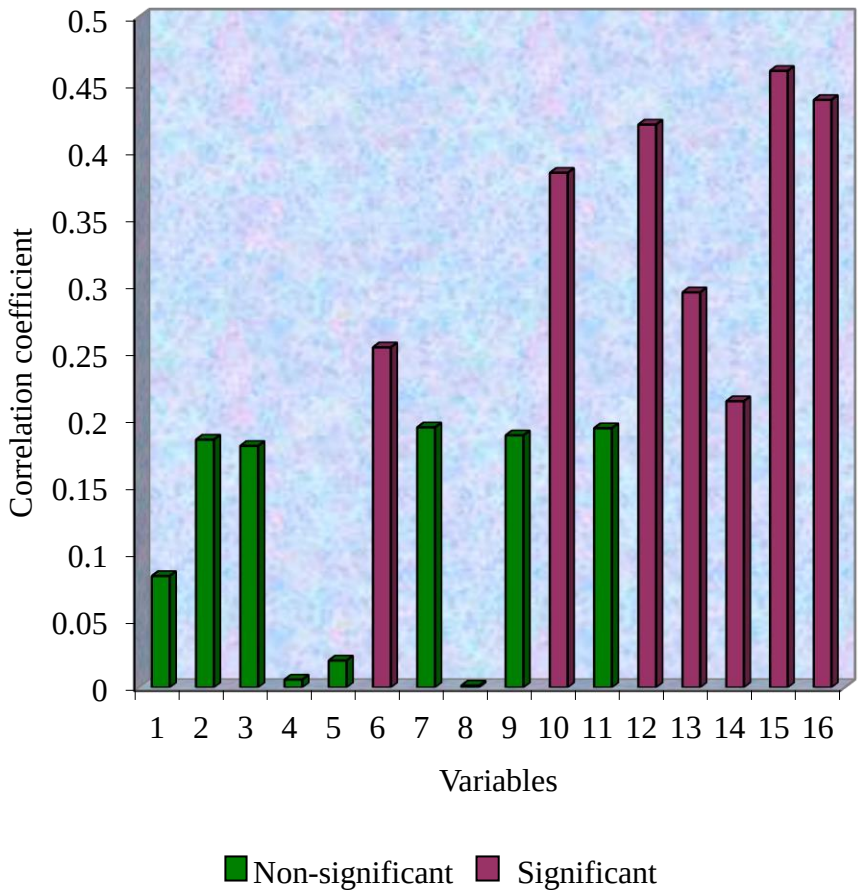
Table 28. Relationship between the characteristics of vegetable growers and attitude towards organic farming practices

| Sl. No. | Independent variables | Correlation coefficient (r) |
|---|---|---|
| 1 | Age | 0.0835 NS |
| 2 | Education | 0.1853 NS |
| 3 | Experience in vegetable cultivation | 0.1806 NS |
| 4 | Area under vegetable cultivation | 0.0059 NS |
| 5 | Livestock possession | 0.0202 NS |
| 6 | Mass media exposure | 0.2540* |
| 7 | Extension orientation | 0.1944 NS |
| 8 | Economic motivation | 0.0015 NS |
| 9 | Training attended | 0.1885 NS |
| 10 | Innovativeness | 0.3840** |
| 11 | Risk orientation | 0.1938 NS |
| 12 | Market perception | 0.4199** |
| 13 | Self confidence | 0.2950** |
| 14 | Environmental orientation | 0.2139* |
| 15 | Awareness | 0.4599** |
| 16 | Knowledge | 0.4383** |

* Significant at 5 per cent level,

** Significant at 1 per cent level

NS – Non significant




1 Age
2 Education
3 Experience in vegetable cultivation
4 Area under vegetable cultivation
5 Livestock possession
6 Mass media exposure
7 Extension orientation
8 Economic motivation
9 Training attended
10 Innovativeness
11 Risk orientation
12 Market perception
13 Self confidence
14 Environmental orientation
15 Awareness
16 Knowledge

**Fig. 11. Relationship between the characteristics of vegetable growers and attitude towards organic farming practices**

A significant and positive relationship existed between innovativeness and attitude towards organic farming practices. Farmers with more innovativeness would have been much interested to use all organic farming practices relatively earlier than others. So farmers would have always been ready to accept the technologies without any delay. This might have influenced the attitude towards organic farming practices. A similar finding was reported by Sajeevchandran (1989), Gangadharan (1993), Varma (1996) Sriram (1997) and Parvathy (2000).

Market perception had a significant and positive relationship with the attitude. Market perception was capable of changing the attitude towards organic farming practice due to the high demand for vegetables cultivated through organic farming practices. This might have changed the attitude of farmers.

Self confidence was found to have a significant and positive relationship with attitude. Self confidence of farmers would always have led to try organic farming practices even before they were convinced about the merits. Besides high mass media exposure and innovativeness, all these factors might have contributed in forming a favourable attitude. This result was in line with that of Varma (1996), Syamkumar (1999) and Parvathy (2000).

A significant and positive relationship existed between environmental orientation and attitude. Organic farming means natural farming, so more environmental orientation led to develop a favourable attitude towards organic farming practices.

Awareness showed significant and positive relationship with attitude towards organic farming practices. High level of awareness might have led to develop a favourable attitude.

Knowledge was found to have a significant and positive relationship with attitude. Having fully understood the organic farming

practices through various extension methods and approaches, the vegetable growers might have automatically go in for testing the same on an experimental basis. If the results were in conformity with the expected one, that is getting more profit and thereby increasing the standard of living, then the farmers would have developed interest and attitude favourably towards organic farming practices.

### 4.7.4 Relationship between the Characteristics of Vegetable Growers and Adoption of Organic Farming Practices

Relationship between the characteristics of vegetable growers and adoption of organic farming practices was worked out and is furnished in Table 29. The dependent variables, namely, awareness, knowledge and attitude were also included among the independent variables in order to know the extent of relationship with adoption.

From the table, it is noted that out of 17 variables studied, nine variables namely education, mass media exposure, training attended, innovativeness, self confidence, environmental orientation, awareness, knowledge and attitude showed a significant and positive relationship with adoption (Fig. 12).

Education and adoption exhibited a significant and positive relationship. Educated farmers had an opportunity to adopt organic farming practices because of the reason that greater exposure and interaction within and outside the social system which would have aided to greater adoption of organic farming practices. This finding was in line with that of Krishnakumar (1996), Sujatha (1996), Sriram (1997), Sudhakar (1998), Syamkumar (1999) and Majjusha (2000).

A significant and positive relationship existed between mass media exposure and adoption. Farmers could be attracted by any practice if it was demonstrated or presented in a feasible and acceptable manner through mass media for wider coverage coupled with the dissemination of

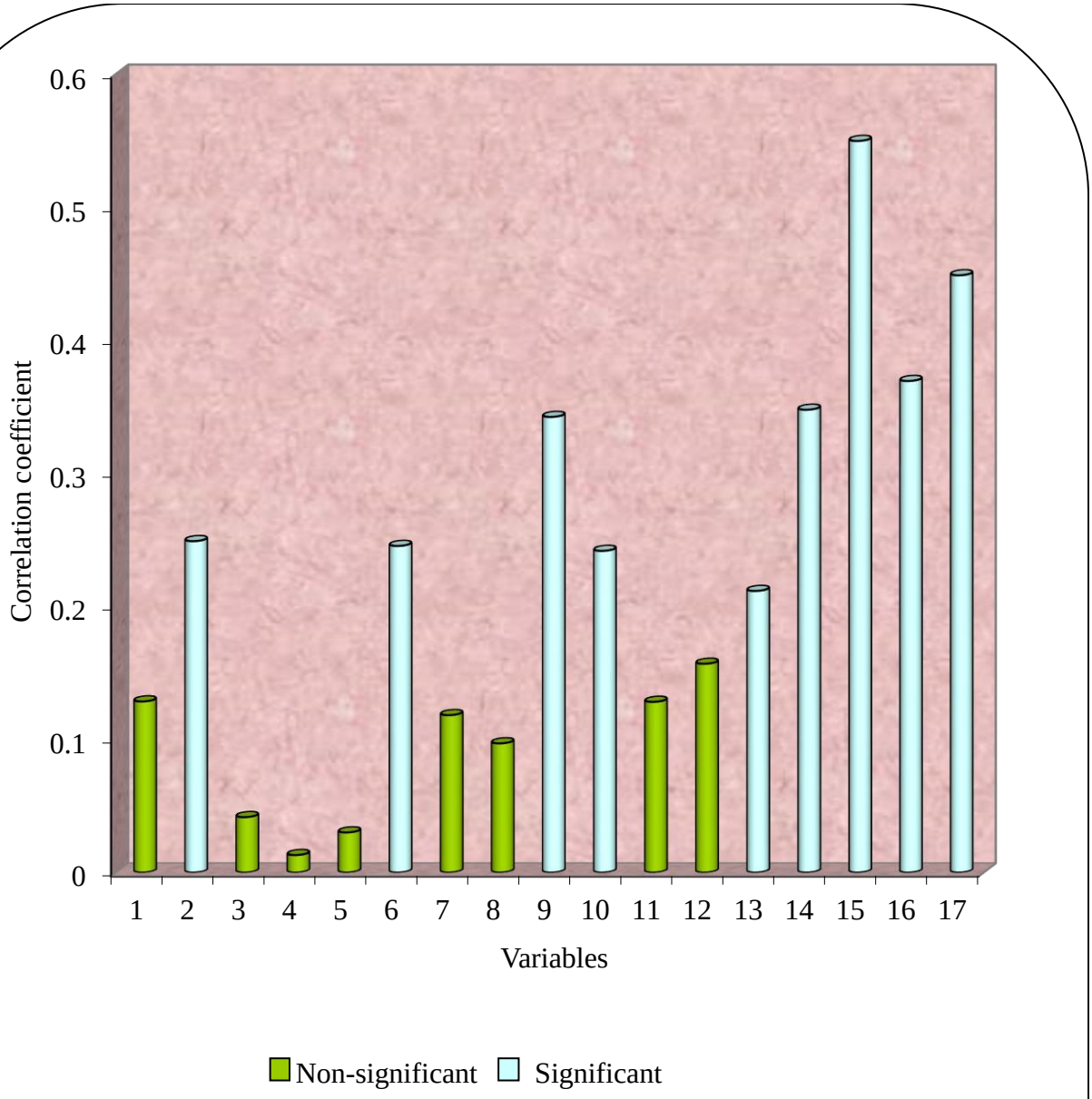
Table 29. Relationship between the characteristics of vegetable growers and adoption of organic farming practices

| Sl. No. | Independent variables | Correlation coefficient (r) |
|---|---|---|
| 1 | Age | 0.1285$^{NS}$ |
| 2 | Education | 0.2489* |
| 3 | Experience in vegetable cultivation | 0.0416 $^{NS}$ |
| 4 | Area under vegetable cultivation | 0.0131 $^{NS}$ |
| 5 | Livestock possession | 0.0301 $^{NS}$ |
| 6 | Mass media exposure | 0.2453* |
| 7 | Extension orientation | 0.1182 $^{NS}$ |
| 8 | Economic motivation | 0.0970 $^{NS}$ |
| 9 | Training attended | 0.3422** |
| 10 | Innovativeness | 0.2416* |
| 11 | Risk orientation | 0.1282 $^{NS}$ |
| 12 | Market perception | 0.1568 $^{NS}$ |
| 13 | Self confidence | 0.2115* |
| 14 | Environmental orientation | 0.3476** |
| 15 | Awareness | 0.5495** |
| 16 | Knowledge | 0.3692** |
| 17 | Attitude | 0.4486** |

* Significant at 5 per cent level,

** Significant at 1 per cent level

NS – Non significant




1 Age
2 Education
3 Experience in vegetable cultivation
4 Area under vegetable cultivation
5 Livestock possession
6 Mass media exposure
7 Extension orientation
8 Economic motivation
9 Training attended
10 Innovativeness
11 Risk orientation
12 Market perception
13 Self confidence
14 Environmental orientation
15 Awareness
16 Knowledge
17 Attitude

**Fig. 12. Relationship between the characteristics of vegetable growers and extent of adoption of organic farming practices**

success stories. Authentic information from reliable sources might have facilitated greater adoption. A similar result was reported by Karthikeyan (1994), Sriram (1997), Syamkumar (1999) and Majjusha (2000).

Training attended was found to have a significant and positive relationship with adoption. Message about organic farming practices strengthened by way of practising the established research results during training sessions. Further active participation of the farmers in training programmes. These would have motivated the farmers to adopt organic farming practices.

Innovativeness and adoption exhibited a significant and positive relationship. Innovative farmers were progressive in their outlook and sought changes in their practices. This might have been the reason for adoption of organic farming practices. A similar finding was obtained by Sujatha (1996), Sriram (1997), Sudhakar (1998), Syamkumar (1999) and Manoj (2000).

Self confidence showed a significant and positive relationship with the adoption and developed the farmers' ability to face any risks. Farmers had faith in organic farming practices, that it would increase their standard of living. So the farmers had started adopting organic farming practices. A similar result was pointed out by Syamkumar (1999).

Environmental orientation was found to have a significant and positive relationship with adoption. Farmers had a concern for and accorded priority in preventing the environmental pollution and toxic residues in vegetables. Moreover a desire for excellence and a drive to become role models for others might have motivated the farmers in adopting organic farming practices in vegetable cultivation.

Awareness exhibited a significant and positive relationship with adoption. The extension scientists had postulated that awareness preceded adoption of any innovation. This was the case in adoption of organic

farming practices also due to tremendous efforts undertaken by the extension agency through mass media and training.

Knowledge also is a pre-disposing factor for adoption. So if a farmer has proper knowledge, he can evaluate the practice more logically and adopt it. A higher level of knowledge about organic farming practices made the farmers to take positive decisions and adoption of organic farming practices as is evident from observed significant and positive relationship between adoption and knowledge.

Attitude showed a significant and positive relationship with adoption. Favourable attitude among the vegetable growers was due to the realization of 'seeing is believing' and 'learning by doing' the organic farming practices. This was popularized by the extension staffs, demonstrations, field visits and training boosted the morale of the farmers' attitude towards switching over from capital and chemical intensive agriculture to low cost organic farming practices.

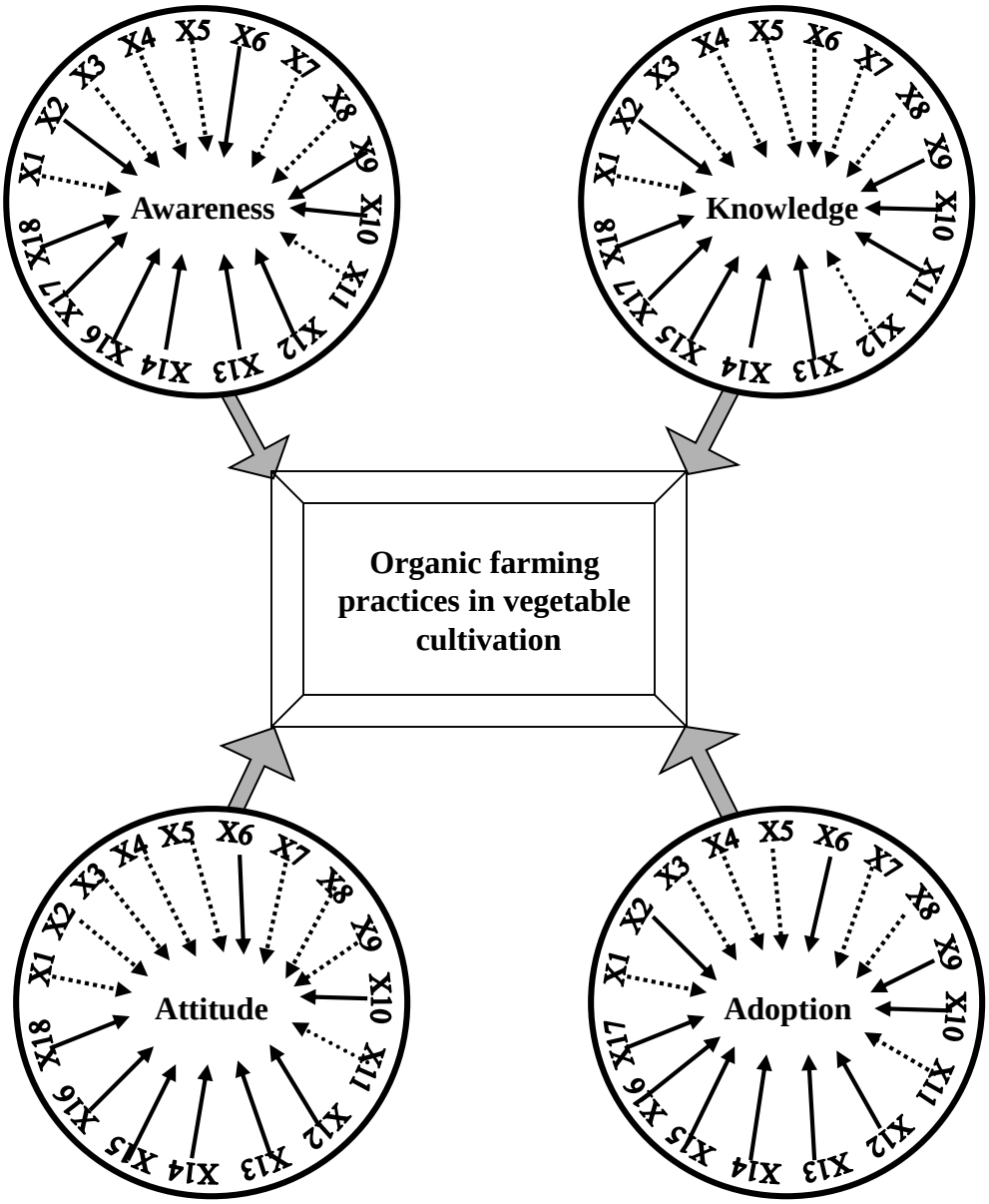
## 4.8 MODELS EVOLVED FOR THE STUDY

### 4.8.1 Empirical Model of the Study

Based on the findings of correlation analysis the empirical model showing the relationship of characteristics of vegetable growers with the dependent variables, namely, awareness, knowledge, attitude and adoption of organic farming practices is depicted in Table 30 Fig. 13.

### 4.8.2 Model of Variables Influencing Organic Farming Practices

This model was further developed based on the relationship between the independent variables and dependent variables and is given in Table 30 and presented in Fig. 14. It was found that out of 14 independent variables only education, mass media exposure, training attended, innovativeness, self confidence and environmental orientation turned out to be the crucial variables in awareness, knowledge, attitude and adoption




| | | | |
|---|---|---|---|
| 1 | Age | 9 | Training attended |
| 2 | Education | 10 | Innovativeness |
| 3 | Experience in vegetable cultivation | 11 | Risk orientation |
| | | 12 | Market perception |
| 4 | Area under vegetable cultivation | 13 | Self confidence |
| 5 | Livestock possession | 14 | Environmental orientation |
| 6 | Mass media exposure | 15 | Awareness |
| 7 | Extension orientation | 16 | Knowledge |
| 8 | Economic motivation | 17 | Attitude |
| | | 18 | Adoption |

——— Positive and significant relationship

..... Non significant relationship

**Fig. 13. Empirical model of the study**

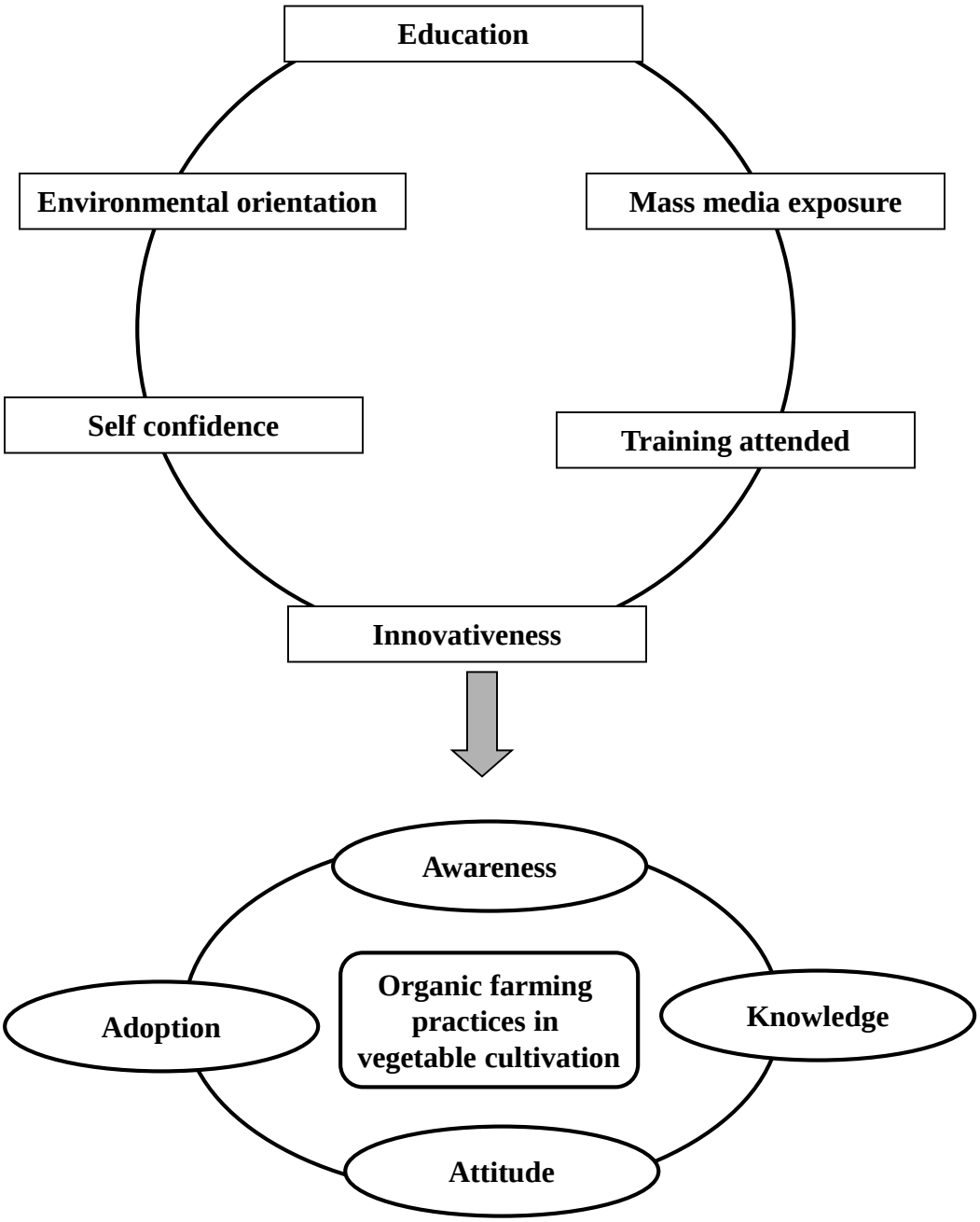



**Fig. 14. Model of variables influencing organic farming practices**

Table. 30 Relationship between the independent variables and the dependent variables

| Variable No. | Independent variables | Awareness | Knowledge | Attitude | Adoption |
|---|---|---|---|---|---|
| $X_1$ | Age | NS | NS | NS | NS |
| $X_2$ | Education | PS | PS | NS | PS |
| $X_3$ | Experience in vegetable cultivation | NS | NS | NS | NS |
| $X_4$ | Area under vegetable cultivation | NS | NS | NS | NS |
| $X_5$ | Livestock possession | NS | NS | NS | NS |
| $X_6$ | Mass media exposure | PS | NS | PS | PS |
| $X_7$ | Extension orientation | NS | NS | NS | NS |
| $X_8$ | Economic motivation | NS | NS | NS | NS |
| $X_9$ | Training attended | PS | PS | NS | PS |
| $X_{10}$ | Innovativeness | PS | PS | PS | PS |
| $X_{11}$ | Risk orientation | NS | PS | NS | NS |
| $X_{12}$ | Market perception | PS | NS | PS | NS |
| $X_{13}$ | Self confidence | PS | PS | PS | PS |
| $X_{14}$ | Environmental orientation | PS | PS | PS | PS |
| $X_{15}$ | Awareness | - | PS | PS | PS |
| $X_{16}$ | Knowledge | - | - | PS | PS |
| $X_{17}$ | Attitude | - | - | - | PS |

PS – Positive and significant relationship,

NS – Non significant relationship

levels. This model implied that these crucial variables would be useful for the extension agents to tackle any problem that will happen in future in adopting organic farming practices in vegetable cultivation.

## 4.9 STEPWISE REGRESSION ANALYSIS FOR IDENTIFYING THE VARIABLES INFLUENCING ADOPTION

Stepwise regression analysis was carried out to identify the most important variables that affect the adoption of organic farming practices. The 'F' value and the percentage of variation were found out, which could identify or explain the maximum variability in the dependent variable selected. The results are presented in Table 31 and Fig. 15.

Table 31. Stepwise regression analysis of variables

| Step Number | Variables | F value | Percentage of variation |
|---|---|---|---|
| 1 | Knowledge | 302.84 | 75.55 |
| 2 | Knowledge<br>Environmental orientation | 169.68 | 77.77 |
| 3 | Knowledge<br>Environmental orientation<br>Awareness | 118.27 | 78.70 |

For identifying the variables of the vegetable growers influencing the extent of adoption, 14 independent variables and three dependent variables, namely, awareness, knowledge and attitude were chosen for regression analysis. In the first step knowledge is the most important variable in explaining the variation in the extent of adoption of organic farming practices as more than 75 per cent of the variation could be

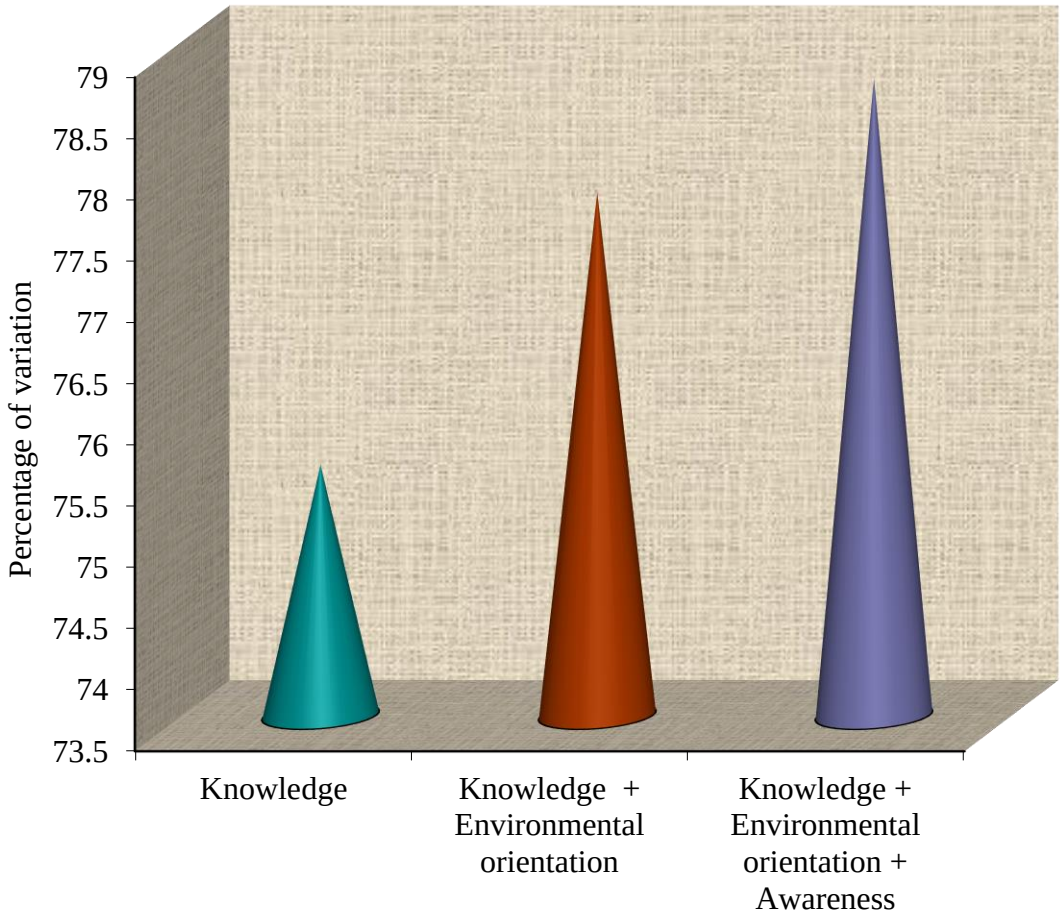



**Fig. 15. Effect of significant groups of the independent variables to the dependent variable adoption**

explained by the single variable. In the second step, knowledge and environmental orientation together contributed to 77.77 per cent of variation. Step number three which included three variables namely knowledge, environmental orientation and awareness gave the maximum percentage of variation (78.70) with an F value of 118.27 which indicated that the extent of adoption of organic farming practices was greatly influenced by knowledge, environmental orientation and awareness of vegetable growers.

All the partial regression coefficients of variables $X_1$, $X_2$ and $X_3$ in the equation given below are significant at one per cent level in identifying the adoption of organic farming practices.

$$Y = 5.064 + 0.409^{**} X_1 + 2.179^{**} X_2 + 5.549^{**} X_3$$

The results indicated that vegetable growers are interested to adopt organic farming practices. Knowledge, environmental orientation and awareness of the vegetable growers influenced the adoption of organic farming practices.

From the above regression equation it is evident that 78.70 per cent of the variation was contributed by knowledge ($X_1$), environmental orientation ($X_2$) and awareness ($X_3$).

## 4.10 CONSTRAINTS IN THE ADOPTION OF ORGANIC FARMING PRACTICES AS PERCEIVED BY THE VEGETABLE GROWERS AND SUGGESTIONS FOR OVERCOMING THEM

The vegetable growers were interviewed with questionnaire to state the constraints in their order of importance, which they faced in adopting the organic farming practices. These constraints were ranked on the importance based on their perceptions.

Table 32. Constraints in the adoption of organic farming practices as perceived by the vegetable growers

| Sl. No. | Constraints | Cumulative index / Frequency of response | Rank |
|---|---|---|---|
| 1 | Non-availability of inputs | 2.69 | I |
| 2 | Lack of information | 2.58 | II |
| 3 | Lack of sufficient good quality seeds | 2.44 | III |
| 4 | High cost of inputs | 2.30 | IV |
| 5 | Extensive prevalence of pests and diseases | 2.12 | V |
| 6 | Lack of credit facilities | 2.09 | VI |
| 7 | Lack of marketing facilities | 2.02 | VII |
| 8 | Lack of recommended package of practices | 1.95 | VIII |
| 9 | High labour charges | 1.88 | IX |
| 10 | Lack of awareness and knowledge about organic farming practices | 1.83 | X |
| 11 | Inadequate extension support | 1.75 | XI |
| 12 | Low premium for organic vegetables | 1.60 | XII |

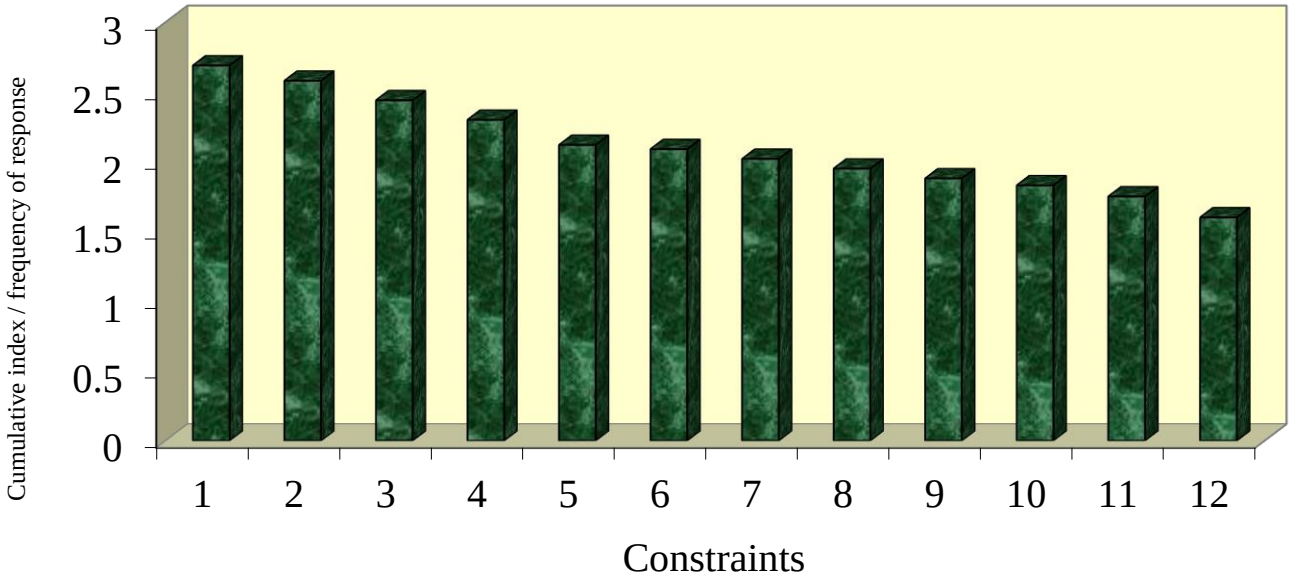
It is clear from the table that the most important constraint experienced by vegetable growers was the non-availability of inputs and other constraints in the order of importance were lack of information, lack of sufficient good quality seeds, high cost of inputs, extensive prevalence of pests and diseases, lack of credit facilities, lack of marketing facilities,

lack of ready package, high labour charges, lack of awareness and knowledge about organic farming practices, inadequate extension support and low premium for organic vegetables (Fig. 16 ).

It was found that non-availability of inputs like vermicompost, poultry manure, biofertilizers, farmyard manure, oilcakes and others was expressed as the first major constraint by vegetable growers. Production of organic inputs was being taken up only by few companies. Again these firms produced organic inputs in small quantities. The effective use period (expiry date) is also short for most of the inputs. So the government should come forward to produce organic inputs through various means.

It is observed that second important constraint as expressed by respondents was lack of information about organic farming practices. The current researchers are heavily biased towards modern agricultural practices and so very little information is available on organic farming practices. Moreover, too little is known about the economics and environmental benefits of the organic farming practices because of lack of professional and scientific incentives for developing location specific technologies. Farmers should be involved closely in the research design and implementation as they know their local conditions better and the type of intervention required. The findings of this study conform to the earlier findings of Iqbal *et al*. (1996), Sriram (1997) and Sherief (1998).

It was found that good quality seeds were required for good yield and quality of the vegetables. Seed production techniques need to be standardised for the vegetable crops. Good quality seeds will help in eliminating the pests and diseases. So adequate facilities have to be generated to produce good quality seeds and supply the seeds in sufficient quantity. A similar result was reported by Gangadharan (1993) and Puzari (1996).




1 Non-availability of inputs
2 Lack of information
3 Lack of sufficient good quality seeds
4 High cost of inputs
5 Extensive prevalence of pests and diseases
6 Lack of credit facilities
7 Lack of marketing facilities
8 Lack of recommended package of practices
9 High labour charges
10 Lack of awareness and knowledge about organic farming practices
11 Inadequate extension support
12 Low premium for organic vegetables

**Fig. 16 . Constraints in the adoption of organic farming practices**

High cost of inputs was considered to be fourth constraint by the respondents. Due to this, the cost of cultivation will increase. The reason for the high cost of inputs was that these materials were not subsidized by the government as in the case of chemicals. The scientists and extension workers should pay attention to recommend only low cost technologies which will not call for additional expenditure and other possible solution is to provide subsidies for the organic inputs as in the case of inorganic inputs. A similar observation was also made by Gangadharan (1993), Sherief (1998), Manjusha (1999) and Majjusha (2000).

It is evident from the table that extensive prevalence of pests and diseases was the fifth important constraint. In the cultivation of vegetables adopting organic farming practices, there was no use of chemicals. So it was natural to find some pests and diseases in areas where it was less polluted with chemicals. One way to combat this problem is group action of the farmers. Resorting to various biological methods of controlling, the farmers as a group, would be able to eradicate the pests or diseases problem as a whole in that area. The support of extension system and government policy for group action would be necessary for tackling this problem. A similar result was observed by Alagirisamy (1997) and Sherief (1998).

Credit facilities are not extended to vegetable cultivation following organic farming practices, non-availability or less effective functioning of co-operatives by big landlords and procedural difficulties in getting credits from commercial banks might have been the reason for the respondents of report this as a constraint. This finding is in conformity with findings of Sherief (1998) and Allan (2000). This should be considered while evolving government policy.

Lack of marketing facilities was one of the major constraints on the expansion of cultivars. There was no organized union-wide or state-wide marketing infrastructure for vegetables especially from organic farming.

So the producers should be guaranteed reasonable prices. The researchers and policy makers should think of starting markets for vegetables. A similar finding was observed by Allan (2000).

Lack of recommended package of practices was another important constraint. Till now, there is no package of practices for organic vegetable cultivation. Package of practices have to be evolved for the major potential vegetable crops. This will facilitate the speedy adoption of organic farming practices. Allan (2000) reported the same finding.

High labour charges was considered as ninth constraint by the vegetable growers. Compared to the neighbouring states, the wage rate for labour is relatively higher in Kerala due to the existing socio-political situation. One way to solve this is to train the family members in activities that require skill. Similarly the farmer can look for alternatives that need less external labour in his farm. A similar result was reported by Manjusha (1999) and Majjusha (2000).

Eventhough a high productive technology has been developed and is being adopted by several farmers it was found that a good per cent of vegetable growers were not adopting the technology in full. This might have been due to lack of awareness and knowledge about organic farming practices in vegetable cultivation. An effective extension strategy should be evolved to educate farmers about organic farming practices. A similar result was observed by Gangadharan (1993), Sriram (1997) and Resmy *et al*. (2001).

Lack of extension support was reported as constraint in the adoption of organic farming practices. A similar observation was also made by Ramachandran (1997), Sriram (1997) and Sherief (1998). A possible reason may be lack of sufficient extension functionaries to act as facilitators in farmer to farmer communication. For this the agricultural extension specialist should be well acquainted with the locality, the farmers, socio-economic and political interaction within the panchayat.

They must know about the different systems and practices present in the village community and for equipping extension specialist to work in this specialized area, it is necessary that they must be trained in participatory extension methods.

Low premium for organic vegetables was expressed as a constraint. Ramachandran (1997) and Sherief (1998) observed similar finding. The reason for this is that the consumers are not yet aware of the difference in the quality of organic vegetables and the vegetables produced by chemicals. For this the public and consumers are to be educated about the quality of organic vegetables. Similarly the farmers producing such organic vegetables are to be given the organic labeling certificate to get it distinguished from other products. The government can procure vegetables from the farmers and sell it on a reasonable rate in the market so that the consumer has a better choice to buy vegetables. This will help the farmers and the consumers.

Suggestions of organic farmers of Kerala reported by Balachandran (2004) are as follows:

1. Awareness programmes both for the producers and consumers
2. Development of model organic plots with institutional support
3. Financial support during transition
4. Assuring availability of quality organic manure at reasonable prices
5. Development and maintenance of organic manure sources within the farm
6. Supportive role of the government in marketing; subsidies and loans
7. Guilds of skilled and experienced organic farming experts to guide new entrants to organic farming
8 Alternative markets for organic produce with no intervention of middlemen

9. Processing of organic produce as a key area of development
10. Grading of organic produce
11. Establishment of public warehouses for storage of organic produce using organic methods
12. Assurance of better prices for organic produce
13. Restrain trends of large scale commercialization of organic produce
14. Creation of networks of organic farmers to facilitate exchange of ideas, technology, inputs and experience
15. Reduction of environmental pollution
16. More studies on organic farming especially on the marketing aspects.

# *Summary*

# 5. SUMMARY

Organic farming is an age old practice of natural farming which avoids use of chemical fertilizers and pesticides. The green revolution with intensive use of inputs has not only polluted soil, water and environment but has also caused several health hazards to human beings. Hence, the adoption of organic farming practices has become the need of the hour. Among the various crops, vegetable crops are called as protective foods as they supply nutrients, vitamins and minerals. Vegetable cultivation is about 4-5 times profitable than cereals and other field crops with more employment opportunities. In Kerala, the Department of Agriculture has started advocating organic farming practices in vegetable cultivation. Keeping this in view, this research project was taken up with the following objectives.

1 To study the profile characteristics of vegetable growers

2 To study the extent of awareness about organic farming practices in vegetable cultivation

3 To find out the extent of knowledge about organic farming practices in vegetable cultivation

4 To study the attitude towards organic farming practices in vegetable cultivation

5 To study the extent of adoption of organic farming practices in vegetable cultivation

6 To find out the relationship between awareness, knowledge, attitude and adoption of organic farming practices with their profile characteristics

7 To identify the constraints in the adoption of organic farming practices and to suggest solutions to them

The study was conducted in the selected Panchayats of Chenkal, Perumkadavila, Kalliyoor and Venganoor of Parassala, Aryancode, Pallichal and Neyyattinkara blocks respectively of Thiruvananthapuram district in Kerala. By using the proportionate random sampling technique 100 vegetable growers were selected.

An explorative methodology was employed to identify the organic farming practices for the study. For this an extensive review of literature was carried out and 30 organic farming practices were identified. Forty Scientists representing different disciplines in agriculture were selected for judging the relevance of the 30 organic farming practices in vegetable cultivation. Based on their rating, 20 organic farming practices were finally selected.

Fourteen independent variables were selected based on judges relevancy rating which included age, education, experience in vegetable cultivation, area under vegetable cultivation, livestock possession, mass media exposure, extension orientation, economic motivation, training attended, innovativeness, risk orientation, market perception, self confidence and environmental orientation. All these variables were quantified with the help of available measurement procedures. The dependent variables for the study were awareness, knowledge, attitude and adoption. These variables were quantified using measurement devices developed for the study. The relationship between the dependent variables and independent variables was studied using correlation analysis. Constraints in the adoption of organic farming practices were also recorded as perceived by the vegetable growers.

The data were collected using a pre-tested structured interview schedule prepared for the study and non-participant observation technique. Different statistical tools like mean, percentage analysis, analysis of variance, correlation analysis and step wise regression analysis were used to analyse the data.

The salient findings are presented below.

## 5.1 PROFILE CHARACTERISTICS OF THE VEGETABLE GROWERS

i) Majority of the vegetable growers (48%) belonged to old age category.

ii) Most of the vegetable growers (52%) had secondary school education

iii) Forty seven per cent of the respondents were having medium level of experience in vegetable cultivation

iv) Most of the vegetable growers (64%) belonged to medium category with respect to area under vegetable cultivation

v) Nearly three fourth of the respondents had medium level of livestock possession

vi) Sixty one per cent of the vegetable growers belonged to medium category with respect to mass media exposure

vii) Most of the vegetable growers (70%) had medium extension orientation

viii) A higher percentage of the respondents (71%) had medium level of economic motivation

ix) Fifty seven per cent of the respondents had medium level of training followed by low level (33%)

x) More than half of the respondents (55%) had medium innovativeness

xi) Almost three fourth of the respondents (73%) had medium level of risk orientation.

xii) Fifty five percent of the respondents had medium level of market perception

xiii) Most of the vegetable growers (63%) belonged to medium category with respect to self confidence

xiv) Nearly three fourth of the respondents (72%) had high environmental orientation

## 5.2 AWARENESS OF VEGETABLE GROWERS ABOUT ORGANIC FARMING PRACTICES

Majority of the vegetable growers (73%) had medium level of awareness followed by high (17%) and low levels (10%).

### 5.2.1 Practice- wise Extent of Awareness

Organic farming practices like summer ploughing, *in situ* incorporation of crop residues, raising green manure crops and incorporation, selection of good seeds, application of FYM, application of poultry manure, timely irrigation, crop rotation, intercropping system, mulching, hand/mechanical weeding, collection and destruction of pests (egg, larvae and pupae) and disease affected plants were well known to the 80 to 95 per cent of farmers

Practices like resistant/tolerant variety, application of vermicompost /compost, application of oil cakes, ash/cowdung slurry spray, use of botanical pesticides and conservation of natural enemies were known to the 64 to 76 per cent of farmers.

Seed treatment with biofertilizers and use of light traps were known to the 40 and 50 per cent of farmers.

## 5.3 KNOWLEDGE OF VEGETABLE GROWERS ABOUT ORGANIC FARMING PRACTICES

Seventy percent of the vegetable growers had medium level of knowledge followed by high (18 %) and low (12 %) levels of knowledge about organic farming practices in vegetable cultivation.

## 5.4 ATTITUDE OF VEGETABLE GROWERS TOWARDS ORGANIC FARMING PRACTICES

Majority of the vegetable growers (64 %) had a favourable attitude towards organic farming practices followed by less favourable (22 %) and most favourable (14 %) attitude.

## 5.5 ADOPTION OF ORGANIC FARMING PRACTICES BY THE VEGETABLE GROWERS

Most of the respondents (64 %) belonged to medium level of adoption of organic farming practices to followed by low (19%) and high levels (17 %).

### 5.5.1 Practice- wise Extent of Adoption

Organic farming practices like summer ploughing, *in situ* incorporation of crop residues, application of FYM, timely irrigation, crop rotation, intercropping system, mulching, hand / mechanical weeding, collection and destruction of pests (egg, larvae and pupae) and disease affected plants were adopted by 80 to 95 per cent of the vegetable growers.

Practices like raising green manure and incorporation, selection of good seeds, application of vermicompost/ compost, application of poultry manure, application of oil cakes, ash/cowdung slurry spray, use of botanical pesticides and conservation of natural enemies were adopted by 63 to 75 per cent of the vegetable growers.

Practices like resistant/tolerant variety, seed treatment with biofertilizers and use of light traps were adopted by 15-38 per cent of the vegetable growers.

## 5.6 RELATIONSHIP BETWEEN THE CHARACTERISTICS OF THE VEGETABLE GROWERS WITH THE EXTENT OF AWARENESS, KNOWLEDGE, ATTITUDE AND ADOPTION

Out of the fourteen independent variables studied, education, mass media exposure, training attended, innovativeness, market perception, self confidence and environmental orientation showed significant and positive relationship with awareness.

Knowledge of vegetable growers about organic farming practices had significant and positive relationship with education, training attended, innovativeness, risk orientation, self-confidence, environmental orientation and awareness.

Seven variables, namely, mass media exposure, innovativeness, market perception, self confidence, environmental orientation, awareness and knowledge showed a significant and positive relationship with attitude towards organic farming practices.

Nine variables namely, education, mass media exposure, training attended, innovativeness, self confidence, environmental orientation, awareness, knowledge and attitude showed a significant and positive relationship with adoption of organic farming practices.

## 5.7 STEPWISE REGRESSION ANALYSIS FOR IDENTIFYING THE VARIABLES INFLUENCING ADOPTION

Stepwise regression analysis was carried out to predict the most important variables that affect the adoption of organic farming practices. The extent of adoption of organic farming practices was greatly influenced by knowledge, environmental orientation and awareness of vegetable growers.

## 5.8 CONSTRAINTS IN THE ADOPTION OF ORGANIC FARMING PRACTICES AS PERCEIVED BY THE VEGETABLE GROWERS

It was found that the most important constraint experienced by vegetable growers was the non-availability of inputs and other constraints in the order of importance were lack of information, lack of sufficient good quality seeds, high cost of inputs, extensive prevalence of pests and diseases, lack of credit facilities, lack of marketing facilities, lack of ready package, high labour charges, lack of awareness and knowledge about organic farming practices, inadequate extension support and low premium for organic vegetables.

**Implications of the Study**

It is evident from the study that productivity and sustainability goals had to be attained in organic vegetable cultivation. For this, instead of a single practice recommendation a basket of choices of practices could be recommended so that vegetable growers would have an option to choose those practices that suit their farming needs and priorities.

The organic farming practices need to be identified separately for individual vegetable crops as till now there is no package of practices for organic vegetable cultivation.

Training institutions, NGOs and extension functionaries who are in constant contact with farming community need to take into account the profile characteristics of the vegetable growers while planning and executing the agricultural development programmes as these characteristics were found to influence their adoption of organic farming practices

Awareness of the vegetable growers about organic farming practices was found to be medium. Hence, it is necessary to provide information on organic farming practices. Mass media can play a vital role, as it could reach many clients in short time. Success stories of experienced vegetable growers through radio, television programmes and publication of feature articles in leading dailies and magazines would create greater awareness, since it largely contributes to the adoption process.

Knowledge of the vegetable growers about organic farming practices was vital. A strategy for knowledge development in organic farming for the farmers/ producers, consumers and related government departments, agricultural research institutions and such regulatory bodies would help in spreading of organic farming.

Attitude of the vegetable growers towards organic farming practices was found to be medium. Attitude is very important for successful of any innovation. Frequent reinforcement of ideas through mass media would create favourable attitude towards organic farming practices.

Adoption of organic farming practices by the vegetable growers was found to be medium. Result demonstrations, farmer exchange and field days would allow the farmers to reinforce their interest by viewing tangible evidence. Training should be necessary at this stage to facilitate the vegetable growers to try organic farming practices. Vegetable growers were in a 'take off' stage regarding adoption of organic farming practices. So new strategies like farmer level research and development, agro-climatic zone specific applicability, participatory research with farmers, establishment of knowledge development centres, development of model organic farms, financial support during transition period and creation of storage and marketing facilities would help farmers' to adopt organic farming practices.

Constitution of a body at a high level that can formulate policies and plans for the spread of organic farming in the state. Creation of a separate and autonomous 'vegetable board' like coffee, tea, rubber, spices board etc. by the central government would go a long way in evolving a suitable export and import policies. Besides, the vegetable board may be asked to look after the welfare schemes of vegetable growers, seed growers, input agencies and traders under one umbrella.

Organic farming in vegetable cultivation is a viable alternative because it enlivens the soil, strengthens the natural resource base and sustains biological production. It is more than a new venue for export earnings; it is part of a culture that values conservation of nature and life on earth as the ultimate philosophy. The export potential is a short-term reward; restoration of environmental health is the long-term reward, which will influence all aspects of life of the people. For this, the efforts from

research, extension, supply of inputs and development of market channels for production of organic vegetables are needed to facilitate the successful adoption of organic farming practices by the vegetable growers. There fore, action plans for developing organic farming should be part of a larger plan for nature conservation and health of the community and the land, and it should be relevant to the social, economic and cultural ethos of Kerala. It is genuinely hoped that organic farming will emerge in adding life and greenery to the field of agriculture and brightness to the farmers' faces.

**Suggestions for Future Research**

1. For generalization of findings, similar studies could be conducted in other districts also as the present study was confined to only one district
2. A multi- disciplinary research team must explore the prospects of organic farming practices in vegetable cultivation as this one is major component of sustainable agriculture
3. In depth studies may be conducted for individual vegetable crops with respect to analyzing the organic farming practices.
4. Similar studies may be conducted with respect to other crops like rice, fruits, medicinal and aromatic plants etc.
5. Content analysis of messages related to organic farming practices through print media and programmes in radio and television may be studied
6. Perception of extension functionaries and scientists on the appropriateness of organic farming practices in vegetable cultivation may be studied
7. Extension strategies of government and non government organizations for promotion of organic farming practices may be studied for their efficiency.

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*Original not seen

# *Appendices*

## APPENDIX -I

### Selection of variables for the study

**KERALA AGRICULTURAL UNIVERSITY**
**College of Agriculture,**
**Vellayani, Thiruvananthapuram-695 522**

**Dr. V.B. Padmanabhan**
Associate Professor

Department of Agricultural Extension
Date: 4.04.2004

Sir / Madam

*Sub*:- P.G. Education – Thesis Research Project – Judges opinion requested – regarding

One of my P.G. students Sri. D. Jaganathan has taken up his research project entitled **"Analysis of organic farming practices in vegetable cultivation in Thiruvananthapuram district"** for his M.Sc.(Ag.) programme.

The objective is Promotion of organic farming practices in vegetable cultivation for which the awareness, knowledge, attitude and adoption of organic farming practices by vegetable growers will be studied. The profile characteristics of vegetable growers will be studied as related to their awareness, knowledge, attitude and adoption. The constraints in the adoption of organic farming practices and suitable solutions to them will also be identified.

For this purpose the student has listed out a number of personal, social, psychological and economic variables which may influence the awareness, knowledge, attitude and adoption of organic farming practices in vegetable cultivation.

So I request you to kindly spare some part of the time from your busy schedule to rate the listed variables by putting a tick mark (✓) in the appropriate column.

Thanking you

Yours faithfully,

V.B. Padmanabhan

The following are the variables which have relationship with awareness, knowledge, attitude and adoption of organic farming practices in vegetable cultivation. Please rate the relevancy of the variables in the three point continuum ranging from most relevant to least relevant by putting a tick mark (✓) in the appropriate column.

| Variables | Most relevant | Relevant | Least relevant |
|---|---|---|---|
| **1. Age**-Refers to the number of calendar years completed by the farmer at the time of interview | | | |
| **2. Education**-Refers to the extent of literacy obtained by the farmer at the time of interview. | | | |
| **3. Experience in Vegetable cultivation**- Refers to the total number of years the farmer has been engaged in vegetable cultivation | | | |
| **4. Scientific orientation**- Refers to the degree to which a farmer is relatively ready to adopt scientific ideas | | | |
| **5. Risk orientation**- Refers to the degree to which the farmer is oriented towards the risks and uncertainty in adopting new ideas in farming | | | |
| **6. Innovativeness**- Refers to the degree to which the farmer is relatively earlier in adopting new ideas | | | |
| **7. Information seeking behaviour**- Refers to the degree to which the farmer is seeking information from different communication sources | | | |
| **8. Mass media exposure**- Refers to the degree to which the different mass media are utilized by the farmer for getting information about different organic farming practices | | | |
| **9. Main occupation**- Refers to whether agriculture is the farmer's chief occupation or not | | | |
| **10. Livestock possession**- Refers to the number of animals possessed by an individual | | | |

| | | | |
|---|---|---|---|
| **11. Social participation**- Refers to the degree of involvement of farmer in formal and informal social organizations either as member or as office bearer which also includes the extent of participation in organizational activities | | | |
| **12. Cosmopoliteness**- Refers to the tendency of the farmer to be in contact with outside village on the belief that all the needs of an individual cannot be satisfied within his own village | | | |
| **13. Extension orientation**- Refers to the extent of contact a farmer has with different extension agencies and also his participation in various extension activities or programmes like meetings, seminars etc organized by these agencies | | | |
| **14. Economic motivation**- Refers to the drive of the farmer for occupational sources in terms of profit making and the relative value placed on economic ends. | | | |
| **15. Annual income** –Defined as the total earning of the farmer and the members of the family in a year from the farm and other sources in rupees | | | |
| **16. Farm size**- Refers to the extent of area possessed by the farmer | | | |
| **17. Area under vegetable cultivation**- Refers to the area under vegetable cultivation measured in cents. | | | |
| **18. Market perception**- Defined as the degree to which a farmer is oriented towards the market in terms of the demand and price of his produce | | | |
| **19. Credit orientation**- Refers to the favourable and positive attitude of a vegetable grower towards obtaining credit from institutional sources | | | |
| **20. Leadership**- It is defined as the ability of a person to influence people to cooperate in achieving a goal | | | |
| **21. Achievement motivation**- Refers to the striving of farmer to do good work and attain a sense of a accomplishment | | | |

| | | | |
|---|---|---|---|
| **22. Irrigation index**- It is the degree to which the vegetable crops are being irrigated | | | |
| **23. Participation in PTD**- Defined as the involvement of the farmer in the developmental activities carried out through various package programmes | | | |
| **24. Training attended –** Defined as the number of trainings in various organic farming activities undergone by the respondent during the last three years | | | |
| **25. Employment generation**- Refers to the extent to which the farmer obtains additional employment opportunities | | | |
| **26. Environmental orientation –** Refers to the degree to which the farmer is concerned about his environment | | | |
| **27. Availability of farm inputs**- Refers to the inputs available to the farmer either by his own possession or by hiring it | | | |
| **28. Self concept**- Refers to the set of cognition and feelings that a farmer has about him as a farmer | | | |
| **29. Self confidence**- Defined as the extent of feeling about one's own powers, abilities, and resourcefulness to perform any activity which the farmer desires to undertake | | | |
| **30. Indebtedness**- Refers to the total debt in terms of money a respondent owes to various money lending sources such as private money lenders, relatives, co-operatives etc | | | |
| **31. Other variables, if any**<br>Please specify and explain | | | |

Signature :

Name :

Designation :

## APPENDIX -II

### Selection of organic farming practices for the study

**KERALA AGRICULTURAL UNIVERSITY**
**College of Agriculture,**
**Vellayani, Thiruvananthapuram-695 522**

**Dr. V.B. Padmanabhan** Department of Agricultural Extension
Associate Professor Date: 22.4.2004

Sir / Madam

*Sub*:- P.G. Education – Thesis Research Project – Judges opinion requested – regarding

One of my P.G. students Sri. D. Jaganathan has taken up his research project entitled **"Analysis of organic farming practices in vegetable cultivation in Thiruvananthapuram district"** for his M.Sc.(Ag.) programme.

The objective is Promotion of organic farming practices in vegetable cultivation for which the awareness, knowledge, attitude and adoption of organic farming practices by vegetable growers will be studied. The profile characteristics of vegetable growers will be studied as related to their awareness, knowledge, attitude and adoption. The constraints in the adoption of organic farming practices and suitable solutions to them will also be identified.

For this purpose the student has listed out a number of organic farming practices in vegetable cultivation. As you may be aware all may not be equal contributors for organic farming practices. So the list of practices are to be rated in a three point continuum such as most important, important and least important.

With your past experience and expertise in vegetable cultivation I consider that you, Sir/Madam will be most appropriate judge to give the opinion about organic farming practices.

I request you to kindly spare a few minutes in rating the practices.

I look forward to your encouragement in my student research.

Thanking you

Yours sincerely,

V.B. Padmanabhan

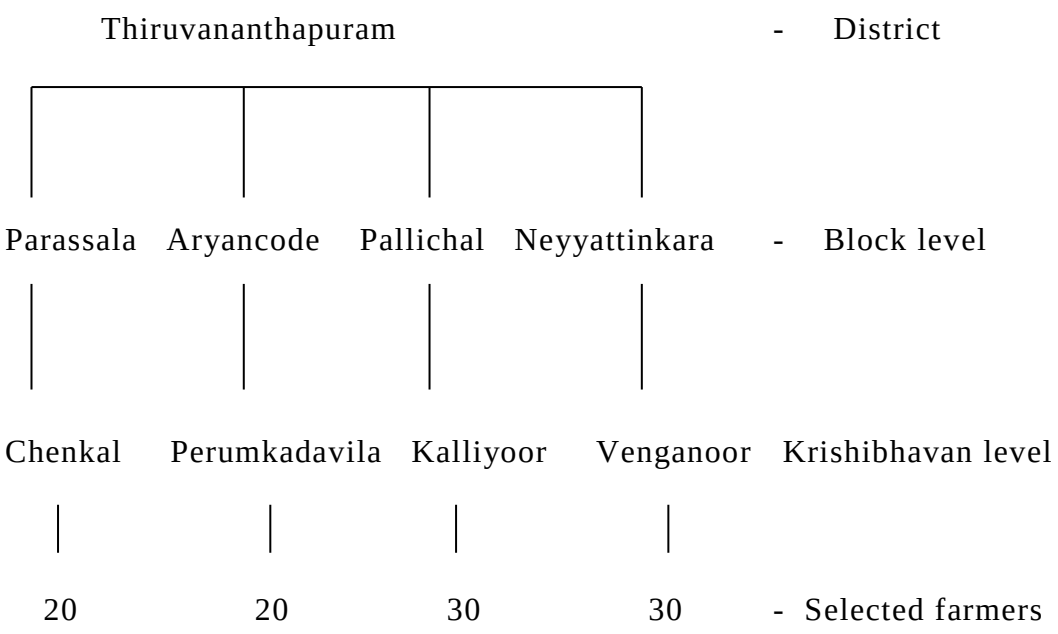
Please put a tick mark (✓) in the appropriate column against each practice keeping in view the possible contribution of each practice towards organic farming practices in vegetable cultivation.

| Sl. No. | Organic farming practices | Most important | Important | Least important | Mean value |
|---|---|---|---|---|---|
| 1 | Summer ploughing | | | | 2.43* |
| 2 | *In situ* incorporation of crop residues | | | | 2.53* |
| 3 | Raising green manure and incorporation | | | | 2.42* |
| 4 | Season | | | | 1.95 |
| 5 | Selection of good seeds | | | | 2.78* |
| 6 | Resistant/tolerant variety | | | | 2.63* |
| 7 | Use of optimum seed rate | | | | 2.02 |
| 8 | Seed treatment with biofertilizers | | | | 2.75* |
| 9 | Correct depth of sowing / planting | | | | 2.00 |
| 10 | Application of FYM | | | | 2.88* |
| 11 | Application of green leaf manure | | | | 2.20 |
| 12 | Application of vermicompost/ compost | | | | 2.68* |
| 13 | Application of poultry manure | | | | 2.65* |
| 14 | Application of oil cakes | | | | 2.58* |
| 15 | Application of biofertilizers in soil | | | | 1.95 |
| 16 | Timely irrigation | | | | 2.50* |
| 17 | Irrigation at critical stages | | | | 1.85 |
| 18 | Trap cropping | | | | 2.41* |
| 19 | Crop rotation | | | | 1.98 |
| 20 | Intercropping system | | | | 2.55* |
| 21 | Mulching | | | | 2.66* |
| 22 | Hand/mechanical weeding | | | | 2.60* |
| 23 | Monitoring of pest and diseases | | | | 2.00 |
| 24 | Collection and destruction of pests (egg, larvae and pupae) and disease affected plants | | | | 2.70* |
| 25 | Use of light traps | | | | 2.48* |
| 26 | Yellow sticky trap | | | | 1.89 |
| 27 | Introduction of biocontrol agents | | | | 2.01 |
| 28 | Use of botanical pesticides | | | | 2.56* |
| 29 | Ash/ cowdung slurry spray | | | | 2.45* |
| 30 | Conservation of natural enemies | | | | 2.57* |
| 31 | Any other practice, please specify | | | | |

* Selected organic farming practices for the study

## APPENDIX - III

## LIST OF KRISHIBHAVANS SELECTED FOR THE STUDY



## APPENDIX - IV

## INTERVIEW SCHEDULE

## ANALYSIS OF ORGANIC FARMING PRACTICES IN VEGETABLE CULTIVATION IN THIRUVANANTHAPURAM DISTRICT

Date :

Block :

Panchayat :

Ward :

Respondent No. :

**1. Name of the respondent :**

**2. Address :**

**3. Age in completed years :**

**4. Educational status**

| Category | |
|---|---|
| Illiterate | |
| Primary school level | |
| Secondary school level | |
| Collegiate | |

5. Experience in vegetable cultivation (No. of years) :

**6. Area under vegetable cultivation (cents)**

| Category | Vegetables grown | Area (cents) |
|---|---|---|
| Area owned | | |
| Leased in | | |
| Leased out | | |
| **Total** | | |

**7. Livestock possession**

| Sl. No. | Category | No. | Value (Rs.) |
|---|---|---|---|
| 1 | Buffalo | | |
| 2 | Bullock | | |
| 3 | Cow | | |
| 4 | Calf | | |
| 5 | Goat | | |
| 6 | Poultry | | |
| 7 | Others, please specify | | |

**8. Mass media exposure**

| Sl. No. | Mass media | Frequency of exposure | | |
|---|---|---|---|---|
| | | Regularly | Occasionally | Never |
| 1 | Radio | | | |
| 2 | Newspaper | | | |
| 3 | Television | | | |
| 4 | Farm magazine | | | |
| 5 | Bulletins | | | |
| 6 | Books | | | |
| 7 | Films | | | |
| 8 | Others, specify | | | |

**9. Extension orientation**

a. Extension contact

| Sl. No. | Category of personnel | Frequency of contact | | |
|---|---|---|---|---|
| | | Regularly | Occasionally | Never |
| 1 | Agricultural scientist | | | |
| 2 | Agricultural Officer | | | |
| 3 | Agricultural Assistant | | | |
| 4 | Others, specify | | | |

b. Extension participation

| Sl. No. | Activities | **Frequency of participation** | | |
|---|---|---|---|---|
| | | Regularly | Occasionally | Never |
| 1 | Study tours | | | |
| 2 | Seminars | | | |
| 3 | Exhibition | | | |
| 4 | Group farming meetings | | | |
| 5 | Demonstrations | | | |
| 6 | Farmer’s day | | | |
| 7 | Others, specify | | | |

**10. Economic motivation**

| Sl. No. | Statements | SA | A | UD | DA | SDA |
|---|---|---|---|---|---|---|
| 1 | A farmer should work towards larger yields and economic returns | | | | | |
| 2 | The most successful farmer is one who makes the most profit | | | | | |
| 3 | A farmer should try any new farming idea which may earn him more income | | | | | |
| 4 | A farmer should grow cash crops to increase monetary profit in comparison to growing of food crops for home consumption | | | | | |
| 5. | It is difficult for the farmer's children to make a good start unless he provides them with economic assistance | | | | | |
| 6 | A farmer must earn his living, but the most important thing in life cannot be defined in economic terms | | | | | |

**11. Training attended**

| Name of the training programme | Organisation which imparted | Duration of training | No. of times attended | Remarks |
|---|---|---|---|---|
| | | | | |

**12. Innovativeness**

When would you like to adopt an organic farming practice?

1. As soon as it is brought to my knowledge

2. After I have seen some other farmers using it successfully in their farms

3. I prefer to wait and take my own time

4. I am not interested in adopting organic farming practices

**13. Risk Orientation**

| Sl. No. | Statements | SA | A | UD | DA | SDA |
|---|---|---|---|---|---|---|
| 1 | A farmer should grow a large number of crops to avoid greater risks involved in growing one or two crops | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | A farmer should take more chance in making a big profit than to be content with smaller but less risky profit | | | | | |
| 3 | A farmer who is willing to take greater risk than the average farmer usually does better financially | | | | | |
| 4 | It is good for a farmer to take risk when he knows his chance of success is fairly high | | | | | |
| 5 | It is better for a farmer not to follow organic farming practices unless most others in the locality have used it with success | | | | | |
| 6 | Trying an entirely organic farming practices by a farmer involves risk but it is worth | | | | | |

**14. Market perception**

Please record your response based on your perception with regard to marketing your produce.

a. Do you think a farmer will be able to sell vegetables at a higher demand if he increases the quality by adopting organic farming practices? Yes / No.
b. How much price the produce of the crop cultivated following organic farming practices will fetch compared to those raised under conventional methods (Low / Same / High).
c. How difficult will it be to dispose off the produce of the crop cultivated following organic farming practices? (Very difficult / Difficult / Easy / Very Easy)

**15. Self confidence**

| Sl. No. | Statements | Always | Most often | Often | Occasionally | Never |
|---|---|---|---|---|---|---|
| 1 | I feel no obstacle can stop me from achieving my final goals | | | | | |
| 2 | I am generally confident in whatever I do | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | I am bothered by the feeling that I cannot compare with others | | | | | |
| 4. | I am not interested to do things at my own initiate | | | | | |
| 5 | I usually workout things for myself rather than get someone to show me | | | | | |
| 6 | I get encouraged easily | | | | | |
| 7 | Life is a struggle for me most of the time | | | | | |
| 8 | I find myself worrying about something or the other | | | | | |

**16. Environmental orientation**

| Sl. No. | Statements | Agree | Disagree |
|---|---|---|---|
| 1 | Indiscriminate use of pesticides cause environmental hazards | | |
| 2 | Man is exploiting the earth too much | | |
| 3 | Man has to be greatly concerned about environmental issues like soil pollution, air pollution, water pollution etc | | |
| 4 | There is truth in what environmental activists claim and we should lend our support to them | | |
| 5 | The present trend is to reduce the use of chemical control measures. Now do you agree that older methods of farming were more safer than the present ones | | |
| 6 | Agricultural produce obtained without use of chemicals are more tastier and healthier | | |

**17. Awareness of farmers about organic farming practices in vegetable cultivation**

| Sl. No. | Practice | Are you aware | | |
|---|---|---|---|---|
| | | Aware | Partially aware | Not aware |
| 1 | Summer ploughing | | | |
| 2 | *Insitu* incorporation of crop residues | | | |
| 3 | Raising green manure and incorporation | | | |
| 4 | Selection of good seeds | | | |
| 5 | Resistant / tolerant variety | | | |
| 6 | Seed treatment with bio-fertilizers | | | |
| 7 | Application of FYM | | | |
| 8 | Application of vermicompost/compost | | | |
| 9 | Application of poultry manure | | | |
| 10 | Application of oil cakes | | | |
| 11 | Timely irrigation | | | |
| 12 | Crop rotation | | | |
| 13 | Intercropping system | | | |
| 14 | Mulching | | | |
| 15 | Hand / mechanical weeding | | | |
| 16 | Collection and destruction of pests (egg, larvae and pupae) and disease affected plants | | | |
| 17 | Use of light traps | | | |
| 18 | Ash /cowdung slurry spray | | | |
| 19 | Use of botanical pesticides | | | |
| 20 | Conservation of natural enemies | | | |

**18. Knowledge of farmers about organic farming practices in vegetable cultivation**

1. Advantage of summer ploughing is

   a. To reduce the water requirement of next season crop
   b. Pupa of pests are exposed and killed

c. Improve soil structure
d. All of the above

2. Which one of the following is green manure?
   a. Daincha
   b. Sunhemp
   c. Both a and b
   d. None of the above

3. Selection of resistant varieties is a better method than treating the pest / disease infested crop (True / False).

4. Name two bio-fertilizers used for vegetable cultivation

5. Organic manures supply
   a. Only N, P and K
   b. Only Ca, Mg and S
   c. All nutrients
   d. None of the above

6. Which one of the following is called nature's plough?
   a. Butterfly
   b. Earthworm
   c. Honeybee
   d. None of the above

7. Name two oil cakes used for vegetable cultivation

8. Intercropping is used to
   a. Minimize weed growth
   b. Reduce pest population
   c. Increase the income
   d. All of the above

9. Advantage of crop rotation with legumes is
   a. To fix atmospheric oxygen
   b. To fix atmospheric nitrogen
   c. To fix atmospheric carbon dioxide
   d. None of the above

10. Mulching is done to
    a. Conserve soil moisture
    b. Reduce weed growth
    c. Improve soil fertility
    d. All of the above
11. Light traps are used to
    a. Control vectors of pests
    b. Monitor population of pests
    c. Both a and b
    d. None of the above
12. Name two neem based products used for pests and diseases control
13. Name two botanicals used for pest and disease control
14. Name two natural enemies

**19. Attitude of farmers towards organic farming practices in vegetable cultivation**

| Sl. No. | Statements | SA | A | UD | DA | SDA |
|---|---|---|---|---|---|---|
| 1 | Organic farming improves fertility status of the soil | | | | | |
| 2 | It is worthful to adopt organic farming practices even by borrowing money | | | | | |
| 3 | Use of organic farming practices is only a waste of money and time | | | | | |
| 4 | The way our forefathers cultivated seems to be good | | | | | |
| 5 | Adoption of organic farming practices is practically not feasible | | | | | |
| 6 | One need not bother about undesirable consequences when chemicals are used in vegetable cultivation | | | | | |
| 7 | It is possible to get good yield by adopting organic farming practices | | | | | |
| 8 | It is not profitable to adopt organic farming practices in vegetable cultivation | | | | | |
| 9 | Organic farming practices should be practiced by all farmers | | | | | |
| 10 | Cultivation of organic vegetables has brought a new light in the field of agriculture | | | | | |
| 11 | Adoption of organic farming practices is highly risky and hence it is not advisable to follow the same | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12 | It is better to give more importance to other occupation than following organic farming practices | | | | | |
| 13 | Use of organic farming practices is essential for better quality of vegetables | | | | | |
| 14 | It is not correct to support organic farming practices | | | | | |
| 15 | It is possible to solve our environmental problems through organic farming | | | | | |
| 16 | Organic farming practices have no advantages over conventional practices | | | | | |

**20. Adoption of organic farming practices in vegetable cultivation**

| Sl. No. | Practice | Have you adopted | | |
|---|---|---|---|---|
| | | Adopted | Partially adopted | Not Adopted |
| 1 | Summer ploughing | | | |
| 2 | *In situ* incorporation of crop residues | | | |
| 3 | Raising green manure and incorporation | | | |
| 4 | Selection of good seeds | | | |
| 5 | Resistant / tolerant variety | | | |
| 6 | Seed treatment with bio-fertilizers | | | |
| 7 | Application of FYM | | | |
| 8 | Application of vermicompost / compost | | | |
| 9 | Application of poultry manure | | | |
| 10 | Application of oil cakes | | | |
| 11 | Timely irrigation | | | |
| 12 | Crop rotation | | | |
| 13 | Intercropping system | | | |
| 14 | Mulching | | | |
| 15 | Hand / mechanical weeding | | | |
| 16 | Collection and destruction of pests (egg, larvae and pupae) and disease affected plants | | | |
| 17 | Use of light traps | | | |
| 18 | Ash / cowdung slurry spray | | | |
| 19 | Use of botanical pesticides | | | |
| 20 | Conservation of natural enemies | | | |

**21. Constraints in the adoption of organic farming practices in vegetable cultivation**

| Sl. No. | Constraints | Most important | Important | Least important | Mention your solutions |
|---|---|---|---|---|---|
| 1 | Lack of sufficient good quality seeds | | | | |
| 2 | Non-availability of inputs | | | | |
| 3 | Extensive prevalence of pests and disease | | | | |
| 4 | Lack of awareness and knowledge about organic farming practices | | | | |
| 5 | Inadequate extension support | | | | |
| 6 | Inadequate information about organic farming practices | | | | |
| 7 | Lack of ready package for organic vegetable cultivation | | | | |
| 8 | High cost of inputs | | | | |
| 9 | Lack of credit facilities | | | | |
| 10 | High labour charges | | | | |
| 11 | Lack of marketing facilities | | | | |
| 12 | Low premium for organic vegetables | | | | |
| 12 | Others, please specify | | | | |

# ANALYSIS OF ORGANIC FARMING PRACTICES IN VEGETABLE CULTIVATION IN THIRUVANANTHAPURAM DISTRICT

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**Abstract of the**
**thesis submitted in partial fulfillment of the requirement**
**for the degree of**

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**Kerala Agricultural University, Thrissur**

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## ABSTRACT

The study entitled “Analysis of organic farming practices in vegetable cultivation in Thiruvananthapuram district” was conducted with an objective of, to study the profile characteristics of the vegetable growers, to study the awareness, knowledge, attitude and adoption of organic farming practices, to find out the relationship between the profile characteristics and awareness, knowledge, attitude and adoption of organic farming practices and to identify the constraints in the adoption of organic farming practices and to suggest solutions to them.

The study was conducted in Chenkal, Perumkadavila, Kalliyoor and Venganoor panchayats of Parassala, Aryancode, Pallichal and Neyyattinkara blocks respectively of Thiruvananthapuram district in Kerala. By using the proportionate random sampling technique 100 vegetable growers were selected.

An explorative methodology was employed to identify the organic farming practices for the study. Twenty organic farming practices based on judges’ relevancy rating were finally selected. Fourteen independent variables were selected based on judges’ relevancy rating which included age, education, experience in vegetable cultivation, area under vegetable cultivation, livestock possession, mass media exposure, extension orientation, economic motivation, training attended, innovativeness, risk orientation, market perception, self confidence and environmental orientation. All these variables were quantified with the help of available measurement procedures. The dependent variables for the study were awareness, knowledge, attitude and adoption. These variables were quantified using measurement devices developed for the study. The relationship between the dependent variables and independent variables was studied using correlation analysis. Constraints in the adoption of organic farming practices were also recorded as perceived by the vegetable growers.

The data were collected using a pre-tested structured interview schedule prepared for the study and non-participant observation technique by the researcher. The statistical tools like mean, percentage analysis, analysis of variance, correlation analysis and step wise regression analysis were used to analyse the data.

The salient findings are presented below:

Majority of the vegetable growers (48%) belonged to old age category. Most of the vegetable growers (52%) had secondary school education. Forty seven per cent of the respondents were having medium level of experience in vegetable cultivation. Most of the vegetable growers (64%) belonged to medium category with respect to area under vegetable cultivation. Nearly three fourth of the respondents had medium level of livestock possession. Sixty one per cent of the vegetable growers belonged to medium category with respect to mass media exposure. Most of the vegetable growers (70%) had medium level of extension orientation. A higher percentage of the respondents (71%) had medium level of economic motivation. Fifty seven per cent of the respondents had medium level of training followed by low level (33%). More than half of the respondents (55%) had medium level of innovativeness. Almost three fourth of the respondents (73%) had medium level of risk orientation. Fifty five percent of the respondents had medium level of market perception. Most of the vegetable growers (63%) belonged to medium category with respect to self confidence. Nearly three fourth of the respondents (72%) had high environmental orientation

Majority of the respondents (73%) had medium level of awareness, seventy per cent of the respondents had medium level of knowledge, most of the respondents (64 %) had a favourable attitude and majority of the respondents (64 %) belonged to medium level of adoption of organic farming practices.

Awareness about organic farming practices showed significant and positive relationship with education, mass media exposure, training attended, innovativeness, market perception, self-confidence and environmental orientation. Knowledge about organic farming practices was found to have significant and positive relationship with education, training attended, innovativeness, risk orientation, self confidence, environmental orientation and awareness. Seven variables, namely, mass media exposure, innovativeness, market perception, self confidence, environmental orientation, awareness and knowledge showed a significant and positive relationship with attitude towards organic farming practices. Nine variables namely, education, mass media exposure, training attended, innovativeness, self confidence, environmental orientation, awareness, knowledge and attitude showed a significant and positive relationship with adoption of organic farming practices. The step-wise regression analysis showed that extent of adoption of organic farming practices was greatly influenced by knowledge, environmental orientation and awareness of vegetable growers.

Most important constraint perceived by the vegetable growers was the non-availability of inputs. The other important constraints were lack of information, lack of sufficient good quality seeds, high cost of inputs, extensive prevalence of pests and diseases and lack of credit facilities.

Organic farming in vegetable cultivation is a viable alternative because it enlivens the soil, strengthens the natural resource base and sustains biological production. The efforts from research, extension, supply of inputs and development of market channels for production of organic vegetables are needed to facilitate the successful adoption of organic farming practices by the vegetable growers. Therefore, action plans for developing organic farming should be part of a larger plan for nature conservation and health of the community and the land. It is genuinely hoped that organic farming will emerge in adding life and greenery to the field of agriculture and brightness to the farmers' faces.