

**Gender analysis of vegetable growers in the homesteads
of Kollam district**

by

VANI CHANDRAN

(2015-11-048)

THESIS

**submitted in partial fulfilment of the
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DEPARTMENT OF AGRICULTURAL EXTENSION

COLLEGE OF AGRICULTURE

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KERALA, INDIA


2018



DECLARATION

I, hereby declare that this thesis entitled “**Gender analysis of vegetable growers in the homesteads of Kollam district**” is a bonafide record of research work done by me during the course of research and the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title of any other University or Society.

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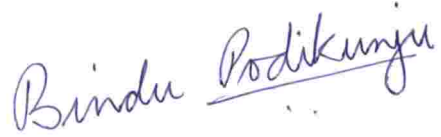

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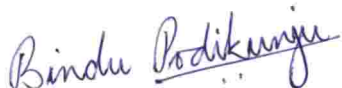
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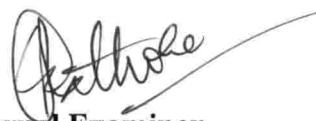
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LIST OF ABBREVIATIONS AND SYMBOLS USED

Fig.	Figure
HYV	High Yielding Variety
KAU	Kerala Agricultural University
AEU	Agro Ecological Unit
No	Number
KVK	Krishi Vigyan Kendra
FSRS	Farming System Research station
VFPCK	Vegetable and Fruit Promotion Council Kerala
IPM	Integrated Pest Management
FYM	Farm Yard Manure
SHG	Self Help Group
F	Frequency
DAP	Days After Planting
MAS	Month After Sowing
@	at
ANOVA	Analysis of Variance
<i>et al.,</i>	Co- workers
<i>i.e.</i>	That is
kg/ha	Kilo grams/ Hectare
%	Percentage

Introduction

1. INTRODUCTION

Vegetables are integral component of a healthy human diet and are important for almost every household. Vegetables are generally known to supplement diets with nutrients including lipids, carbohydrates and vitamins (Komolafe *et al.*, 1980). A meal without a vegetable is assumed to be incomplete. Kerala is a consumer state for vegetables and the major portion is produced in the neighbouring states. The land-use pattern plays a key role for this condition. The changes in the land use exert influence on the pattern of production and livelihood. A structural change in the land use pattern with in agriculture has been noticed in Kerala since land reforms and which resulting a shift from food crops to on food crops.

Hence a planned development in the field of vegetable production is necessary to cater to the nutritional requirements of the masses. Due to scarcity of land and growing demand for conversion of agricultural land for other purposes, a shrinking land holding size is also commonly observed in Kerala. Moreover, attaining self-sufficiency in the production of vegetables has become a challenge to the state much more now than before as the vegetables importing from the neighbouring states are found to be affecting the health of the people due to over usage of pesticides and chemicals for the production (Balakrishnan, 2015). This has forced the state to produce more food grains and vegetables to bridge the demand-supply gap.

Vegetables play a key role in mitigating the problems of micronutrient deficiencies and in view of the need to increase the production of vegetables by all possible means the challenge of attaining self-sufficiency in vegetable production in Kerala's peculiar situation of limited cultivable area can be achieved through promotion of homestead farming. Hussein *et al.* (1988) observed that by considering the total homestead area about 13% was used under vegetable cultivation.

Homestead cultivation refers to the, cultivation around the immediate surroundings of a house. Home gardening is considered as the oldest land-use

activity and has evolved through generations of gradual intensification of crop cultivation in response to two important factors - increasing human pressure and the shortage of arable land (Kumar and Nair, 2006).

Hanman (1986) refers to a homestead as the home and its adjoining land (including the immediate area surrounding the dweller's unit) owned and occupied by a household, and the space used for cultivation of trees and vegetables. The idea is to evolve an exhaustive production system through which small families can obtain sufficient vegetables throughout the year and by that they can ensure the supply of needed micronutrients for the family members. In the context of ever increasing problems of malnutrition and smaller farm size for field crops production, and with the increasing awareness on adverse effect of chemicals in vegetables and fruits the only feasible option for both consumers and producers are to use their homesteads effectively to cultivate vegetables for their needs. Thus, the homesteads can be best utilized for vegetable production as they are known to give higher yields per unit area and it assumes great importance for conservation as well as cultivation.

Homestead cultivation is different from other cultivation as it concentrates only on the immediate surroundings of the home and produces a range of food items using mainly organic manures provided by livestock whose milk and meat provide nutritional security to the households. Other cultivation mainly focuses on market demand and is cultivated on land away from their homestead farms (Ali, 2005). Home gardening activities are centred around women of the family and it can also increase income of women, which may result in the better use of household resources and empowerment. Thus, the simultaneous impact of home gardening programmes in terms of giving women a voice and promoting their full participation in these activities can make an important contribution to the overall development of communities. Food based strategies such as home gardening, small animal husbandry, poultry and social marketing of foods, lead to better food production, food consumption, income generation and overall food security. In addition, homestead food production provides additional income for poor

households, which is mainly used for purchasing foods of higher nutritional quality including animal products. The participation in the home gardening programme together with the income that the activity generates has been found to empower women. Their participation in decision-making increases and that, amongst others, had a positive impact on food preparation practices.

Thus, homestead vegetable production enhances food and nutritional security in many socioeconomic and political situations, improving family health and human capacity, empowering women, promoting social justice and equity, and preserving indigenous knowledge and culture (Mitchell and Hanstad, 2004). Homestead vegetable production not only create employment opportunity for the growers, but also the adoption of production techniques will help to combat overall food shortage, malnutrition and also boost up economic development of the country.

1.1 Need of the study

Homestead food production has been shown to be an important way to improve the intake of safe and micro nutrient rich foods, particularly for households. Homestead gardening programme can be credited not only with improving the availability of food to households but also their ability to access quality foods. State Agricultural Universities through its extension centres can play a vital role in enhancing the homestead vegetable cultivation. Homestead farms are heavily dependent on family labour and in the case of vegetable cultivation women play a prominent role. Approximately 70 per cent of all farmers in the developing world are women. Women play a critical role in all aspects of agriculture, but invariably their intellectual role and managerial skills remain unrecognized, unreached and untouched by the developmental efforts. Homestead vegetable production not only provide safe to eat vegetables but also help to shape the lives of rural women through their technical, infrastructural and financial support in collaboration with other line departments. Efforts need to be made to ensure that the technologies meant for the cultivation practices get disseminated at large scale throughout the length and breadth of the State leading to high rate of adoption of these technologies

and to eradicate the gender inequalities, if existing. A number of programmes have been introduced in Kerala by various formal institutions to improve the knowledge level and rate of adoption thereby increase the agricultural production and income of the homestead growers. Still some homestead farmers don't have sufficient knowledge regarding various cultivation practices. But there is paucity of data in this regard and no such study had been conducted so far to provide a baseline data for the functionaries to design action plan for them. Keeping these views in mind the research study was conducted with the following objectives:

Objectives

To identify the gender roles of vegetable growers in Kollam district. Their scale of knowledge, the rate of adoption of vegetable production practices, constraints faced in vegetables production and formulate strategy to mitigate the constraints faced.

1.2 Scope of the study

The present research study seeks to carry out gender role analysis of the farmers involved in homestead vegetable cultivation, knowledge about vegetable cultivation, adoption of technologies and constraints faced by the farmers. The findings of the study would help to reveal the facts about knowledge, attitude and extent of adoption levels of Homestead technologies recommended by KAU among the homestead vegetable growers.

The findings would give information to Scientists of KAU, officials of State Department of Agriculture, Extension scientists of KVKs, Development Organisations and other change agencies to implement plans, policies and programs for the benefit of homestead growers. Knowledge test developed could be used among the growers where KAU Homestead technologies are going to be popularised for studying the phenomena, so that better strategy can be formulated by knowing their knowledge level about homestead technologies. The study also gives information about the problems faced by the growers which helps the scientists in technology generation and dissemination. Elucidation of problems and solutions given by the homestead vegetable growers will give a deeper insight for the policy makers for developing better strategies in future programs and plans. The

study provides information about the research gaps and gender gaps. Thus, it would help the extension workers to take measures to bridge the gaps that exist.

1.3 Limitations of the study

Being a single student research project, it was not possible to cover large sample. The study was confined to only one district of Kerala and that to covering only six panchayat owing to the paucity of funds, time and manpower available at the disposal of the researcher. The research design used in this study was Ex-post facto research, so all the limitations associated with it set a limitation for this study. As usual, the results of this study were based on a small size of study samples and as such the result cannot be generalized for the larger area of the state or nation. The findings of the thesis are exclusively based on verbal expression and response of the respondents.

1.4. Presentation of the study

Hence the present study seeks to carry out gender role analysis of the farmers involved in homestead vegetable cultivation, knowledge about vegetable cultivation, adoption of technologies and constraints faced by the farmers. It would help the extension workers to fill the gender gaps that exist. Accordingly, the thesis is organised into five sections; Section 1 is an introduction to the study, section 2 collects the reviews on the present study, section 3 offers the methodology used for analysing the homestead cultivation; section 4 contains result and discussions. Major conclusions and implications are listed in section 5. The references, appendices, and abstract of the thesis are given at the end.

Review of Literature

II. REVIEW OF LITERATURE

In any scientific investigation a comprehensive review of relevant literature is imperative. Besides giving a knowledge of work already done in the area and providing insight into methods and procedures it provides basis for operational definition of major concept. Keeping in view efforts have been made to collect most relevant reviews regarding objectives of the present study. The review of literature has been arranged in five major heads as follows:

- 2.1. Gender roles of growers in homestead vegetable production.
- 2.2. The scale of knowledge about vegetable production practices.
- 2.3. Rate of adoption about vegetable production practices.
- 2.4. Constraints faced by the respondents in vegetable production.
- 2.5. Profile characteristics of vegetable growers.

2.1. GENDER ROLES OF GROWERS IN HOMESTEAD VEGETABLE PRODUCTION.

Muntemba (1982) revealed that, following male shifts away from food production into cash crop production over the decades, women carry the burden of food production.

Muntemba (1982) had discovered that in the agricultural region, many women turned to vegetable farming because they saw in vegetable a crop they could control and thereby ensure household relishes.

Palmer (1985) given that in many farming systems, men and women have different but complementary spheres of obligation in food production, the specific role of women is beclouded in some contexts. For instance, in Asia, the household garden is small but it is never entirely women's sphere because its produce is normally destined for the market.

Sadik (1989) advanced that women were responsible for fifty percent of the food produced in developing countries.

Buvinic and Rakna (1990) found that the prevalence of farming systems which accommodate gender role segregation in farm task gives impetus to women's involvement in food production. There are "female crops" distinguishable from "male crops". Examples of these include vegetables, cassava, and other tubers and roots while examples of "male crops" include yam, rice and maize in some cases, etc.

Johnson (1992) reported that within the context of alimentation activity as identified earlier, women play fundamental roles in the food security of individual family members by providing adequate energy and nutrient intake, normal meal patterns and some choice. That is, they have the major role of preparing balanced meals for all members of the family, in maximizing the nutritional value and safety of the food used, and in making the food acceptable in terms of quality and quantity.

Saito and Spurling (1992) reported that the range of women in doing various activities related to agricultural production is much wider than that of men. But generally, the extension service, being primarily focused on men. So, there needs improvement to understand women's contribution and to observe farm business and household economics from their point of view.

Sultana (1993) stated that all through every member of the family has some contribution, the major labour input was contributed by women. Most of the homestead agricultural activities, including seed preparation, land preparation; transplanting, watering and harvesting are done by women. Men usually help in fertilizer and pesticide application.

Akanda (1994) found that highest proportion of the rural women had high participation in vegetable cultivation while only 0.5 percent of them had high participation in the cultivation of fruit trees.

Halim *et al.* (1994) reported that in Bangladesh, women produced Indian spinach, amaranths, okra, gourd, cucumber, and pumpkin during summer season and Country bean, brinjal and tomato during winter season in their homestead garden successfully.

According to Williams (1994), women played an important role on the farm by tending to the vegetable garden, as well as the keeping of cows, while the men were often absent from the farm.

Habtemariam (1996) reported that in Ethiopia women are engaged in various economic activities like crop cultivation and harvesting, food processing, marketing, gardening, construction of housing, and animal husbandry and they provide approximately 40% of the family labour.

Habtemariam (1996) reported that policy makers and administrators in Ethiopia consider men as the farmers and women play only supportive role as farmers' wives. This attitude results a remarkable adverse effect on women regarding the access to agricultural extension services.

Karim and Wee (1996) reported that women in small land holdings have the highest involvement in agriculture. Besides most household vegetable gardens that supplement the family food consumption become the women's responsibility. They reported that one-third to one half of vegetables spices and fruits grown in the homestead were sold to supplement the family income.

Sadangi *et al.* (1996) reported that in rural areas 75 per cent of the rural women are found participating in different farm and allied works, which shows their affinity towards farming .

Hahn (1997) revealed that homestead cultivation is found to be one of the main survival system for household food security which is primarily managed by women.

Gender relates to socially assigned roles and behaviours attributed to men and women. Gender roles are roles that are played by both men and women which

are not determined by biological factors but by the socio-economic and cultural environment or situation (Mollel *et al.*, 2000)

Lanjouw and Lanjouw (2001) reported that in most societies, women are responsible for most of the household and child-rearing activities as well rearing of small livestock. The nature of tasks, such as caring for children and elderly household members, requires women to stay near the home, thus limiting options to work for a wage.

Winrock (2001) reported that in addition to child care, take care of the family and other household activities, women spend a great portion of their time fetching water and collecting firewood.

Odame *et al.* (2002) reported that women are twice as likely as men to be more involved in agriculture related activities.

Ranjan and Hedija (2004) reported that A major chunk of women's labour force in production system is invested in weeding, harvesting, household animal care, marketing, post-harvest handling etc. Harrowing and weeding, in particular, are considered as women's activities. Women are also active in livestock production.

Talukder (2005) reported that the participation in the home gardening programme together with the income that the activity generates has been found to empower women.

Negatwa (2006) suggests that the agricultural extension service in the country is male dominated and mainly align towards advising and working with male farmers of the households. Women are typically and still considered as economically inactive group.

Negatwa (2006) Found that 50 percent of the population are occupied with women and they are the main work force in rural Ethiopia where economy rely on agriculture.

Ahmad *et al.* (2007) reported that even though both male and female were involved in agricultural practices, female was specifically involved in vegetable production. Most of the cases the vegetable fields were located nearer to their houses and that was the reason behind their involvement in vegetable cultivation besides their household activities.

Taj *et al.* (2009) revealed that women are heavily involved in all household activities, such as food preparation, child rearing and other household activities (Table 4). On the other hand, majority of men does not involve in daily household activities. All activities like, food preparation, childcare and washing are performed by women and on an average 9.06 hour are daily consumed on these routine household chores.

Taj *et al.* (2009) revealed that marketing of vegetables output is male dominated as more than 90 percent of male are involved in marketing of these commodities. Women have more involvement in milk, ghee and poultry sale. Main reason for this distribution is that milk, ghee and poultry are usually sold at village level while other commodities are usually sold to adjacent areas/markets or out of village markets for which women do not participate.

Taj *et al.* (2009) found that in agriculture, women are more than half of total labour force. Female involvement in crop and livestock management is undervalued and regarded as housework.

Baba *et al.* (2010) concluded that even though there are some men dominated and women dominated operations of vegetable cultivation but in totality both the gender has a significant participation in most of the activities.

Baba *et al.* (2010) reported that the magnitude of gender contribution in diverse vegetable cultivation activities are varied from one activity to the other. While some activities are generally performed by male, others by female yet some activities are performed jointly by male and female partners of the family.

Fartyall and Rathore (2014) reported that due to the lack of gender sensitive data collection women's contributions and concerns remain invisible. Women's work and women's jobs are undervalued in comparison to those done by men. Therefore, both for consideration of sustainability and equity, it essential that vegetable farming research and extension should be more gender centered reflecting the role of women and men as vegetable farmers.

Fartyall and Rathore (2014) revealed that among various vegetable cultivation activities, land preparation, cleaning activities, raising seed beds, seed treatment before sowing, transplanting of seedlings, weeding were carried out by the women farmers and activities such as selection of seeds, sowing, and irrigation, ploughing of field and marketing of vegetable produce were male dominated.

Folayan (2014) found that men and women have important role to play in agricultural production. Women trailed behind men in their participation, production and ownership of the farm enterprises. Men dominated in tree crop, food crop production and livestock rearing. However, women were found to dominate in cassava and vegetable production.

2.2. THE SCALE OF KNOWLEDGE ABOUT VEGETABLE PRODUCTION PRACTICES

Amudha and Veerabhadraiah (2000) conducted a study to determine the knowledge status of women involved in poultry farming and found that majority of them had medium level of knowledge about simple practices in poultry management.

Bhople and Borkar (2002) concluded from their study that most of the respondents (84.0%) were having moderate level of knowledge about different kinds of biofertilizers and their use. About one-tenth of them had adequate knowledge about biofertilizers and appeared in high knowledge category. A very few percentage of the farmers were in low knowledge category.

Rani and Reddy (2002) reported that though there were significant differences in knowledge and adoption levels, the women respondents of both villages were acquainted with rice production and nutrition technology through their own pattern of inter personal communication.

Israel (2003) found that most of the respondents had low (45.42%) followed by high (32.92%) and medium (21.66%) knowledge level about watershed technologies.

Navadkar *et al.* (2004) from their study on awareness and adoption of organic farming in Maharashtra observed that 96.41 per cent of the farmers had awareness about bio-fertilizers followed by bio-pesticides (87.25%), vermicompost (74.51%) and tissue culture (63.75%).

Buddhibhuvaneswari (2005) reported that the knowledge and adoption level of vegetable growers on eco-friendly technologies was low to medium. This finding brought out an insight into the farmers understanding of the various eco-friendly technologies and their benefits which is the-need of the hour.

Das *et al.* (2005) observed that there was remarkable change in knowledge level of farmers in all three ICM technologies after exposure to on-farm trials. The pre exposure mean knowledge increased from 27.0 per cent to 86.0 per cent indicating a change of 59.0 per cent in overall knowledge level of farmers.

Krishnamurthy *et al.* (2005) found that 53 % of the trained rice growers had high knowledge followed by low (27.0%) and medium (20.0%) knowledge levels regarding IPM practices in rice. In case of untrained farmers majority (45.0%) of them had low knowledge followed by high (32.0%) and medium (23.0%) knowledge levels.

Singh and Kumar (2006) observed that most of the cultivators had (60.67%) medium knowledge level by a score of 13-17 in soil and water management practices.

Waman *et al.* (2006) revealed that nearly half of the cotton growers had high knowledge level on IPM practices in cotton.

Maraddi *et al.* (2007) observed that more than half of the respondents belonged to medium knowledge level category (53.34%) followed by low (32.77%) and high (13.89%) in respect of sugarcane cultivation practices.

Jayalakshmi and Santha (2008) reported that the knowledge level on sustainable plant protection practices of farm women was found to be low in rice cultivation.

Kushwaha (2008) concluded that 46.66 per cent of the tomato growers had low knowledge level.

Mahantesh and Singh (2009) reported that increasing the knowledge level of pesticide hazards and promotion of alternative pest and disease management strategies such as use of bio-pesticides and IPDM is essential for reducing adverse effect on environment.

Chaturvedi *et al.* (2010) reveal that in general 40 per cent cauliflower growers were found to be under medium knowledge category.

Nemade (2010) concluded that majority of the vegetable growers (57.00%) had high knowledge level of Integrated Pest Management practices.

Jat *et al.* (2011) reported that more than half of his respondents were having medium knowledge level about tomato cultivation practices and 25.3 per cent respondents were having high Knowledge level, whereas 16.92 per cent of respondents were having low knowledge level about recommended cultivation practices of tomato.

Sreenivasulu (2011) found that more than half of the FFS respondents (57.78%) were having medium level of knowledge about cotton ICM practices followed by high (24.44%) and low (17.78%) levels. In case of non-FFS farmers,

majority (46.67%) of them were having medium level of knowledge about ICM practices followed by 36.11 per cent in low and 17.22 per cent in high categories.

Arulraj (2012) concluded that higher percentage (42.50%) of the tomato growers possessed medium knowledge about Integrated Pest Management practices

George *et al.* (2012) found that characteristics of vegetable growers like education, social participation, land holding, annual income, risk orientation, economic motivation, attitude towards IPM, information seeking behaviour, mass media contact had positive and significant relationship with knowledge and adoption level of IPM practices.

Kumar *et al.* (2013) found that most of the farmers had medium level of knowledge about vegetable production technology. It also indicated that the knowledge about vegetable production technology of the small farmers was lower than the medium and large.

Mondal (2014) reported that the knowledge of the farmers who responded in the survey on organic vegetable production concepts, especially pertaining to the use of chemical insecticides, herbicides, and fertilizers, still needs to be improved. Knowledge on organic vegetables especially at a high level is required to understand the systematic management of organic vegetables and for good practice which currently is totally unsatisfactory in this area.

Rai *et al.* (2014) reported that from total, 73.3 per cent respondents belonged to medium knowledge group about vegetable production technology whereas, 13.3 and 13.3 per cent belonged to high and low knowledge group about vegetable production technology group, respectively.

2.3. RATE OF ADOPTION ABOUT VEGETABLE PRODUCTION PRACTICES.

According to Feder *et al.*, (1982) adoption is a process defined as “the decision to make full use of an innovation, which encompasses the mental process

that an individual undergoes from first hearing about to finally adopting an innovation.

Sharma (1992) reported that the social problems which the farm women face in adoption of Homestead technology are caste, customs, tradition, religious beliefs, family ties, male dominant society, lack of education, social barriers, lack of managerial ability, limited mobility and lack of self confidence. Other problems are non-availability of technical knowledge, lack of skill in technical knowledge and non-availability of information on various topics resulting in a negative attitude.

Khandekar and Sharma (2000) disclosed that all the recommended scientific package of practices was not being followed by the small poultry farmers of UttarPradesh.

Reddy *et al.* (2000) concluded that ten practices out of twenty six recommended practices of poultry were adopted by the farmers of three different combinations of enterprises viz. paddy + poultry, paddy + dairy + poultry and paddy +poultry + fisheries.

Thayagarajan and Vasanthakumar (2000) found that majority (48.33%) of the farmers were in low category of adoption of recommended rice technologies followed by high (28.67%) and medium (23.0%).

Ranganathan *et al.* (2001) observed that nearly half of the small farmers (49.0%) were medium adopters while 30.0 per cent and 21.0 per cent of them were belongs to low and high adopters level of organic farming practices in rice cultivation.

Vijayalan (2001) in his study on eco-friendly agricultural practices in rice revealed that majority of the rice growers were found to have low (41.66%) adoption level followed by medium (32.5%) and high (25.84%) levels.

Bhople and Sinde (2002) found that the majority of vegetable grower (58 per cent) had medium level of adoption.

Madhavalatha (2002) reported that majority (35.0%) of the respondents had high extent of adoption followed by low (33.33%) and medium (31.67%) extent in case of trained farmers, whereas 40.0 per cent had low extent of adoption followed by high (31.67%) and medium (28.33%) extent of adoption in untrained farmers.

Natarajan (2004) observed that in case of FFS farmers 36.66% belonged to medium adoption category followed by high and low category with percentage of 35.56 % and 27.78 % respectively. whereas in case of non-FFS farmers, majority (36.67%) were in medium category followed by low (33.33%) and high (30.0%) categories.

Meena *et al.* (2005) found that 51.33 per cent respondent belonged to medium level of adoption group.

Sumathi and Budhar (2005) in their study on the role of women in storing grains with different storage practices in Vellore district of Tamil Nadu, India, revealed that those with big farms had a higher percentage of adoption of rice storage practices such as impregnated bags, pre treatment of storage structures, tin-cone plates for storage structures and anti-coagulants for rat control since they can afford the costs of these storage methods. However, the usage of metal storage bins by those with small farms was high since these bins are provided to them at a subsidized rate.

Ferdousi (2007) in her findings revealed that the highest proportion (42.0%) of rural women had medium adoption of agricultural technologies while 39.0 per cent had low adoption and only 19.0 per cent had high adoption of agricultural technologies.

Ashalatha and Rao (2010) carried out a study to evaluate the extent of adoption of different vermiculture technologies recommended by scientists and found the adoption gap in various practices. The highest adoption gap (62.09%) was observed for filling beds to recommended level followed by keeping beds from unwanted plants (52.10%) and keeping vermicompost beds away from sunlight (50.54%). The lowest adoption gap was observed for using vermicompost in

different crops including vegetables and fruits (27.57%) followed by use of thick layer of cow dung to cover agricultural waste (30.21%), sprinkling water on beds regularly (30.21%) and separating earthworms (31.63%).

Kumari *et al.* (2010) in their study observed that there was highly significant difference in the mean adoption scores of trained and untrained entrepreneurs with respect to scientific fruit preservation and stitching of cloth enterprise. The trained entrepreneurs had significantly higher mean adoption scores than the untrained entrepreneurs.

Singh *et al.* (2010) found that vegetable cultivators who earned more and had a favourable attitude towards vegetable cultivation were better adopters of modern production technology.

adoption of vegetable growers was found to have a positive correlation with education (Singh *et al.*, 2010)

Sreenivasulu (2011) in his study observed that more than half of the of the FFS respondents (55.56%) were belongs to medium adoption category of cotton ICM practices and 23.88 % belongs to high and 20.56% in low levels. In case of non-FFS farmers, majority (46.11%) of them were having medium level of adoption of cotton ICM practices followed by 32.78 per cent in low and 21.11 per cent in high categories.

George *et al.* (2012) found that characteristics of vegetable growers like education, social participation, land holding, annual income, risk orientation, economic motivation, attitude towards IPM, information seeking behaviour, mass media contact had positive and significant relationship with knowledge and adoption level of IPM practices.

Kumari (2014) found that adoption of technologies in rural areas is affected by many factors like farming situation, resource availability, needs and aspirations of the rural women having different socio-economic and cultural backgrounds, etc. Further, inadequate extension services, high illiteracy among rural women, socio-

cultural background, low paying capacity, lack of skill, etc. may be the barriers for non-adoption or low adoption of various improved Homestead technologies.

Sarker *et al.* (2016) found that farm sizes, organizational participation, knowledge about agriculture and extension contact are positively significant with the adoption of homestead vegetable production techniques.

2.4. CONSTRAINTS FACED BY THE RESPONDENTS IN VEGETABLE PRODUCTION.

Ezedinma (1991) revealed that most of their findings confirm that farming is susceptible to physical uncertainties of nature and man-made constraints. Such constraints include diseases, pests, erosion, flood, drought, fire disaster, soil fertility, hills and slopes, soil texture and degradation, among others. These pose serious constraints to the productivity of the soil in terms of potential crop yields.

Jayale (1992) in his study on horticulture crop growers observed that majority of the respondents (79.16%) opined that filling of pit with manure and fertilizers is costly and laborious while, 66.66 per cent of farmers opined the constraints of digging the standard size pit and expensive and forty five per cent of the farmers opined that getting seedling is different.

Patil (1995) conducted in his study on sunflower seed production reported that 76.25 per cent respondents faced the problem of labour scarcity, delay in the release of loan, pest and disease infection and loss due to birds were problem faced by 61.00, 52.50 and 36.00 per cent respondents, respectively.

Srinivasareddy (1995) observed that the major problems felt by the mango growers were pest and disease incidence, high cost of fertilizers and pp chemicals, labour scarcity, lack of technical guidance, rain during harvest and problem of weed.

Bonny (1996) surveyed the constraints in commercial production of vegetables in Panachery and Puthur, Kerala and reported that increased cost of plant protection chemicals was perceived as the most important factor by the respondents

followed by inadequate market facilities, poor storage and other post-harvest facilities, insufficient capital and high labour costs.

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

Wankede *et al.* (1997) reported the major felt problems like non-availability of fertilizers and insecticides in time (68.67%) non-availability of plant protection appliance (13.33%) and high cost of seeds, fertilizer, FYM and insecticides (91.33%).

Shrivastava *et al.* (1998) observed that incidence of pest and disease, high cost for pesticides and insecticides, non-availability of plant protection equipment and inadequacy of labour were the problems faced by the chilli growers in Kheda district of Gujarat with a percentage of 96.67, 98.33, 36.67 and 30.00, respectively.

Kumar and Arora (1999) found that the major problems perceived by farmers in vegetable storage were lack of cold storage facilities, perishable nature of products, lack of demand on stored products which leads to the non-profitability of storing vegetables.

Vasudev and Chowdary (1999) identified problems such as lack of grading facilities, absence of market information and spoilage and malpractices as the major production problems in tomato. They have concluded that providing these facilities can improve the marketing efficiency and will help the farmers in realizing better prices.

Ozkan *et al.* (2000) suggest that women farmers require more exposure to extension services since their contribution as agricultural labours especially in activities like planting, hoeing, harvesting very high and still they have less access to various resources when compared to men.

Ravishankar and Katteppa (2000) observed that 94.16 per cent respondents faced the problem of lack of technical guidance.

Waman and Patil (2000) found that difficulty in identifying pests and disease (54.66%) and non curable nature of onion diseases with pesticides (42.00%) were the major problems.

Basawarajaiah (2001) concluded that the constraints felt by the respondents in adoption of technologies were lack of resources, follow-up action by implementing officials, technical guidance by scientists, efforts on the part of implementing agency to educate and convince the farmers, illiteracy and farmers' habituation to subsidies, low level of motivation and less availability of suitable technology for resource poor situations, lack of credit facility and untimely supply of inputs.

Chote and Borkar (2001) in their study reported that 61.33 per cent of the respondent stated lack of knowledge about bio-fertilizers as the major constraint encountered, whereas low income was the constraint experienced by one-fourth of the respondents. Approximately 42.0 per cent of the farmers stated that due to lack of demonstration facility they had not used bio-fertilizers, 20.0 per cent respondents stated that unavailability of extension literatures like agricultural magazines was the constraint for non-adoption of biofertilizers.

Tiwari (2001) reported that the technological constraints are lack of viable and compatible technology for rural women, technological skills not developed through special training programs and lack of access to technology and inputs.

Achuta and Radhakrishnamurthy (2002) conducted a study on Betel vine growers of Puttur district of Andhra Pradesh noticed the problems like prevalence of pests and diseases (100%) and lack of accessibility of plant protection chemicals in time (58.33%).

Bhagyalakshmi (2002) in her study revealed that high cost of raw materials and insufficient credit facility, competition from neighbours, distant location from

markets were the major problems faced by rural women in adoption of micro enterprises.

Natarajan (2004) stated that high cost of inputs, high labour cost, labour scarcity during peak period of the season were the major problems encountered by the beneficiaries of rice in IPM FFS.

Ferdousi (2007) found that the major three problems in adoption of agricultural technologies as per descending order of Problem Confrontation Index (PCI) were: (i) lack of quality seed and seedling for homestead cultivation, (ii) high mortality rate of the poultry and (iii) lack of training facilities on agricultural technologies.

Chandel *et al.* (2008) reported that the major felt problems of the vegetable growers in Himachal Pradesh were prevalence of pest and diseases, high cost of fertilizers and plant protection chemicals and lack of timely availability of fertilizers.

Mahantesh and Singh (2009) said that increasing farmers' awareness of pesticide hazards to the environment and promotion of alternative pest management strategies such as use of bio-pesticides and IPM is essential for reducing adverse effect on environment.

Meena *et al.* (2009) in their study revealed that most of the agro processors realized on 'sometimes' bases and the major constraints felt by the rural agro-processors were socio-economic, technological and farming constraints when compared to extension and marketing constraints.

Samantaray *et al.* (2009) recognized the major constraints by the farmers were insufficient post harvest technologies, lack of storage facilities, in adequate training programmes and lack of demonstration of new technology are faced by the growers.

Das (2012) showed that although women farmers play a vital role in agricultural development in a country, they are comparatively less informative than

male farmers due to certain socio-economic, cultural constraints. They need more accurate, reliable and quick information along with male farmers for agricultural development as a whole. Rural women received most of the agricultural information from interpersonal sources rather than mass media sources.

Mohanty *et al.* (2013) found that the major constraints like lack of regular soil testing, lack of mechanization in agriculture, poor knowledge of IPM, lack of innovativeness, lack of entrepreneurial ability, lack of low responsiveness, absence of storage facilities, post harvest technologies and lack of effective supervision and monitoring by extension workers are faced by the vegetable growers.

Kumari (2014) reported that the main economic constraints faced by rural women in adopting Homestead technologies are scattered holdings, limited resources for purchase of inputs, unavailability of labour to carry out work, small size of holding, non-availability of loans at the proper time, costly inputs, finance problem, difficult to arrange initial investment, tough competition, lack of marketing skills.

According to Patil *et al.* (2014), labour scarcity for organic farm practices and in sufficient research support for providing new scientific information's were the major production related constraints expressed by most of the farmers.

2.5. PROFILE CHARACTERISTICS OF VEGETABLE GROWERS.

2.5.1. Age

Mohai and Twight (1987) suggested that people may become more cautious and conservative due to the biological, psychological and social changes they experienced as they grow older.

Mahitha (2000) reported that 48.3 percent of the respondents were middle aged followed by young (34.2%) and old age (17.5%).

Shinde *et al.* (2000) observed that 44.0 per cent of the respondents were old i.e. above 50 years.

Babu (2002) found that majority (67.06%) of the beneficiary respondents of Indo-Dutch Network Operations Research Project were middle aged followed by old (21.18%) and young age (11.76%).

Bhagyalakshmi (2002) in her study revealed that majority of rural women entrepreneurs in three categories of micro level enterprises were middle aged.

Prasad (2002) reported that majority of the beneficiaries (60.71%) were middle aged followed by young age (35.71%) and old age (3.58%) categories.

Prakash *et al.* (2003) indicated that most of the backyard poultry farmers (70.83%) of Meghalaya were middle aged.

Obaiah (2004) revealed that more than half (52.14%) of the respondents were middle aged followed by young age (26.43%) and old age (21.43%).

Prasad (2004) concluded from his study that majority (80.8%) of the R-E-F linkage farmers were middle aged followed by old (13.6%) and young age (5.6%).

Purnima (2004) observed that 43.75 percent of the respondents were middle aged followed by young (38.33%) and old age (17.92%).

Sarada (2004) revealed that 44.17 percentage of the total respondents were included in middle aged group. 39.16% and 16.67% were in old and young age group respectively.

Tanzo (2005) reported that age is an important socioeconomic characteristic which may reflect changing attitudes and roles.

According to Ahmad *et al.* (2007), age of the farmers plays a key role in the adoption or rejection of a practice and it is reported that most of the farmers were in age group of 20-40 years.

Choubitker (2007) reported that maximum vegetable growers belonged to middle age group.

Kushwaha (2008) concluded that maximum number of tomato cultivators (49.18%) were in middle age group (36-55 years).

Satyagopal (2009) from his study concluded that majority (58.33%) of the unreached farmers belonged to middle age category and remaining were almost equally distributed under young (21.11%) and old age (20.56%).

Abbas *et al.* (2010) reported that gender and age are one of the important demographic factors that can contribute to the knowledge, attitude, and practices of farmers.

Lokhande (2010) concluded that higher percentage of the tomato growers (46.66%) belonged to middle age group (36-55 years).

Nemade (2010) concluded that half of the vegetable growers (50.00%) belonged to middle age group.

Singh *et al.* (2010) reported that adoption was negatively and significantly correlated with age.

Sreenivasulu (2011) in his study reported that majority (70.0%) of the FFS farmers were middle aged followed by young (26.67%) and old age (3.33%). In case of non-FFS farmers, majority (67.77%) of them were middle aged followed by 26.61 percent young and 5.62 per cent old aged.

Arulraj (2012) concluded from the data that higher percentage of the tomato growers (48.33%) were of middle age group.

Masillem (2012) pointed that older age of the respondents is proportional to their active engagement to farming. The younger the age of the respondents, the lesser engagement and exposure to farming activities.

Ezeibe (2015) The age of a female farmer will also determine the amount of labour to be utilized in different level of production. The older women will like to participate in levels that are less tedious than the younger women.

2.5.2. Education

Draughn *et al.* (1988) reported that education refers to the number of formal years of schooling the individual has attended. It is a factor that may influence the responsibilities or roles that a person is assigned to. It is possible that the more educated a person is, the more roles she will perform because she will be able to handle these duties with the knowledge she possesses.

Traxler (1995) pointed out that education is an important factor that may have bearing on one's level of knowledge. Formal education allows individuals to have a closer contact with scientific and technological issues.

Chatterjee (2000) in his study indicated that 40 percent of the respondents were educated up to primary school, 28.33 per cent of them were illiterate, followed by middle school (18.33%), high school (10.17%) and college education (3.17%).

According to Shinde *et al.* (2000), among the total 42 percent of the respondents were educated up to high school.

Veerendranath (2000) inferred that 30 percent of rainfed castor growers were illiterates followed by 'can read' category (18.89%), 'can read and write' category (16.11%), primary level education (17.22%), middle school education (9.44%), intermediate education (6.67%) and 1.67 per cent graduate and post graduate education.

Basawarajiah (2001) found that 74.17% of the total farmers were belongs to the category of illiterate, followed by 11.17 % with primary school education, 8.33 per cent with middle school, 4.16 per cent with high school education and college education (2.17%).

Babu (2002) revealed that more than one-fourth of the respondents (27.06%) were educated up to primary school, followed by middle school (21.18%), college education (18.82%), illiterate (17.65%), high school (10.59%) and functional literate (4.7%).

Kappala (2002) reported that 29 percent of the respondents were functional literate, followed by illiterate (27.0%), primary school education (16.0%), middle school education (12.0%), secondary education (9.0%) and college education (7.0%).

Prasad (2002) reported that 35.12 percent of the beneficiaries were primary level educated followed by upto middle school (16.07%), functional literate and illiterate (25.6%), high school educated (12.5%), and college educated (10.71%).

Raju (2002) from his study concluded that one fourth of the growers were belongs to middle school education category. 23.33% having education up to primary school followed by high school education (20.0%), illiterate (13.33%), intermediate (10.84%) and can read & write (7.5%).

Prakash *et al.* (2003) indicated that most (61.66%) of the backyard poultry farmers of Meghalaya were illiterates.

Natarajan (2004) observed that majority of FFS respondents were in middle school category (34.44%) followed by high school (28.89%), higher secondary school (18.89%), primary school (16.67%) and illiterate (1.11%) categories.

Barodia (2005) concluded that maximum vegetable growers were educated up to higher secondary level.

Ahmad *et al.* (2007) reported that the rate of adoption of various agricultural practices were positively correlated to education of the farmers. It is one of the most important factors which decides the acceptance, rejection of adoption and transfer of information to others.

Enyinaya *et al.* (2007) suggest that education was found to be negatively related to women labour utilization and it is expected to be so in this work. This is because higher education attainment might make the woman not to engage in much farm work.

Kushwaha (2008) concluded that maximum of the tomato growers (30.83%) were educated up to middle school.

Lokhande (2010) concluded that higher percentage of the tomato growers (26.66%) were educated up to higher secondary school.

Singh *et al.* (2010) pointed that in case of vegetable grower's adoption is significantly correlated with education of the growers.

Rajpoot (2011) concluded that maximum numbers of respondents (31.66%) were found to be educated up to high school.

Arulraj (2012) concluded from the data that higher percentage of the tomato growers (35.00%) were educated up to high school level.

According to Kumar *et al.* (2013) majority of the respondents (80.00%) were having education up to high school level.

Ezeibe (2015) reported that education is the number of years spent in school (Formal Education) by the women. Educated women tend to do other jobs than working in the farm.

2.5.3. Occupation

Karpagam (2000) observed that majority of the respondents (71.66%) had only agriculture as their occupation. Followed by agriculture and dairy (11.67%) agriculture + business (16.67%).

Shinde *et al.* (2000) in their study reported that over 90.0 per cent of the respondents had farming as the main occupation.

Raju (2002) reported that farming was the main occupation for more than half (57.5%) of the respondents under watershed environment followed by farming + enterprise (21.5%), farming + wages (14.0%) and farming + service (7.0%).

Isreal (2003) pointed that 57 % of farmers were engaged in farming & one enterprise, followed by farming & wage earners (23.75%) and farming & two enterprises (19.17%) as their occupation.

3.33 per cent of farm women were practicing agricultural and subsidiary enterprises in addition to other sources of income. Great majority (92.50%) of farm women were practicing agricultural and subsidiary enterprises while 4.17 per cent of farm women were dependent only on agriculture (Anitha, 2004).

Purnima (2004) from her study reported that majority (47.5%) of the respondents were engaged in labour + subsidiary occupation followed by 21.25 per cent in subsidiary occupations alone, subsidiary + agriculture (19.58%) and labour + subsidiary + agriculture (11.67%) occupations.

Ahirwar *et al.* (2005) reported that maximum 35.00 per cent of farmer had agriculture occupation.

Mishra (2007) found that 59.17 per cent of the total growers were solely dependent on farming.

Satyagopal (2009) from his study revealed that majority (93.89%) of the unreached farmers had both agriculture + agricultural labourer as their main occupation. Only 6.11 per cent of them had agriculture + agricultural labourer + caste occupation as their main occupation.

Singh *et al.* (2010) reported that majority 86.67 per cent of respondents were solely dependent on agriculture.

Ezeibe (2015) reported that the primary occupation of women plays vital roles in determining their participation in crop production. Women farmers may tend to engage more in different farm operations than women in civil services or other occupations.

2.5.4. Innovativeness

Reddy (1997) observed that most of the respondents (62.00%) were belongs to category of medium innovativeness, whereas 20 % in high category, low innovativeness category was preceded by high with a percentage of 18.

Mahitha (2000) in his study pointed that 67.5% of the total growers were in medium level of innovativeness.16.67% and 15.83% of respondents were in high and low levels of innovativeness, respectively.

Kumar (2001) indicated that 47.50 per cent of respondents fell in low innovativeness and 31.66 per cent in medium category followed by 20.84 per cent in high category.

Bhagyalakshmi (2002) in her study reported that majority of rural women entrepreneurs in three categories of micro level enterprises belonged to medium category of innovativeness.

Kappala (2002) in his study reported that majority (59.5%) of the respondents had medium level of innovativeness followed by high (21.5%) and low (19.0%) levels of innovativeness.

Madhavalatha (2002) reported that 45 percent of the total respondents had medium level of innovativeness followed by high (30 %) and low (25 %) levels in case of trained farmers, whereas 41.67 per cent had medium level of innovativeness followed by high (33.33%) and low (25.0%) levels in untrained farmers.

Prasad (2002) reported that 67.86 per cent of the beneficiaries had medium level of innovativeness. 17.86% and 14.08 % were in high and low levels respectively. For no beneficiaries, the percentage of farmers in low, medium, high category were 51.78, 37.5 and 10.72, respectively.

According to Bhagyalaxmi *et al.* (2003), the percentage of farmers belongs to category of medium innovativeness were 69.44%. The percentage in high and low category were 15.56 and 15.00 %, respectively.

Obaiah (2004) indicated that in case of trained farmers, 56.43 per cent of the respondents were in marginal level of innovativeness. low level (13.57%) is preceded by high and which is preceded by marginal level. whereas 65.71 per cent in marginal level of innovativeness, 22.86% high and 11.43% low levels in untrained farmers.

Purnima (2004) from her study reported that 40.41 percent of the respondents had high innovativeness followed by medium (34.17%) and low (25.42%) innovativeness.

Sarada (2004) reported that 35.83 percent of the total growers had high innovativeness followed by medium (34.17%) and low (30.0%) innovativeness levels.

Suresh (2004) indicated that 55 % total cattle growers were in medium level of innovativeness followed by 25 % in high and 21 % in low level, respectively.

Pandeti (2005) revealed that majority of small farmers had low innovativeness, medium farmers (42.50%) had medium innovativeness and of big farmers (37.50%) had high innovativeness.

In a study conducted by Nagesh (2006) pointed that 64.16% of pomegranate growers were fell in the category of innovativeness. However, only 20% in low and 15.84 % in higher level of innovativeness.

Chaudhari *et al.* (2007) observed that 53 % of trained and 48 % of untrained milk producers were fell in moderate level of innovativeness.

Chaudhari *et al.* (2007) observed that the scale values of component of entrepreneurial behaviour of dairy farmers i.e. innovativeness, was found to be 9.28.

Monge *et al.* (2008) reported innovation as anything new successfully incorporated into social or economic processes, has been inherent to human development.

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Tamilselvi and Vasanthkumar (2008) in their study on entrepreneurship development among rural women suggested that the percentage of rural women in different innovative categories were 52,33,15 for high, medium, low level of innovativeness, respectively.

Sreenivasulu (2011) in his study reported that half of the FFS farmers were having medium level of innovativeness followed by high (26.67%) and low (23.33%) levels. In case of non-FFS farmers, majority (43.89%) of them were having medium level of innovativeness followed by 32.22 per cent with low and 23.89 per cent with high levels.

Vijayakumar (2011) in his study on entrepreneurial behaviour of silk worms seed producers and reported that 41.67 percent of the producers had low innovativeness. However only 25.00 per cent of producers fall under medium innovativeness and 33.33 per cent of the producers are in high innovativeness category.

Oluwasuzi (2014) reported that the small farm sized farmers who may not take up risks of innovation on time due to their more cautions and skeptic nature, until they see a large number of farmers taking up such innovation for utilization, effectively well over time.

2.5.5. Market orientation

Brein and Stafford (1968) found out that most vegetable sellers rely on private sources for most of their information about the market system and concluded that market information is very inefficient in most developing countries. Adequate information on demand, supply and price conditions is necessary in a form that is easily understood by traders, consumers and farmers if foodstuffs and vegetables are to be distributed efficiently.

Ritson (1986) reported that marketing is the process whereby in order to fulfill its objectives, an organization accurately identifies and meets its customers' wants and needs.

Johnson (1992) marketing farm products is affected by certain features of farming that together are unique to the industry. These factors include: Seasonality of products, Perishability of products, Inelastic demand, Bulkiness of products, Production hazards, Changes in market demand, large number of small producers, and geographical specialization of production.

Wankhede *et al.* (1996) reported that maximum onion growers had high level of marketing orientation.

Dhamodaran and Kumar (2001) identified that the markets are associated with issues like unstable prices of various commodities, perishability of the products, presence of middlemen and problem on vegetable importation influence the income of the farmer-respondents.

Purnima (2004) from her study reported that among the total 48.75 percent of the respondents had medium market orientation followed by high (27.92%) and low (23.33%) market orientation.

Sharma (2004) indicated that efficient marketing structures optimized the supply chain from farmers to consumers by adding significant values and mitigating risk to ensure that the consumers obtain the produce in the desired time, place and form.

Barodia (2005) found that majority of the vegetable growers had moderate marketing orientation.

Neelaveni (2005) brought out that majority (56.7%) of growers were fell in moderate level of market orientation. 28.3 % were in high level. Low level market orientation was preceded by high level with a percentage of 15 % per cent.

Chobitkar (2007) reported that higher percentage of vegetable growers had low level of marketing orientation.

Ali and Kapoor (2008) reported that the major area in which growers were exploited in a large scale is during the marketing of their produces. This may be due

to the market risk with respect to variation in the supply and demand of produces which are not treated to price control and the inability of controlled market for the appropriate act in response to change in market conditions.

Reddy (2008) observed that 23.9 % of the farmers had low market orientation, 60.0 per cent in medium and 6.1 per cent in high categories of market orientation.

Baba *et al.* (2010) reported that Produce is marketed in many different segments in the domestic market and except for the open markets there seem to be no clearly identified market outlets for small farmers. Middlemen are an important part of domestic distribution chains as it eases the burden on farmers to find their own markets. Many of these middle men are linked to fresh produce exporters. Small farmers face challenges in the domestic market due to high food importation.

Sreenivasulu (2011) in his study pointed that most (54.44%) of the FFS respondents were having moderate level of market intelligence followed by high (25.0%) and low (20.56%) levels. In case of non-FFS farmers, majority (49.44%) of them were having medium market orientation. 27.22 per cent were in low and 23.34 per cent in high categories.

2.5.6. Training

Patel (1994) found that maximum 50.00 per cent of farmers had low training exposure.

Ahirwar *et al.* (2005) concluded that majority 54.17 per cent had low training exposure.

Ahmad *et al.* (2007) reported that training plays a key role in human resource development and it increases the productivity. The quality of training is depends on the duration of training, which influence the performance of trainee there by increase their productivity.

Belwanshi (2007) reported that higher percentage of the respondents (49.01%) had attended one training.

Namdeo (2007) reported that majority of the respondents attended more than one training.

Rana (2010) reported that higher percentage of the respondents (43.33%) had medium number of trainings attended.

Sharma (2014) Training is the critical input for human resource development and plays important role in acceleration human behaviours and also a tool for making intervention of the level of human resource is increasingly becoming crucial for development in almost all fields with a growing satisfaction in technology.

2.5.7. Experience in vegetable cultivation

Ufiem, (2000) that the more farmers gain experiences the more knowledge and technical ideas they have to tackle farm production problems.

Arulraj (2012) also opined that farming experience encourages acquisition and utilization of farm innovations and hence increase the food production and income. The significance was because majority of the farmers had many years of farming experience.

Ezeibe (2015) reported that Farming experience had a positive relationship with output. It implies that output increases with increase in farming experience over the years i.e. as the farmer remain in farming, they gain more experience.

Suman (2017) reported that farming experience has a positive correlation with the knowledge level of SDA respondents. Farming experience possessed by the farmer is one of the prerequisites to take up agriculture as a profession. The farming experience of a farmer will help him in identifying the upcoming problems in farming and in also search for proper solutions from different sources to

encounter such problems, and farming experience also helpful in generating new ideas / concepts in farming.

2.5.8. Extension agency contact

Sakharkar (1995) in his study on knowledge, fertilizer use pattern and constraints in soybean cultivating farmers of Nagpur in Maharashtra found that, 36.00 per cent of the respondents had participated in one or more extension activities whereas, two-third (64.33%) of the respondents did not participate in any extension activity.

Saravanakumar (1996) in his study revealed that majority 51.67% mango growers never contacted Assistant Agricultural Officer. Whereas, 43 % regularly contact village Administrative Officers and 50.83 per cent contacted Agricultural Officers occasionally.

Angadi (1999) found that most of the pomegranate growers (65.62 %) consult agricultural assistant when they face difficulties, where as 62.50 % of growers never made contact with AAO. Among the total 13.12 % seek advice from Scientists when they face problems. Most of the pomegranate growers were not participated in diverse extension activities viz, discussions with extension personnel, group meetings, trainings with a percentage of 98.76, 75.23% and 72.50 %, respectively. The regular participation was found to be more for activities like method demonstrations and Krishimela with percentage of 43.75 % and 38.13 % respectively.

According to Ramanna *et al.* (2000) majority of the farmers (70 %) were belongs to medium extension agency contact followed by high level (30%) extension agency contact.

From analysing the extension agency contact of sugarcane growers, majority (52.50%) of the sugarcane growers were belongs to low level category and 47.50 % of the growers were in medium category (Dhamodaran and Kumar, 2001)

Anitha (2004) pointed that 17.50 % of farm women in Bangalore were having high extension participation followed by medium (44.20%) and low (38.30%) participation.

Ahmad *et al.* (2007) delineated that Agriculture extension has a key role in the development of agriculture. The objective of extension includes promote the spiritual, mental and social growth of farmers and their families.

Kushwaha (2008) concluded that majority of the tomato growers (56.00%) had low extension participation.

Nemade (2010) concluded that majority of the vegetable growers (54.00%) had low extension participation

Arulraj (2012) concluded that majority of the tomato growers (56.67%) had medium participation in extension activities.

Oluwasusi (2014) reported that the extension contacts received and frequency of extension services available to farmers on organic farming practices are poor and posit hindrance to massive adoption of innovation on organic practices.

Suman (2017) reported that the effectiveness of extension services is highly dependent on the ability of extension workers who are competent because the entire extension process is dependent on them to transfer information from extension organizations to the clients.

2.5.9. Economic motivation

Hanchinal (1999) pointed that 43.75 percent of the farmers had medium level of economic motivation, whereas 34.17 and 22.08 per cent of the respondents belongs to high and low economic motivation category respectively.

Bhagyalakshmi (2002) in her study reported that majority of rural women entrepreneurs in three categories of micro level enterprises belonged to medium category of economic motivation.

Chauhan and Patel (2003) in his study reported that slightly less than half (48.47%) on the poultry entrepreneurs were fell in the category of medium level economic motivation. The percentage of poultry entrepreneurs belonging to the high and low level category were 31.25 % and 20 %, respectively.

Chauhan and Patel (2003) in their study on entrepreneurial uniqueness of poultry entrepreneurs reported that slightly less than half (48.47%) of the poultry entrepreneurs were having medium level of economic motivation whereas, 31.52% were having high and 20% having low level of economic motivation, respectively.

Isreal (2003) found that 40.42 percent of the total respondents were having high economic motivation. 31.25 % were in medium level followed by 28.33 % in low level.

Purnima (2004) pointed that most (42.08%) of the respondents were in high economic orientation followed by 35,23 per cent in medium category and low category.

Sarada (2004) observed that most (51.67%) of the farmers were belongs to high economic motivation followed by low (32.5%) and medium (15.83%) categories.

Solanki and Soni (2004) conducted a study on entrepreneurial behaviour of potato growers reported that 67.41% of growers were having medium economic motivation. 18.89 % were having low level of economic motivation and 13.70 % were in high level of economic motivation.

Nagesh (2006) observed that majority (65.83%) of the farmers had medium economic motivation and only 18.33 and 15.84 % of the farmers were belongs to high and low economic motivation, respectively.

Jadhao (2008) reported that majority of the respondents were having high level of economic motivation.

Nemade (2010) concluded that majority of the vegetable growers (69.00%) had medium economic motivation.

Vijayakumar (2011) in his study on entrepreneurial behaviour of silk worms seed producers reported that majority (38.33 %) of the farmers be included in medium level of economic motivation and it is preceding by high and low level with 30.00 and 31.67 per centage, respectively.

Arulraj (2012) concluded that most of the tomato growers (56.67%) were having high economic motivation.

2.5.10. Family labour utilization

Fresco (1986) point out that family labour use in agriculture comprise the nuclear family of man, his wife or wives and children, and other dependent relations such as the elderly parents, young brothers or children of relatives.

Chidebelu (1990) noted that the farm family is the most important source of unpaid labour. According to him, the family head supervises farming activities and allocates jobs to family members based on ability, gender, age, the nature of farm operations and custom.

Mayra and Mehra (1990) reported that family labours are the most important source of labour in traditional agriculture. The contribution of family labour is over 75 percent of labour force in traditional agriculture, although it varies inversely with the size of the farm.

Ezedinma (1991) is of the opinion that decreasing family labour could be attributed to rural-urban migration of able-bodied family members.

Onwueme (1991) observed that recently family labour has been decreasing because of children going to school, inability of school graduates to return to the farm, decrease in family size and government policies as well as rural-urban migration of most of the able- bodied family members.

Dvorak (1996) described family labour as a valuable but scarce resource since family labour is often not available in the right quantity and at the right time.

Bhagyalaxmi *et al.* (2003) is also of the view that family labour is the determinant source of labour in smallholder farming.

Islam *et al.* (2003) pointed that the involvement of men and women as labourers in homesteads for doing various agricultural activities was found to be equal.

Rahman *et al.* (2008) observed that the homestead cultivation is predominantly controlled by the unemployed family members. Usually male members of a family inevitably perform a key role in almost all the family affairs whereas the role of women and children were neglected.

Khan *et al.* (2009) found that in homestead vegetable cultivation the involvement of men is more when compared to women.

Shaheb *et al.* (2014) pointed that in homesteads, as a result of vast intercession of technologies the involvement of family labour increased. Homestead cultivation is predominantly controlled by the unemployed family members. The involvement of men was found to be more for activities such as bed preparation, planting, weeding, staling, fencing, crop protection and marketing whereas activities such as irrigation, mulching and harvesting of vegetables women participation was found to be more. In certain activities the participation of children was noticed in order to help their parents.

Ezeibe (2015) reported that family labour determines the amount of labour to be hired. This is because once the family labour is fully employed, the extra labour has to be hired.

2.5.11. Information seeking behaviour

Michalowski *et al.* (1995) suggested that the women vegetable growers mainly depends brochures, articles, instructions and books than advisers for getting various information related to agriculture information.

Chandrapaul (1998) revealed that 41.60 % of the respondents were having low information seeking behaviour, which is preceding medium and high information seeking behaviour with percentage of 32.50 and 25.90, respectively.

Gattu (2001) in his study production constraints of turmeric cultivation in Andhra Pradesh observed that 66.67% of the turmeric growers were having medium level of mass media contact which is preceding low and high level mass media contact with 18.33 and 15 percentage.

Goswami *et al.* (2001) revealed that most of the livestock owners used radio as an effective mass media with respect to information sources on animal husbandry practices whereas farm publications were least used by the livestock owners.

Kumar (2001) observed that 41.60 % of the growers were having low information seeking behaviour. 32.50 % were belongs to medium category whereas 26 % having high level information seeking behaviour.

Tripathi (2001) reported that majority of the respondents (77.13%) were utilizing non- institutional interpersonal information sources at high level, followed by 18.0 per cent in the medium level and 4.87 per cent in the low level. Non-institutional sources utilized were mainly friends, relatives, neighbours, own family sources.

Vijaykumar (2001) reported that 41.66 per cent of entrepreneurs fell under low information seeking category followed by 33.34 and 25 % of farmers in medium and high level, respectively.

Bhagyalakshmi (2002) in her study reported that majority of rural women entrepreneurs in three categories of micro level enterprises had medium category of information seeking behaviour.

Neelaveni *et al.* (2002) observed that 50 % of the farm women were fell under medium information seeking behaviour category. The report also shows that 32.50 % were belongs to low and 14.16 % were belongs to high level of information seeking behaviour.

Anitha (2004) pointed that 20% of the women growers were belongs to high level of information seeking behaviour. More than half (52.50%) of farm women were having medium information seeking behaviour and 27.50 % in low level.

Navadkar *et al.* (2004) in their study reported that more than 70.0 per cent sample farmers gained information through mass media including newspapers, radio and television in Maharashtra and Western Maharashtra. The agro services centres served as information source for 77.42 per cent of farmers in Vidarbha region followed by agricultural department, agricultural university, extension activities, media and progressive farmers.

Purnima (2004) from her study pointed that most (42.08%) of the respondents were belongs to medium information source utilization and the percentage of respondents in low and high level were 31.67% and 26.25%, respectively.

The percentage of information seeking behaviour for the dairy farmers in Andra Pradesh were 68.75, 17.08 and 14.17 for medium, high and low level respectively (Suresh, 2004).

Pandeti (2005) revealed that most (42.50%) of the small farmers were fell under low category, while majority of medium (42.50%) and large (40.00%) farmers had medium information seeking behaviour.

Chaudhari *et al.* (2007) revealed that in case of trained farmers 61% were having high information behaviour followed by 29 % having medium and 10 % having low level of information seeking behaviour, whereas, 23,49 and 28 % of untrained farmers were belongs to high, medium and low level information seeking behaviour, respectively.

Chaudhari *et al.* (2007) observed that the scale values of component of entrepreneurial behaviour of dairy farmers i.e. information seeking behaviour, was found to be 5.22.

Singh *et al.* (2007) reported that majority of the vegetable growers had medium mass media exposure.

Kavaskar and Santha (2008) in their study on communication sources utilized by paddy farmers in organic farming practices observed that 40.83 per cent of the organic farmers were having medium information seeking behaviour which is preceding 35.83 % of the farmers with low and 23.34 per cent with high level of information seeking behaviour.

Sreenivasulu (2011) in his study reported that majority (59.44%) of the FFS farmers were belongs to medium information seeking behaviour followed by low (22.78%) and high (17.78%) levels.

Vijayakumar (2011) revealed that 37.50 percent of the total silkworm seed producers were belongs to low level, followed by medium (31.67 %) and high level (30.83 %) of information seeking behaviour respectively.

Oluvasuzi (2014) reported that majority of the farmers rely up on the innovators and early adopters for getting information regarding various agricultural practices and few farmers use newspapers for getting information regarding organic cultivation practices.

2.5.12. Risk orientation

Chatterjee (2000) observed that more than half (68%) of the growers were belongs to medium risk orientation and 17 % in low level orientation followed by 15% having high level risk orientation.

Mahitha (2000) found that more than half (70%) of the respondents had risk orientation in medium level which is preceding high (18.33%) and low (11.67%) levels.

Veerendranath (2000) found that majority (65%) of rainfed castor growers had low risk orientation whereas 27 and 8 % of castor growers were under medium and high level of risk orientation.

Gattu (2001) in his study found that majority (62.5%) of the farmers were in medium level of risk orientation and the percentage of farmers in low and high level of risk orientation were 19.17% and 18.33%, respectively.

Kumar (2001) pointed that 45% of the growers had low level risk orientation which is preceding medium (40.0%) and high (15.0%) levels of risk orientation.

Bhagyalakshmi (2002) in her study reported that majority of rural women entrepreneurs in three categories of micro level enterprises belonged to medium category of risk orientation.

Kappala (2002) reported that majority (62.0%) of the respondents had medium risk orientation followed by high (22.0%) and low (16.0%) levels.

Latha (2002) from her study concluded that 62 % of the farmers under watershed environment were in medium risk orientation and the percentage in high and low categories were 24% and 14%, respectively.

Madhavalatha (2002) reported that in case of trained farmers 45% were in medium risk orientation. 31.67% were belongs to low level and 23.33% in high levels, whereas 48.34 per cent had low level of risk orientation followed by high (28.33%) and medium (23.33%) levels in untrained farmers.

Subramanyam (2002) inferred that majority (75.0%) of the growers having medium risk preference whereas 13.34% and 11.66% were fell under low and high levels of risk preference.

Sivasubramanayam (2003) concluded that majority (60.84%) of the coconut farmers were having medium level of risk orientation whereas 24.16 % of coconut growers had low and 15.0 percent had high levels of risk orientation.

Isreal (2003) indicated that more than one forth (36.25%) of the growers were having low risk orientation and 32.5% in high level and 31.25% in medium levels.

Suresh (2004) reported that rural women perceived risk in each and every process of vegetable cultivation but the extent of risk taking behaviour varied from process to process.

Neelaveni (2005) indicated that nearly half (46.67%) of the farmers were included in medium risk orientation category. The percentage of farmers in high and low level were 27.78% and 25.55% respectively.

Prasad (2005) revealed that nearly three-fourths (74.17%) of crop loan beneficiaries had medium risk orientation followed by high (19.16%) and a small percentage (6.67%) had low risk orientation.

Satyagopal (2009) observed that majority (62.78%) of the un-reached farmers were under medium risk orientation category and 28.89 per cent were under low risk orientation category. Only a meagre percentage (8.33%) was under high risk orientation category.

Sreenivasulu (2011) in his study reported that majority (56.11%) of the FFS farmers were included in medium level of risk orientation. 22.78% were in high level and 21.11% were in low levels. In case of non-FFS farmers, majority (45.50%) of them had medium level of risk orientation whereas 28.85 per cent in low and 25.65 percent in high categories.

Dhanotiya (2012) reported that maximum numbers of farm women were found to possess medium risk taking behaviour followed by low and high respectively.

Jain and Singhal (2012) reported that in India, agricultural risks are exacerbated by a variety of factors. These factors not only endanger the farmer's livelihood and incomes but also undermine the viability of the agriculture sector

and its potential to become a part of the solution to the problem of endemic poverty of the farmers and the agricultural labor.

Chouhan *et al.* (2016) reported that maximum numbers of farm women, i.e. (46.7 %) of total were included in low risk taking behaviour category.

2.5.13. Social participation

Solanki and Lodha (2005) found that the most of the growers were having medium level of social participation.

Tanzo (2005) reported that farmers who have major agricultural roles are the ones who may want to become members of farm organizations compared to those who have minor roles only or none at all. It is also possible that members of farm organizations have more access to farm information and training which equips them with the necessary skills to perform more farm roles.

Deshmukh *et al.* (2007) under the social participation, it was noticed that 45.13 % of total farmers belongs to medium category while remaining percent of respondents was belonging to high (38.88 per cent) and low (15.97 per cent).

Nemade (2010) concluded that more than half of the total vegetable growers (52.00%) were fell under medium level social participation.

Singh *et al.* (2010) revealed that social participation was significantly correlated the adoption of cut flower production technology.

Singh *et al.* (2010) found that was found to be an important element for the improvement of flower cultivators. There is a need for enhancing the social participation of cultivators further and which ultimately results in the formation of SHGs and co-operative associations.

Yadav (2012) observed a positive and significant relationship with the social participation of farmers and extent of adoption of BF's and NBF's about watershed technology.

Oluvasuzi (2014) reported that farmers who actively participated in both community development and extension programmes were generally better farmers than those who never participated. According to him such farmers adopted more profit-yielding agricultural innovations than those who were never associated with any organization.

Patil *et al.* (2014) found that farm organizations provide forums where farmers may share their resources and discuss farm issues/concerns (Farm organizations may even be contacted by institutions or companies to showcase the latest farm technologies or to present experiment or laboratory results.

Methodology

III. METHODOLOGY

This chapter of Research Methodology deals with the design and methodological plan to study objectives set forth. The various aspects of this chapter have been presented under the following subheads:

- 3.1 Research design
- 3.2 Locale of the study
- 3.3 Selection of the respondents
- 3.4 Operationalisation of variables and their measurements.
- 3.5 Method of data collection
- 3.6 Analysis of data and statistical measures

3.1 RESEARCH DESIGN

Research designs are invented to enable the researcher to answer research questions as validly, objectively, accurately, and economically as possible. According to Kerlinger (1983) "Research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance."

Ex-post-facto research design was used in this study. Kerlinger (2004) defined "Ex-post-facto research is the systematic empirical enquiry in which the scientist does not have direct control over the independent variables because their manifestations have already occurred or because they are inherently not manipulated."

3.2 LOCALE OF THE STUDY

The present study was conducted in Kollam District of Kerala. Kollam District is situated on the South west coast of Kerala. The latitudinal and longitudinal extends are 8°48'N 76°36'E and / 8°80'N 76°6'E, / 8.80; 76.6, respectively. The district is divided into thirteen development blocks, 71

panchayaths and 103 villages. Paravoor, Punalur, Karunagappally, Kottarakkara are municipal towns and Kollam is the corporation. It covers 2492 sq. km and is the seventh largest district in Kerala. According to the 2001 census, Kollam district has a population of 25.85 lakhs and a population density of 1038 inhabitant per square km. Figure.1. shows the map of Kollam district.

3.2.1. Selection of Agro Ecological Units

Kollam district is classified into 5 Agro Ecological Units based on their location and climate, soil and topographical features, of these AEU 9 (South Central Laterites) and AEU 12 (Southern and Central Foot Hills) were selected for the study because it has the largest vegetable cultivation among the Agro Ecological Units of the selected district. The proposed Units are the major Agro Ecological Units of the district from where the better representative sample of respondents could also be drawn for the present investigation.

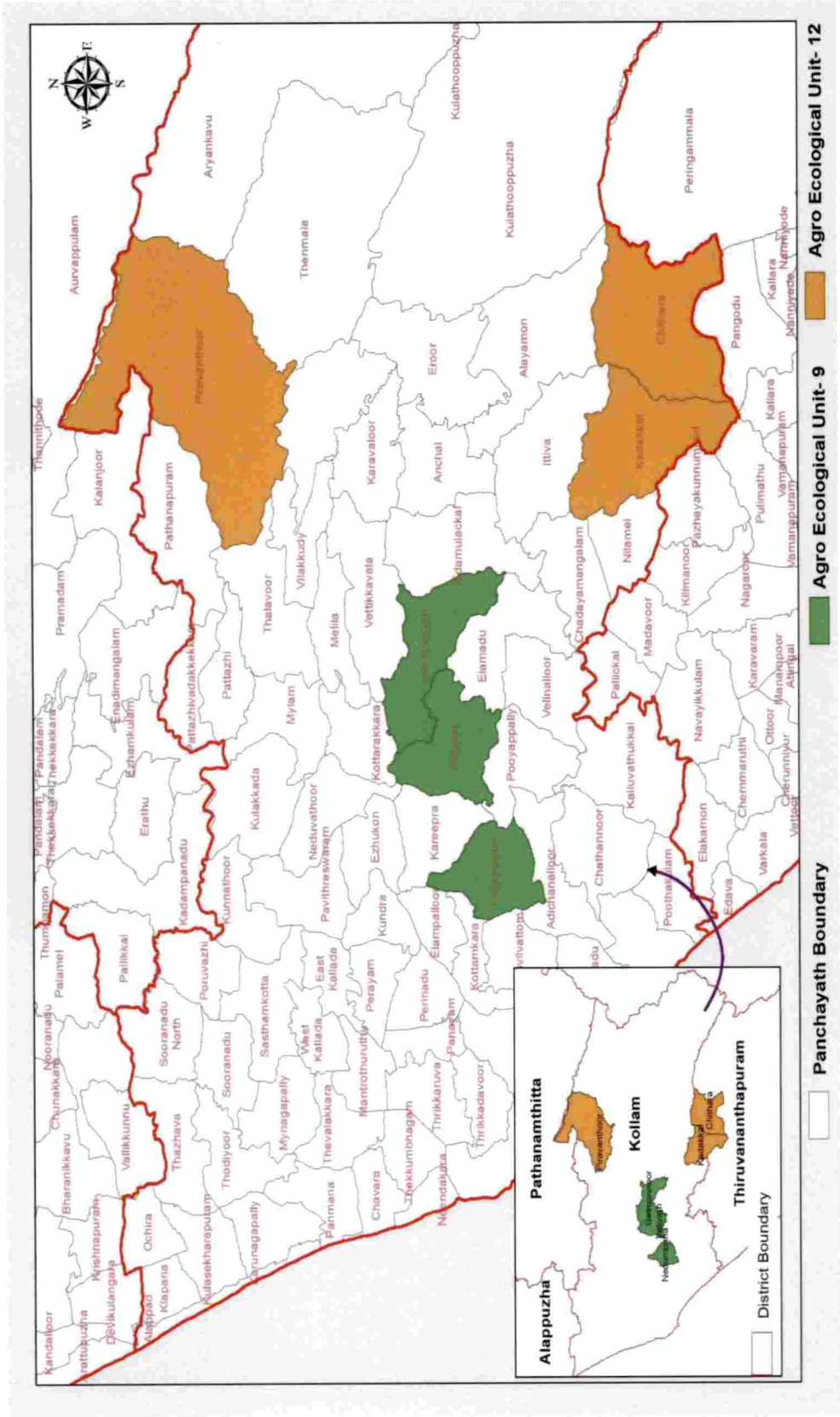
3.2.2. Selection of Panchayats:

A comprehensive list of all the panchayats from the selected Agro Ecological Units along with their vegetable cultivation details was prepared in consultation with the Krishi Vigyan Kendra personnel's and secondary information sources. As such three panchayats with maximum vegetable cultivation were selected from each Agro Ecological Units for the present investigation. The panchayats were: Nedumpana, Veliyam, Ummannoor (from AEU 9(South Central Laterites)) and Kadakkal,Chithara, Piravanthur (from AEU 12(Southern and Central Foot Hills)). The criterion of maximum vegetable cultivation was considered with a view that the investigator would be able to find the sizeable sample of targeted respondents from such selected panchayats.

3.3 SELECTION OF THE RESPONDENTS

To select respondents, a comprehensive list of homestead vegetable growers having an area of 0.1- 0.5 ha in each selected panchayat was prepared separately in consultation with krishibhavans and local influential persons of the respective panchayts. On the basis of the lists, 20 homesteads were selected randomly from

Fig.1. Location of the study



each identified panchayat, thus making the total sample size 120 homesteads. fig.2 shows the selection of respondents.

3.4 OPERATIONALISATION OF VARIABLES AND THEIR MEASUREMENTS.

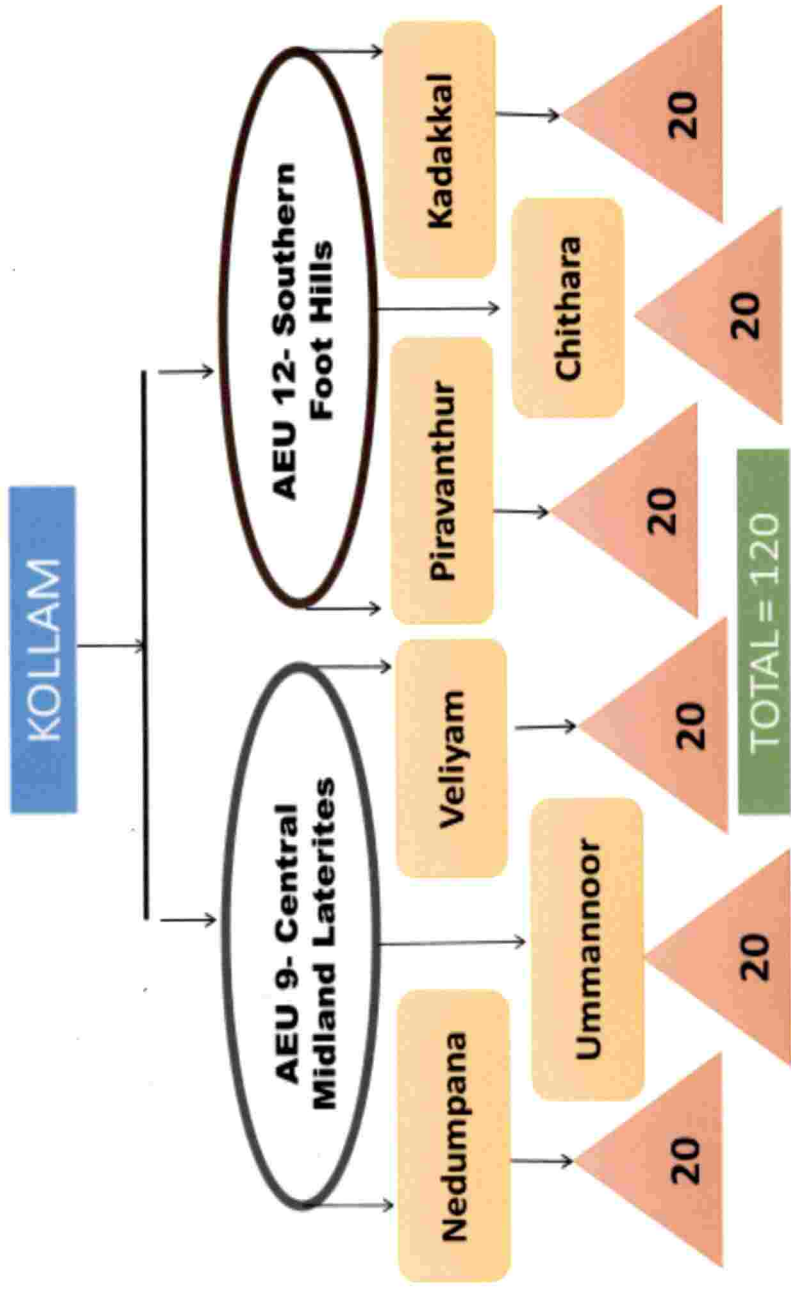
A list of 39 independent variables supposed to have close association with the profile characteristics of the homestead vegetable growers and important for meeting the objectives of the study were identified after extensive review of literature, discussion with experts and observation made by the researcher. These identified variables along with their operational definitions were sent to 15 judges comprising of extension scientists and subject matter specialists, to rate the relevancy of the variables based on their knowledge and experience in this field of study and to include additional items, if any, left uncovered (Appendix I). These variables were rated in a five point continuum ranging from most relevant to least relevant.

The scores were assigned as follows:

Response	Score
Most relevant	5
More relevant	4
Relevant	3
Less relevant	2
Least relevant	1

The final variables were selected based on the criterion of mean relevancy score, which was obtained by summing up the mean obtained for each variable and dividing it by the total number of variables listed out. The variables which obtained a score more the mean score were selected for this study. The selected variables with its mean relevancy scores are presented in Appendix II.

Fig.2. Selection of respondents



The details of the independent variables with their respective measures are as under:

Table 1: List of independent variables and their measurements:

Sl.no	Variables	Measurements
1	Age	Census report , 2011
2	Education	Scoring pattern developed by Trivedi (1963)
3	Occupational status	Scale developed by Anandaraja (2002)
4	Innovativeness	Method developed by Selvanayagam (1986)
5	Market orientation	Method developed by Samantha (1977)
6	Training	Modification of Scale used by Meera (2001)
7	Experience in vegetable cultivation	Scale prepared by Ahmed <i>et al.</i> (2007)
8	Extension agency contact	Scoring procedure used by Bhaskaran (1979)
9	Economic motivation	Scale developed by Supe (1969)
10	Family labour utilization	Method developed for the study
11	Information seeking behaviour	Method used by Mankai(2005)
12	Risk orientation	Scale developed by Supe (1969)
13	Social participation	Scale followed by Fayas(2003)

3.4.1. Age

Refers to the number of years completed by the respondent at the time of interview. The respondents were categorized into three age groups on the basis of census report, 2011.

The categories were:

Age category	Years
Young	(< 35 years)
Middle age	(35-55 years)
Old age	(>55 years)

3.4.2. Education

Education is referring to the highest academic qualification possessed by the respondent through formal and informal learning process. It was measured using the scoring pattern developed by Trivedi (1963). In view of the educational level of the respondent, they were grouped into seven categories.

The categories were:

Sl.No.	Category	Score
1	Illiterate	1
2.	Can read and write	2
3.	Primary school	3
4.	Middle school	4
5.	High school	5
6.	College	6
7.	Professional degree	7

3.4.3. Occupational status

Occupational status is operationalised as the primary activity in which the respondent spends major part of the time and attention for the livelihood and it was measured using the scale developed by Anandaraja (2002).

The vegetable growers were classified into four groups according to their occupations.

The scoring procedure was described below:

Category	Score
Farming as a sole profession	4
Farming+ Agri. labour	3
Farming+ business	2
Farming+ service	1

3.4.4. Innovativeness

Innovativeness is operationalised as the degree to which an individual is relatively earlier in adopting new ideas than other members of the social system. This variable was measured using the method developed by Selvanayagam (1986).

The respondents were asked to when he/she would like to adopt some improved practices in vegetable cultivation and the response were scored as follows:

Sl.no	Statements	Score
1	As soon as it is brought to knowledge	3
2	After I have seen other farmers tried successfully in the farm	2
3	I prefer to wait and take my own time.	1

3.4.5. Market orientation

Market orientation refers to the means or opportunity to get the inputs for vegetable cultivation as well as to sell the outputs.

The method developed by Samantha (1977) was adopted for measuring market orientation of the respondents. The scale consists of six statements (Interview Schedule –Appendix III) in which the responses were collected on a two point continuum, “Agree” and “Disagree”, with the score 2 and 1 for the positive statements and reverse scoring for the negative statements.

The maximum and minimum score that could be obtained by the respondent was ‘twelve’ and ‘six’ respectively. (The respondents were categorized into three groups based on the obtained score.)

3.4.6. Training

Training refers to the number of trainings undergone by the respondent in various activities related to vegetable production by different agricultural institutions during the last 3 years in Kollam district.

Scoring technique followed by Meera (2001) was modified and used in the study to measure this variable.

The sample were grouped into four, based on the number of training attended by the respondents during the last 3 years.

The scoring procedure was done as follows:

Sl no.	Trainings undergone	score
1	No training	1
2	1-5	2
3	6-10	3
4	>10	4

3.4.7. Experience in vegetable cultivation

Experience in vegetable cultivation is operationalised as the number of years the respondent has been engaged in vegetable production. This variable was measured using the scale prepared by Ahmed *et al.* (2007).

The scoring procedure was done as follows:

Years	Score
1- 2 Years	1
3-4 Years	2
5-6 Years	3
7-8 Years	4
>8 years	5

3.4.8. Extension agency contact

Refers to the degree to which the respondent meets the extension agents for information related to various aspects of vegetable cultivation in homesteads. Extension agency contact of the vegetable growers was measured using the method developed by Bhaskaran (1979).

The maximum and minimum score that could be obtained by the respondent was 'twenty four' and 'eight', respectively.

The response was measured as follows:

Response	Score
Regularly	3
Occasionally	2
Never	1

3.4.9. Economic motivation

Refers to the extent to which respondent is oriented to obtain profit and the relative value placed on economic ends so that it influences further adoption or its sustenance related to agriculture.

The scale developed by Supe (1969) was used to measure this variable. This scale consists of six statements (Interview Schedule –Appendix III) in a five point continuum, ranging from 'Strongly Agree' to 'Strongly disagree'. The scores

assigned for positive statements were as follows. The scoring pattern was reversed for the negative statements.

Response	Score
Strongly Agree	5
Agree	4
Undecided	3
Disagree	2
Strongly Disagree	1

The total scores obtained by a respondent on economic motivation was worked out by adding the scores on each of the statements. The maximum and minimum score that could be obtained by the respondent was ‘thirty’ and ‘six’ , respectively.

3.4.10. Information seeking behaviour

Information seeking behaviour refers to the sources or channels from which the respondents get technological information regarding agriculture and related area. The scoring procedure followed by Mankai (2005) was modified and used in the study to measure the information seeking behaviour of vegetable growers.

In this scale the responses were collected on a five point continuum, with score ranging from 5 to 1 for ‘regularly’ to ‘never’. The possible scores ranges from ‘eight’ to ‘forty’.

The response category and scores assigned were as follows:

Sl no.	Trainings undergone	score
1	Regularly	5
2	Once in a fortnight	4
3	Once in a month	3
4	Whenever problem arise	2
5	never	1

25

3.4.11. Risk orientation

Refers to the degree to which the farmer is oriented towards encountering risks and uncertainty in adopting new ideas related to vegetable cultivation.

Scale developed by Supe (1969) was adopted to measure risk orientation of the respondents. The scale consists of six statements (Interview Schedule – Appendix III) in which two are negative. The scoring was on a five point continuum viz, ‘strongly agree’, and ‘agree’, ‘undecided’, ‘disagree’ and ‘strongly disagree’.

The scores assigned for positive statements were as follows and the scoring pattern was reversed for the negative statements. Summing up the scores on each statement indicates the total score obtained by the respondent on risk orientation.

Response	Score
Strongly Agree	5
Agree	4
Undecided	3
Disagree	2
Strongly Disagree	1

3.4.12. Social participation

Social participation is operationally defined as the degree of involvement and participation of vegetable growers in various formal and informal organizations either as member or as office bearer.

Scale followed by Fayas (2003) was used in this study to measure the social participation of the vegetable growers. The scale has two dimensions namely Nature of participation and participation in organizational activities. The scoring procedure followed is detailed below:

For membership in organization

No membership in organization	1
Membership in each organization	2
Office bearer in each organization	3

Frequency in participation

Never attending any meeting	1
Sometimes attending meeting	2
Regularly attending meeting	3

The scores obtained by a respondent on the above two dimensions were multiplied across each item for all the organizations to obtain his social participation score. The maximum and minimum score that could be obtained by the respondent was 'forty five' and 'five' respectively.

3.4.13. Family labour utilization

Family labour utilization is the extent of utilization of family members by the respondents for various vegetable cultivation activities. The maximum score that could be obtained by the respondent was 'thirty' with a minimum of ten.

The response was scored as follows:

Always utilized	3
Occasionally utilized	2
Do not utilized	1

3.4.14. The scale of knowledge about vegetable production practices

Refers to the extent of information possessed by the vegetable growers on recommended practices. To determine the extent of knowledge of the vegetable growers a teacher made knowledge test was used (Interview Schedule –Appendix III). Five crops having higher production in homesteads of Kollam district viz, amaranths, chilli, okra, bitter gourd, ivy gourd, were selected to study this variable. Major practices as per the package of practice recommendation, starting from sowing to harvesting, were included for each crop in the knowledge test to

understand the existing knowledge of the respondent about homestead vegetable cultivation. Against each of the practice, scores of 'two' and 'one' were given to the correct and wrong answers respectively. Therefore, possible maximum knowledge scores a respondent could obtain was 138. The respondents were categorized in to three group based on their obtained knowledge index score. The knowledge index of each respondent was calculated by using the following formula:

$$K.I = \frac{K}{P} \times 100$$

Where

K.I - Knowledge Index

K - Knowledge score obtained

P - Maximum obtainable score.

3.4.15. Rate of adoption about vegetable production practices.

In this study adoption level refers to the level of adoption of recommended cultivation practices of selected vegetables by the homestead growers. Sixty six recommended practices included in the package of practices in vegetable cultivation were used for measuring this adoption (Interview Schedule –Appendix III). Against each of the practice, the scoring was on a three point continuum ranging from 'adopt', 'partially adopt' and 'not adopt' with weightage of 3, 2, and 1 respectively.

The minimum and maximum score a respondent could get on this scale were 198 and 66 respectively. The homestead vegetable growers were categorized in to three group based on their obtained adoption index score. The adoption index of each respondent was calculated by using the following formula:

$$\text{Adoption Index} = \frac{\text{Total adoption score obtained by an individual}}{\text{Maximum obtainable score}} \times 100$$

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3.4.16. Gender roles of growers in homestead vegetable production.

To determine the gender roles in vegetable cultivation under homesteads a suitable structured schedule was developed (Interview Schedule –Appendix III). Five major aspects viz, decision making analysis, benefits and incentives analysis, activity analysis, influencing factors analysis, resource analysis, were denoted in the schedule. Selected major aspects were further divided in to sub activities for identifying the role performed by respondents in homestead vegetable cultivation. The response of the growers were recorded on a three point continuum viz, women, men, and both for identifying their roles in each activity. After recording the response, the same were counted and found the percentage for each activity. Based on the percentage obtained the activity is categorized in to male dominated and female dominated activities.

3.4.17. Constraints faced by the respondents in vegetable production.

To measure the Constraints faced by the respondents in vegetable production, a suitable schedule was developed by way of enlisting all the possible constraints based on the discussion with farmers and also through data from relevant review of literature. To measure the intensity of constraints intervening in the homestead vegetable cultivation, a four point continuum scale was used. These four points were most important, important, least important and not important, comprising of scores as 4, 3, 2 and 1 respectively. The recorded responses were summed up and worked out the total score for each constraint. The constraints were ranked according to the total score obtained.

3.5. Method of data collection

Relevant data were collected from the selected respondents with the help of a well - structured pretested interview schedule prepared for this purpose (Appendix –III). Personal interview technique was applied by the researcher for collection of data from the respondents and responses were recorded by the researcher herself. The data so collected were subjected to statistical analysis and interpretation was made for drawing meaningful conclusions.

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3.6. Analysis of data and statistical measures

Collected data were processed; tabulated and following statistical tests were applied for interpretation of data:

Percentage Analysis:

Simple comparisons were made on the basis of percentage distribution of the farmers.

Mean Score:

It was obtained by dividing total scores of each statement by total number of respondents.

$$\text{Mean Score} = \frac{\text{Total score of a practice}}{\text{Total number of respondents}}$$

Correlation analysis:

It was applied to determine the degree of relationship between the independent variables and dependent variables.

Knowledge Index:

$$\text{Knowledge Index} = \frac{\text{Total knowledge score obtained by an individual}}{\text{Maximum obtainable score}} \times 100$$

Adoption Index:

$$\text{Adoption Index} = \frac{\text{Total adoption score obtained by an individual}}{\text{Maximum obtainable score}} \times 100$$

Results & Discussions

IV. RESULT AND DISCUSSION

This chapter aims to highlight the experimental findings in the form of analysis of data, interpretation of results and their discussions. The results are presented under the following heads:

- 4.1 Assessment of gender roles of vegetable growers.
- 4.2 The scale of knowledge about vegetable production practices.
- 4.3 Rate of adoption about vegetable production practices.
- 4.4 Profile characteristics of vegetable growers.
- 4.5 Relationship between the profile characteristics of vegetable growers with the extent of knowledge and rate of adoption.
- 4.6 Constraints faced by the respondents in vegetable production.
- 4.7 Formulation of strategy to mitigate the constraints faced.

4.1 ASSESSMENT OF GENDER ROLES OF VEGETABLE GROWERS.

Gender relates to socially assigned roles and behaviours attributed to men and women. Gender analysis is part and parcel of social analysis and the study of social diversity. It provides a focused examination of the differences in the asset bases, livelihood strategies and vulnerabilities between women and men, as well as the reasons for and implications of these differences. Gender roles are roles that are played by both men and women which are not determined by biological factors but by the socio-economic and cultural environment or situation. The magnitude of gender contribution in different activities relating to vegetable cultivation varied from one activity to the other.

While some activities are generally performed by male, others by female yet some activities are performed jointly by male and female partners of the family. This study was conducted to identify and specify gender tasks and roles in vegetable production in homesteads of Kollam district with ultimate goal of better targeting

the resources in agricultural sector. To get an overall view of the respondents with respect to their roles in vegetable cultivation in homesteads, the study was conducted under five major headings as follows:

4.1.1 Decision making analysis

4.1.2 Benefits and incentive analysis

4.1.3 Activity analysis

4.1.4 Resource analysis

4.1.5 Influencing factor analysis of development

4.1.1 Decision making analysis

In this section analysis of involvement of growers in decision making process was conducted. The decisions were classified into 11 sub groups for identifying the involvement of respondents in decision making for each sub group. In order to find the result percentage analysis were used.

Table No.2: Distribution of respondents based on decisions made by men and women.

N=120

Sl no.	Type of decisions	Women		Men		Joint decision	
		F	%	F	%	F	%
1	Household decisions	33	27	26	22	61	51
2	Farm operations	24	20	59	49	37	31
3	Religious decisions	67	56	17	14	36	30
4	Child rearing	91	76	11	9	18	15
5	Education	22	18	34	28	64	54
6	Jobs to be taken	17	14	37	31	66	55
7	Entertainment	35	29	48	40	37	31

8	Expenditure of income	14	12	48	40	58	48
9	Health related issues	28	23	31	26	61	51
10	Decisions regarding elderly people in the house	12	10	27	23	81	67
11	Decisions regarding the transfer and ownership of ancestral properties.	7	6	73	61	40	33

Table 2 revealed that 76 % of the women took decisions related to child rearing. Fifty six per cent of the women took decision regarding religious activities. In the case of men 61% took decisions regarding the transfer and ownership of ancestral properties. Forty nine percent took decision regarding various farm operations and 40% regarding entertainment. In 67% and 54% household decisions regarding elders in the house and education were joint decisions. Decisions regarding jobs to be taken (55%), health related issues (51 %) and expenditure of income (48%) were of joint.

From preview of table 2, we can conclude that female oriented decisions were related to child rearing and religion. The decisions regarding transfer and ownership of ancestral properties, decision regarding various farm operations and entertainments were the major men oriented decisions. Both men and women had significant role in decisions regarding elderly people in the house, education, jobs to be taken, expenditure of income, decision related to health issues and household.

There was not a single homestead where the female or the male partner alone took all the decisions without discussing with their partner. This result indicates that involvement of women was dominated in some decisions and male participation was found more prominent in other decisions. Although there were certain decisions in which women or men have a dominant role but in totality joint

decision making was found to be more prominent. Even though women have all the facilities and exposure for taking decisions, majority of women believed on joint decisions by consulting with their spouse. This may be due to family norms, social obligation, low confidence, average literacy besides ever changing agro climatic conditions and lack of motivation. These findings are in line with those of Krishna and Thankamani (1993) who reported that women participated actively and dominantly in the case of household decisions like the source of fuel and investment in household goods. In more than 90 per cent of the decision, the participation of women are only supportive in nature. Illiteracy and lack of knowledge and awareness are the major reasons for low participation. Figure 3. Shows the distribution of respondents based on decision making analysis

4.1.2 Benefits and incentive analysis

Benefits and incentive analysis was conducted to identify who among the two genders is more capable of utilizing the benefits of basic facilities they receive in their day to day life. The basic facilities that were selected for conducting the study are shown in the table 3. Percentage analysis was carried out to derive the final results.

Table No.3: Distribution of respondents based on benefits and incentive analysis

(N=120)

Sl no.	Benefits	Women		Men		Joint benefits	
		F	%	F	%	F	%
1	Income	0	0	0	0	120	100
2	Education	0	0	0	0	120	100
3	Training and skill development	32	26	38	32	50	42
4	Extension agency contact	40	33	53	44	27	23

5	Medical facilities	0	0	0	0	120	100
6	Technological development	37	31	57	48	26	21
7	Govt polices and incentives	57	48	43	36	20	16
8	Political interventions	8	7	94	78	18	15
9	Employment opportunity	50	42	31	25	39	33
10	Transportation facilities	0	0	0	0	120	100
11	Farmer groups	52	43	48	40	20	17

Table 3 revealed that there were no facilities in which benefits were utilized by women or men alone. Both the gender jointly enjoyed the benefits of basic facilities like income, education, medical facilities, and transportation.

But benefits in case of political interventions (78%), technological development (48%), extension agency contact (44%) were utilized more by men than women. The benefits of Govt policies and incentives (48%), farmer groups (43%), and employment opportunities (42%) were utilized more by women in comparison to men. It does not mean that men cannot utilize the benefits of Govt polices and incentives and employment opportunities but the percentage is slightly less than that of women.

This may be the result of the women oriented plans and policies by the government and financial institutions to empower women in agriculture and allied sectors by enhancing their potential and their continued growth and development through SHGs, Kudumbasree, Ayalkuttam etc. It was observed that there is no gender difference in case of utilizing the basic facilities like education, medical

facilities, transportation facilities and utilization of income. This may be the result of the availability of facilities for primary health care, their accessibility, high degree of awareness and acceptability among the people regarding the importance of education and availability of transportation facilities in the state. The State could attain significant achievements in the critical sectors of health and education and improvement in basic infrastructures. The results are in line with that of Danusha (2017)

From the data it can be concluded that there were no facilities in which benefits were utilized by women or men alone. Out of the selected facilities, there was no inequality noticed in the availability of basic facilities. Some facilities were utilized more by women while some by men. During the analysis, facilities like extension agency contact, political interventions and technological development were found to be benefited by men than women.

So, the policy makers, extensive workers, voluntary organization and other agencies should give more attention towards rural women for their better social participation and extension agency contact which will enhance their development. Figure 4 shows the distribution of respondents based on benefits and incentive analysis

4.1.3 Activity analysis

Activity analysis enables us to identify the gender roles in various activities. The activity analysis was conducted in two sections namely agricultural activity analysis and house hold activity analysis.

4.1.3.1 Agricultural Activity Analysis

Here the gender roles for various agricultural activities were identified with the help of percentage analysis.

Table No.4 shows the Distribution of respondents based on agricultural activity analysis. The data in table 4 shows that 74% of women were engaged in post-harvest operations followed by livestock and poultry activities (67%). In case of men, 74 % of the respondents were engaged in plant protection activities, 61 %

Fig. 3. Distribution of respondents based on decision making analysis

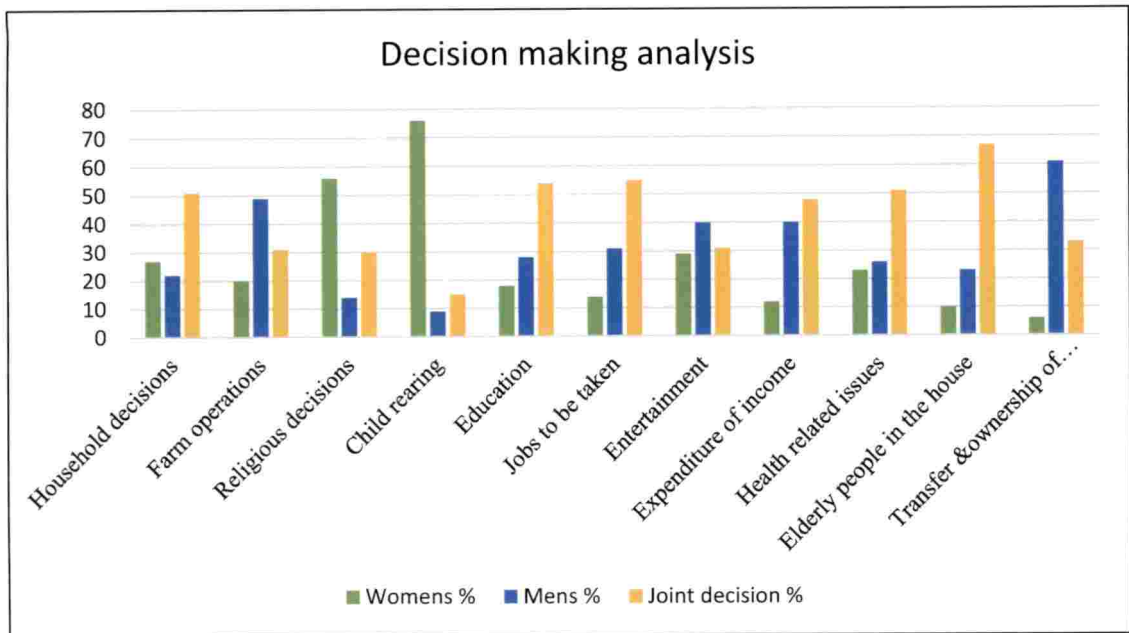
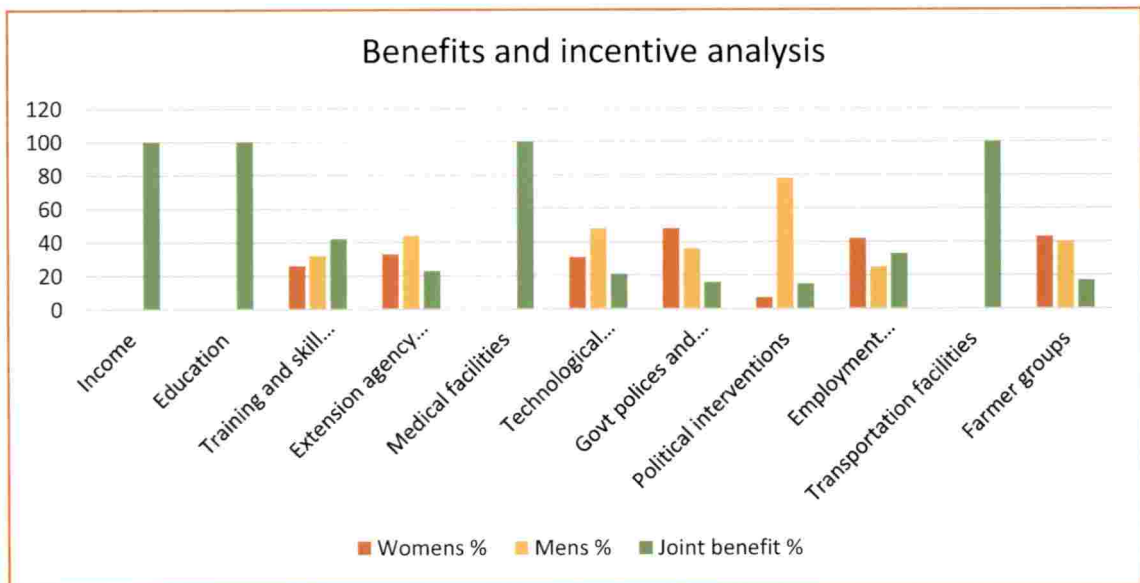


Fig.4. Distribution of respondents based on benefits and incentive analysis



involved in fertilizer application, 60% of were involved in land preparation and 42 % for collection and arrangements of inputs.

Table No.4: Distribution of respondents based on agricultural activity analysis.

N=120

Sl no.	Activities	Women		Men		Jointly involved	
		F	%	F	%	F	%
a	Land preparation	5	4	72	60	43	36
b	Collection and arrangements of inputs	33	27	50	42	37	31
c	Sowing	39	32	24	20	57	48
d	Planting	18	15	28	23	74	62
e	Weeding	27	23	20	16	73	61
f	Mulching	20	16	25	21	75	63
g	Stalking	21	17	30	25	69	58
h	Fertilizer application	20	16	73	61	27	23
i	Plant protection	8	7	89	74	23	19
j	Harvesting	48	40	21	17	51	43
k	Post-harvest operations	89	74	12	10	19	16
l	Livestock and poultry activities	80	67	12	10	28	23

This was expected since it is the males of the family who mainly carry out the land preparation and plant protection activities. Male domination in land preparations and plant protections activities might be due to the fact that these

activities were very tedious hence the involvement of women was found to be minimum.

In some cases, where women were involved, they worked as a helper to the male members in the activities due to the lack of skill and scientific knowledge. Forty three percent of the total respondents reported that both men and women were engaged in harvesting of produce. Other activities in which both men and women had a significant role were mulching (63%), planting (62%), weeding (61%), staking (58%) and sowing (48%). There were no activities which were done by men or women alone.

We can conclude that among all the agricultural activities major women oriented activities were post-harvest operations and livestock and poultry activities. The results were in line with that of Jain and Singhal (2012) who reported that most of the works related to livestock management are looked after by women more than their counterpart and have proved that they work in livestock management in a better way than men since they had more affection and care with livestock. The major men oriented activities were land preparation, plant protection, collection and arrangements of inputs and fertilizer application.

The activities in which both men and women had significant role were harvesting, planting, weeding, staking, mulching and sowing. This indicates that in homesteads vegetable production is not gender exclusive but certain activities were mostly carried out by the male partner. Similar results were also reported by Kalash *et al.* (2012).

From the study, it can be concluded that although men dominated in some operations of vegetable cultivation but in totality both the gender had a significant participation in most of the activities. This indicates that the farm women can manage the agriculture in similar fashion to men, even without any formal training, but their skill can be enhanced further by giving proper scientific guidance related to agriculture. The role of women in certain cases was supportive in nature while the dominative role was performed by men.

There is a need that the policy maker, extensive workers, voluntary organization and other agencies should give more attention towards rural women for better development of agriculture. It is suggested that projects and programmes which aims to increase vegetable production should be designed such a way that it must address the complementary roles that men and women farmers play. This result is on par with that of Mofeke *et al.* (2003). Fig.5. shows the Distribution of respondents based on agricultural activity analysis

4.1.3.2 House hold activity analysis

This study was conducted to identify the roles of men and women in house hold activities. The selected household activities for studying the roles are enlisted in table 5. Percentage analysis was used to reach out the result.

Table No.5: Distribution of respondents based on household activity analysis. N=120

Sl no.	Activities	Women		Men		Jointly involved	
		F	%	F	%	F	%
1	Food preparation	120	100	0	0	0	0
2	Child care	93	77	0	0	27	23
3	Elderly care	82	68	0	0	38	32
4	Cleaning activities	80	66	12	10	28	24
5	Collection of water	81	67	9	8	30	25
6	Daily wage labourers	17	14	2	1	0	0

From table 5 it is clear that food preparation activity was 100% women oriented and 77% of childcare activity were carried out by women of the family. Other women oriented activities were elderly care (68%), collection of water (67%)

and cleaning activities (66%). Women were also engaged in off farm and house activities such as daily wage labourers (14%). Among household activities there were no men dominant activities in particular.

According to the data it can be concluded that all the house hold activities were women oriented. Combined activities to some extent were noticed in case of elderly care (32%), collection of water (25%), cleaning activity (24%) and childcare (23%).

Scrutiny of the activity analysis showed that most of the agricultural activities were gender exclusive and house hold activities were gender inclusive. That means in case of household activities, all activities were women oriented. Women in the general population still spend more time on parenting and housework than men. It may be driven by deeper sociocultural barriers to changes in traditional gender roles, Breen and Cooke (2005). Rural women play an eminent role in both inside and outside the home as a partner in the man's profession. They are the central figure in the family, who influencing and serving the social, economic, and cultural standards of the family. Fig.6. depicts distribution of respondents based on house hold activity analysis

4.1.3.3. Resource Analysis

The ability of men and women to access certain basic resources were identified with the help of percentage analysis under resource analysis. Access to resources could be explained as those resources to which they had the power to use without the consultation and permission of the partner. Table No.6 and shows the distribution of respondents based on resource analysis of Kollam district.

Table No.6: Distribution of respondents based on resource analysis of Kollam district.

N=120

Sl. No	Access	Women		Men		Joint Access	
		F	%	F	%	F	%

Fig.5. Distribution of respondents based on agricultural activity analysis

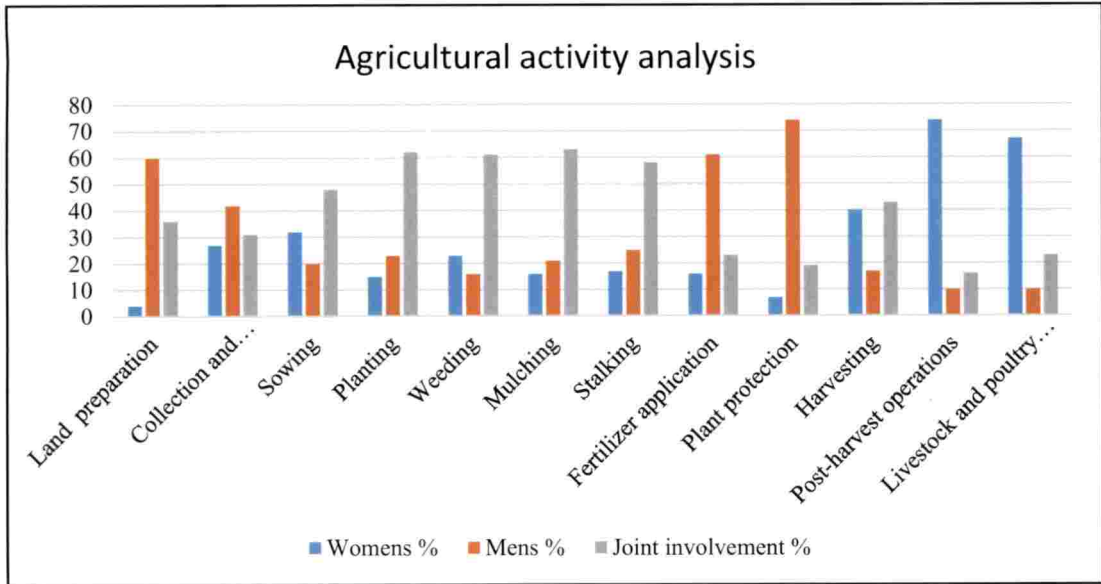
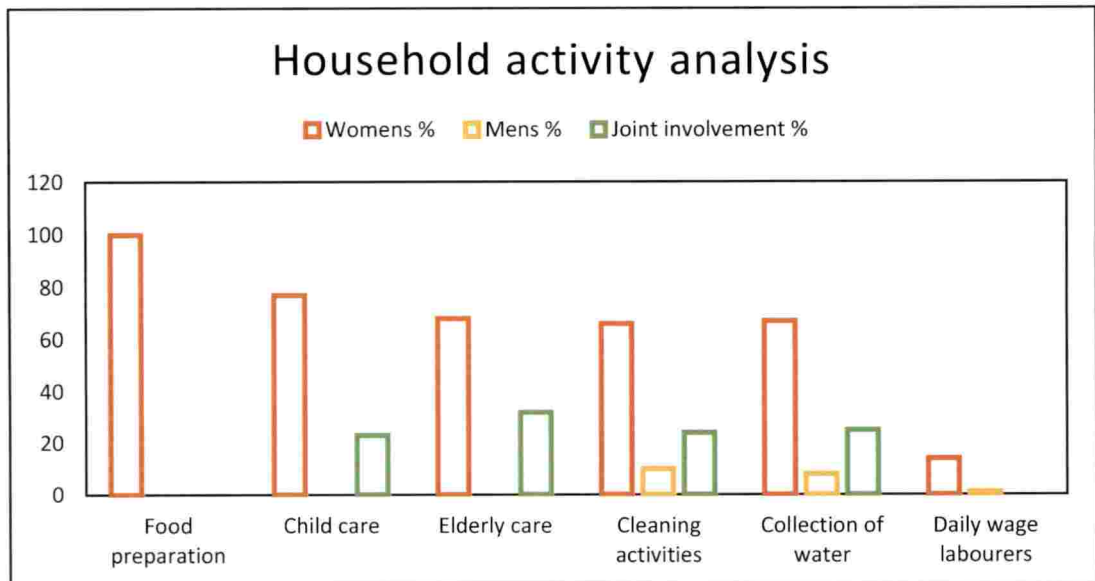


Fig.6. Distribution of respondents based on house hold activity analysis



1	Inputs	25	21	40	33	55	46
2	Land	17	14	70	58	33	28
3	Knowledge	0	0	0	0	120	100
4	Labour	9	8	99	82	12	10
5	Money	8	7	80	66	32	27
6	Technology	16	13	77	64	27	23

A cursory look at the distribution of respondents based on resource analysis from Table 6 revealed that men had maximum access over most of the resources. For the resources like labour (82%), money (66%), technology (64%) and land (58%). The more access was recorded on men but they did not have sole control over the same. There was no single resource for which women had a sole access, it does not mean that such resources were not available for use of women instead it meant that for the use and control of such resources women required assistance or permission of their spouse. In the case of combined access to resource, maximum access was recorded in the cases of knowledge (100%) and inputs (46%).

From the result we can conclude that access to resource is more men dominated. This happens not because women are less skilled, but because they do not have equal access to the resources and opportunities. The result shows gender gaps in accessing agricultural resources such as land, farm labour, money and technology. We need to empower women, providing them access to land, fertilizer, education and financial services.

Promoting gender equality is crucial for agricultural development and food security, we need to promote economic opportunities for women, allowing them to build assets, increase incomes and improve family welfare. These are essential steps to female empowerment, and to sustainable development in agriculture. Similar findings have also been reported by Dhanusha (2017). Fig.7. shows the distribution of respondents based on resource analysis.

4.1.3.4. Influencing factors of development

This section aims to identify the influencing factors of development. The influencing factors were studied under 3 subheadings namely community norms, political factors and economic factors. As it was a yes or no type of schedule, a score of one and zero was given for yes or no respectively and percentage analysis was done.

Table No. 7 Distribution of respondents based on influencing factors of development of vegetable growers.

Sl.No	Influencing factors	Women(n=120)		Men(n=120)	
		F	%	F	%
A.	Community norms				
1	Are you allowed to stay outside home for late hours?	0	0	120	100
2	Are you allowed to take up jobs outside your community?	80	67	120	100
3	Are you allowed to marry outside your community?	0	0	0	0
4	Are you allowed to dress in any manner you wish to?	108	90	120	100
5	Are you allowed to pursue education and take up jobs?	120	100	120	100
6	Are you allowed to inherit properties of your parents?	120	100	120	100
7	Are you allowed to travel distant places alone?	20	17	120	100
8	Are you allowed to have equal medical facilities?	120	100	120	100

9	Are you allowed to have entertainment of your choice?	35	29	120	100
10	Are you allowed to take part in social meetings & gathering	90	75	120	100
B.	Economic factors				
11	Are you paid equal wages for the same amount of work?	0	0	120	100
12	Are you given incentives timely?	60	50	60	50
C.	Political factors				
13	Are you allowed to vote in elections?	120	100	120	100
14	Are you allowed to enjoy the benefits of political interventions?	20	17	72	60
15	Are you allowed to enjoy the democratic rights?	101	84	110	92
16	Are you allowed to take up political powers in the society?	3	2.5	28	23.36

A glance at Table 7 highlights that the most positively influencing factors for women under community norms were, they had the provision to pursue education and take up jobs (100%), they were allowed to inherit properties of their parents (100%), they reported that they get equal medical facilities (100%). Ninety percent of the respondents had the freedom to dress in any manner as they wish, 75 % of them were allowed to take part in social meeting and gathering and 67 % of the female respondents were allowed to take up jobs outside their community. Only 29 % of women had the permission to choose entertainment as they wish. The most negatively influencing factors were they did not have the permission to stay outside the home for late hours, marry outside from their community and were not allowed to travel distant places alone. In the case of men, all the factors coming under community norms except denial to marry outside from their community were positively influencing.

On previewing the economic factors women were of the opinion that they did not get equal amount of wages for the same amount of work done as that of men workers, 50 % of both men and women reported that they did not get the incentives timely. So unequal wages and lack of timely incentives were the negatively influencing factors for women and unavailability of incentives on time was the negatively influencing economic factor for men respondents. While considering the political factors, both men and women were allowed to vote in elections and allowed to enjoy the democratic rights of a citizen (84 % for women and 92% for men) and this can be considered as a positively influencing factor for both men and women. But the percentage shows that both men and women felt difficulty in taking up political powers (for women and men 2.5 %, 23.36%, respectively) and to enjoy the benefits of political interventions (i.e., 17 % women and 60 % for men).

From the table we can conclude that out of various factors, positively influencing factors for women were they were allowed to pursue education and take up jobs as they wish, allowed to inherit properties of their parents, they get equal medical facilities also they were allowed to take part in meeting and social gathering, allowed to take up jobs outside their community, they were allowed to vote in election and allowed to enjoy the democratic rights of a citizen. Negatively influencing factors were they were not allowed to stay outside the home for late hours, not allowed to marry outside from their community, they were not allowed to travel to distant place alone, they were not having entertainment as their choice, not get equal wages for the same amount of work, they were not given incentives timely, not allowed to enjoy the benefits of political interventions and not allowed to take up political powers in the society. All the factors except four have a positive influence on men. The negatively influencing factors were they were denied to marry outside from their community, unavailability of incentives in time, lack of opportunities to take up political powers in the society and enjoy the benefits of political interventions. The findings are similar to the result obtained by Dhanusha (2017)

The higher number of negatively influencing factors for women might be the result of the traditional structure of the society. Resistance, shyness, inhibition, conservatism are some of the cultural and social systems prevailing in the Indian society. Under these circumstances women are suffering from different social restrictions. There is a need for sincere and sustained efforts to improve status of women in India. There is an urgent need to get aware and give education about their different rights for their happy and rightful life in their families. Therefore, the authorities can develop a training package on women rights awareness especially for rural women and to judge the effectiveness of the package in increasing awareness of rural women about woman rights.

By conducting the gender analysis, we can conclude that even though there are some men dominated and women dominated operations of vegetable cultivation but in totality both the gender has a significant participation in most of the activities. There was not a single homestead in the study area wherein all agriculture related operation was done by male partner alone. Which implies that women have a significant contribution in agricultural activities. Traditionally, women's roles are confined to household chores which, in general engage them for a longer hour than men each day. In traditional structure of the society women were suffering from different social restrictions. But the present study revealed that there are some changes happening in such restrictions and which has resulted in the active involvement of women in agriculture and allied sectors. Similar trend was noticed in case of decision making and benefit and incentive analysis. They can become a great resource in the development process if they are properly mobilized and organized. The poor rural women need to be more self-reliant by encouraging them to engage in economically productive activities.

In the present scenario the state and central governments are implementing many women oriented programmes with objectives of empowerment of women in agriculture and allied sectors. A number of programmes have been introduced in Kerala by various formal institutions to identify and improve their potential thereby increase the agricultural production and income of the homestead growers. Which

resulted in the improved social participation and extension agency contact of women. Due to this exposure other than agriculture, women took up some entrepreneurial activities to supplement their family income. The present result shows that these programmes could improve the potential and confidence of women to a great extent but still we can see some gender gap in certain aspects mainly in case of accessing the resources.

The best option which ensure the total empowerment of farm women about efficient networking of agricultural information is by increasing their involvement in various areas of extension programmes. This can make significant improvement in women's participation in household decision making. Also, women's earning has a positive correlation with children's health, nutritional levels and education. All that is required is to motivate them to participate in economic activities needed for self-development.

Hence, it is suggested that, more training programmes should be coordinate and conduct depends on women's requirement, in a way that farm women are inspired to participate, think about timing, duration, location and language of the training programmes.

4.2 THE SCALE OF KNOWLEDGE ABOUT VEGETABLE PRODUCTION PRACTICES.

4.2.1 Distribution of respondents based on their knowledge of selected practices

Knowledge is referred to the extent of information possessed by the vegetable growers on recommended practices. It is considered as a pre requisite for adoption by many authors. Effective adoption process can only be achieved if farmers had sufficient awareness and knowledge on different cultivation practices. When the knowledge level of farmer is low, the rate of adoption is also low. It results in loss of benefits of sustainable practices to the cultivators and the public.

On this ground, it is imperative to examine their status of knowledge about KAU practices for the selected vegetables. The present investigation was therefore, carried out with one of its objectives, to assess the extent of knowledge of homestead vegetable growers about KAU practices. For the study five vegetables were selected based on the maximum area under homesteads namely amaranthus, chilli, ivy gourd, okra and bitter gourd.

To get an overall view of the knowledge level, the vegetable growers were grouped into (i) low (ii) medium (iii) high knowledge level on the basis of knowledge index.

Table No.8: Distribution of respondents according to their knowledge about KAU practices in selected vegetables.

Sl .no	Category	Frequency	Percentage
1	Low (50-66)	14	12
2	Medium (67-83)	59	49
3	High (84-100)	47	39
Total		120	100

Vegetable growers based on their knowledge about vegetable cultivation practices revealed that the majority of respondents had medium level of knowledge about vegetable cultivation and few of them (39 per cent) were included in high knowledge level. Only 12 per cent of the growers were in the group of low knowledge level. The results are on par with the finding of Waman *et al.* (1996), Meena (2002) and Yadav (2004).

Hence from the total result it can be summarised that majority of the vegetable growers had medium level of knowledge on vegetable cultivation practices. The absence of respondents with zero score indicated that all the respondents had knowledge about any of the recommended practice. This was

presumably due to the active contribution of Farming System Research Station and Krishi Vigyan Kendra in homestead farming in the district. High level of literacy, extension orientation and social participation among the farmers also can be considered as a reason for high rate of knowledge among the farmers.

Special attention should be taken to provide training about vegetable production to the farmers so that their knowledge could be increased and the adoption of technology would ultimately be enhanced. There are many characteristics influencing the extent of knowledge about vegetable production technology, which also need manipulation towards higher production of vegetables. Similar findings have also been reported by Yadav *et al.* (2002). Fig.8 depicts the distribution of respondents based on their knowledge about KAU practices.

4.2.2 Percentage of respondents' knowledge about recommended practices.

The knowledge of respondents with regard to KAU cultivation practices of selected vegetables was assessed. As many as ten practices were included in the knowledge schedule to assess the knowledge of respondents. The recommended practices were ranked based on the respondent's knowledge and its result has been presented in table 9,10,11,12,13.

Table No.9: Percentage of respondents' knowledge about recommended practices in Amaranthus cultivation.

N=120

Sl no.	Particulars	POP Recommendation	No	%	Rank
1	Season	Through out the year	65	54	6
2	Varieties	Arun, Kannara local, Krishna Sree, Mohini (green), Co varieties, Renu sree	102	88	2
3	Seed rate	1.5-2 kg/ha	40	33	8

Fig.7. Distribution of respondents based on resource analysis

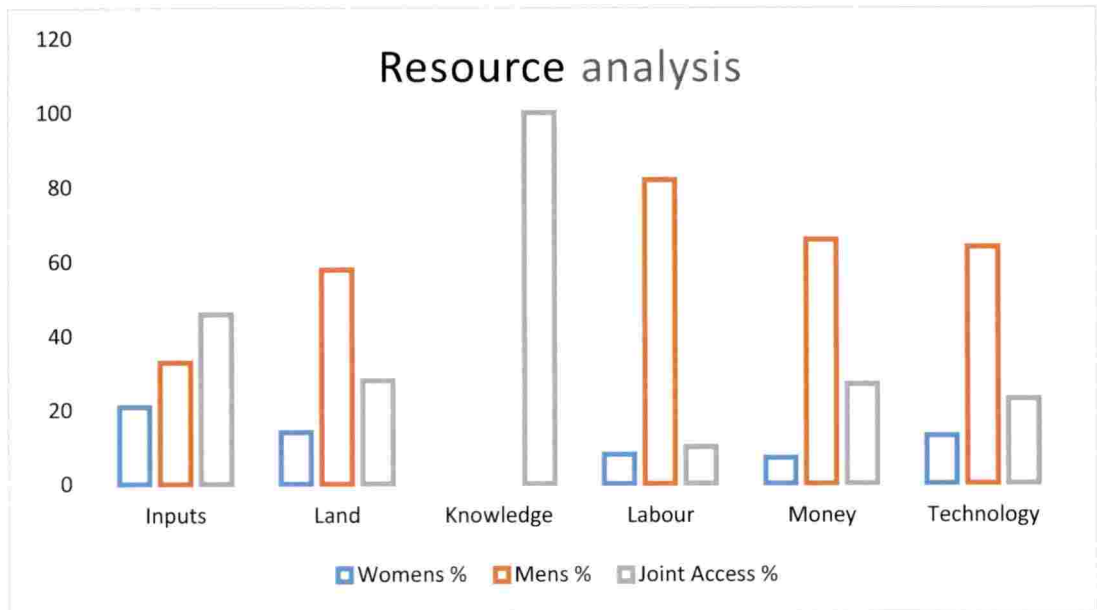
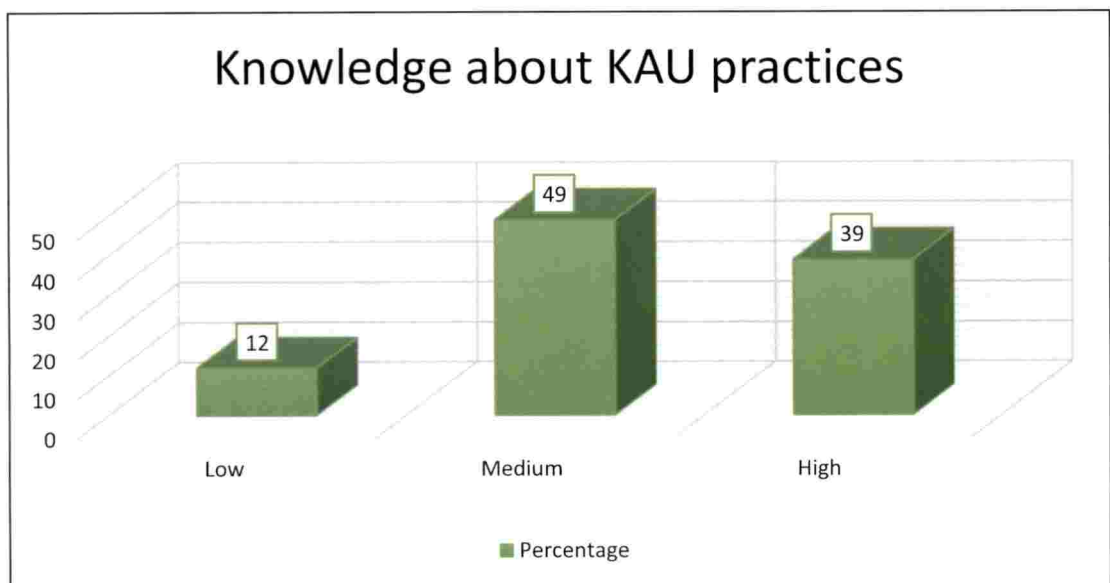


Fig.8. Distribution of respondents based on their knowledge about KAU practices



4	Spacing	10 x 30 cm	92	77	5
5	Sowing	Transplanting	98	82	3
6	Irrigation	Furrow irrigation or drip / sprinkler	5	4	10
7	Manuring	FYM -50 t/ha ,N:P:K -100:50:50 kg/ha	60	50	7
8	Pests and diseases	Foliar insects (leaf webber,roller), Leaf spot disease	97	80	4
9	Pesticides Doses	0.1% malathion	30	25	9
10	Harvesting	20-45 DAP	120	100	1

The analysis of table 9 revealed that all the respondents had knowledge about harvesting of crop i.e., 20-45 DAP. Varieties released by KAU was the next most known knowledge component by most the farmers. About 88 per cent farmers knew about amaranths varieties released by KAU followed by sowing related knowledge like transplanting of crop to main field (82%) and pest and diseases of amaranthus (80%), spacing is 45 X 45 cm (77%). The least known practices were irrigation methods for amaranthus i.e, most of the farmers don't know about furrow irrigation (4%), application of pesticides 0.1% malathion (25%)and seed rate is 1.5 -2 kg/ha (33%). This might be due to the awareness of respondents about the use of chemical pesticides and interest in the production of safe to eat vegetables. The present findings are in line with the findings of Anju (2016).

Table No.10: Percentage of respondents' knowledge about recommended practices in chilli cultivation.

N=120

Sl no.	Particulars	POP Recommendation	No	%	Rank
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1	Season	May – June (rainfed crop), Sept – October (irrigated crop)	28	23	8
2	Varieties	Jwala, Jwalasakhi, Jwalamukhi, Manjari, Ujwala, Anugraha, Vellayani Athulya, Vellayani Samrudhi	105	88	2
3	Seed rate	1 kg/ha	23	19	9
4	Spacing	45 X 45 cm (75 X 45-60 cm for white kanthari)	89	67	5
5	Sowing	Seeds are sown in nursery , 1 MAS transplanted to main field	90	75	4
6	Irrigation	Furrow or drip irrigation is recommended.	10	8	10
7	Manuring	FYM - 20- 25 t/ha ,N:P:K – 75:40:25 kg /ha	66	47	6
8	Pests and diseases	Aphids, mite, fruit worm ,nematode, mealy bug ,thrips Damping off , bacterial wilt , anthracnose , phytophthora blight , aphid transmitted viruses	95	80	3
9	Pesticides Doses	Dichlorvos (0.02%) / quinalphos (0.025%), dimethoate 0.05%	30	25	7
10	Harvesting	55-60 DA Flowering	120	100	1

From Table 10 it can be concluded that among the different KAU cultivation practices of chilli the most known practices were harvesting of fruit 55-60 days after flowering (100%), followed by varieties released by KAU (88%) and knowledge regarding pest and diseases (80%). Three fourth of total respondents had a knowledge about sowing. i.e., at first, they were sown in nursery and then one month old seedlings were transplanted to main field. Sixty seven per cent of them

had knowledge about the spacing of chilli. But only 47 % of total respondents knew about the correct fertilizer dose and manuring and 25 % them were familiar about chemical pesticide dosage. The knowledge regarding cultivating season, seed rate, irrigation were the least known practices with percentage of 23,19 and 8, respectively.

Table No.11: Percentage of respondents' knowledge about recommended practices in bittergourd cultivation.

N=120

Sl no.	Particulars	POP Recommendation	No	%	Rank
1	Season	Jan- march and sept- dec	24	20	8
2	Varieties	Priya ,Preethi ,Priyanka , Arka harit	113	94	2
3	Seed rate	5- 6 kg /ha	21	18	9
4	Spacing	2 x 2 m	95	79	5
5	Sowing	4-5 seeds /pit @ 1-2 cm depth	100	83	4
6	Irrigation	Furrow irrigation	8	7	10
7	Manuring	FYM – 20-25 t /ha ,N:P:K- 70 : 25 : 25 kg/ha	68	57	6
8	Pests and diseases	Fruit flies ,epilachna beetle, aphids, pumpkin beetle, Downy mildew ,powdery mildew ,mosaic	110	92	3
9	Pesticides Doses	Carbaryl 10% DP/ Carbaryl 0.2%, malathion	30	25	7
10	Harvesting	90 DAP	120	100	1

The table 11 revealed that all the respondents had knowledge about harvesting of crop. The percentage of knowledge seemed to be higher for practices like varieties of bittergourd released by KAU (94%), knowledge about pest and diseases (92%), sowing (83%), spacing (79%), manuring (57%). The least known practices were knowledge about pesticides doses (25%), growing season (20%), seed rate (18%) followed by irrigation methods (7%). The present findings echo the findings of Noobiya (2016).

Table No.12: Percentage of respondents' knowledge about recommended practices in okra cultivation.

N=120

Sl no.	Particulars	POP Recommendation	No	%	Rank
1	Season	Feb – March, June- July, October – November	22	18	8
2	Varieties	Salkeerthi, Kiran, Aruna, Sushthira	108	90	5
3	Seed rate	7 -8.5 kg/ha	18	15	9
4	Spacing	60 X 30-45 cm	113	94	4
5	Sowing	Dibbling @ 1-2 cm depth @ 3-4 seeds /hole	117	98	2
6	Irrigation	Furrow irrigation method @ 2- 3 days interval	8	7	10
7	Manuring	FYM – 12 t /ha, N: P: K – 50:8:25 kg /ha	68	57	6
8	Pests and diseases	Shoot and fruit borer, root knot nematode, leaf hopper, mites, aphids, white fly, Yellow vein mosaic, damping off, fusarium	115	96	3

		wilt, powdery mildew , leaf spot , leaf curl			
9	Pesticides Doses	Dimethoate 0.05%, wettable sulphur 80 WP (2 g / liter), quinolphos 25 EC (2 ml/liter of water, carbaryl (4 g/ liter of water)	30	25	7
10	Harvesting	60 DAPS	120	100	1

A cursory glance at the table 12 revealed that hundred per cent respondents had knowledge about the harvesting time of okra i.e., 60 days after planting. Ninety eight per cent of total respondent were aware about dibbling of 3-4 seeds in a hole at 1-2 cm depth and 96 % could identify pests and disease of okra. Ninety four per cent had knowledge of correct spacing (60X 30-45 cm). In okra 90% knew the okra varieties released by KAU. More than half of the respondents (57%) had knowledge about the actual fertilizer and manure dosage. Only 25 % of total had the knowledge regarding pesticide doses. The percentage of respondents having knowledge about season and seed rate were 18% and 15 %, respectively. Only 7 % had knowledge regarding irrigation method recommended by KAU.

Table No.13: Percentage of respondents' knowledge about recommended practices in ivy gourd cultivation

N=120

Sl no.	Particulars	POP Recommendation	No	%	Rank
1	Season	May – June, September – October	15	13	8
2	Varieties	Sulabha	22	18	7

3	Propagation	Stem cuttings with 3-4 nodes and of 30 – 40 cm length	110	92	2
4	Spacing	4X 3 m	55	46	3
5	Irrigation	Drip irrigation	10	8	9
6	Manuring	FYM – 25 t /ha, N: P: K – 60-80: 40-60: 40 kg/ha	40	33	4
7	Pests and diseases	Fruit flies and gall insects, Leaf spot	35	29	5
8	Pesticides Doses	Carbaryl 10% DP/ Carbaryl 0.2%, malathion	30	25	6
9	Harvesting	MAP	120	100	1

From Table 13 it is clear that all the respondents had knowledge about stage of harvest i.e, 3 MAP. Ninety two percent knew that propagation of ivy gourd is through stem cuttings of 30 – 40 cm length with 3-4 nodes. Forty six percent of growers were aware that the spacing of ivy gourd is 4X 3 cm where as 33 % of total growers had knowledge about manuring of ivy gourd. The knowledge about pesticide doses was limited to 25% only. Only 18 % of respondents knew about KAU variety ‘Sulabha’. The least known practices were correct season (13%) followed by apt method of irrigation (8%).

Hence from the total result it was summarised that most of the homestead vegetable growers were included in medium knowledge level apropos the KAU recommended practices of selected vegetables. From the findings, it is clear that most of the respondents were possess high knowledge regarding the KAU varieties (except ivy gourd), sowing methods, spacing, pest and diseases attack of the particular crops, harvesting etc. whereas minimum knowledge was noticed in practices like seed rate, pesticide doses and irrigation methods (Fig.9.)

This might be due to the reason that most of homestead growers were cultivate vegetables regularly for their own needs and market purpose and the above listed practices are crucial from the point of view of the vegetable production. Also, for optimising vegetable production the respondents were made contact with the extension agents resulting the gain in knowledge about these recommended production practices (they also had contact with the neighbours, friends, and progressive farmers and with subject matter specialists of KVK). All the homestead growers were literate hence they knew about these practices by reading the related literature. In addition to this homestead farming oriented projects and activities of FSRS and KVK functioning in Kollam district also had a significant role in the high knowledge level of farmers. The respondents had low knowledge about dose of insecticides /pesticide, dose of fungicide, dose of chemicals for seed treatment etc. This might be due to the reason that the respondents might not have understood the instructions written on the pack of chemicals because of its complex language, as the instructions are mostly written in Hindi or English language or in the language of the state where the insecticides, fungicides, weedicides etc. are manufactured. The “safe to eat concept” also helped to increase a favourable attitude towards organic vegetables which also can be considered as the reason for low level knowledge regarding chemical pesticides and fungicides.

4.2.3. Comparison of respondent’s knowledge about the KAU practices in selected vegetables.

Table No.14: Comparison of respondent’s knowledge about the selected practices in amaranthus, chilli, bitter gourd and okra.

(N = 120)

Sl. No	Groups	Average	F	F crit	Inference
1	Amaranthus	23.34	0.93	2.62	NS
2		23.60			

	Chilli				
3	Bittergourd	22.91			
4	Okra	23.15			

When we compare the knowledge about KAU recommended practices in the selected vegetables, it was evident that the F value of ANOVA table was less than F critical value; hence there is no significant difference between the knowledge about KAU practices in these four vegetables. This result revealed that the homestead vegetable growers from Kollam district possess similar level of knowledge regarding KAU practices of amaranthus, chilli, okra and bitter gourd, which indicates that the farmers gave equal importance to all the four vegetables and had made efforts to update their knowledge in all these crops. In homestead farming emphasis is given for ensuring food security for the family and making profit by marketing the products is secondary. The selection of crops, for cultivation in homestead is a reflection of needs of the family. So, the homestead vegetable growers gave equal importance to all vegetables, this may be the reason for the result in table 14.

The high and equal knowledge rate for all crops among farmers revealed that the extension orientation from different sources such as formal institutions like Krishi Vigyan Kendra, FSRS (Farming System Research station), Krishi Bhavan and VFPCCK and various mass media sources were also giving equal priority for all vegetables. They were also participating more in social organizations due to which they might gain more knowledge regarding almost all crops by discussing with other respondents, group members about recommended cultivation practices of selected vegetable. Similar result was reported by Anju (2016) and Noobiya (2016).

The findings of the present study provide the empirical feedback to agricultural development departments, State Agricultural Universities and various

non-governmental organizations working in agricultural and allied departments to strengthen the research-extension farmer linkage by providing credible and timely information to the farming community. To achieve these, extension personnel should disseminate the technology related to different cultivation aspects and plant protection measure with emphasis on providing knowledge and skills to farmers. Farmer's programmes and result demonstrations on vegetable cultivation should be organized by the extension personnel's. Thereby we can enhance the percentage of high and medium knowledge level to a greater extent. The findings of the study are in accordance with the observations of Jangid (2001) and Geengar (2006).

4.3. RATE OF ADOPTION ABOUT VEGETABLE PRODUCTION PRACTICES.

Adoption is a process defined as the decision to make full use of an innovation, which encompasses the mental process that an individual undergoes from first hearing about to finally adopting an innovation. Extension services in India today have a large number of professional extension workers at national, state, district, block and village level. Several programmes to help farmers to adopt the new technologies are in operation throughout the country. Still there exist a wide gap between the technology available at the research end and its adoption at farm level. Keeping this in mind, an attempt has been made to know the extent of adoption of KAU practices on vegetable cultivation by the homestead vegetable growers. The results are discussed below.

4.3.1 Distribution of respondents based on their rate of adoption of KAU practices.

To get an overall view of adoption level, the vegetable growers were grouped into three strata, low adoption group, medium and high adoption group based on the adoption index.

Table No. 15: Distribution of respondents according to their rate of adoption about KAU practices in selected vegetables.

Sl. No	Category	Frequency	Percentage
1	Low (34-55)	10	8
2	Medium (56-77)	86	72
3	High (78-100)	24	20
Total		120	100

Table 15 and fig. 10 makes it clear that of the total, 72 percentage of respondents were observed in the category of medium level of adoption. Twenty percent of respondents were found having high level of adoption. The table also depicted that 8 percentage of the respondents were categorised in low level of adoption. It was due the fact that different extension programmes conducted by KVK, FSRS, KrishiBhavans, VFPCCK, helped in rapid transfer to technology and at the same time in acceptable manner to the respondents which might have resulted in increasing the adoption level of the KAU cultivation practices. The higher knowledge possessed by the respondents, higher literacy rate and increased participation in social activities and training programmes etc had a significant role in this result. The findings are on par with the results of Natarajan (2004) who reported that majority (36.66%) of farmers were grouped into medium adoption category accompanied by high (35.56%) and low (27.78%).

From the findings it was clear that the majority of the farmers (92%) had medium to high rate of adoption about recommended technology of KAU practices, because most of the farmers were literate due to which they may read literature regarding recommended technology of vegetables. Also, they participated more in social organizations due to which they might gain more knowledge by discussing to the farmer's group leaders about recommended KAU production practices. The few number of marginal farmers having low rate of adoption (8 per cent) might be attributed due to the fear among the marginal farmers about innovation. The results of the study are fitting to the findings of Patel *et al.* (1994).

Fig.9. Percentage of respondents' knowledge about recommended KAU practices

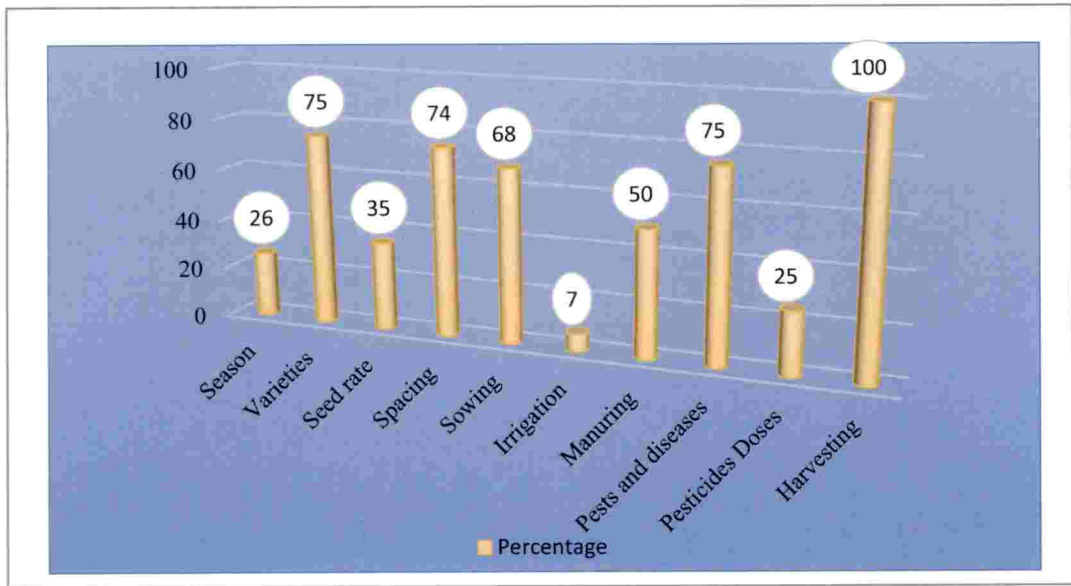
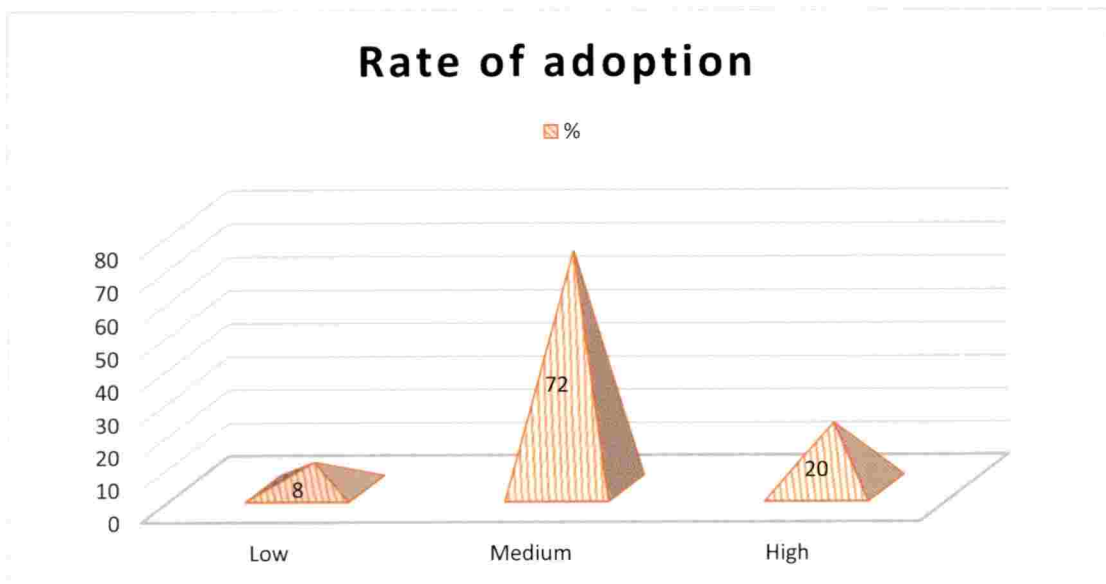


Fig.10. Distribution of respondents based on their rate of adoption about KAU practices



4.3.2. The extent of adoption of KAU practices by the respondents.

In order to understand the extent of adoption of various KAU cultivation practices by the respondents, the recommended practices were ranked separately for the selected crops. The adoption scores were calculated for each Practice based on the respondent's rate of adoption for all the crops and then the results are presented below.

Table No. 16: Adoption scores of respondents about recommended practices in Amaranthus cultivation.

N=120

Sl no	Vegetable practices – Amaranthus	Adoption score	Rank
1	Avoid sowing of red leaved varieties during period of heavy rain to prevent leaf spot diseases.	230	6
2	Varieties : Red – Kannara local, Arun, Krishnasree Green – Co1, Co2, Co3, Mohini and Renusree	348	1
3	Seed rate is 1.5 – 2.0 Kg/ ha	255	5
4	Transplant in the late afternoon or on a cloudy day to minimize transplanting shock.	340	2
5	50 t/ha of FYM as basal dose before planting	310	4
6	NPK: 50:50:50 Kg/ ha after preparing trenches	220	7
7	Top dressing of 50 Kg of N fertilizer at regular interval	180	8

8	Spraying of, 0.1% of Malathion or malathion 10% DP during severe cases of leaf webber incidence	148	9
9	Spraying 1% urea immediately after each harvest for increasing yield	130	10
10	Avoid use of insecticide or fungicide if maximum possible	330	3

A close look at the table 16 revealed that majority of the respondents ranked KAU varieties as the major practice they adopted followed by transplanting. Avoid use of insecticide or fungicide maximum possible was the next practice which was adopted by most farmers. They were interested in organic farming. It might be presumably due to the awareness of respondents regarding the side effects of using pesticides. The next mostly adopted practices were use of 50 t/ha FYM as basal dose before planting, seed rate, avoid sowing of red leaved varieties during period of heavy rain to prevent leaf spot diseases in that order.

The least adopted practices were spraying of, 0.1% of Malathion or Malathion 10% DP during severe cases of leaf Webber incidence, spraying 1% urea immediately after each harvest for increasing yield, application of NPK fertilizers and top dressing of 50 Kg of N fertilizer at regular interval. The result revealed that they were using organic manures more than that of chemical fertilizers. Similar result was reported by Anju (2016).

Table No. 17: Adoption scores of respondents recommended practices in bitter gourd cultivation.

N=120

Sl no	Vegetable practices – Bitter gourd	Adoption score	Rank
1	Spacing is 2× 2 m	319	6

2	Varieties are Preethi, Priyanka, Priya and Arka Harit	353	2
3	January –march and Sept- December are the ideal seasons.	168	12
4	Seed rate is 5-6 Kg/ ha	252	7
5	Soaking of seeds for 24 hrs in water for better germination.	340	4
6	Retain 3 plants/ pit	350	3
7	Tie a pebble @ the end of a long piece of string to the flower end to weigh down the fruit and keep it from curling.	250	8
8	FYM @ 20-25 t /ha as basal dose	330	5
9	35 kg N and full dose of P (25) and K (25) as basal dose and top dressing of N fertilizer in split doses at fortnightly interval	220	9
10	Spraying vines with flowering hormones @ 6-8 leave stage to increase female flowers (GA- 25- 100ppm)	120	13
11	Spraying 0.2% Mancozeb against Downey mildew	180	11
12	Introduction of beehives in the field to ensure good pollination.	190	10
13	Covering of fruits with polythene cover or paper.	360	1

It can be concluded from table 18 that all the homestead vegetable growers ranked covering of fruits with polythene cover or paper as the widely adopted practice followed by KAU varieties. Among the varieties Preethi, Priyanka, Priya had a higher adoption rate. The next commonly adopted practices were retaining 3 plants/ pit, soaking of seeds for 24 hrs in water for better germination, application

of 20-25 t/ha FYM as basal dose, maintaining a spacing of 2X2 cm, seed rate, tying a pebble at the end of a long piece of string to the flower end to weigh down the fruit and keep it from curling and application of fertilizers. The least adopted practices were spraying vines with flowering hormones, introduction of beehives in the field to ensure good pollination and use of fungicides. The perusal of the table shows that the least followed practice was correct season of bitter gourd cultivation. This may be due to higher demand of bitter gourd for family needs. The result also shows that most of the respondents were not interested in using chemical fungicides or pesticides. This result was similar to that of Noobiya (2016)

Table No. 18: Adoption scores of respondents recommended practices in chilli cultivation.

N=120

Sl no	Vegetable practices – chilli	Adoption score	Rank
1	Spacing is 45 X 45 cm (75 X45-60 cm for white kanthari)	291	4
2	Varieties are Jwala, Jwalasakhi, Jwalamukhi Manjari, Ujwala, Anugraha, Vellayani athulya , Vellayani samrudhi	350	1
3	May – June (rainfed crop) , Sept – October (irrigated crop) is the cropping season	140	13
4	Seed rate is 1 Kg/ ha	257	6
5	Soil sterilization using burning the rice straws or other organic matter on the bed before sowing.	170	10
6	Well rotten FYM @ 20- 25 t/ha at the time of land preparation	345	2

7	NPK: 35:40:12.5 Kg/ ha applied as basal dose before transplanting. One fourth nitrogen and half of potash applied @ 20-30 DAP and remaining one fourth nitrogen @ 2 MAP.	220	7
8	Provide staking to prevent lodging.	320	3
9	Use of dimethoate @ 0.05% and dichlorvos (0.02%) with fish oil rosin soap against aphids,mites ,thrips,	180	8
10	Use of soil fumigants or nematicides to reduce the attack of root knot nematode	150	12
11	Application of 1% bordeaux mixture	280	5
12	Seeds soaking in streptocycline (1 g/40 li) for 30 min. to reduce bacterial wilt infestation.	160	11
13	hot water treatment @ 52 0c for 30 min. is recommended against anthracnose	175	9

It is clear from the table 17 that the most widely adopted practices for chilli cultivation were use of KAU varieties, application of well rotten FYM at the time of land preparation, providing staking to prevent lodging, maintain proper spacing between crops, application of Bordeaux mixture, seed rate, application of NPK fertilizers as per the recommendation. The least adopted practices were seasonality in cultivation and use of soil fumigants or nematicides, seeds soaking in streptocycline, soil sterilization using burning the rice straws or other organic matter on the bed before sowing. These results were in line with that of Vashishtha (2012)

Table No. 19: Adoption scores of respondents recommended practices in okra cultivation.

N=120

Sl no	Vegetable practices – okra	Adoption score	Rank
1	Spacing is 60 X 30-45 cm	310	5
2	Varieties are salkeerthi ,kiran ,aruna ,susthira	328	3
3	Feb – March , June- July , October – November is the ideal cropping season	170	12
4	Seed rate is 7- 8.5 Kg/ ha	260	7
5	Storage of seeds in polythene cover to increase storage life up to 7 months.	240	9
6	Soaking of seeds for 24 hrs in water for better germination	350	1
7	Soaking seeds in a solution of Bavistin @ 0.2% for 6 hours and drying under shade before sowing to reduce attack of soil borne fungus.	190	10
8	FYM @ 25 t /ha as basal dose	340	2
9	First weeding is done @seedlings are 2 weeks old and subsequent weeding at an interval of 25 days.	290	6
10	Pre emergence application of basalin 48 EC for weed control and Carbaryl 4 g/ li of water or neem oil emulsion @ 5% @ 15- 20 days intervals against fruit borer	180	11
11	Application of <i>Bacillus macerans</i> or <i>B. circulans</i> (1.2×10^6 cells/pit) before sowing to control root knot nematode.	160	13
12	Seed treatment with fungal culture of <i>Trichoderma viride</i> (3-4 g/kg of seed)	250	8
13	Continuous cultivation of bhindi on the same piece of land should be avoided.	310	4

Analysis of table 18 shows that soaking of seeds for 24 hours in water for better germination is the practice which was adopted by majority followed by application of basal dose of FYM. Varieties released by KAU were the next commonly adopted practice which was followed by avoiding cultivating okra on the same piece of land. The other practices which having a higher adoption rate based on the rank obtained were maintaining proper spacing between crop, first weeding is done when seedlings are 2 weeks old and subsequent weeding at an interval of 25 days, seed rate, seed treatment with *Trichoderma viride*, storage of seeds in polythene cover to increase storage life. The respondents reported that application of *Bacillus macerans* or *B. circulans* before sowing to control root knot nematode, cultivation of okra on a particular season, application of chemical weedicides, pesticides, soaking of seeds in bavistin are the least adopted practices by them. Similar findings were also reported by Rashmi *et al.* (2011)

Table No. 20: Adoption scores of respondents recommended practices in ivy gourd cultivation.

N=120

Sl no	Vegetable practices – ivy gourd	Adoption score	Rank
1	Spacing is 4 x 3 m	255	5
2	Use variety sulabha	220	6
3	Grown in May – June and Septmber- October.	130	8
4	Stem cuttings with 3-4 nodes and having 30-40 cm length is used as planting material	360	1
5	FYM @ the rate of 25 kg /pit is given two doses.	260	4
6	The ratio of female and male plant population in the field should be 10:1	200	7
7	Pruning of vines once fruiting is completed.	280	3

8	Weeding and light hoeing is practiced during the early phase of plant vine growth	290	2
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The table shows that most commonly adopted practices was selection of planting material, followed by weeding and light hoeing which was practiced during the early phase of plant vine growth. The next practice having highest adoption rate was pruning of vines once fruiting is completed, followed by spacing. The least adopted practices were growing crop only in the recommended season, use KAU variety Sulabha, maintaining a 10:1 female and male plant population in the field.

From the above mentioned results, it may be inferred that majority of the farmers adopted KAU varieties and they follow almost all the cultural practices like seed treatments, seed rate, land preparation, weeding, application of manures as per the recommendations of package of practice. A partial adoptivity was noticed in case of application of NPK fertilizers that means they didn't regularly follow the exact dosage and time of application. It is also seen that they use organic manures, compost etc. along with chemical fertilizers. An increase in fertilizer price has impeded some farmers from using fertilizer at all, while others tend to use lower rates than the recommendation. Therefore, attention is needed on farmers' financial capacity and access to credit. In addition, equal attention is needed in the timely supply of fertilizers and seeds to encourage farmers to use improved technology and use them as per the recommendation. Similar trend was observed in case of plant protection measures. The low adoption of 'plant protection measures' which might be due to the reason that most of the growers were not using insecticides and fungicides. It might also be due to the need of special equipment's for spray or their hazardous effect on human beings and non-availability of suitable insecticides and fungicides. Findings are in line with the findings of Singh *et al.* (1999) who reported that majority of the farmers adopted plant protection and weedicides chemicals in low level. Majority of homestead growers preferred bio pesticides, botanicals and organic manures and avoid use of chemicals maximum possible. The farmers who

were using chemical pesticides and fungicides reported that they choose pesticides that have short persistence and harvesting is done only one week after pesticide spray.

The adoption of varieties and recommended seed rate of the five crops and application of basal dose of FYM were found to be almost similar showing the popularity of these practices among homestead vegetable growers. This result also suggests that, there is a need to educate the vegetable growers by the extension agencies for the adoption of recommended doses of fertilizer application and to popularize the use of organic plant protection measures by conducting the result demonstrations. Also, the subsidy on fertilizers will increase its adoption rate. These findings are in conformity with the earlier work of Choudhary and Bangarva (2013).

4.3.3 Comparison of respondent's knowledge about the KAU practices in selected vegetables.

Table No.21: Comparison of respondent's knowledge about the selected practices in amaranthus, chilli, bitter gourd and okra.

Sl. No	Groups	Average	F	F crit	Inference
1	Amaranthus	30.55	0.85	2.62	NS
2	Chilli	31.02			
3	Bitergourd	31.48			
4	Okra	30.77			

When we compare the extent of adoption about KAU recommended practices in the selected vegetables, it was evident that the F value of ANOVA table was less than F critical value; hence there is no significant difference between the adoption of KAU practices in these four vegetables.

The high and equal knowledge rate for all crops among the growers can be considered as the reason behind above result. In homesteads the decision regarding the crops to be cultivated is takes place based on the family needs. So according to the growers all the vegetables that they cultivate are of equal importance. Most of the practices except quantity and time of fertilizer application and adoption of plant protection practices can be adopted to all crops at a time irrespective of the variety. Because of this, the extent of adoption of KAU practices among the selected vegetables are seemed to be equal. This result also shows that the extension workers and scientists of FSRS and KVK are giving equal preference for all vegetables because all are important to maintain the nutritional security of family members. Similar result was reported by Noobiya (2016) and Namitha (2017).

4.3.4. Adopter categorisation of homestead farmer respondents on level of adoption of recommended practices.

In this section the farmer respondents were categorised into different adopter categories as explained by Rogers (1982) namely, innovators, early adopters, early majority, late majority and laggards.

Table No.22: Adopter categorisation of homestead vegetable growers on level of adoption of recommended practices.

N=120

Category	Standard Rogers curve	No.	%
Innovator	2.5	2	2
Early adopters	13.5	22	18
Early majority	34	39	33
Late majority	34	37	31
Laggards	16	20	17
Total		120	100

174356



Table 22 and fig 11 revealed that 2 percent of total respondents belonged to innovator category which was almost on par with the normal Rogers curve (2.5%). The early adopter per cent (18 %) was higher than the standard per cent of 13.5 in Rogers curve. Early majority per cent of 33 per cent was almost in line with the normal curve. 31 per cent of total respondents belonged to late majority which was lesser than the normal value of 34 percent. Whereas the laggards were found to be 17 per cent, slightly greater compared to the normal Rogers curve. All these are indicating a fairly good level of adoption of KAU cultivation practices by homestead vegetable growers.

The higher percentage of early adopters signifies better adoption of KAU practices for the selected vegetables. The percentage of laggards reveals the suspicious nature of few farmers. Some farmers are reluctant to adopt KAU practices owing to multiple reasons like the effectiveness, sustainability, cost and returns of the technologies, lack of favourable attitude towards change. Overall adoption can be improved by focusing on late majority and laggards through different and effective extension programmes. Therefore, extension efforts should focus on effective transferring of practices and technologies that the farmers are reluctant to adopt after identifying the reasons. Thereby we can lower the percentage of laggards and late majorities to a great extent which enhances the percentage of early adopters and early majority. The results are in line with that of Noobiya (2016) and Namitha (2017)

Generally, the result of this section indicates that adoption of KAU practices is medium to high for the selected vegetables, which implies the need for more targeted and continued extension service. Thus, the extension system functioning in the study area, and elsewhere, need to enhance further to expand the flow of information for rural transformation. This trend implicit that for improving the knowledge and adoption level among the homestead vegetable growers, more educational and extension efforts are hence, required to be undertaken by extension

agencies by way of organizing training and demonstrations. The study suggests that the extension agencies should give due heed to the practices such as application of fertilizers and plant protection measures which is having low adoption score so that we can increase the existing level of adoption of such practices.

4.4 PROFILE CHARACTERISTICS OF VEGETABLE GROWERS.

The data regarding the profile characteristics were collected for the sake of giving a profile of the homestead vegetable growers included in the study. The data related to the profile characteristics of the respondents such as age, education, occupational status, innovativeness, market orientation, training, experience in vegetable cultivation, extension agency contact, economic motivation, information seeking behaviour, risk orientation, social participation and family labour utilization are presented here:

4.4.1 Age

Table No.23: Distribution of respondents according to their age

N=120

Sl .no	Category	Age (In Years)	Frequency	Percentage
1	Young	< 35	14	12
2	Middle	35- 55	77	64
3	Old	>55	29	24
Total			120	100

Age is an important factor as it reveals the maturity of an individual to take decisions for achieving higher yields. The data in table 22 and fig 12 revealed that 12 percent of the total respondents were in the young age group i.e. below 35 years. The respondents who fall in the age group of 35-55 years (middle age group) and above 55 years (old age group), in the sample constituted 64 per cent and 24 per

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Fig.11. Adopter categorization of homestead vegetable growers

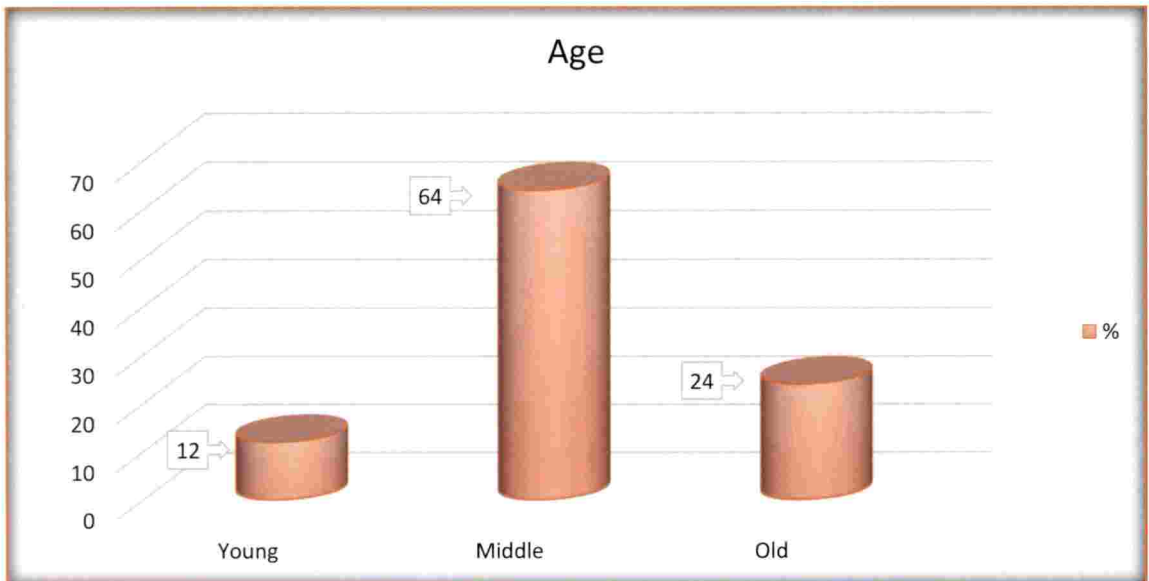
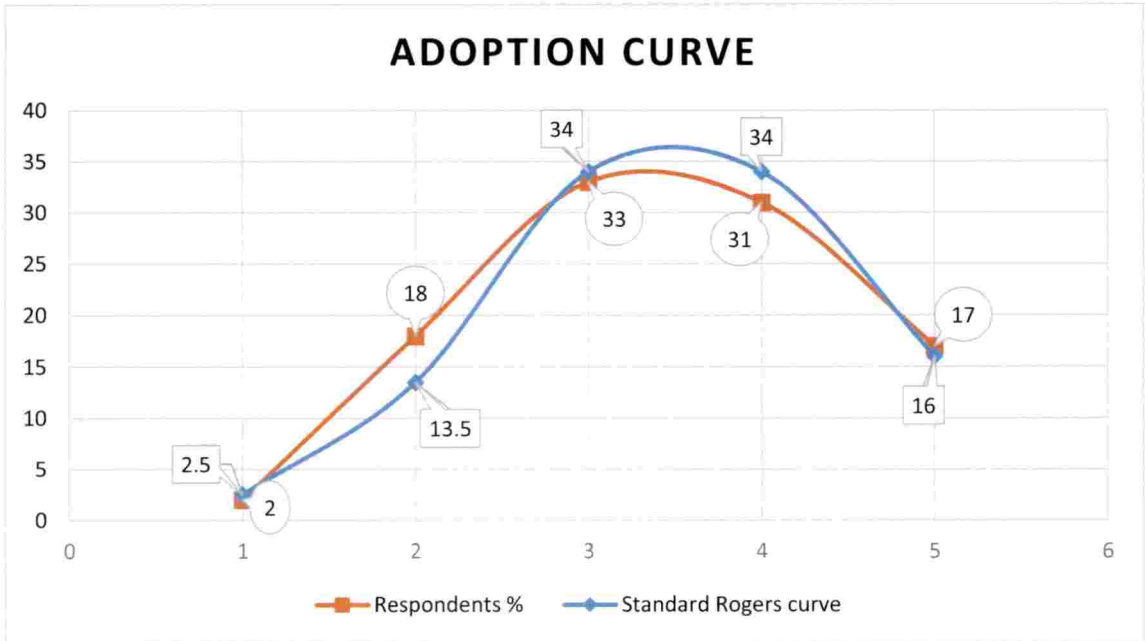


Fig.12. Distribution of respondents according to age

cent, respectively. It can be surmised that, more than half of the homesteads vegetable growers in the study area were belongs to middle age group.

The possible reason for this would be that most of educated youth perceive agriculture as a profession of intense labour, not profitable and unable to support their livelihood compared to white collar jobs offer. So, youngsters are usually not interested in this field of work. Farmers of middle age are enthusiastic and are possess moderate experience in farming and having more work efficiency than older and younger. The middle aged vegetable growers possess more physical vigour and family responsibilities when compared with younger ones. The results are in adherence with the report of Pandya (1996). According to Suresh (2004), majority of respondents were of middle age group.

4.4.2. Education

Table No.24: Distribution of respondents according to their education

N=120

Sl .no	Category	Frequency	Percentage
1	Illiterate	0	0
2	Can read and write	1	1
3	Primary school	17	14
4	Middle school	20	17
5	High school	50	42
6	College	30	25
7	Professional degree	2	2
Total		120	100

Education of the individual determines their knowledge level and the mental status of the individual. It is obvious that education plays a significant role in the

acceptance, rejection, adoption and dissemination of useful information to peers for their benefits. Results pertaining to the education level of vegetable growers indicated that out of 120 respondents, the maximum percentage (42%) of respondents had education up to high school level. It is important to note that there were no illiterate farmers and 1 percent belongs to 'can read and write' category. 25 per cent of the respondents had studied up to graduation and above, whereas, only 2 per cent of respondents had a professional degree (fig.13). This result can be considered as a true reflection of higher literacy status of Kerala. These findings are in line with the studies of Pandya (1996).

4.4.3. Occupation

Table No.25: Distribution of respondents according to their occupation

N=120

Sl.no	Category	Frequency	Percentage
1	farming as a sole profession	69	58
2	farming + agri labour	19	16
3	farming + business	15	12
4	farming + service	17	14
Total		120	100

On the basis of occupation, respondents were divided into four categories. Table 24 and fig 14 divulges that 58 per cent of total respondents were having farming as a sole profession while 16 per cent belongs to farming + agri labour category. Table further shows that 14 per cent of respondents were having farming + service as their occupation and lowest number of respondents were included under farming + business as occupation i.e.,12 %. The majority of farmers were practicing agriculture alone. This might be due to the continuation of ancestral

Fig.13. Distribution of respondents according to education

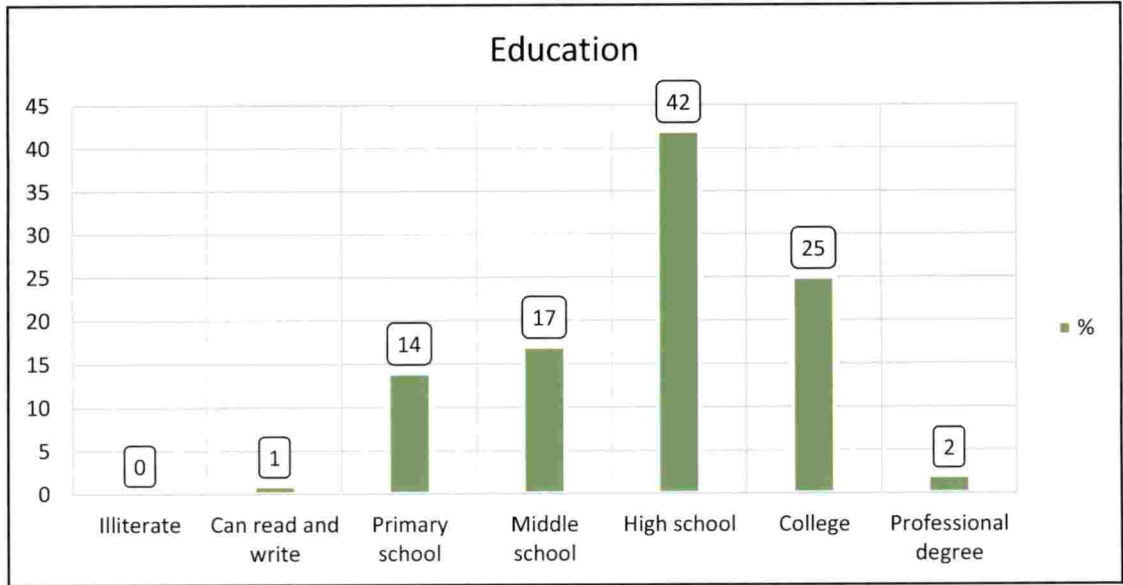
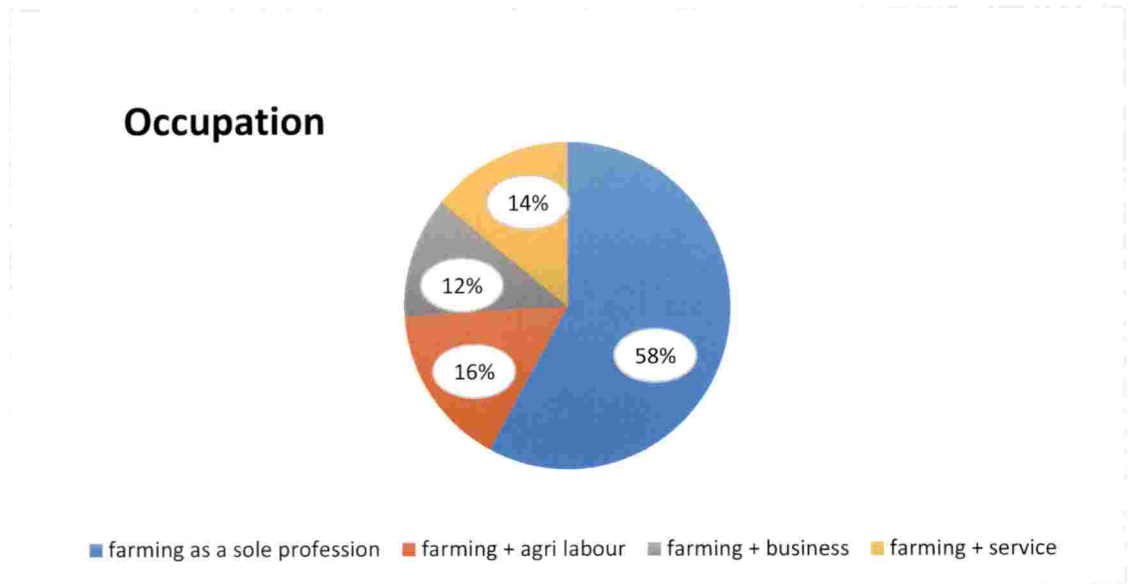


Fig.14. Distribution of respondents according to their occupation



traditional occupation of agriculture. Another factor is limited scope of employment in non-agricultural sector as their education level is not high to get employment and also nature of farming is also intensive. The findings are in line with the studies of Karpagam (2000).

4.4.4. Innovativeness

Table No.26: Distribution of respondents according to their innovativeness

N=120

Sl.no	Category	Frequency	Percentage
1	Low	59	49
2	Medium	50	42
3	High	11	9
Total		120	100

From the Table 25 and fig 15 ,it could be vividly observed that 49% of the respondents were belonged to low innovative category and were followed by medium innovativeness (42%) and high innovative (9 %).

The low level innovativeness of farmers might be due to their middle and old age of (64% and 24%, respectively) which has restricted them to go always for new things and their level of education (42%) was high school level of education only. All these factors might have the reason for their low level of innovativeness. The results are in accordance with the findings of Kumari (2014) and Jayapalan (1999).

4.4.5. Market orientation

Table No.27: Distribution of respondents according to their Market orientation

N=120

Sl. No	Category	Frequency	Percentage
1	Low (<10)	26	22
2	Medium (10-11)	79	66
3	High (>11)	15	13
Total		120	100

The data shows that 66 per cent of the respondents were categorized in medium market orientation, whereas 22 per cent and 13 per cent of the growers were in low and high market orientation, respectively (fig.16). With the increasing awareness on adverse effect of chemical farming at present resulted in a growing demand for home grown safe to eat vegetables. The customers are interested to purchase the vegetables directly from the vegetable growers than from market which reduces the dependability of market and middle men for selling their products.

This might be the reason for medium and low (66% and 22 %) market orientation for the homestead vegetable growers. These findings are in line with that of Purnima (2004) that majority of the vegetable growers had medium level market orientation and Sreenivasulu (2011) that majority (49.44%) of them were having medium level of market orientation followed by 27.22 per cent in low and 23.34 per cent in high categories.

4.4.6. Training

Table No.28: Distribution of respondents according to their Training

Sl .no	Category	Frequency	Percentage
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Fig.15. Distribution of respondents according to innovativeness

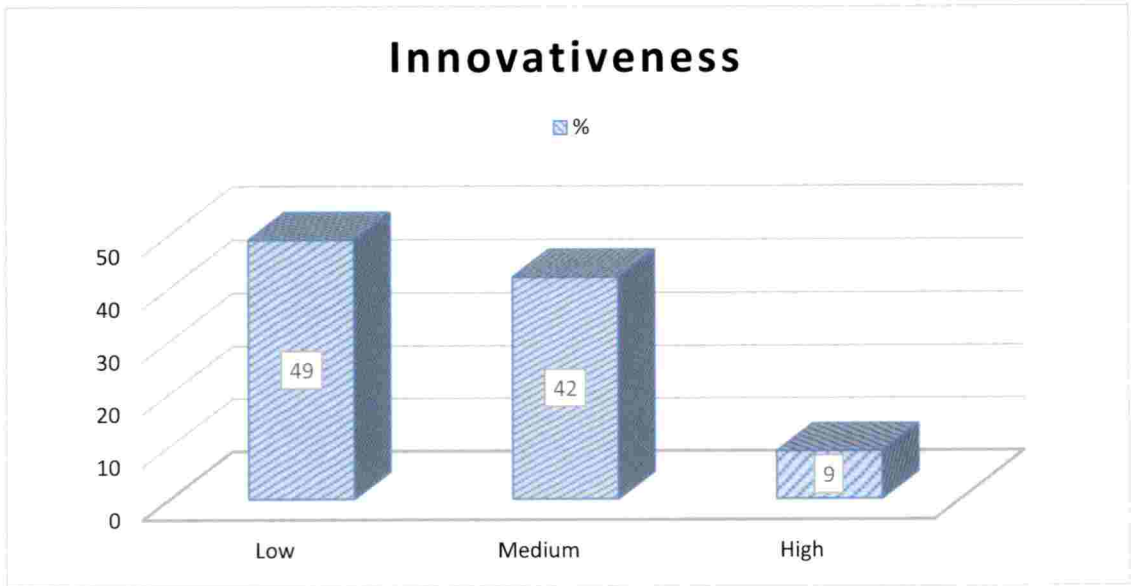
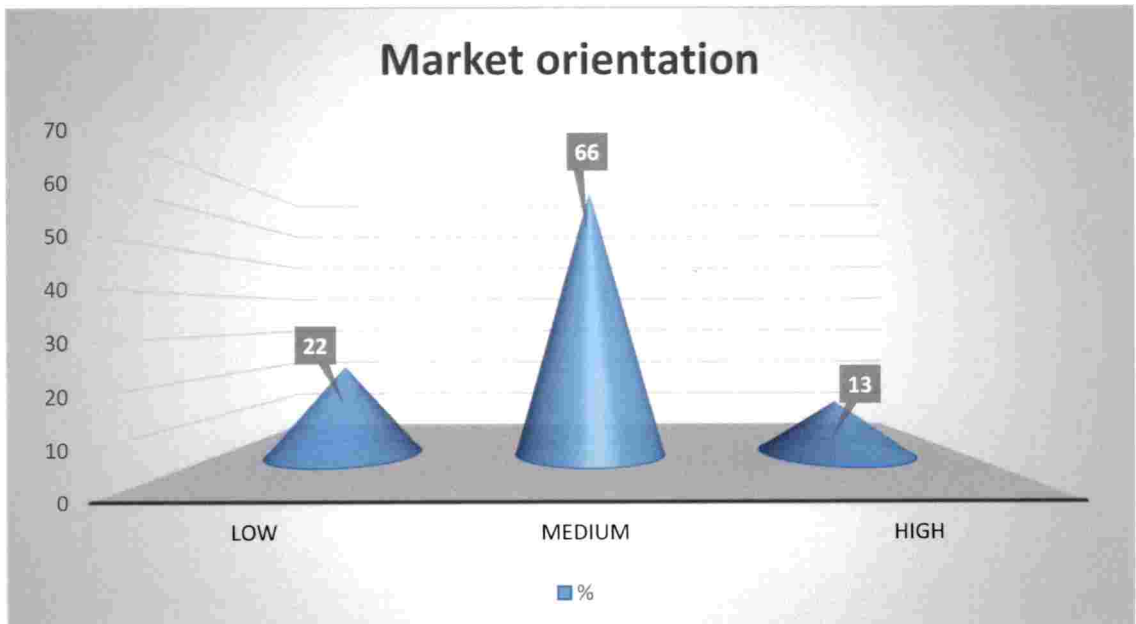


Fig.16. Distribution of respondents according to market orientation



1	no training	30	25	N=120
2	1-5 training	81	67	
3	6-10 training	9	8	
4	>10 training	0	0	
Total		120	100	

The data of Table 27 and fig 17 revealed that out of total vegetable growers, 67 per cent had attended 1 -5 training for the last three years. One fourth of the total vegetable growers never attended any training programme and only 8 % growers had attended upto 10.

There were no respondents who attended more than 10 training during the last three years. This finding is almost in conformation with the results of Rana (2010) and Namdeo (2007) that majority of the respondents attended more than one training.

4.4.7 Experience in vegetable cultivation

Table No.29: Distribution of respondents according to their experience in vegetable cultivation

N=120

Sl.no	Category	Frequency	Percentage
1	1- 2 Years	17	14
2	3-4 Years	19	16
3	5-6 Years	22	18
4	7-8Years	25	21
5	>8 years	37	31
Total		120	100

Farming experience possessed by the farmer is one of the prerequisites to take up agriculture as a profession. Farming experience of a farmer will help him in identifying the upcoming problems in farming and in also searching for proper solutions from different sources to encounter such problems, and farming experience is also helpful in generating new ideas in farming.

A perusal of data pertaining to vegetable growing experience of respondents shows that (Table 28 and fig 18) 31 percent of total respondents were having more than 8 years of farming experience followed by 7-8 years of experience (21%) and 5-6 years of experience (18%). Fourteen percent of the vegetable growers had 1-2 years of experience in vegetable cultivation in homesteads and 16% had 3-4 years of experience. Hence it was inferred that majority of the respondents were experienced farmers and the long experience can be ascribed to the fact that majority of the respondents belonged to middle and old aged category and farming is the primary source of income to many respondents. The result contradicts the findings of Jayapalan (1999) and is in confirmatory with the studies done by Jacob (2015).

4.4.8. Economic motivation

Table No.30: Distribution of respondents according to their economic motivation

N=120

Sl.No	Category	Frequency	Percentage
1	Low(6-14)	0	0
2	Medium(15-22)	68	57
3	High(23-30)	52	43
Total		120	100

Fig.17. Distribution of respondents according to training

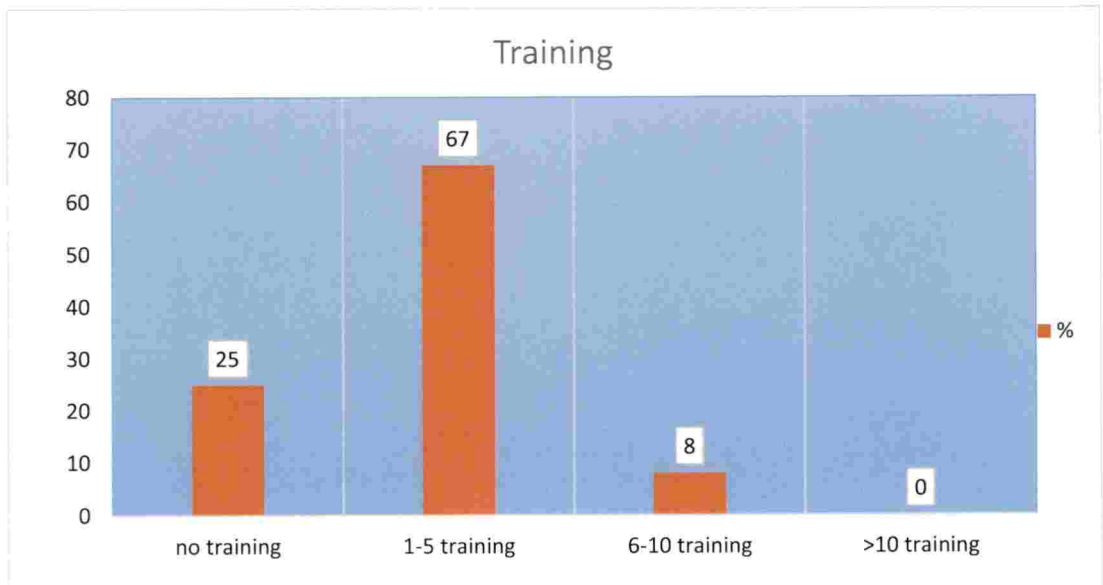
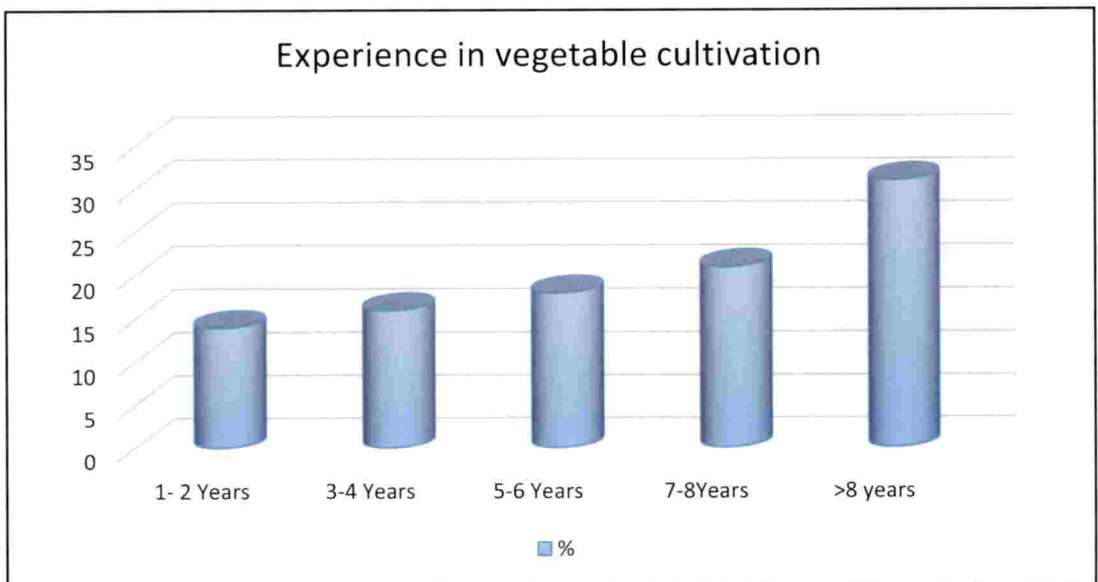


Fig.18. Distribution of respondents according to their experience in vegetable cultivation



The economic motivation of the respondents was grouped into three categories as depicted in table 26 and fig 19. The data in the table divulged that 57 % of the respondents possessed medium level of economic motivation, followed by high (43%). The data also highlighted that none of the respondents belonged to low economic motivation.

The probable reason that majority of respondents had medium economic motivation might be because they had more exposure with various private companies and close interaction with extension personnel. (Other reason might be peers had medium standard of living and their income were responsible for moderate economic motivation). The results are in accordance with the findings of Kumari (2014) and Chauhan and Patel (2003).

4.4.9. Risk orientation

Table No.31: Distribution of respondents according to their risk orientation

N=120

Sl. No	Category	Frequency	Percentage
1	Low (<19)	22	18
2	Medium (19-24)	72	60
3	High (>24)	26	22
Total		120	100

The data in table 30 and fig 20 inferred that majority (60 %) of the respondents had medium level of risk orientation, followed by high (22%) and low (18%) levels of risk orientation. The risk bearing capacity of individuals rely upon their personal, psychological, socio-economic characteristics.

It is evident from the results that contact with extension personnel by the respondents which might have increased the perception and confidence of the respondents about new technologies and to gain more income by taking risk. All these factors might have contributed to make the respondents to be in medium risk

Fig.19. Distribution of respondents according to economic motivation

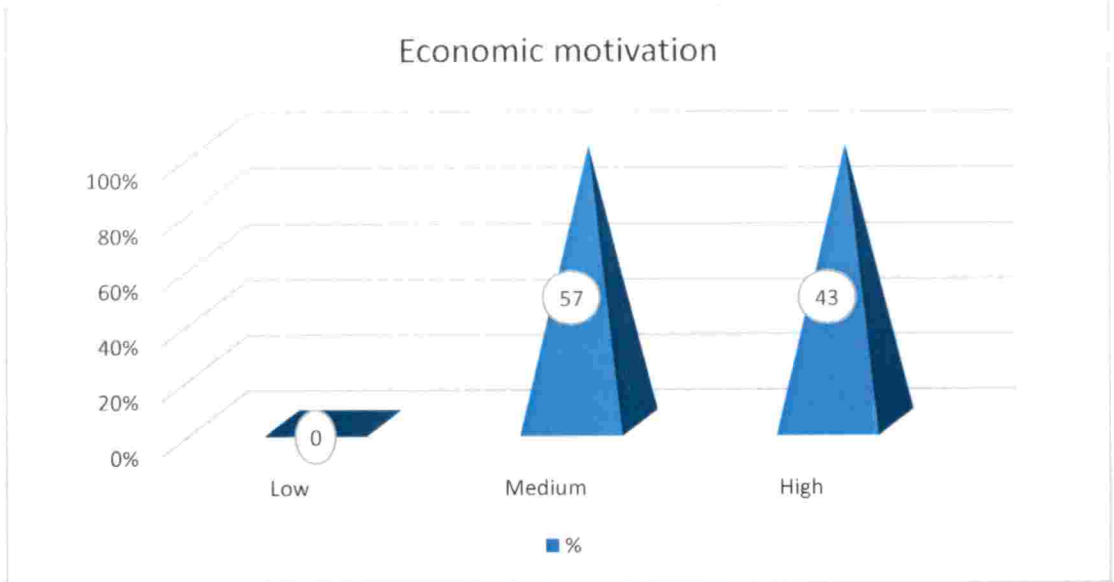
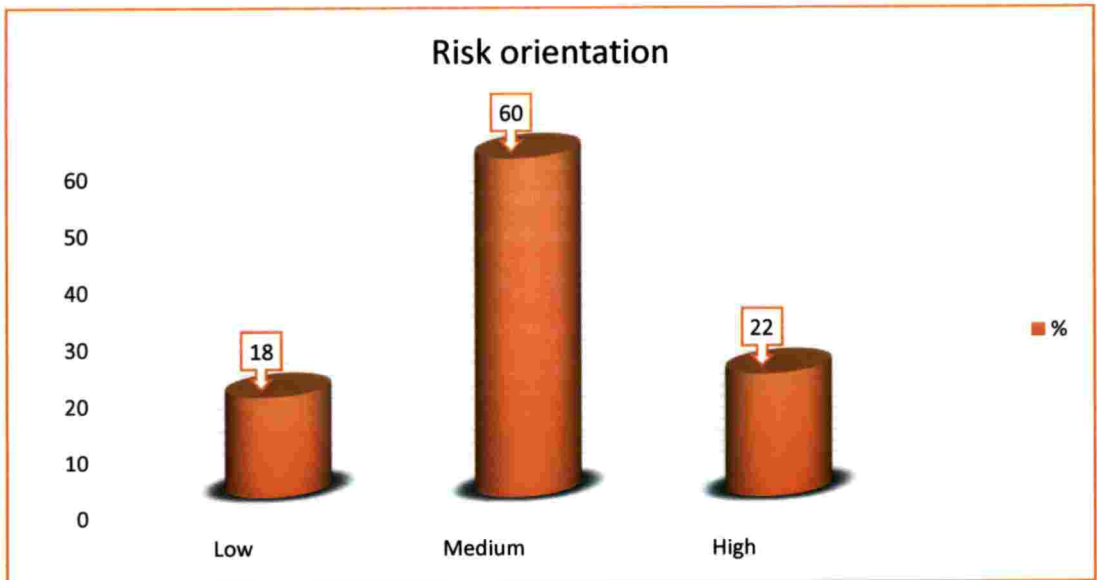


Fig.20. Distribution of respondents according to risk orientation



orientation. The results are in accordance with that of Bhagyalaxmi *et al.* (2003), Suresh (2004) and Kumari (2014)

4.4.10. Family labour utilization

Table No.32: Distribution of respondents according to their family labour utilization

N=120

Sl .no	Category	Frequency	Percentage
1	Low (10-16)	5	4
2	Medium (17-23)	44	37
3	High (24-30)	71	59
Total		120	100

The family labour utilization of the respondents is presented in table 31 and fig 21. It is evident that majority (59%) of the homestead vegetable growers were categorized in to high level of family labour utilization. 37 % were grouped in to medium level and 4% in low level, respectively. The possible reason for this would be that most of the homestead cultivation was predominantly handled by the idle family members including male, female, and children. The family labours determine the amount of labour to be hired. i.e. the farm family is the most important source of unpaid labour. The family head supervises farming activities and allocates jobs to family members based on ability, gender, age, the nature of farm operations and custom. The results are fitted to the findings of Mayra and Mehra (1990), Chidebelu (1990).

4.4.11. Extension orientation

It was obtained by summing up the values obtained in distribution of respondents based on their extension contact and extension event participation.

Table- No.33: Distribution of respondents according to their extension contact

N=120

Sl. No	Extension personnel	Frequency of exposure(percentage)		
		Regularly	Occasionally	Never
1	Agricultural scientist	30	60	10
2	Agricultural officer	54	41	6
3	Agricultural Assistant	48	46	6

From table 32 and fig 22 it was found that 54 percent of them contacted Agricultural Officer ‘regularly’ followed by Agricultural Assistant (48%) and scientists at KAU (30%). Respondents also stated that occasionally contacts were made with scientists of KAU (60 %) followed by Agricultural Assistant (46%).

Table No.34: Distribution of respondents according to their extension participation

N=120

Sl. No	Activities	Frequency of participation(percentage)		
		Regularly	Occasionally	Never
1	Study tour	25	35	40
2	Seminars	34	80	6
3	Exhibition	65	32	3
4	Group farming meetings	72	21	7
5	Demonstrations	34	50	16

On previewing the results of table 33 and fig 23 it was found that the percentage of regular participation of respondents for the various extension

Fig.21. Distribution of respondents according to family labour utilization

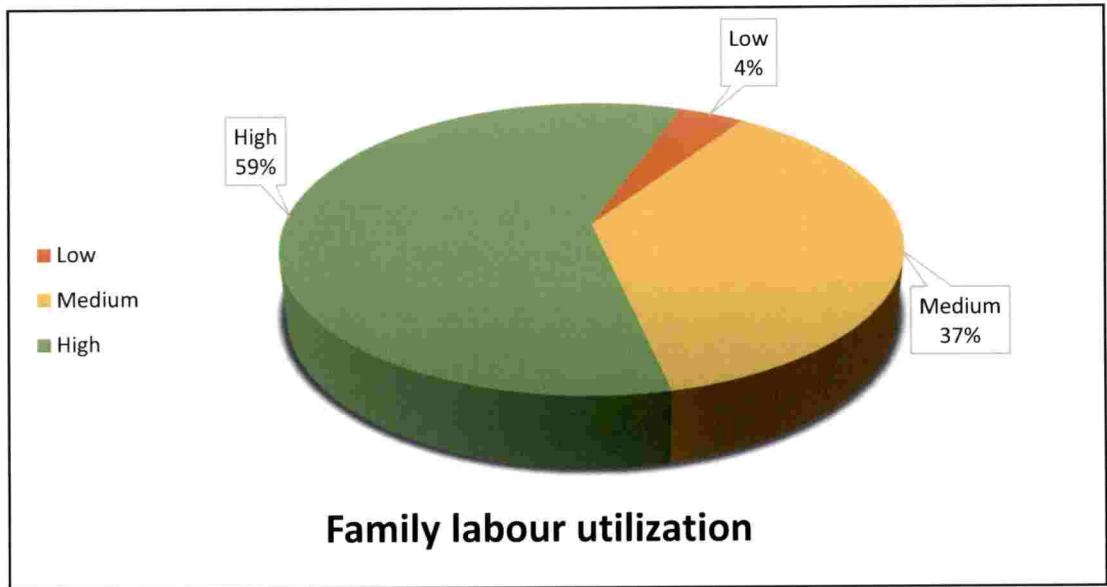
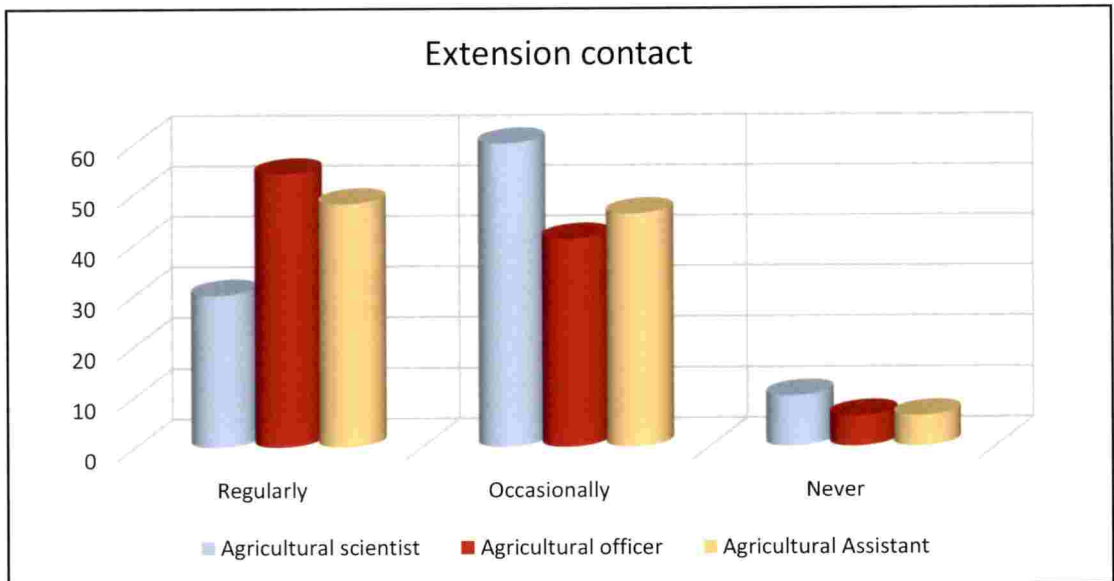


Fig.22. Distribution of respondents according to extension contact



activities was highest for group farming meeting (72%) followed by exhibitions (65%) and seminars (34%). Occasional participation was higher for seminars (80%) followed by demonstrations (50%), study tour (35%) and exhibitions (32%). Among all the activities study tour was the activity in which least number of participation was noticed.

Table No.35: Distribution of respondents according to their total extension orientation

N=120

Sl. No	Category	Frequency	%
1	Low (8-13)	22	18
2	Medium (14-19)	55	46
3	High (20-24)	43	36
Total		120	100

The observations on extension orientation in table 34 and fig 24 implied that 46 per cent of vegetable growers were having moderate and 36 per cent were having high extension orientation followed by 18 per cent of low extension agency orientation. So, it could be concluded that the majority of the respondents of the study area medium extension agency orientation.

The probable reason for majority of farmers belonging to medium category was because of their eagerness in solving their problems and better exposure with various institutes, officials and also their interest in extension activities to gather recent information and good contact with extension workers. This finding can also be considered as a result of farmer centered activities conducted by the extension officials and the influence of them among the farming community. The findings are keep up with the results of Ramanna *et al.*, (2000) and Anitha (2004).

Fig.23. Distribution of respondents according to extension participation

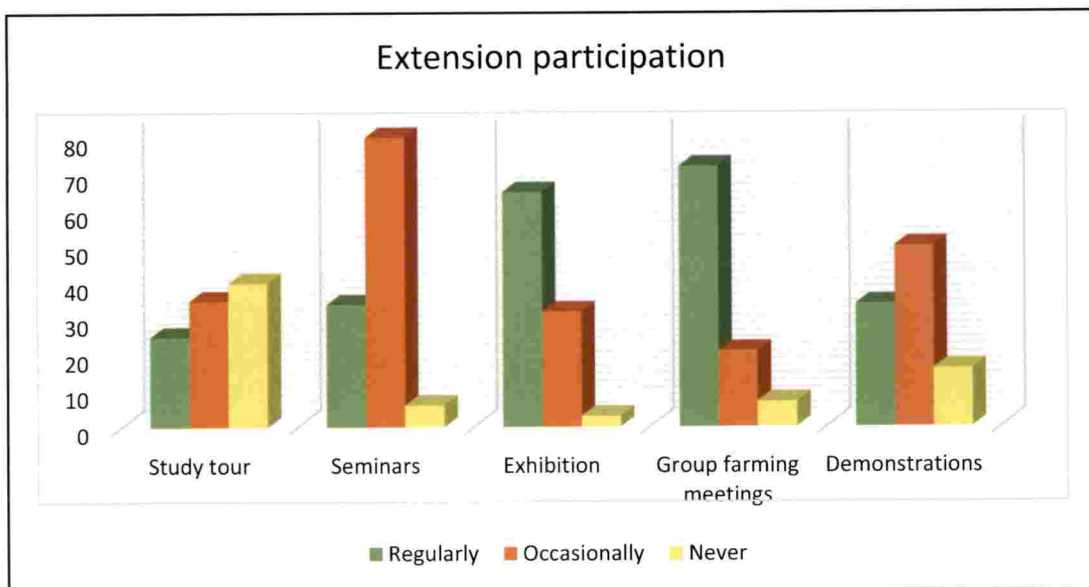
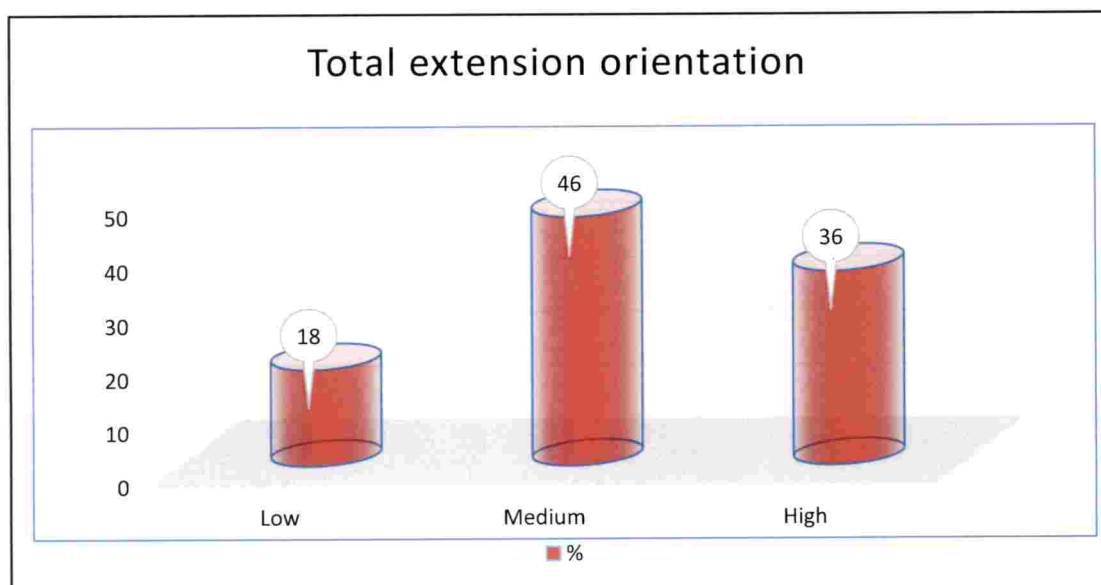


Fig.24. Distribution of respondents according to their total extension orientation



4.4.12 Information Seeking Behaviour

Table No.36:- Distribution of respondents according to their information seeking behaviour

N=120

Sl .no	Category	Frequency	Percentage
1	Low (8-18)	5	4
2	Medium (19-29)	89	74
3	High (30-40)	26	22
Total		120	100

Information seeking behaviour is very important and had direct impact on the knowledge levels of the respondents. The increased information seeking behaviour drives the farmer for the search of new information on vegetables cultivation.

From the Table 35 and fig 25, it is evident that majority (74%) of the homestead vegetable growers were belongs to medium information seeking behaviour. 22 and 4 per cent of respondents belonged to high and low categories, respectively. This result is in agreement with the results generated by Sligo *et al.* (2005), Gattu (2001) and Neelaveni *et al.* (2002).

Table No.37: Distribution of respondents based on the frequency of exposure to various information sources

N=120

Sl no.	Sources	Frequency of exposure(percentage)		
		Regularly	Occasionally	Never
Media sources				
1	Television	70	30	0

2	Radio	42	28	30
3	Newspapers	88	10	2
4	Agri.literatures	32	46	22
Formal sources				
1	Scientists of KAU	30	60	10
2	B.D.O, A.E.O	20	30	50
Informal sources				
1	Family members	89	10	1

The analysis of table 36 and fig 26 shows a clear picture of information sources utilized by the homestead vegetable growers. Majority (88%) of the homestead vegetable growers were utilizing newspaper for getting farm information, as all the farmers are educated and also newspaper is a low cost available media for all, it was used by most of the respondents. With regard to television, 70 % of them use it regularly and 30 % use it occasionally. Almost all the farmers have television of their own and hence this might be the reason for using it regularly. Radio was used by 42 % of the total respondents for getting information regarding vegetable cultivation.

This result also shows that more than one fourth of the respondents don't use radio. Other media like agriculture literatures were regularly utilized by 32 % of farmers and occasionally by 46 %. Majority of the farmers were consulting scientists of KAU for getting informations than B.D.O, A.E.O. Majority of the respondents had medium extent of information seeking behaviour. The above study revealed that mostly used mass media sources were newspapers, television, radio, agricultural literatures and institutionalized sources like scientist of KAU and non-institutionalized interpersonal sources like friends, family members, and relatives for accessing information on agriculture and homestead technologies. It clearly

Fig.25. Distribution of respondents according to information seeking behaviour

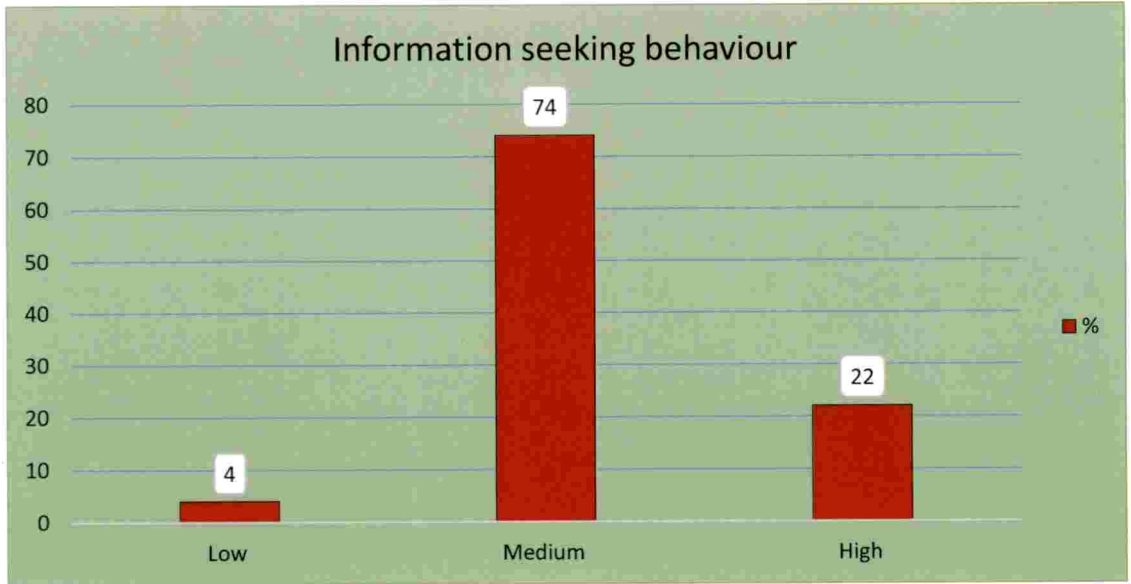
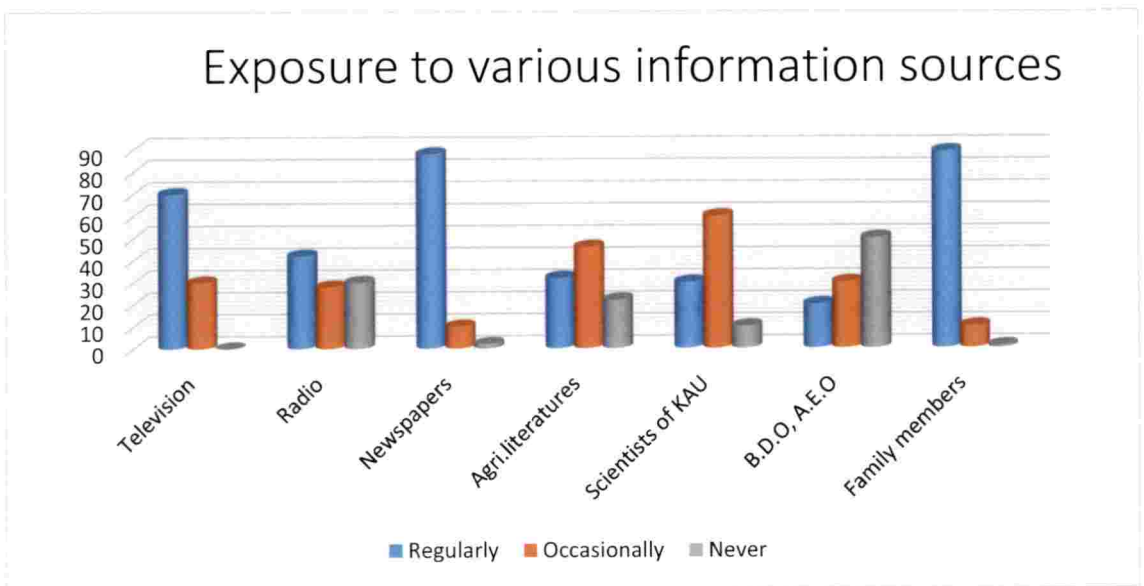


Fig.26. Distribution of respondents based on the frequency of exposure to various information sources



highlights the importance of these communicational media in providing information in rural areas.

4.4.13. Social participation

Table No.38: Distribution of respondents according to their social participation

N=120

Sl.no	Category	Frequency	Percentage
1	Low (5 -18)	7	6
2	Medium (19-32)	80	67
3	High (33-45)	33	27
Total		120	100

Table 37 and fig 27 reveal that out of the total vegetable growers 67 per cent were having medium level of social participation, 27 per cent had high social participation and 6 per cent had low social participation. The high literacy rate and extension orientation might have contributed to the medium level of social participation among the vegetable growers. The results are similar to the finding of Kumaran (2008).

4.5 RELATIONSHIP BETWEEN THE PROFILE CHARACTERISTICS OF VEGETABLE GROWERS WITH THE EXTENT OF KNOWLEDGE AND RATE OF ADOPTION.

4.5.1. Relation between the scale of knowledge on KAU practices with the selected characteristics of the respondents.

To find the relationship between the scale of knowledge of homestead vegetable growers with their selected profile characteristics correlation analysis was conducted and the result have been given below:

Fig.27. Distribution of respondents based on their social participation

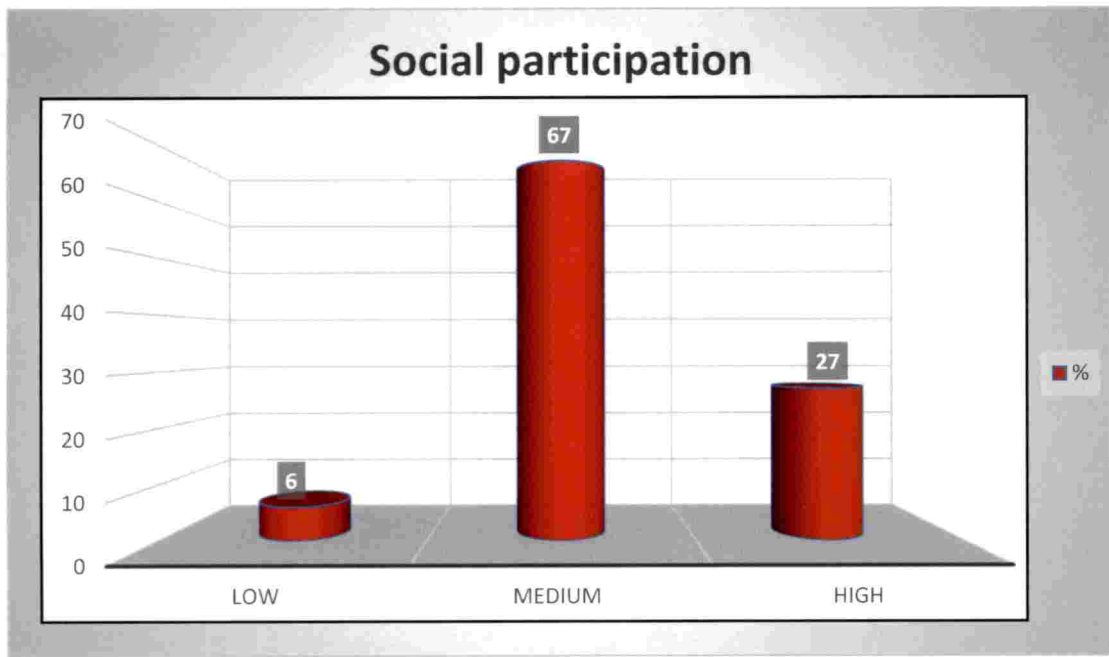


Table No.39: Relation between the knowledge on KAU practices with the selected characteristics of the respondents.

Independent variables	Correlation co-efficient
Age	-0.04
Education	0.20*
Occupational status	-0.07
Innovativeness	-0.03
Market orientation	0.13
Experience in vegetable cultivation	0.42**
Extension agency contact	0.27**
Economic motivation	0.19*
Family labour utilization	0.15
Information seeking behaviour	0.41**
Risk orientation	-0.11
Social participation	0.37**
Training	0.42**

* Significant at 5 per cent level

** Significant at 1 per cent level

A perusal of table 38 indicated that out of total variables, knowledge of vegetable growers was positively and significantly correlated with experience in vegetable cultivation, extension agency contact, economic motivation, education, information seeking behaviour, social participation, and training. Among these independent variables education and economic motivation were positively and significantly correlated to knowledge at 5%. Whereas the variables, experience in vegetable cultivation, extension agency contact, information seeking behaviour,

social participation, and training were positively and significantly correlated to knowledge on KAU practices at 1 % level of significance.

The results furnished that knowledge of vegetable growers were positively and significantly related to education level of the growers. The possible reasons for this trend is attributed to advantages of education to individual for acquisition of knowledge, broadening the vision and motivating towards higher accomplishment. An educated vegetable grower can understand the ways to acquire, analyse, synthesis, evaluate and communicate knowledge and information in an appropriate way and develop the skills that will respond to changing nature of agriculture. This variable also helps in decision making and to manage over all planning, production and marketing aspects with higher efficiency. Similar findings are reported by Subramanyeshwari and Reddy (2003).

Farming experience possessed by the farmer were positively and significantly related to scale of knowledge. The farming experience of a farmer will help him in identifying the upcoming problems in farming and in also search for proper solutions from different sources to tackle such problems. This might be the reason behind this relationship. This finding is seemed to be true to the results of Reddy *et al.* (2007) that the significant relationship between farming experience and knowledge.

A significant and positive relationship existed between knowledge of homestead vegetable cultivation practices and extension agency contact. The knowledge level of respondents regarding the homestead vegetable cultivation practices increases with increase in the frequency of contact with development agents and frequency of participation on various extension activities. This hinted that frequency of contacts with extension agent is very much helpful to reform the knowledge and skill of growers on various farm technologies, practices or activities. Thus, the exposure to various extension activities in the rural areas is essential to the vegetable growers. In addition to it, participation in extension activities ameliorates the knowledge and increases the concern of farmers about agricultural

activities. Participation of homestead vegetable growers in extension programmes allows them to recognize their constraints regarding vegetable cultivation and thereby develop strategies to mitigate the constraints. This finding is in agreement with the result of Dinpanah *et al.* (2010).

Social participation had a significant, positive strong relationship between knowledge of homestead vegetable cultivation. Which insinuated that social participation can provide an impact on knowledge of vegetable cultivation practices. This might be due to the fact that vegetable growers who interact with various informal and formal institutions in the society get more exposure than others which helps to acquaint new information. This study is in compliance with then study of Jemal (2006).

There observed a positive and significant relationship between information seeking behaviour and knowledge level of vegetable growers. The increased information seeking behaviour drives the farmer for the search of new information on nutrient management in vegetables and also for application in the field. This insinuated that, when the keenness of homestead vegetable growers to acquire information regarding vegetable cultivation increases, the effort for that will increase their knowledge of homestead vegetable production. The findings of this study is true to the study done by Elias (2005).

The results provided that there was a significant positive relationship between economic motivation and scale of knowledge. This may be due to the fact that farmers are expecting more returns per unit of investment from farming. When one develops higher levels of economic motivation and wants to achieve it, he would strive himself hard to get knowledge about different aspects of homestead cultivation practices besides aiming at profit maximization Hence, the derived result. The findings are commensurate with the result of Narmatha *et al.*, (2002).

Training was found to be positively and significantly related to scale of knowledge. Organizing and conducting training programmes based on felt needs of homestead vegetable growers, would definitely influence and change the

knowledge level of growers in a desired manner. The findings are in line with Namitha (2017).

4.5.1 Relation between the extent of adoption of respondents on KAU practices with the selected characteristics of the respondents.

To find the relationship between the extent of adoption of homestead vegetable growers with their selected profile characteristics correlation analysis was conducted and the result have been given in table 39.

Table No.40: Relation between the extent of adoption on KAU practices with the selected characteristics of the respondents.

Independent variables	Correlation co – efficient
Age	-0.03
Education	0.14
Occupational status	0.19*
Innovativeness	0.05
Market orientation	0.15
Experience in vegetable cultivation	-0.36**
Extension agency contact	0.31**
Economic motivation	0.22*
Family labour utilization	0.21*
Information seeking behaviour	0.44**
Risk orientation	-0.12
Social participation	0.30**
Training	0.49**

* Significant at 5 per cent level

** Significant at 1 per cent level

From the table 39 it is clear that the extent of adoption of homestead vegetable growers was positively and significantly correlated with occupational status, extension agency contact, economic motivation, family labour utilization, information seeking behaviour, social participation, and training. A negatively significant correlation was noticed between extent of adoption and experience in vegetable cultivation. Among these independent variables occupational status, economic motivation, family labour utilization were positively and significantly correlated to extent of adoption at 5 %. Whereas the variables extension agency contact, information seeking behaviour, social participation, and training were significantly correlated to extent of adoption at 1 %.

The occupation of vegetable growers was found have a positive and significant relationship with extent of adoption of KAU practices. It means occupation of farmers exerted its influence on the rate of adoption of technology with respect to vegetable production. This might be due to the fact that majority of the respondents takes farming as a sole profession for their livelihood. The results are in compliance with that of Kumawat (2005).

Experience in vegetable cultivation had a negative and significant relation with extent of adoption. The experience attained through years decelerates the innovation decision process to a crawl, with adoption lagging far behind awareness and knowledge of a new idea. Their rich experience in homestead vegetable cultivation forces them to continue the same practices instead of adopting a new one. It is inferred that respondents who were young had higher extent of adoption of homestead vegetable cultivation technologies than their older counterparts. Youngsters were more encouraged to adopt them since they were full of energy and enthusiasm as compared to middle and old aged respondents who might be skeptical. Similar result was reported by Kumari (2014)

Extension agency contact had a positive significant relation with extent of adoption. Extension participation helps the farmers to get information from various

sources. Extension activities conducted in the area have direct effect on gain in knowledge about improved agricultural practices. Greater contacts with extension personnel might have motivated the farmers in various ways and they might have gained more knowledge due to the wider exposure, contact and interaction with source of technical information that is extension personnel. It helps the farmers to adopt new agricultural practice earlier than others in his social system. This kind of farmers who are early adopters were consulted by fellow farmers for information and readily accepted as leaders. The results are in consonance with the reports of Kumar *et al.* (2013) and Patel *et al.* (2003).

Economic motivation showed a positive and significant correlation with extent of adoption at 5 %. Economic motivation is the basic character upon which other motives, drives and other attributes are built. It psychologically conditions an individual to orient himself to achieve higher income. Some homestead vegetable cultivation is a highly remunerative enterprise; one could develop higher levels of economic motivation. When one develops higher levels of economic motivation and wants to achieve it, he/she would strive hard and get internalize himself/herself about different aspects of vegetable cultivation practices besides aiming at profit maximization. Hence, it is quite natural to expect this type of relationship. This finding is in line with that of Namitha (2017)

There was a positive and significant correlation observed between extent of adoption and family labour utilization. Labour is one of the major factor of production in the traditional farming systems and so that the utilization and productivity of labour is a vital component in increasing the agricultural output and incomes of small farmers. Due to the severe labour scarcity and high wage rate of labours the homestead cultivation mainly depends on family labours. They are the most important source of unpaid labour. If the family members contribute sincerely they can reduce the dependency on hired labours and thereby they can adopt all the practices that they want at minimal cost.

A significant and positive relationship existed between extent of adoption and information seeking behaviour. Information seeking behaviour has a significant role in the dissemination of information and creating awareness among farmers about homestead vegetable cultivation. This indirectly influences their knowledge thus influencing the extent of adoption. The results are in line with the report of Suresh (2004)

Social participation showed a positive and significant relation with extent of adoption. More social participation of the homestead vegetable growers exposes them to different information regarding improved farming practices which succoured to strengthen their knowledge and skills to improve the accuracy of execution of the technology packages. This result is on par with that of Jemal (2006), where he observed a positive relationship between social participation and adoption of dairy package. This finding is also in line with that of Aparna (2009).

Training was positively and significantly related to extent of adoption. The participation in training programmes provide the opportunities for gaining experiences and serve as reinforcement in gaining knowledge about agricultural innovations leading to quick decision to adopt innovations. The results are similar to that of Namitha (2017).

4.6. Constraints faced by the respondents in vegetable production.

One of the objectives of the study was to find out the constraints being faced by the farmers in vegetable production practices in homesteads. An attempt has been made to identify the major constraints. The respondents were asked to give score for the constraints they faced and based on the score the problems were ranked in order of their importance, which has been presented under two headings.

Table No.41: Constraints faced by the respondents in homestead vegetable cultivation.

Sl no.	Constraints	Total obtained score	Rank over class	Rank over total
A.	Crop management constraints			
1.	Prevalence of pest and diseases	410	2	2
2.	Labour scarcity	358	3	6
3.	Non availability of good quality seeds	293	7	10
4.	Non availability of inputs in time	312	4	7
5.	Lack of awareness and knowledge about high yielding varieties	289	8	12
6	Inadequate extension support	247	12	16
7	Inadequacy of capital	272	9	14
8	Lack of knowledge about post harvest handling	244	13	19
9	Lack of time for home garden activities.	267	11	15
10	High perishability	300	6	9
11	Lack of storage facilities	260	12	18
12	Crop damage due to animal attack	197	14	21
13	Non assurance of premium price for organic products	303	5	8
14	Scarcity of water resources	440	1	1
B.	Economic constraints			
1	High cost of cultivation	362	3	5
2	Price fluctuation	398	1	3

3	High labour charges	371	2	4
4	Lack of marketing facilities	238	7	20
5	High transportation cost	256	6	17
6	Non availability of credit	292	4	11
7	Inadequate facilities for value addition	277	5	13

From the data presented in table 40 among the different constraints indicated by respondents the most acutely faced problems were scarcity of water resources, prevalence of pest and diseases, price fluctuation, high labour charges, high cost of cultivation, labour scarcity, non availability of inputs in time and non assurance of premium price for organic products. Similar results were reported by Sujitha (2015) and Thasneem (2016).

Among the crop management practices most important constraints were scarcity of water resources, prevalence of pest and diseases, labour scarcity, non availability of inputs in time, non assurance of premium price for organic products, high perishability and lack of time for home garden activities. Similar results were reported by Jaganathan (2004) and Thasneem (2016).

The scarcity of water from Sasthamkotta Lake affected the water distribution in the study area as pumping was limited to alternate days. The acute water shortage in selected area is apparently due to cessation of local water sources. The problems of pest and diseases may due to the low adoption rate of plant protection practices, change in climatic conditions, non-adoption of crop rotation i.e, growing same crop in same field subsequently, variation season i.e. not sown in recommended season and continuous use of same chemicals to control the particular disease and pest.

The reasons for unavailability of quality seeds could be attributed to a number of factors. One important reason is the high price of HYV seeds. The state Agriculture Department was the important source from which most of the farmers obtained HYV seeds free of cost under some programmes. But these schemes are not a regular occurrence which forces the farmers to procure seeds from other sources. Moreover, seeds that were available to the farmers through these programmes were sometimes of low quality. Besides these some progressive farmers purchased seeds from other seed sources like KVK and Regional Agricultural Research Stations etc. Their cosmopolitaness, better economic status and knowledge enabled them to go for alternative sources. However, distance was a major problem for the farmers in collecting the seeds. Therefore, seed unavailability is a major problem and good quality seeds should be provided to farmers in the right time.

The central and state governments have a significant role in the supply of inputs and other support services to the farmers through the Department of Agriculture Development Farmers Welfare and other specialized organisations. Though, over time, the efficacy of these institutions were abraded for a variety of reasons, which includes insufficient staff, lack of sufficient funds and lack of motivation between the service providers. Apart from these reasons, the majority benefits of agricultural support system are cornered by large and medium farmers, and small and marginal farmers were being neglected to a greater extent. Some homestead vegetable growers reported the constraints regarding the poor quality and adulteration of fertiliser. Due to high literacy rates, lack of professional and skilled jobs Keralites were encouraged to look for higher wages and skilled labour outside India. This trend causes a decline in the availability of workforce in Kerala especially in agricultural sector. Withdrawal of young people from agricultural sectors was found to be main cause for shortage of labour. Agricultural activities involve physical labour and youth especially those having school education do not consider the agriculture work as white collar job. Employment opportunities in non-

agriculture sector, chances for migration of labour to other parts of the country and abroad also can be considered as the reason for labour shortage.

Constraints which were given less importance by the growers were crops damage due to animal attack, lack of knowledge about post harvest handling, lack of storage facilities, inadequate extension support.

When it comes to economic constraints price fluctuation was perceived as top priority by the respondents and was ranked first in problem hierarchy. Price fluctuation may be due to the changes in supply and demand and changes in weather condition. The second ranked constraint was high labour charges. As adequate number of labourers were not available in the locality, the existing labours demanded higher wages.

The third and fourth most important problems were with respect to cost of cultivation and lack of credit on time. The high cost of manures, pesticides, high wage rate and high cost of agricultural equipments were the reason behind high cost of cultivation.

Loans from the normal banking system require collateral or counter guarantee economically backward cannot offer and therefore, cannot get loan in appropriate time. Lack of marketing facilities, high transportation cost, inadequate facilities for value addition were ranked lowest in the constraints hierarchy. The results are in line that of Patil *et al.* (2014)

4.7 STRATEGY TO MITIGATE THE CONSTRAINTS

4.7.1. Suggestion for overcoming the constraints as perceived by farmers.

The suggestions put forward by farmers for overcoming the constraints identified were given in table 42.

Table No.42: Suggestion for overcoming the constraints as perceived by respondents.

SI no	Suggestions	Frequency	Percentage
1	Fixation of minimum support price for organic produce	69	58
2	Establishment of separate market facility for sale of organic produce	43	36
3	Arrangement for certification of produce for getting better price	48	40
4	Arrangements for supply of inputs, loans in time	75	63
5	Promotion of value addition technologies and facilities	62	52
6	Participation of NREGS to agricultural sector	90	75
7	Inclusion of accessible and low cost technologies	52	43

The elicited suggestions by the farmer to overcome their constraints are presented in table 41. Most of the vegetable growers suggested the introduction of NREGS workers to agricultural sectors will reduce the constraints of labour scarcity and high wage rate (75%), more than fifty per cent of farmers (63%) pointed out that proper arrangements should be needed for the supply of inputs, loan and to get other information related to cultivation. Fifty eight percent suggested they need an intercession by the state Government for fixing minimum support price for organic produce.. Promotion of value addition technologies and facilities (52%), inclusion of accessible and low cost technologies (43%), Compact plans should be promoted for getting certificates for their produces for getting better price (40%) were the

other expressed suggestions. were the other expressed suggestions. Around 36% of homestead vegetable growers were having a suggestion regarding the establishment of separate market facility mainly for the selling of organic vegetables.

4.7.2. Strategy to mitigate the constraints.

Irrigation is an essential factor for vegetable cultivation. To solve the acute water shortage especially during the summer seasons, make use of rain water harvesting systems in the homesteads. This is one of the simplest and cost effective water preservation systems. As per the government order of local self government department, all new buildings should have either rainwater harvesting tanks or rain water percolation pits. A project named 'Varsha' (rain water harvesting scheme) was launched by under the aegis of KWA (Kerala water authority) envisaging construction of ferro cement rain water harvesting systems in the districts of Ernakulam, Alleppy, Kottayam, Trivandrum and Pathanamthitta. This clearly calls for necessary implementation of government order in Kollam district also which will not undermine the traditional wisdom of Keralites to conserve the rain water at their homesteads. They may allowed to collect and make use of rainwater thereby can reduce the water scarcity maximum as possible.

In case of labour shortage, necessary amendments may be made in government orders to deploy NREGS workers in agricultural sector also. In many Krishibhavans, they have formed group named 'Karmasena', with the main objective of solving labour shortage. These types of initiatives can be taken up by all Krishibhavans by which we can solve the problem of labour scarcity and high wage rate. Along with these, ensuring maximum participation by the family members also help to reduce the dependency of hired labours.

Appropriate advance planning is required to make sure that all the inputs which are essential for the production of vegetables like good quality seeds or planting materials, fertilisers, and credit are made accessible to the homestead growers on time and in sufficient quantity. Revamping of these programmes and

the delivery systems at the grass root level is needed to defeat the problems felt with homestead vegetable growers. It is not just a matter of allocating more funds and staffs, but the whole approach to the delivery system has to change which is concentrating on the end-user that is the farmer.

Special attention should be given by the extension personnel to increase the rate of adoption of plant protection practices. Most of the homestead vegetable growers preferred organic farming so that they were not adopting any chemicals for plant protection. Some farmers use pesticides which were recommended by dealers without even the knowledge of name of the pesticide. Hence, an integrated pest and disease management approach by the concerned research institutes, development departments, government agencies play a key role for invigorating the homestead vegetable growers to accept the KAU plant protection practices.

It is suggested that to enhance the participation of homestead vegetable production it is important to increase the access to credit by strengthening local micro-finance institutions and lowering down the payments.

These results are in compliance with the findings by Thimmareddy (2001) and Shashidhara (2006).

Summary

V. Summary

Vegetables are integral component of a healthy human diet. A meal without a vegetable is assumed to be incomplete. Kerala is a consumer state for vegetables and the major portion is produced in the neighbouring states. Hence a systematic and planned development in vegetable production area is necessary to cater to the nutritional requirement of the masses. The challenge of attaining self-sufficiency in vegetable production in Kerala's peculiar situation of limited cultivable area can be achieved through promotion of homestead farming. In this context, family farming assumes great importance for conservation as well as cultivation. Thus, the homesteads can be best utilized for vegetable production as they are known to give higher yields per unit area. Homestead cultivation can be promoted not only for improving the availability of food to households but also increasing their ability to access quality foods. Homesteads are heavily dependent on family labour and in the case of vegetable cultivation women play a prominent role. Approximately 70 per cent of all farmers in the developing world are women. Women play a critical role in all aspects of agriculture, but invariably their intellectual role and managerial skills remain unrecognized, unreached and untouched by the developmental efforts. Hence the present study seeks to carry out with the following objectives:

1. To identify the gender roles of vegetable growers in Kollam district.
2. Their scale of knowledge about vegetable production practices.
3. Rate of adoption about vegetable production practices.
4. Constraints faced by the respondents in vegetable production.
5. Formulation of strategy to mitigate the constraints faced.

The present study was conducted in six Panchayats from two Agro Ecological Units of Kollam district. Nedumpana, Veliyam, Ummannoor, Kadakkal, Chithara, Piravanthur panchayath were the selected panchayaths based on the maximum area and production of vegetables. The research design used for conducting the study was ex-post facto research design. Twenty respondents were selected from each panchayaths. Thus, the total sample size of 120 homesteads. Data was collected by using a detailed interview schedule employing personal interview method, which included aspects like gender role analysis of the farmers involved in homestead

vegetable cultivation, scale of knowledge and rate of adoption about KAU cultivation practices and constraints faced by the farmers. The responses were scored, quantified, categorized and tabulated using statistical methods like percentage, frequencies and correlation.

Scale of knowledge and rate of adoption of different production and plant protection practices of selected vegetable (amaranthus, chilli, bitter gourd, okra, ivy gourd) included in the package of practice of KAU was selected as the dependent variable and the independent variables were age, education, occupational status, training, experience in vegetable cultivation, economic motivation, innovativeness, market orientation, extension agency contact, family labour utilization, information seeking behaviour, risk orientation, social participation.

5.1 Salient Findings of the Study:

The important findings of the study are presented under the following heads:

1. The result of the present study showed that more than half of the total homestead vegetable growers (64%) belonged to middle age group (35-55 years).
2. The results showed that 99 per cent of the respondents were educated in levels ranging from primary school to college level. One per cent of vegetable growers could read and write, followed by 14 per cent growers who had education up to primary and 42 per cent growers were having high school level education. The percentage of respondents having professional degree was only 2%.
3. As regards the occupation, 58% of the vegetable growers reported agriculture as their main occupation.
4. Forty nine percentage of growers were belongs to low innovative category followed by 42 with medium innovativeness followed by per cent in high innovativeness.
5. The data shows that 66 per cent of the growers had market orientation in medium level, followed by 22 per cent and 13 per cent in low and high market orientation category, respectively.

6. The study further revealed that out of total vegetable growers, 67 per cent had attended 1 -5 training in the last three years .One fourth of the total vegetable growers never attended any training programme and only 8 % growers had attended up to 10 training.
7. A perusal of data pertaining to vegetable growing experience of respondents showed that 31 total respondents were having more than 8 years of farming experience followed by 7-8 years of experience (21%) and 5-6 years of experience (18%).Only 14 % of the vegetable growers had 1-2 years of experience in homestead vegetable cultivation.
8. Fifty seven percent of total respondents were having medium economic motivation which is preceding high level (43%). The data also highlighted that none of the respondents belonged to low economic motivation.
9. The result showed that most (60%) of the homestead vegetable growers had medium level of risk orientation.
10. It is reported that family labour utilization pattern in homesteads of Kollam district showed that majority (59%) of the growers in high level of family labour utilization which is preceding medium (37%) and low (4%), respectively.
11. The observations on extension orientation implied that 46 % of growers were having medium and 36 per cent were having high extension agency contact followed by 18 per cent with low extension agency contact. It also reported that 54 of them contacted Agricultural Officer 'regularly' followed by Agricultural Assistant (48%) and scientists at KAU (30%) and it was found that the percentage of regular participation of farmers for the various extension activities was highest for group farming meeting (72%) followed by exhibitions (65%).
12. In regard to the information seeking behaviour majority (74%) of the homestead vegetable growers had medium information seeking

behaviour .22 and 4 per cent of the growers were categorised to high and low categories.

13. In context of social participation out of the total vegetable growers 67 % of homestead vegetable growers were in medium level of social participation, whereas 27 % in high social participation and 6 per cent had low social participation.
14. On analysis of the overall data, we can conclude that major women oriented decisions are those related to child rearing and religious activity. The decisions regarding the transfer and ownership of ancestral properties, decision regarding various farm operations, entertainments were mainly men oriented decisions. Both men and women had significant role in decisions regarding elderly people in the house, education, jobs to be taken, expenditure of income, health related issues and household decisions.
15. Both the gender jointly, was able to enjoy the benefits of basic facilities like income, education, medical facilities, transportation facilities and training and skill development. But in case of political interventions, technological development, extension agency contact benefits were utilized more by men than women. The benefits of government policies and incentives, farmer groups and employment opportunities were utilized more by women.
16. Among all the agricultural activities major women oriented activities were post-harvest operations and livestock and poultry activities. In case of men, 60% of men involved in land preparation and 74% of them engaged in plant protection activities. The percentage involvement of men respondents in the activities like fertilizer application, collection and arrangements of inputs, were 61% and 42%, respectively.
17. From the data 43% of the total respondents reported that both men and women were engaged in harvesting of produce. Other activities in which both men and women had a significant role were planting

(62%), mulching (63%), weeding (61%), staking (58%) and sowing (48%). There were no activities which were done by men or women alone

18. It is clear that food preparation activity was 100% women oriented and 77% of childcare activity were carried out by women. Other women ++oriented activities were elderly care (68%), collection of water (67%) and cleaning activities (66%). The participation of women in off farm and house activities such as daily wage labourers (14%) were also identified. Among these household activities there was no particular men oriented activity.
19. For the resources like labour (82%), land (58%), money (66%) and technology (64%) the more access was recorded on men but they did not have sole control over the same. There was no single resource for which women had a sole access, it does not mean that such resources were not available for use of women instead it meant that for the use and control of such resources women required assistance or permission of their spouse.
20. From the data we can conclude that out of various factors, positively influencing factors for women were they were allowed to pursue education and take up jobs as their wish, allowed to inherit properties of their parents, they get equal medical facilities, they were allowed to take part in meeting and social gathering, allowed to take up jobs outside their community, they were allowed to vote in election and allowed to enjoy the democratic rights of a citizen.
21. Negatively influencing factors for women were they were not allowed to stay outside the home for late hours, not allowed to marry outside from their community, they were not allowed to travel to distant place alone, they were not able to choose entertainment of their choice, did not get equal wages for the same amount of work, they were not given incentives timely, not allowed to enjoy the

benefits of political interventions and were not allowed to take up political positions in the society.

22. All the factors except four have a positive influence on men. The negatively influencing factors were not allowed to marry outside from their community, unavailability of incentives in time, lack of opportunities to take up political powers in the society and enjoy the benefits of political interventions.
23. Respondents based on their knowledge regarding the vegetable cultivation practices revealed that the majority of respondents had medium level of knowledge about vegetable cultivation and few of them (39 %) were belongs to high knowledge category whereas, only 12 % were in low knowledge level category.
24. The percentage of knowledge of respondents with regard to KAU cultivation practices of selected vegetables found that most of the homestead vegetable growers had knowledge about the KAU varieties, sowing methods, spacing, pest and diseases attack of the particular crops, harvesting etc. Whereas minimum knowledge was noticed in practices like seed rate, pesticide doses and irrigation methods.
25. When we compare the knowledge about KAU cultivation practices for the selected vegetables, it was found that the homestead vegetable growers from Kollam district possess similar level of knowledge regarding KAU practices of amaranthus, chilli, okra and bitter gourd, which indicates that the farmers gave equal importance to all the four vegetables and so efforts are taken to update their knowledge in all these crops.
26. It is clear that of the total, 72 percentage of respondents were observed in the category of medium level of adoption. Twenty percentage were found having high level of adoption. It was also found that 8 percentage of the respondents were categorised into low level of adoption.

27. The results showed that most of the homestead vegetable growers were adopting KAU varieties and they follow almost all the cultural practices like seed treatments, seed rate, land preparation, weeding, application of manures etc. as per the recommendation of package of practice.
28. A partial adoptivity was noticed in case of application of NPK fertilizers that means they didn't regularly follow the exact dosage and time of application. Similar trend was observed in case of plant protection measures. The low adoption of 'plant protection measures' might be due to the reason that most of the growers were not using insecticides.
29. When we compare the extent of adoption about KAU practices in the selected vegetables, it was clear that there is no significant difference between the adoption of KAU practices in these four vegetables. The high and equal knowledge rate for all crops among the growers can be considered as the reason behind above result.
30. The data revealed that 2 of total respondents belonged to innovator category which was almost on par with the normal Rogers curve (2.5%). The early adopter percent (18 %) was higher than the standard per cent of 13.5 in Rogers curve. Early majority per cent of 33 per cent was almost in line with the normal curve. Thirty one of total respondents were belonging to late majority which was lesser than the normal value of 34. Whereas the laggards were found to be 17 per cent, slightly greater compared to the normal Rogers curve.
31. Among these independent variables education and economic motivation were positively and significantly correlated to scale of knowledge at 5 %. Whereas the variables, experience in vegetable cultivation, extension agency contact, information seeking behaviour, social participation, and training were positively and significantly correlated to scale of knowledge at 1 % level of significance.

32. Among independent variables of occupational status, economic motivation, family labour utilization were positively and significantly correlated to extent of adoption at 5 %. Whereas the variables experience in vegetable cultivation, extension agency contact, information seeking behaviour, social participation, and training were significantly correlated to extent of adoption at 1 %.
33. Among the different constraints indicated the major problems faced by the homestead vegetable growers were scarcity of water resources, prevalence of pest and diseases, price fluctuation, high labour charges, high cost of cultivation, labour scarcity, lack of availability of inputs in time, non assurance of premium price for organic products.
34. The elicited suggestions by the farmer for their constraints indicated that, most of the growers had an opinion that the introduction of NREGS workers to agricultural sectors will reduce the labour scarcity and high wage rate (75%). More than fifty per cent of farmers (63%) highlighted that proper arrangements should be done for the supply of inputs, loan and other needed information. 58% suggested that they need an intercession by the state Government for fixing minimum support price for organic produce. Promotion of value addition technologies and facilities (52%), inclusion of accessible and low cost technologies (43%). Compact plans should be promoted for getting certificates for their produces for getting better price (40%) were the other expressed suggestions. Around 36% of homestead vegetable growers were having a suggestion regarding the establishment of separate market facility mainly for the selling of organic vegetables.
35. To solve the acute water shortage especially during the summer seasons, rain water harvesting systems in the homesteads should be encouraged.

36. In case of labour shortage, the respondents suggested that necessary amendments, be made to bring the NREGS workers to the agricultural sector. In many Krishibhavans, they have formed groups named 'Karmasena', with the main objective of solving labour shortage. These type initiatives can be taken up by all Krishibhavans by which we can solve the problem of labour scarcity and high wage rate.

5.2. Implications of the study

The implications of the study, documented on the basis of the findings of the investigation, would serve as pace setter for future endeavours, researchers and extension personnel. Hence an attempt was made to document the implications of the present study in the form of suggestions so as to improve the knowledge level, develop favourable attitude and improve adoption rate of recommended cultivation practices of KAU by the homestead vegetable growers.

Two-third of the homestead vegetable growers had favourable attitude towards safe to eat vegetable production, which implies that these cultivation practices are being perceived useful by vegetable growers and hence these should be further promoted throughout the state.

Medium knowledge level of the respondents implies that more effort is needed to be done to better the knowledge level of vegetable growers on all the practices equally.

Majority of respondents were in medium level of adoption. This has an implication that there is still scope for betterment of adoption rate of homestead technologies by respondents. Also, efforts should be made to ensure that all the technologies get disseminated and consequently adopted equally by the growers.

The problems and solutions given by the respondents would serve as a benchmark for the scientists, extension scientists, State Department of Agriculture etc to improve the adoption of recommended cultivation practices of KAU.

5.3. Suggestions for future research

The following suggestions are proposed for further research works: -

Similar studies may be conducted in the homestead vegetable growing areas to verify the present findings by considering following points.

A separate study on assessment to the knowledge and adoption of the components of recommended vegetable cultivation technology.

Assessment of training needs of homestead vegetable growers.

Assessment of constraints in adoption of recommended components of production practices.

Replication of research is planned for studying different vegetable crops grown in various agro-climatic zones of the state.

In this study, the dependent and independent variables were limited and therefore, future studies may be taken up based on situational and infrastructural variables.

More intensive statistical techniques should be used for improving the contribution of different variables which might be given more strength to the study.

The present investigation had the limitation of the time and resource of single investigator and the size of the sample were only 120. Hence, a comprehensive study with a large size sample farmers conducted for in-depth probing and for wide application of results.

Only six panchayats from Kollam district was selected in this study. But there is a need to replicate in large sample covering all the major potential areas in Kerala. So that the inference drawn can be generalized to a greater extent.

Also, the study was confined to only few vegetables namely, amaranthus, chilli, bittergourd, okra, and ivygourd.

Further, there is also need to develop entrepreneurial development programme (EDP) modules to train different types of farmers under different agroclimatic conditions for economic development of homestead vegetable growers. Hence, this field of investigations offers a broad scope for future research.

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**Gender analysis of vegetable growers in the homesteads
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by

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ABSTRACT

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ABSTRACT

The study entitled “Gender analysis of vegetable growers in the homesteads of Kollam district” was conducted in two Agro Ecological Units of Kollam District which involved a total of 120 respondents, during the period, 2016-2017. The study was done to determine the gender roles of vegetable growers in Kollam district, their scale of knowledge, the rate of adoption of vegetable production practices, constraints faced in vegetable production and formulate strategy to mitigate the constraints faced.

In the case of Gender analysis conducted, under the decision-making analysis, major women dominated decisions were child rearing and religious decisions. The decisions regarding the transfer and ownership of ancestral properties, various farm operations and decision related to entertainments were mainly men dominated. Both men and women were able to enjoy the benefits of basic facilities like income, education, medical facilities, and transportation facilities. But in the case of political interventions, technological development, and extension agency contact, benefits were utilized more by men than women. The benefits of government policies and incentives, employment opportunities and farmers group were enjoyed more by women. In the agricultural activity analysis, major women oriented activities were post-harvest operations, livestock and poultry activities. Major men oriented agricultural activities were land preparation, collection and arrangements of inputs, fertilizer application and plant protection activities.

In the case of house hold activity analysis, all the house hold activities were women oriented. In the case of influencing factors of development, the positively influencing factors for women were provision of equal medical facilities, freedom to pursue education and take up jobs, inherit properties of their parents and freedom to vote in elections. In the case of men, when most of the factors were positively influencing, factors such as lack of timely availability of incentives, inability to marry outside the community and inability to take up political powers in the society

were negatively influencing. Results of analysis of access to resources showed that access to resource was mostly male dominated.

Vegetable growers according to their knowledge about vegetable cultivation practices indicated that the majority of respondents had medium level of knowledge about vegetable cultivation and only few of them (39 per cent) had high knowledge. Only 12 per cent of respondents were in the group of low knowledge level. Majority of the respondents were having high knowledge about the KAU varieties, sowing methods, spacing, pest and diseases attack of the particular crops, and harvesting of the produce.

Correlation analysis of scale of knowledge with independent variables, education and economic motivation were positively and significantly correlated to scale of knowledge at 5 percent level of significance. Whereas the variables, such as experience in vegetable cultivation, extension agency contact, information seeking behaviour, social participation, and training were positively and significantly correlated to scale of knowledge at 1 percent level of significance.

In the case of adoption, 72 per cent of respondents belonged to the category of medium level of adoption. 20 per cent of the respondents were found having high level of adoption and 8 percentage of the respondents belonged to low level of adoption category. Majority of the farmers adopted KAU varieties and they followed almost all the cultural practices like seed treatments, seed rate, land preparation, weeding, and application of manures as per the recommendation of Package of Practices. A partial adoption was noticed in the case of application of NPK fertilizers and similar trend was observed in case of plant protection measures. On distributing the respondents into various adopter categories, only 2 % of them were innovative in nature, which was almost on par with the normal Rogers curve (2.5%), whereas majority of the respondents fell into the category of early majority (33%) followed by late majority (31%). This is an indication of fairly good level of adoption of KAU cultivation practices by homestead vegetable growers.

Independent variables such as occupational status, economic motivation, and family labour utilization were positively and significantly correlated to extent of adoption at 5 percent level of significance. Whereas the variables such as

experience in vegetable cultivation, extension agency contact, information seeking behaviour, social participation, and training were significantly correlated to extent of adoption at 1 percent level of significance. A negatively significant correlation was noticed between extent of adoption and experience in vegetable cultivation.

The major constraints faced by the respondents were scarcity of water resources, prevalence of pest and diseases, price fluctuation, high labour charges, high cost of cultivation, labour scarcity, non-availability of quality planting materials and non-assurance of premium price for organic products.

To solve the acute water shortage especially during the summer seasons, rain water harvesting systems in the homesteads should be encouraged. In case of labour shortage, necessary amendments, be made to bring the NREGS workers to the agricultural sector. Integrated pest and disease management approaches can reduce the problems of prevalence of pest and diseases. Homestead farming has to be made more remunerative to attract more farmers, for which measures like popularization of organic vegetable production, timely availability of inputs, fixation of minimum support price for organic produce and proper post harvest management will enable the farmer to commercially utilize the produce in an effective manner and thereby increasing overall output.

From this study, it can be concluded that even though there are some men and women dominated operations in homestead vegetable cultivation, both the gender had a significant participation in most of the activities. There was no single homestead where the agriculture is done by male partner alone which implied that the women had a significant contribution in agricultural activities. Hence, the overall extent of knowledge about vegetable production technology was found to be medium, there is a need of special attention by providing training about vegetable production to the farmers, so that their knowledge could be increased and the adoption of technology would be enhanced. Therefore, more educational efforts are, required to be undertaken by extension agencies by organizing training and demonstrations to enhance the knowledge and adoption level of farmers.

സംഗ്രഹം

കൊല്ലം ജില്ലയിലെ പുരയിടപച്ചക്കറി കൃഷിക്കാരിലെ ലിംഗഭേദ വിശകലനം

കൊല്ലം ജില്ലയിലെ പുരയിട പച്ചക്കറി കൃഷിക്കാരിലെ ലിംഗഭേദ വിശകലനം എന്ന പ്രസ്തുത പഠനം കൊല്ലം ജില്ലയിലെ തിരഞ്ഞെടുത്ത പഞ്ചായത്തുകളായ വെളിയം, ഉമ്മന്നൂർ, നെടുമ്പന, കടയ്ക്കൽ, ചിതറ, പിറവന്നൂർ തുടങ്ങിയ ഇടങ്ങളിലാണ് നടത്തപ്പെട്ടത്. പുരയിട പച്ചക്കറി കൃഷിക്കാരിലെ ലിംഗഭേദ വിശകലനം,വിവിധ തരം കൃഷിരീതികളെപ്പറ്റിയുള്ള അറിവ്, അവയുടെ സ്വീകാര്യത,പുരയിടപച്ചക്കറി കൃഷിയിൽ കർഷകർ നേരിടുന്ന വെല്ലുവിളികൾ, അവയുടെ പരിഹാര മാർഗ്ഗങ്ങൾ എന്നിവ ആയിരുന്നു പഠനത്തിന്റെ പ്രധാന ഉദ്ദേശം.

ഈ പഠനത്തിനായി 120 പുരയിട കൃഷിക്കാരെയാണ് സമീപിച്ചത്. ആശ്രിത പരിവർത്തിത വസ്തുതകളായ കൃഷി രീതികളെപ്പറ്റിയുള്ള അറിവും അവയുടെ സ്വീകാര്യതയും 13 സ്വതന്ത്ര പരിവർത്തിത വസ്തുതകളേയും അടിസ്ഥാനമാക്കി നടത്തിയ ഈ പഠനത്തിൽ പുരയിട പച്ചക്കറി കൃഷിക്കാർ നേരിടുന്ന വിവിധതരം പ്രശ്നങ്ങളെപ്പറ്റി മനസ്സിലാക്കുവാനും സാധിച്ചു.

ശേഖരിച്ച വിവരങ്ങളുടെ അടിസ്ഥാനത്തിൽ ഭൂരിഭാഗം പുരയിട പച്ചക്കറി കൃഷിക്കാരിലും മധ്യമ നിലവാരത്തിലുള്ള കാഴ്ചപ്പാടാണ് കാണുന്നത്. മേൽപ്പറഞ്ഞ 13 സ്വതന്ത്ര പരിവർത്തിത വസ്തുതകളിൽ 7 എണ്ണത്തിലും പുരയിട പച്ചക്കറി കൃഷിരീതികളെപ്പറ്റിയുള്ള അറിവിലും അവയുടെ സ്വീകാര്യതയിലും മധ്യമ നിലവാരം തന്നെയാണ് ഭൂരിഭാഗം കർഷകരിലും കാണാൻ സാധിക്കുന്നത്.

ലിംഗഭേദ വിശകലനത്തിന്റെ അടിസ്ഥാനത്തിൽ തീരുമാന കൽപ്പനയുടെ കീഴിൽ പ്രധാന സ്ത്രീ മേൽക്കോയ്മയുള്ള തീരുമാനങ്ങൾ, ശിശു പരിപാലനം, മതപരമായ തീരുമാനങ്ങൾ എന്നിവ ആയിരുന്നു. പുരുഷ മേൽക്കോയ്മയുള്ള തീരുമാനങ്ങൾ വിവിധ കാർഷിക പ്രവർത്തികളെ സംബന്ധിച്ച തീരുമാനങ്ങൾ, വിനോദം, അധികാരകൈമാറ്റം , എന്നിവ സംബന്ധിച്ച തീരുമാനങ്ങളാണ്. കാർഷിക പ്രവർത്തികളുടെ വിശകലനത്തിൽ സ്ത്രീകൾക്ക് മേൽക്കോയ്മയുള്ള പ്രധാനപ്പെട്ട അഭിവിന്യാസ പ്രവർത്തികൾ വിളവെടുപ്പ് അനന്തര പ്രവർത്തനങ്ങൾ, കന്നുകാലി പരിപാലനം എന്നിവയാണ്. പ്രധാന പുരുഷ അഭിവിന്യാസ പ്രവർത്തികൾ നിലമൊരുക്കൽ, വളപ്രയോഗം,കീടനിയന്ത്രണം എന്നിവയാണ്. കുടുംബ പ്രവർത്തനങ്ങളിൽ സ്ത്രീകൾക്കാണ് മേൽക്കോയ്മ കൂടുതൽ.

ലിംഗഭേദമന്യേ എല്ലാ വ്യക്തികൾക്കും അടിസ്ഥാന സൗകര്യങ്ങളായ വരുമാനം, വിദ്യാഭ്യാസം, വൈദ്യ സഹായം, ഗതാഗത സൗകര്യങ്ങൾ എന്നിവയുടെ പ്രയോജനം അനുഭവിക്കാൻ സാധിക്കുന്നുണ്ട്.രാഷ്ട്രീയ ഇടപെടൽ സാങ്കേതികവിദ്യകൾ മനസ്സിലാക്കുവാനും ഉപയോഗിക്കുവാനുമുള്ള സാഹചര്യം,വിജ്ഞാനവ്യാപന വിഭാഗവുമായുള്ള ഇടപെടൽ എന്നിവയുടെ പ്രയോജനം കൂടുതലും പുരുഷൻമാർക്കും, വിവിധ സർക്കാർ പദ്ധതികളുടെ ആനുകൂല്യങ്ങളും, തൊഴിലവസരങ്ങളും കൂടുതൽ സ്ത്രീകൾക്കൊന്നെന്ന് കണ്ടെത്തി.

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പുരോഗതിയെ സ്വാധീനിക്കുന്ന ഘടകങ്ങളുടെ കീഴിൽ പ്രധാനപ്പെട്ട സ്ത്രീപുരോഗമന ഘടകങ്ങൾ വോട്ടവകാശം, മാതൃപിതൃസ്വത്ത് അനുഭവിക്കാനുള്ള അവകാശം, വിദ്യാഭ്യാസത്തിനും തൊഴിൽ നേടാനുമുള്ള സ്വാതന്ത്ര്യം എന്നിവയാണ്. പുരുഷന്മാരെ സംബന്ധിച്ചിടത്തോളം പ്രതികൂലമായി സ്വാധീനിക്കുന്ന ഘടകങ്ങൾ യഥാസമയത്തുള്ള സർക്കാർ സേവനങ്ങളുടെ ലഭ്യതക്കുറവ്, കുലത്തിന് പുറത്തുനിന്നും വിവാഹം ചെയ്യുന്നതിനുള്ള അനുമതി ഇല്ലായ്മ, രാഷ്ട്രീയ അധികാരങ്ങൾ ഏറ്റെടുക്കാനുള്ള ബുദ്ധിമുട്ട് എന്നിവ മാത്രമാണ്.

കേരള കാർഷിക സർവ്വകലാശാല നിർദ്ദേശിക്കുന്ന പച്ചക്കറി കൃഷി രീതികളെ സംബന്ധിച്ച അറിവിന്റെ അടിസ്ഥാനത്തിൽ കൃഷിക്കാരെ വിശകലനം ചെയ്തതിൽനിന്നും അവർക്ക് കാർഷിക സർവ്വകലാശാലയുടെ വിത്തിനങ്ങളെപ്പറ്റിയും, വിത്തിടീൽ രീതികൾ, കീടരോഗശല്യം, വിളവെടുപ്പ്, ഇടയകല പാലനം എന്നിവയിൽ മികച്ച അവബോധം ഉള്ളതായും ഈ അറിവിനെ വ്യക്തമായി സ്വാധീനിക്കുന്ന ഘടകങ്ങൾ കർഷകരുടെ വിദ്യാഭ്യാസ യോഗ്യത, സാമ്പത്തിക പ്രയോജകം, അനുഭവ സമ്പത്ത്, വിജ്ഞാനവ്യാപന വിഭാഗവുമായുള്ള ഇടപെടൽ, അറിവ് തേടാനുള്ള ശീലം, സമൂഹിക പങ്കാളിത്തം, പരിശീലനം എന്നിവയാണെന്നും കണ്ടെത്തി.

ഭൂരിഭാഗം കർഷകരും കാർഷിക സർവ്വകലാശാലയിലെ വിത്തിനങ്ങളാണ് ഉപയോഗിക്കുന്നത്. ഇത് കൂടാതെ വിത്തുകളുടെ പരിചരണം, അനുപാതം, നിലമൊരുക്കൽ, കളനശീകരണം, ജൈവ വള പ്രയോഗം എന്നീ പ്രവർത്തികളും സർവ്വകലാശാലയുടെ നിർദ്ദേശാനുസരണം പ്രയോഗിച്ച് വരുന്നു. മേൽപ്പറഞ്ഞ പ്രയോഗങ്ങളുടെ സ്വീകാര്യതയെ സ്വാധീനിക്കുന്ന ഘടകങ്ങൾ തൊഴിൽ, സാമ്പത്തിക പ്രയോജകം, വീട്ടിൽ നിന്നുള്ള തൊഴിലാളികളുടെ പ്രയോജനപ്പെടുത്തൽ, അനുഭവ സമ്പത്ത്, വിജ്ഞാന വ്യാപന വിഭാഗവുമായുള്ള ഇടപെടൽ, അറിവ് തേടാനുള്ള ശീലം, സമൂഹിക പങ്കാളിത്തം, പരിശീലനം എന്നിവയാണെന്നും കണ്ടെത്തി.

ശുദ്ധജലക്ഷാമം, കീടരോഗശല്യം, തൊഴിലാളികളുടെ ലഭ്യതക്കുറവ്, ഉയർന്ന വേതനം, ഗുണനിലവാരമുള്ള വിത്തുകളുടെയും, നടീൽ വസ്തുക്കളുടെയും ലഭ്യതക്കുറവ് എന്നിവയാണ് കർഷകർ നേരിടുന്ന പ്രധാന വെല്ലുവിളികൾ. മഴവെള്ള സംഭരണികളുടെ നിർമ്മാണം പ്രോത്സാഹിപ്പിക്കുക, ജൈവകീടരോഗ നിയന്ത്രണ മാർഗ്ഗങ്ങളെ സംബന്ധിച്ച പരിശീലന ക്ലാസ്സുകൾ സംഘടിപ്പിക്കുക, തൊഴിലുറപ്പ് പദ്ധതിയിൽ കാർഷിക ആവശ്യങ്ങൾ കൂടി ഉൾപ്പെടുത്തുക, ഗുണനിലവാരമുള്ള വിത്തുകളുടെയും, നടീൽ വസ്തുക്കളുടെയും ലഭ്യത ഉറപ്പ് വരുത്തുക എന്നിവയാണ് പ്രശ്ന പരിഹാരത്തിനായുള്ള പ്രധാന നിർദ്ദേശങ്ങൾ.

പുരയിട പച്ചക്കറി കൃഷിയിലെ ചില കാർഷിക പ്രവർത്തനങ്ങളിൽ ലിംഗഭേദം പ്രകടമാണെങ്കിലും പൊതുവായി വിശകലനം ചെയ്യുമ്പോൾ ഇരുകൂട്ടർക്കും തുല്യപ്രാധാന്യമാണ് കാണാൻ സാധിച്ചത്. പുരയിട പച്ചക്കറി കൃഷിയെ ആസ്പദമാക്കി വിവിധ തരം പരിശാലന പരിപാടികൾ സംഘടിപ്പിക്കുക വഴി പുരയിട പച്ചക്കറി കൃഷിക്കാരുടെ ഈ മേഖലയിൽ നിലവിലുള്ള അറിവും അതിന്റെ സ്വീകാര്യതയും വർദ്ധിപ്പിക്കാൻ സാധിക്കുന്നതുമാണ്.

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Appendices

APPENDIX I



KERALA AGRICULTURAL UNIVERSITY

Krishi Vigyan Kendra, Kollam
Kerala Agricultural University
Sadanandapuram

Dr. Bindu Podikunju
Assistant Professor and Major Advisor
email: bindupodikunju75@gmail.com
Mobile no: 9745643733

Dated: 24-10-2016

Sir/Madam,

Ms. Vani Chandran (Ad. No. 2015-11-048), the Post graduate scholar in the Department of Agricultural Extension, College of Agriculture, Vellayani is undertaking a research study entitled "**Gender analysis of vegetable growers in the homesteads of Kollam district.**" as part of her research work. Variables supposed to have close association with the study have been identified after extensive review of literature.

Considering your vast experience and knowledge on the subject, I request you to kindly spare some of your valuable time for examining the variables critically as a judge to rate the relevancy of them. Kindly return the list duly filled at the earliest in the self-addressed stamped envelope enclosed with this letter.

Thanking you

Yours faithfully

Bindu Podikunju

2016

OBJECTIVES OF THE STUDY

To identify the gender roles of vegetable growers in Kollam district. Their scale of knowledge, the rate of adoption of vegetable production practices and constraints faced in vegetables production will be studied. A strategy to mitigate the constraints will also be formulated.

Table showing variables taken for the study

Variables are given in bold cases and their respective meaning is explained for easy understanding of intended meaning. You may please rate the statement with a tick mark in the appropriate column against the statement with special reference to its importance to meet the objectives of the study.

Sl. no.	Independent Variable	Operational definition	Relevancy rating (R - relevant)				
			Most R	More R	R	Less R	Least R
1.	Age	Refers to the number of years completed by the respondent at the time of interview.					
2.	Education	Education is refers to the highest academic qualification possessed by the respondent through formal and informal learning process.					
3.	Main Occupation	Main occupation will be operationalised as the primary activity in which the respondent spends major part of the time and attention for the livelihood.					
4.	Family Composition	Refers to the number of male, female and children in the family.					

5.	Member's Interest	Defined as the extent of interest exhibited by family members for the cultivation of vegetables in homesteads.					
6.	Annual income	Refers to the total earnings of all family members of the respondent in a year.					
7.	Need satisfaction	Refers to achieving the common family needs and requirements by individual members within a stipulated time on vegetable cultivation.					
8.	Involvement in decision making	Defined as the frequency with which family members were involved in generating ideas, evaluation of opinion and making choice from the available options related to vegetable cultivation.					
9.	Land holding	Land holding is operationally defined as the total farm area in hectare owned or leased by the respondent for the cultivation of vegetables.					
10.	Mass Media exposure	Mass Media exposure will be operationalised as the degree to which the respondent has accessed mass media information sources for obtaining					

		information related to vegetable production.					
11.	Dependency	Dependency will be operationalised as the number of persons above age of 14 who are solely dependent on head of the family.					
12.	Communication Behaviour	Defined as the behaviour of communication among the members of the family.					
13.	Extension agency contact	Refers to the degree to which the respondent meets the extension agents for information related to various aspects of vegetable cultivation in homesteads.					
14.	Accessibility	Refers to the ability to access the innovations related to vegetable cultivation practices.					
15.	Risk orientation	Refers to the degree to which the farmer is oriented towards encountering risks and uncertainty in adopting new ideas related to vegetable cultivation.					
16.	Economic motivation	Refers to the extent to which respondent is oriented to obtain profit and the relative value placed on economic ends so that it influences further adoption or its					

		sustenance related to agriculture.					
17.	Self Confidence	Self Confidence is defined as the extent of feeling about one's own powers, abilities and resourcefulness to perform any activity which the respondent desires to undertake.					
18.	Training	Refers to the number of trainings undergone by the respondent in various activities related to vegetable production by different agricultural institutions during the last 3 years in Kollam district.					
19.	Family labour utilization	Refers to the extent of utilization of family members by the respondents for various vegetable cultivation activities.					
20.	Innovativeness	Refers to the degree to which an individual is relatively earlier in adopting new ideas than other members of the social system.					
21.	Social participation	Social participation is operationally defined as the degree of involvement and participation of vegetable growers in various formal and informal organisations either as member or as office bearer.					

22.	Level of aspiration	Level of aspiration is operationalised as the future level achievements in his job which he is expecting based on the knowledge about the level of past performance.					
23.	Cosmopolitaness	Refers to the tendency of the farmers to be in contact with outside village with a belief that all the needs of an individual cannot be satisfied with in his own village.					
24.	Information seeking behaviour	Refers to the sources or channels from which the respondents get technological information regarding agriculture and related area.					
25.	Entrepreneurial behaviour	Refers to the human behaviour involved in identifying and exploiting opportunities through creating and developing new ventures.					
26.	Experience in vegetable cultivation	Experience in vegetable cultivation is operationalised as the number of years the respondent has been engaged in vegetable production.					
27.	Empowerment	Refers to the extent to which the respondent has the ability to get					

		involved in decision making and implementing programmes related to vegetable cultivation.					
28.	Access to credit	Refers to cash money loaned to farmers for purchase of agricultural inputs.					
29.	Trialibility	Refers to the degree to which an innovation may be experimented with in a limited basis.					
30.	Observability	Refers to the degree to which the results of an innovation are visible to others.					
31.	Compatibility	Refers to the degree to which an innovation is perceived as consistent with the existing values, past experience and needs.					
32.	Complexity	Refers to the degree to which an innovation is perceived as relatively difficult to understand and use.					
33.	Relative advantage	Refers to the degree to which an innovation is perceived as being better than the idea it supersedes.					
34.	Scientific orientation	Refers to the degree to which the respondent is relatively ready to adopt scientific ideas related to agriculture.					
35.	Market assess	Market assess is operationalised as the means or opportunity to get the inputs for vegetable cultivation as well as to sell the outputs.					

36.	Consciousness about nutrition and nutritional security	Refers to the perception of the respondent about the health status and the nutritional requirements of the family members.					
37.	Self reliance	Self reliance is operationalised as the extent to which a personal relies on self for his future.					
38.	Occupational mobility	Operationalised as the extent to which the respondent strives to take up occupations other than caste occupations.					
39.	Social status	Refers to the relative rank that an individual holds, with attendant rights, duties, and lifestyle, in a social hierarchy based upon honour or prestige.					
40.	If other, specify:						

Vani Chandran

(2015-11-048)

APPENDIX II

The variables with their mean relevancy score

Sl.No	Independent variables	Mean score
1	Age	4.76
2	Education	4.68
3	Main Occupation	4.55
4	Family Composition	4.01
5	Member's Interest	3.98
6	Annual income	4.01
7	Need satisfaction	3.68
8	Involvement in decision making	4.02
9	Land holding	3.89
10	Mass Media exposure	4.01
11	Dependency	4
12	Communication Behaviour	4.01
13	Extension agency contact	4.70
14	Accessibility	3.57
15	Risk orientation	4.43
16	Economic motivation	4.44
17	Self Confidence	3.77
18	Training	4.64
19	Family labour utilization	4.71
20	Innovativeness	4.53
21	Social participation	4.36
22	Level of aspiration	4
23	Cosmopolitaness	4.03
24	Information seeking behaviour	4.56
25	Entrepreneurial behaviour	3.89
26	Experience in vegetable cultivation	4.62
27	Empowerment	3.73
28	Access to credit	4
29	Trialibility	3.50
30	Observability	3.50
31	Compatibility	3.50
32	Complexity	3.50
33	Relative advantage	3.10
34	Scientific orientation	4
35	Market orientation	4.49
36	Consciousness about nutrition and nutritional security	3.40
37	Self reliance	3.55
38	Occupational mobility	3.88
39	Social status	4
	MEAN	4.05

APPENDIX III

INTERVIEW SCHEDULE

S.No.....

Date.....

1. Name of the respondent:.....
2. Spouse name:.....
3. Village:.....
4. Panchayat:.....
5. Age:.....
6. Education:.....
7. Occupation:
8. Area under cultivation:
 - a. Area owned:
 - b. Cultivated:
 - c. Leased in:
 - d. Leased out:
9. Crops grown:

Sl. No.	Crops	Area

10. Family type:
11. Family size:
12. Annual income (Rupees):

13. Knowledge on vegetable production : Please indicate your response in the appropriate alternative by putting a tick mark (✓)

Amaranthus

Sl no.	Particulars	POP Recommendation	Score	
			2	1
1	Season	Through out the year		

2	Varieties	Arun Kannara local Krishna sree Mohini (green) Co varieties Renu sree		
3	Seed rate	1.5-2 kg/ha		
4	Spacing	10 x 30 cm		
5	Sowing	Transplanting		
6	Irrigation	Furrow irrigation or drip / sprinkler		
7	Manuring	FYM -50 t/ha N:P:K -100:50:50 kg/ha		
8	Pests and diseases	Foliar insects (leaf webber,roller), Leaf spot disease		
9	Pesticides Doses	0.1% malathion		
10	Harvesting	20-45 DAP		

Chilli

Sl no.	Particulars	POP Recommendation	Score	
			2	1
1	Season	May – June (rainfed crop) , Sept – October (irrigated crop)		
2	Varieties	Jwala , Jwalasakhi , Jwalamukhi Manjari ,Ujwala ,Anugraha Vellayani athulya , Vellayani samrudhi		
3	Seed rate	1 kg/ha		
4	Spacing	45 X 45 cm (75 X45-60 cm for white kanthari)		
5	Sowing	Seeds are sown in nursery , 1 MAS transplanted to main field		
6	Irrigation	Furrow or drip irrigation is recommended.		
7	Manuring	FYM - 20- 25 t/ha ,N:P:K – 75:40:25 kg /ha		

8	Pests and diseases	Aphids ,mite ,fruit worm ,nematode, mealy bug ,thrips Damping off , bacterial wilt , anthracnose , phytophthora blight , aphid transmitted viruses .		
9	Pesticides Doses	Dichlorvos (0.02%) / quinalphos (0.025%), dimethoate 0.05%		
10	Harvesting	55-60 DA Flowering		

Bitter gourd

Sl no.	Particulars	POP Recommendation	Score	
			2	1
1	Season	Jan- march and sept- dec		
2	Varieties	Priya ,Preethi ,Priyanka ,Arka harit		
3	Seed rate	5- 6 kg /ha		
4	Spacing	2 x 2 m		
5	Sowing	4-5 seeds /pit @ 1-2 cm depth		
6	Irrigation	Furrow irrigation		
7	Manuring	FYM – 20-25 t /ha ,N:P:K- 70 : 25 : 25 kg/ha		
8	Pests and diseases	Fruit flies ,epilachna beetle, aphids, pumpkin beetle, Downy mildew ,powdery mildew ,mosaic		
9	Pesticides Doses	Carbaryl 10% DP/ Carbaryl 0.2%, malathion		
10	Harvesting	90 DAP		

Okra

Sl no.	Particulars	POP Recommendation	Score	
			2	1
1	Season	Feb – March , June- July , October – November		
2	Varieties	Salkeerthi , Kiran , Aruna ,Susthira		
3	Seed rate	7 -8.5 kg/ha		

4	Spacing	60 X 30-45 cm		
5	Sowing	Dibbling @ 1-2 cm depth @ 3-4 seeds /hole		
6	Irrigation	Furrow irrigation method @ 2- 3 days interval		
7	Manuring	FYM – 12 t /ha, N: P: K – 50:8:25 kg /ha		
8	Pests and diseases	Shoot and fruit borer, root knot nematode , leaf hopper ,mites, aphids, white fly, Yellow vein mosaic , damping off , fusarium wilt , powdery mildew , leaf spot , leaf curl		
9	Pesticides Doses	Dimethoate 0.05% , wettable sulphur 80 WP (2 g / liter), quinolphos 25 EC (2 ml/liter of water , carbaryl (4 g/ liter of water)		
10	Harvesting	60 DAP		

Ivygourd

Sl no.	Particulars	POP Recommendation	Score	
			2	1
1	Season	May – June , September – October		
2	Varieties	Sulabha		
3	Seed rate	Stem cuttings with 3-4 nodes and of 30 – 40 cm length		
4	Spacing	4X 3 m		
5	Irrigation	Drip irrigation		
6	Manuring	FYM – 25 t /ha, N: P: K – 60-80: 40-60: 40 kg/ha		
7	Pests and diseases	Fruit flies and gall insects , Leaf spot		
8	Pesticides Doses	Carbaryl 10% DP/ Carbaryl 0.2%, malathion		
9	Harvesting	3 MAP		

14. Adoption of different practices: Please indicate your response in the appropriate alternative by putting a tick mark (✓)

Amaranthus

Sl no	Vegetable practices - Amaranthus	Adopt	Partially adopt	Non adopt
1	Avoid sowing of red leaved varieties during period of heavy rain to prevent leaf spot diseases .			
2	Varieties : Red – Kannara local, Arun, Krishnasree Green – Co1, Co2, Co3, Mohini and Renusree			
3	Seed rate is 1.5 – 2.0 Kg/ ha			
4	Transplant in the late afternoon or on a cloudy day to minimize transplanting shock.			
5	50 t/ha of FYM as basal dose before planting			
6	NPK : 50:50:50 Kg/ ha after preparing trenches			
7	Top dressing of 50 Kg of N fertilizer at regular interval			
8	Spraying of , 0.1% of Malathion or malathion 10% DP during severe cases of leaf webber incidence			
9	Spraying 1% urea immediately after each harvest for increasing yield			
10	Avoid use of insecticide or fungicide if maximum possible			

Bittergourd

Sl no	Vegetable practices – Bitter gourd	Adopt	Partially adopt	Non adopt
1	Spacing is 2× 2 m			
2	Varieties are Preethi, Priyanka, Priya and Arka Harit			

3	January –march and Sept-December are the ideal seasons.			
4	Seed rate is 5-6 Kg/ ha			
5	Soaking of seeds for 24 hrs in water for better germination.			
6	Retain 3 plants/ pit			
7	Tie a pebble @ the end of a long piece of string to the flower end to weigh down the fruit and keep it from curling.			
8	FYM @ 20-25 t /ha as basal dose			
9	35 kg N and full dose of P (25) and K (25) as basal dose and top dressing of N fertilizer in split doses at fortnightly interval			
10	Spraying vines with flowering hormones @ 6-8 leave stage to increase female flowers (GA- 25-100ppm)			
11	Spraying 0.2% Mancozeb against Downey mildew			
12	Introduction of beehives in the field to ensure good pollination.			
13	Covering of fruits with polythene cover or paper.			

Chilli

Sl no	Vegetable practices – chilli	Adopt	Partially adopt	Non adopt
1	Spacing is 45 X 45 cm (75 X45-60 cm for white kanthari)			
2	Varieties are Jwala , Jwalasakhi , Jwalamukhi , Manjari , Ujwala , Anugraha , Vellayani athulya , Vellayani samrudhi			

3	May – June (rainfed crop) , Sept – October (irrigated crop) is the cropping season			
4	Seed rate is 1 Kg/ ha			
5	Soil sterilization using burning the rice straws or other organic matter on the bed before sowing.			
6	Well rotten FYM @ 20- 25 t/ha at the time of land preparation			
7	NPK : 35:40:12.5 Kg/ ha applied as basal dose before transplanting . One fourth nitrogen and half of potash applied @ 20-30 DAP and remaining one fourth nitrogen @ 2 MAP.			
8	Provide staking to prevent lodging.			
9	Use of dimethoate @ 0.05% and dichlorvos (0.02%) with fish oil rosin soap against aphids,mites ,thrips,			
10	Use of soil fumigants or nematicides to reduce the attack of root knot nematode			
11	Application of 1% bordeaux mixture at monthly intervals.			
12	Seeds soaking in streptocycline (1 g/40 li) for 30 min. to reduce bacterial wilt infestation.			
13	hot water treatment @ 52 0c for 30 min. is recommended against anthracnose			

Okra

Sl no	Vegetable practices – okra	Adopt	Partially adopt	Non adopt
1	Spacing is 60 X 30-45 cm			
2	Varieties are salkeerthi ,kiran ,aruna ,susthira			

3	Feb – March , June- July , October – November is the ideal cropping season			
4	Seed rate is 7- 8.5 Kg/ ha			
5	Storage of seeds in polythene cover to increase storage life up to 7 months.			
6	Soaking of seeds for 24 hrs in water for better germination			
7	Soaking seeds in a solution of Bavistin @ 0.2% for 6 hours and drying under shade before sowing to reduce attack of soil borne fungus.			
8	FYM @ 25 t /ha as basal dose			
9	First weeding is done @seedlings are 2 weeks old and subsequent weeding at an interval of 25 days.			
10	Pre emergence application of basalin 48 EC for weed control and Carbaryl 4 g/ li of water or neem oil emulsion @ 5% @ 15- 20 days intervals against fruit borer			
11	Application of <i>Bacillus macerans</i> or <i>B. circulans</i> (1.2 x10 ⁶ cells/pit) before sowing to control root knot nematode.			
12	Seed treatment with fungal culture of <i>Trichoderma viride</i> (3-4 g/kg of seed)or Thiram (2-3 g/kg of seed) and soil drenching with Dithane M 45 give protection against damping off disease.			
13	Continuous cultivation of bhindi on the same piece of land should be avoided.			

Ivygourd

Sl no	Vegetable practices – ivy gourd	Adopt	Partially adopt	Non adopt
1	Spacing is 4 x 3 m			

2	Use variety sulabha			
3	Grown in May – June and Septmber- October.			
4	Stem cuttings with 3-4 nodes and having 30-40 cm length is used as planting material			
5	FYM @ the rate of 25 kg /pit is given two doses.			
6	The ratio of female and male plant population in the field should be 10:1			
7	Pruning of vines once fruiting is completed.			
8	Weeding and light hoeing is practiced during the early phase of plant vine growth			

- 15 Social participation: Please indicate whether you are a member or office bearer in any of the following organization. If so, indicate the frequency of the participation

Sl. No	Organis ation	Nature of participation			Frequency of participation in meetings		
		No membersh ip	Members hip	Office bearer	Never	Sometim es	Regular ly
1	Pancha yat						
2	Co-operati ve society						
3	Farmer' s club						
4	Youth club						
5	Socio-cultural organiz ation						
6	Any other (specify)						

16. Extension orientation: Please indicate your response in the appropriate alternatives by putting a tick mark (✓)

a. Extension contact

Sl.No	Extension personnel	Frequency of exposure		
		Regularly	Occasionally	Never
1	Agricultural scientist			
2	Agricultural officer			
3	Agricultural Assistant			
4	Other, specify			

b. Extension participation

Sl.No	Activities	Frequency of participation		
		Regularly	Occasionally	Never
1	Study tour			
2	Seminars			
3	Exhibition			
4	Group farming meetings			
5	Demonstrations			
6	Others, specify			

17. Economic motivation: Please indicate your response in the appropriate alternative by putting a tick mark (✓) SA- Strongly agree, A-agree, UD-undecided, D-Disagree, SD-Strongly disagree

Sl.No	Statements	SA	A	UD	D	SD
1	A farmer should work towards higher yields and economic profit					
2	The most successful farmer is one who makes more profit					
3	A farmer should try any new farming ideas which may help him to earn more money					

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4	A farmer should grow more food crops for home consumption and to increase monetary profits					
5	It is difficult for the farmer's children to make good start unless he provides them with economic assistants					
6	A farmer must earn his living but most important thing in life cannot be identified in economic returns.					

18. Risk orientation:

Please indicate your response in the appropriate alternative by putting a tick mark (✓) SA- Strongly agree, A-agree, UD- undecided, D-Disagree, SD- Strongly disagree

Sl.No	Statements	SA	A	UD	D	SD
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 commercial vegetable cultivation unless most others in the locality have used it with success					
6	Trying an innovative vegetable farming technique is beneficial even though an					

	element of failure is involved in it.					
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19. Experience in vegetable production and Who Grow Vegetables: Please indicate your response in the appropriate alternative by putting a tick mark (✓)

Length of Producing Vegetables

Years	Response
1- 2 Years	
3-4 Years	
5-6 Years	
7-8Years	
Greater than 8 years	

Who Grow Vegetables

Themselves Labor Family Membe

20. Innovativeness: Please indicate your response in the appropriate alternatives by putting a tick mark (✓)

Sl no.	Statements	Response
1	As soon as it is brought to knowledge	
2	After I have seen other farmers tried successfully in the farm	
3	I prefer to wait and take my own time.	

21. Market orientation: Please indicate your response in the appropriate alternative by putting a tick mark (✓) A-agree and DA-Disagree

Sl no.	Statements	Response	
		A	DA
1	Market is not useful to a farmer		
2	A farmer can get good price by eliminating the middle man		
3	One should sell his produce to the nearest market irrespective of price		
4	One should purchase his inputs from shops where his friends or relatives purchase		
5	One should grow those crops which have more market demand		

6	Co-operatives can help a farmer to get better price for his produce		
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22. Training: Please indicate your response in the appropriate alternative by putting a tick mark (✓)

Sl no.	Trainings undergone	Response
1	No training	
2	1-5	
3	6-10	
4	>10	

23. Information seeking behaviour : Please indicate your response in the appropriate alternative by putting a tick mark (✓)

Sl no.	Sources	Regularly	Once in a fortnight	Once in a month	Whenever problem arise	never
Media sources						
1	Television					
2	Radio					
3	Newspapers					
4	Agri.literatures					
Formal sources						
1	Scientists of KAU					
2	B.D.O, A.E.O					
Informal sources						
1	Family members					

24. family labour utilization: Please indicate your response in the appropriate alternative by putting a tick mark (✓)

Sl no.	Operations	Always utilized	Occasionally utilized	Do not utilized
1	Land preparation			
2	Planting			
3	Weeding			
4	Mulching			
5	Irrigation			
6	Stalking			
7	Fencing			
8	Plant protection			
9	Harvesting			

10	Marketing			
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25. Constraints in vegetable production: Please indicate your response in the appropriate alternative by putting a tick mark (✓) most important, important, least important, not important.

Sl No.	constraints	MI	I	LI	NI
1.	High cost of cultivation				
2.	Labour scarcity				
3.	Non availability of good quality seeds				
4.	Non availability of inputs in time				
5.	Lack of awareness and knowledge about high yielding varieties				
6	Inadequate extension support				
7	High labour charges				
8	Inadequacy of capital				
9	High transportation cost				
10	Lack of marketing facilities				
11	High perishability				
12	Lack of storage facilities				
13	Price fluctuation				
14	Prevalence of pest and diseases				
15	Inadequate facilities for value addition				
16	Non assurance of premium price for organic products				
17	Crop damage due to animal attack				
18	Non availability of credit				
19	Lack of knowledge about post harvest handling				
20	Lack of time in home garden activities.				
21	Others				

26 Gender analysis:

1. Which are the decisions made by men and women

Sl no.	Type of decisions	Men	Women	Both
1	Household decisions			
2	Farm operations			
3	Religious decisions			
4	Child rearing			
5	Education			
6	Jobs to be taken			
7	Entertainment			
8	Expenditure of income			
9	Health related issues			
10	Decisions regarding elderly people in the house			
11	Decisions regarding the transfer and ownership of ancestral properties.			

2. Benefits and incentives analysis:

Sl no.	Benefits	Men	Women	Both
1	Income			
2	Education			
3	Training and skill development			
4	Extension agency contact			
5	Medical facilities			
6	Technological development			
7	Govt polices and incentives			
8	Political interventions			
9	Employment opportunity			
10	Transportation facilities			
11	Farmer groups			

3. Activity analysis:

Sl no.	Benefits	Men	Women	Both
1	Agricultural activity			
a	Land preparation			
b	Collection and arrangements of inputs			
c	Sowing			
d	Planting			
e	Weeding			
f	Mulching			
g	Stalking			
h	Fertilizer application			
i	Plant protection			
j	Harvesting			

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k	Post harvest operations			
l	Livestock and poultry activities			
2.	Household activities			
a	Food preparation			
b	Child care			
c	Elderly care			
d	Cleaning activities			
e	Collection of water			
f	Daily wage labourers			
c	Others			

4. influencing factor for men and women in the society:
(indicate with yes / no)

Sl no.	Benefits	Men	Women
1	Community norms		
a	Are you allowed to stay outside your home for late hours?		
b	Are you allowed to take up jobs outside your community?		
c	Are you allowed to marry outside your community?		
d	Are you allowed to dress in any manner as you wish?		
e	Are you allowed to pursue education and take up jobs of your wish?		
f	Are you allowed to inherit properties of your parents?		
g	Are you allowed to travel to distant place alone?		
h	Are you allowed to equal medical facilities?		
i	Are you allowed to have entertainment of your choice?		
j	Are you allowed to take part in meeting and social gathering?		
2.	Economic factors		
a	Are you paid equal wages for the same amount of work?		
b	Are you given incentives timely?		
3.	Political factors		
a	Are you allowed to vote in election?		
b	Are you allowed to enjoy the benefits of political interventions?		

c	Are you allowed to enjoy the democratic rights of a citizen?		
d	Are you allowed to take up political powers in the society?		

5. Resource analysis:

Sl no.	Activities	Access		
		Men	Women	Both
1	Capital goods			
2	Inputs			
3	Land			
4	Knowledge			
5	Labour			
6	Money			
7	Education			
8	Technology			

27.ITKs

Sl No.	ITKs



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Plate No.1: Survey of the homestead vegetable growers

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Plate No.2: Homesteads of Respondents



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