TECHNOLOGY UTILIZATION OF KAU-PRACTICES OF AMARANTHUS AND VEGETABLE COWPEA IN THIRUVANANTHAPURAM DISTRICT

by

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(2014-11-159)

THESIS

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DECLARATION

I, hereby declare that this thesis entitled **"Technology Utilization of KAU Practices of Amaranthus and Vegetable Cowpea in Thiruvananthapuram 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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LIST OF ABBREVIATIONS AND SYMBOLS USED

AESA	Agro Ecosystem Analysis
cm	centimeter
^{0}C	Degree Celsius
DP	Dustable Powder
et al	and other co-workers
FYM	Farmyard manure
GOI	Government of India
Ha	Hectare
IPM	Integrated Pest Management
KAU	Kerala Agricultural University
kg	kilogram
m	meter
NPK	Nitrogen, Phosphorous and Potassium
NPV	Nuclear Polyhedrosis Virus
%	Per cent
QDPM	Quality Declared Planting Material
SD	Standard Deviation
t	tonne
TV	Television
VFPCK	Vegetable and Fruit Promotion Council Keralam

INTRODUCTION

1. INTRODUCTION

Vegetables are important constituents of Indian agriculture and nutritional security due to their short duration, high yield, nutritional richness, economic viability and ability to generate on-farm and off farm employment Our country is blessed with diverse agro-climates, making it possible to grow wide array of vegetables India is the second largest producer of vegetables in the world India produces 14 % (146 55 million tonnes) of world's vegetables on 15 % (8 5 million hectares) of world area under vegetables (Vanitha *et al* ,2013)

Amaranthus (*Amaranthus tricolor* L) also known as "poor man's spinach" is popular among all communities of India It is one of the popular leafy vegetables grown commercially in Kerala due to its easiness in culture, fast growth rate, adaptability to varying agro climate and high yield potential It fits well into any crop rotation due to very short duration and high yield of edible matter per unit area (Malathy *et al* , 2013) Amaranthus serves as an alternative source of nutrition for people in developing countries since it is a rich source of protein, vitamins and dietary fibre Besides immense nutritional importance, it can be successfully grown under varied soil and agro-climatic conditions It is extremely adaptable to adverse growing conditions and is resistant to heat and drought In Thiruvananthapuram district, the total area under amaranthus cultivation is 170 hectares (GOK, 2016) Some varieties of amaranthus recommended by KAU include red coloured varieties like Kannara Local, Arun, Krishnasree and green coloured varieties like Co-1, Co-2, Co-3, Mohini and Renusree (KAU, 2011)

Vegetable cowpea / Yard long bean (*Vigna unguiculata* subsp *sesquipedalis* (L) verdcourt, also known as 'asparagus bean', 'chinese long bean' and 'snake bean' is one of the most popular and remunerative vegetable crop traditionally grown in the humid tropics of Kerala It is a distinct form of cowpea grown for its immature pods The traditional vernaculars like 'Achingapayar',' Kurutholapayar', 'Vallipayar', and

'Pathinetumaniyan', used to refer vegetable cowpea indicate that Kerala is the land of this crop It is a rich and inexpensive source of vegetable protein It enriches soil fertility by fixing atmospheric nitrogen Because of its quick growing habit, it has become an essential component of sustainable agriculture in margmal lands of this tropic In Thiruvananthapuram district, the total area under vegetable cowpea cultivation is 231 hectares (GOK, 2016) Some varieties of vegetable cowpea recommended by KAU include Sharika, Malika, Vellayani Jyothika, Lola and Vyjayanthi (KAU, 2011)

In Kerala, eventhough these crops are commercially cultivated, most of the vegetable requirements are met from other states This situation would be changed only by increased production of quality vegetables from the available cultivable area To mercase the production and quality of vegetable crops, different research and developmental activities are being carried out by various agricultural institutions such as KAU and various production practices are being recommended Whether these practices received good attention by the commercial amaranthus and vegetable cowpea growers or not? This formed the nucleus of this research programme with the following objectives

OBJECTIVES

- To study the extent of awareness, knowledge and adoption of KAU varieties and selected recommended practices of amaranthus and vegetable cowpea
- To study their relationship with selected socio - psychological and economic characteristics of commercial vegetable growers
- To identify the constraints in the adoption of KAU varieties and recommended practices of amaranthus and vegetable cowpea
- To bring out suggestions for refinement of technologies

SCOPE OF THE STUDY

The study attempts to systematically assess the awareness and knowledge of the commercial growers of amaranthus and vegetable cowpea about the new varieties and the selected practices of amaranthus and vegetable cowpea recommended by KAU The study looks into the rate of adoption of KAU varieties and the recommended practices of amaranthus and vegetable cowpea Thus, the results of the study will show the achievement of KAU in the dissemination of scientific results of research and practical knowhow to the farmers If the adoption rate is low, the reasons can be identified and necessary steps can be taken to enhance adoption This study will also identify the constraints faced by the commercial growers of amaranthus and vegetable cowpea in the adoption of KAU varieties and recommended practices, if any and bring out suggestions for refinement of technologies The results of the study would be of immense help to provide information for further research in the release of new varieties of amaranthus and vegetable cowpea and recommendation of refined package of practices

LIMITATIONS

It was impossible to cover all the blocks in Thiruvananthapuram district with the limited time and resources available Hence the study was limited to three blocks in Thiruvananthapuram district having larger area under commercial cultivation of amaranthus and vegetable cowpea which were selected at random Also, the sample size and the variables for the study were limited to a manageable size However, sincere efforts have been taken to make the study as objective and as systematic as possible

PRESENTATION OF THE THESIS

Besides the present introduction chapter, the second chapter, that is, theoretical orientation, deals with the review of important and related studies in the

field of the present investigation The third chapter deals with the methodology of the study within which the location of the study area, sampling procedure followed, selection of variables for the study and their quantification, and the statistical tools used are included The fourth chapter contains results of the study and discussion The last chapter summarizes the study with implications and suggestions for future research The appendices and abstract of the thesis are given at the end

REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

The objective of this chapter is to link whatever research findings and other observations exist in the area of study with the research problem For this, a review of literature has been made to integrate important findings which give proper orientation for the proposed research This chapter explains the theoretical perspective adopted for the study The results of the review are presented under the following main heads

1 Dependent variables
2 Independent variables
3 Relationship between dependent variables and independent variables
4 Constraints experienced by the farmers
5 Suggestions for refinement of technologies

2 1 DEPENDENT VARIABLES

2.1.1 Awareness

According to the Dictionary of Behavioural Sciences, awareness is being conscious of something, perceiving and taking account of some event, occasion, experience or object

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

Krishnamurthy *et al* (1999) reported that 65 per cent of the respondents had awareness about the application of chemical fertilizers while 61 66 per cent had awareness about plant protection measures

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

Kella and Iqbal (2002) opined that 65 per cent of the respondents had high awareness about the indigenous farming practices

Sudhakar and Kanagasabapathi (2002) observed that awareness of the farmers was high for practices, namely, cotton ratoon cropping, crop rotation, intercropping, use of light traps, maintaining the field free from weeds, summer ploughing, correct spacing, identification of beneficial insects, pest resistant high yielding varieties, correct dose of nitrogenous fertilizers and seed treatment with *Trichogramma*

Jaganathan (2004) reported that organic farming practices like summer ploughing, in situ incorporation of crop residues, raising green manure crops and incorporation, selection of good seeds, application of FYM, application of poultry manure, timely irrigation, crop rotation, intercropping systems, mulching, hand/ mechanical weeding and destruction of plants affected with pests and diseases were well aware to 80 to 95 per cent farmers

Sasidaran (2015) pointed out that 67 per cent of the vegetable growers had medium level of awareness about organic farming technologies Almost an equal percentage of farmers fell in the low (18 per cent) and high (15 per cent) category

2.1.2 Knowledge

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

Ramsey *et al* (1959) suggested that cognitive adoption includes obtaining knowledge and critical evaluation of the practice in terms of the individual situation The educational activities tend to increase the knowledge of the participants in these activities

Prasad and Sundaraswamy (1999) reported that majority of the farmers possessed medium level of knowledge about dry land agricultural technologies

Ghuman *et al* (2002) observed that majority of the farm women had low to medium level of knowledge regarding technologies of crop production, gram storage and cattle management

Kumar (2002) reported that 76 00 per cent of the respondents had correct knowledge about chemical fertilizer application

Accordmg to Sheela and Seetharam (2002), 33 33 per cent of the brinjal growers and 40 per cent of the tomato growers belonged to low category regarding the knowledge about plant protection measures Majority (36 67 per cent of brinjal growers and 26 67 per cent of tomato growers) had medium knowledge level and exactly 30 per cent of the brinjal farmers and 33 33 per cent of tomato growers had high level of knowledge about plant protection measures

Fayas (2003) revealed that majority of the vegetable growers (75 60 per cent) had medium level of knowledge in vegetable cultivation

Nandini *et al* (2003) stated that 51 67 per cent of the farmer respondents belonged to high category with respect to knowledge about soil and water conservation practices About 26 per cent of the respondents possessed medium level of knowledge followed by 21 67 per cent having low level of knowledge about soil and water conservation practices

Atchutaraja *et al* (2004) reported that majority of the farmers possessed medium level of knowledge followed by low and high level of knowledge on eco - friendly farming practices

Jaganathan (2004) opined that majority of the vegetable growers (70 per cent) had medium level of knowledge followed by high (18 per cent) and low (12 per cent) levels of knowledge about organic farming practices in vegetable cultivation

Pandey *et al* (2004) revealed that 78 85 per cent of the farmers had knowledge about the modern rice varieties followed by 68 96 per cent having knowledge about the application of balanced fertilizers

Accordmg to Singh and Kaur (2004), more than 90 per cent of the cotton farmers had high knowledge about the practices such as soil testing, recommended rate of sowing, crop spacing and irrigation practices

Suji and Vasanthakumar (2004) noticed that majority of the respondents belonged to medium category with regard to the knowledge of botanical pesticides

Study conducted by Sidram (2008) revealed that majority of the respondents (63 per cent) had medium level of knowledge about organic cultivation practices of pigeon pea With regard to individual organic farming practices, majority (81 per cent) of the respondents had knowledge about the recommended seed rate, recommended sowmg time (98 per cent), application of farm yard maure (100 per cent), vermicompost (100 per cent) and jeevamruth (98 per cent), summer ploughing (100 per cent), crop rotation (96 per cent), use of pheromone traps (98 per cent), NPV (100 per cent) and NSKE (100 per cent)

Rani and Selvaraj (2013) observed that more than half (54 per cent) of the BT cotton growers under irrigated conditions had high level of knowledge about cultivation aspects followed by 26 per cent and 20 per cent with low and medium level respectively

Mondal *et al* (2014) showed that 45 per cent of the respondents had a medium level of knowledge while there were no organic vegetable growers who had high level of knowledge

2.1.3 Adoption

The word 'adopt' has the meaning 'to take up and practice as one's own, to accept formally and put in to effect' Adoption of a particular message or production recommendation by a farmer implies the voluntary acceptance of the message and its practice

Wilkening (1953) postulated the adoption of an innovation as a process composed of learning, deciding and acting over a period of time

According to Rogers (1962), adoption process is the mental process through which an individual passes from first hearing of an innovation to its final adoption

Janadevan and Prakash (1992) reported that knowledge of coconut farmers about fertilizers, information sources used and extension contact were positively and significantly correlated to adoption

Iqbal *et al* (1996) revealed that majority (82 98 per cent) of small farmers, 50 per cent of medium farmers and 46 15 per cent of big farmers adopted NPV to control the pests of cotton

Prasad *et al* (1999) stated that marginal farmers exhibited low level of adoption of plant protection measures compared to small and big farmers of paddy

Ranganathan and Sundaraman (2001) recorded that majority of the big growers belonged to high level and majority of the small growers belonged to low category of adoption of groundnut seed production technologies

Mercykutty and Ranjan (2000) stated that 78 12 per cent of farmers adopted bio–fertilizers in vegetable cultivation

Kumar (2002) registered that about 72 67 per cent of the respondents adopted the recommended dose of chemical fertilizers, followed by 63 33 per cent of the respondents who adopted the correct concentration of pesticides in cole crop cultivation

Sakunthalai (2002), in her study, observed that among the recommended practices of cotton cultivation, almost all the practices except a few were adopted by half of the sample size Among the adopted practices, season, varieties, field preparation, seed rate, seed treatment and insecticide application were modified to suit the socio- economic conditions

Sudhakar and Kanagasabapathi (2002) noticed that out of twenty three IPM practices in cotton cultivation, adoption was noticed high for the practices, namely, avoiding crop ratooning, summer ploughing, following crop rotation, using light traps, following correct spacing followed by intercropping

Kamalakkannan (2003) revealed that majority of the commercial vegetable growers (65 per cent) had medium level of adoption of recommended technologies followed by 16 25 per cent and 18 75 per cent of farmers who belonged to low and high adoption categories respectively

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

Vetriselvan and Ravichandran (2003) pointed out that majority of the respondents were medium level adopters of groundnut technologies Use of high yielding varieties was found to be high in the case of small and big farmers

Suji and Vasanthakumar (2004) reported that more than half of the respondents were found with low level adoption of botanical pesticides

According to Kavaskar and Govind (2005), high adoption was found for recommended planting technique, while low adoption was found for recommended fertilizers and manuring practices in banana cultivation

Rabari (2006) opined that about 65 34 per cent of the respondents had medium level of adoption of recommended technologies of tomato, followed by 23 33 per cent and 11 33 per cent of the respondents who were having high and low level of adoption respectively

Thippeswamy (2007) found that the practice of application of bordeaux paste was fully adopted by 28 per cent of the farmers

Yavanapriya *et al* (2014) revealed that majority (64 per cent) of the respondents belonged to medium category in the case of adoption of maize cultivation practices As much as 23 per cent of the respondents belonged to the category of low adoption and above one tenth (13 per cent) of the respondents belonged to high adoption category

2 2 INDEPENDENT VARIABLES

2.2.1 Age

Wolman (1973) defined age as the period of time from birth to any given time in life or chronological age

Sinha (1996) studied the socio economic characteristics of coconut growers in a progressive area of Assam and revealed that majority (66 67%) of the farmers were middle aged

Vennila and Annamalai (2002) found that most of the millet farmers in general as well as category wise were found to be coming under middle–aged group

Priya (2003) reported that 80 per cent of the respondents were in the age group of 33-52 years and 15 per cent below 33 years

Jaganathan (2004) reported that majority of the vegetable growers (4 per cent) belonged to old age category

According to Thiyagu (2011), majority of the respondents (49 2 per cent) belonged to the young age category followed by 27 5 per cent in the middle age category, and only 23 3 per cent fell under old age category

Hanjabam (2013) revealed that majority (80 per cent) of the precision farmers belonged to the old age category while 63 33 per cent of the conventional farmers belonged to the middle aged category

Anupama (2014) observed that more than 50 per cent of the organic farmers belonged to old age category and 42 per cent belonged to middle age category

2.2.2 Education

Rai (1965) pointed out that higher the education of the farmer, greater the interest in reading various kinds of literature in relation to the improved agricultural practices

Wolman (1973) defined education as progressive changes of a person, affecting knowledge, attitudes and behaviour as a result of formal institution and study

Quazi and Iqbal (1991) opined that education was an important determinant of innovation adoption

Vennila and Annamalai (2002) found that education level of small and big farmers was low and 44 per cent of the respondents were illiterate

Jaganathan (2004) reported that status of the farmers had significant and positive relationship with knowledge and adoption of organic farming practices Also, majority (52 per cent) of the respondents had secondary level education

Sasankan (2004) stated that nearly half of the respondents (49 per cent) had education up to secondary level There were negligible percentage (<2 per cent) of illiterate farmers

Sangeetha (2009) noticed that 90 per cent of the respondents were literate and the rest 10 per cent were illiterate The precision farming beneficiaries having primary to middle education were about 59 90 per cent, whereas only 30 10 per cent had secondary to collegiate education

Hanjabam (2013) found that 100 per cent of the farmers were literate and also more than 50 per cent of the farmers had attended high school

2.2.3 Experience in Vegetable Farming

Experience in vegetable cultivation refers to the total number of years a respondent has been engaged in vegetable cultivation

Fayas (2003) reported that 75 per cent of the farmers had more than 20 years of experience in vegetable cultivation

Jaganathan (2004) noticed that 47 per cent of the respondents were having medium level of experience in vegetable cultivation

Hanjabam (2013) revealed that majority (76 7 per cent) of the respondents were having more than 25 years of experience Farmers with less than 10 years of experience were negligible because of the reason that farming has been the primary occupation

Anupama (2014) reported that majority of the farmers (54 per cent) had high experience in vegetable cultivation, that is, more than 25 years, while 39 per cent of the respondents had experience between 11- 25 years, 5 per cent had experience between 6-10 years and only 2 per cent had farming experience of less than 5 years

2.2.4 Area under Vegetable Cultivation

Area under vegetable cultivation is measured as the extent of area under vegetable cultivation in hectares

Surendran (2000) opined that large farm size resulted in more returns from farming which was conducive for higher group participation

Balachandran (2004) found that majority of organic farmers, that is, about 53 per cent were small and marginal farmers with land holdings up to 2 00 acres, as compared to 44 per cent with holdings above 2 acres up to 25 acres

Chinchu (2011) stated that majority (55 per cent) of the farmers had 1-2 acres of land while 35 per cent of the farmers had less than 1 acre of area Only 10 per cent had more than 2 acres of farm size

Sasidharan (2015) noticed that more than half of the respondents had less than 0 1 Ha of organic vegetable cultivating area and 43 per cent had area ranging from 0 1 to 0 4 Ha

2.2.5 Contact with Extension Agency

Contact with extension agency is defined as the degree to which farmers used to maintain contact with extension agencies

Arunkumar (2002), in his study reported that 48 50 per cent of the respondents had high level of contact with extension agencies

Reddy (2003) stated that majority (60 per cent) of the respondents were having medium level of extension contact followed by low (24 67 per cent) and high (15 33 per cent) levels of extension contact respectively

Mishra (2006) found that most of the farmers were not aware of the latest technologies and schemes regarding agriculture and their major sources of information were local shop supplying farm inputs

Chavan *et al* (2010) reported that extension contact had significant correlation with the perceived effectiveness of agricultural programmes

2.2.6 Scientific Orientation

Scientific Orientation refers to the degree to which a farmer is oriented to the use of scientific methods

Kamaruddeen (1981) found significant positive relationship between scientific orientation and attitude of farmers towards the demonstrated agricultural practices

Bindu (1997) reported that 38 per cent, 32 per cent and 30 per cent of the cassava cultivators belonged to high, low and medium level of scientific orientation respectively

Saktivel (2000) revealed that 35 per cent of the respondents had low level of scientific orientation, closely followed by medium level (34 17 per cent) and high level of scientific orientation (30 83 per cent)

Floralavanya (2007) stated that 38 40 per cent and 26 60 per cent of the adopters and non-adopters had high level of scientific orientation, 25 per cent and 44 90 per cent of the adopters and non adopters had medium level of scientific orientation and 36 60 per cent of adopters and 28 50 per cent of non adopters had low level of scientific orientation

Oommen (2007) observed that 74 per cent of the viewers of agricultural programmes through various channels of television had medium level of scientific orientation

Rakesh (2010) reported that 42 50 per cent of the respondents possessed medium level of scientific orientation followed by 35 50 per cent with high level and 22 per cent with low level of scientific orientation respectively

Hanjabam (2013) found that the respondents were medium to high scientific in their approach to take up precision farming practices in Kerala

2.2.7 Innovativeness

Innovativeness refers to the degree to which the respondents are relatively earlier in adopting new ideas

Saktivel (2000) found that equal proportion (39 17 per cent) of the cassava cultivators had low and medium level of innovativeness, followed by 21 66 per cent of them with high level of innovativeness

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

Priya (2003) stated that 97 50 per cent of the vegetable growers had high level of innovativeness

Jaganathan (2004) observed that more than half of the respondents (55 per cent) had medium innovativeness and also found that innovativeness had a significant and positive relationship with extent of awareness, knowledge and attitude of the respondents

Nath (2004) found that no significant difference exists in the mean scores among the farming systems with regard to innovation proneness of farmers in NARP zones

Sasankan (2004) reported that majority (49 per cent) of the farmers had medium level of innovativeness

Chinchu (2011) noticed that more than half (58 per cent) of the beneficiary farmers of SHM- Kerala were innovative in nature and also were good adopters of improved agricultural practices

2.2 8 Mass Media Exposure

Mass media exposure refers to the degree to which an individual has been exposed to mass media information sources

Thomas (2000) stated that majority of the medicinal plant cultivators were having low mass media exposure

Suthan (2003) revealed that majority of the vegetable growers (65 33 per cent) had high level of mass media exposure

Jaganathan (2004) reported that majority (61 per cent) of the vegetable growers belonged to medium category with respect to mass media exposure

Ahire and Shoney (2005) opined that television and radio were the important sources of mass media for the mango growers

Sengupta (2008) stated that many farmers were extremely vulnerable to misinformation about crop prospects due to lack of mass media exposure

Mishra *et al* (2012) in their study revealed that mass media like TV, radio and newspaper were used for the purpose of news or information by majority of the respondents

2.2.9 Economic Motivation

Economic motivation refers to the extent to which a person is oriented towards profit maximization and relative value he places on monitory gains

Saktivel (2000) reported that 46 66 per cent of the cassava cultivators had high level of economic motivation followed by medium level (26 67 per cent) and low level (26 67 per cent)

Vennila and Annamalai (2002) revealed that majority of the respondents (two third of them) had medium level of economic motivation

Fayas (2003) in his study, stated that 86 per cent of the respondents had medium level of economic motivation

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

Suthan (2003) reported that more than half of the vegetable growers (57 33 per cent) had high level of economic motivation

Bhavya (2008) reported that 60 per cent of the respondents had medium level of economic motivation followed by high (21 67 per cent) level of economic motivation

Anupama (2014) stated that a higher percentage (78 per cent) of the respondents had high level of economic motivation, followed by medium (12 per cent) and low level (10 per cent).

2.2.10 Risk Orientation

Risk Orientation refers to the degree to which a farmer is oriented towards risk and uncertainty and has courage to face the problems in farming

Majjusha (2000) observed that equal percentage (50 per cent) of cowpea growers had high and low risk orientation

Sreedaya (2000) reported that 66 per cent of the farmers had low risk orientation followed by 17 per cent each having medium and high risk orientation

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

According to Suthan (2003), 58 67 per cent of the farmers had medium level of risk orientation

Jaganathan (2004) noticed that nearly three fourth of the respondents had medium level of risk orientation Also, knowledge of the farmers about organic farming practices had significant and positive relationship with risk orientation

Somanath (2009) reported that agripreneurs of the state in general were moderate risk takers

According to Jayakumar and Sundaramari (2014), risk orientation was negatively significant with the adoption of indigenous agricultural practices

2 3 RELATIONSHIP BETWEEN INDEPENDENT VARIABLES AND DEPENDENT VARIABLES

2.3.1 Relationship Between the Profile Characteristics of the Respondents and Their Awareness.

The research findings pertaining to the relationship of characteristics of respondents with their awareness are presented in Table 1

Table 1 Relationship between the profile characteristics of the respondents and their awareness

Author	Year	Age	Education	Experience in vegetable cultivation	Area under Vegetable cultivation	Contact with extension agency	Scientific orientation	Innovativeness	Mass media exposure	Economic motivation	Risk orientation
Gangadharan	1993	SN	SP	-	-	SP	SP	SP	-	SP	S P
Sherief	1998	NS	NS	-	-	-	-	-	SP	-	-
Syamkumar	1999	NS	NS	-	-	-	-	-	SP	SP	
Jaganathan	2004	NS	SP	NS	NS	-	-	SP	-	NS	N S
Sasidaran	2015	NS	SP	NS	NS	-	-		-	-	-

SP – Significant, Positive

SN – Significant, Negative

NS – Not significant

2.3.2 Relationship between the Profile Characteristics of the Respondents and Their Knowledge.

The research findings about the relationship of profile characteristics of respondents with their knowledge are presented in Table 2

Table 2 Relationship between the profile characteristics of the respondents and their knowledge

Author	Year	Age	Education	Experience in vegetable cultivation	Area under cultivation	Contact with extension agency	Scientific orientation	Innovativeness	Mass media exposure	Economic motivation	Risk orientation
Gangadharan	1993	SN	SP	-	-	SP	SP	SP	-	SP	SP
Manjusha	1999	NS	SP	NS	NS	-	-	NS	-	NS	NS
Majjusha	2000	SN	SP	SN	NS	-	-	NS	-	NS	SP
Thomas	2000	SP	NS	SP	SP	-	-	-	SP	-	-
Manoj	2000	NS	SP	NS	NS			SP	SP	SP	SP
Jaganathan	2004	NS	SP	NS	NS	-	-	SP	-	NS	SP
Anupama	2014	NS	NS	NS	-	SP	NS	NS	NS	SP	-
Sasidaran	2015	NS	SP	NS	NS	-	-	-	-	-	-

SP – Significant, Positive

SN – Significant, Negative

NS – Not significant

2.3.3 Relationship Between the Profile Characteristics of the Respondents and Their Adoption.

The research findings related to the relationship of profile characteristics of respondents with their adoption are presented in Table 3

Table 3 Relationship between the profile characteristics of the respondents and their extent of adoption

Author	Year	Age	Education	Experience in vegetable cultivation	Area under cultivation	Contact with extension agency	Scientific orientation	Innovativeness	Mass media exposure	Economic motivation	Risk orientation
Gangadharan	1993	SN	SP			SP	SP	SP		SP	SP
Manjusha	1999	NS	NS	NS	NS			NS		NS	NS
Majjusha	2000	NS	SP	NS	NS	-	-	NS	-	NS	NS
Manoj	2000	NS	NS	SP	NS				SP	NS	NS
Venkatesan	2000	NS	NS	NS							SP
Jaganathan	2004	NS	SP	NS	NS	-	-	SP	-	NS	NS
Sasidaran	2015	NS	SP	NS	NS	-	-	-	-	-	-

SP – Significant, Positive

SN – Significant, Negative

NS – Not significant

2 4 CONSTRAINTS FACED BY THE FARMERS

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

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

Kalavathy and Anithakumari (1998), in their study, stated that, more than ninety per cent of the respondents opined that lack of knowledge and lack of conviction about the recommended practices were the major constraints faced by them

According to Sujaths and Nanjayan (1999), as much as 93 33 per cent of the farmer respondents registered the incidence of diseases as the major constraint with respect to agricultural activities This was followed by pest problems (pointed out by 70 per cent of the farmers), scarcity of water (93 33 per cent) and labour scarcity (87 50 per cent)

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

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

Ponnusamy and Ravi (2002) reported that exactly 62 50 per cent of the farmers perceived very low price of the produce and 56 67 per cent expressed dominance of local merchants as major problem Malpractice in weighing was perceived by 45 83 per cent of paddy farmers as the third most important constraint

Ramasubramanian and Manoharan (2002) revealed that seasonal fluctuations in the market, exploitation by middlemen, and lack of regulated markets for mango were the major constraints faced by the farmers Lack of irrigation facilities, lack of knowledge on pest and diseases, lack of information about production technologies, imbalanced manuring, high cost of inputs and lack of transport facilities were other important constraints faced by the farmers

Chandran and Kumar (2003) reported that the agricultural labourers especially farm women were not fully aware of the advantages of the use of new machinery and progressive technology due to their low literacy rate and technical knowledge

Sumati and Annamalai (2003) in their study, stated that inadequate market facilities, high transport cost, lack of transport and lack of technical guidance were the major constraints expressed by the farmers

Vetriselvan and Ravichandran (2003) revealed that inadequate knowledge was expressed as the major constraint by the farmers

Manohari (2004) reported than more than 70 per cent of the tribal farmers expressed that lack of awareness, lack of knowledge, lack of capital, non availability of inputs and lack of equipment were the major constraints faced by them

Pandey *et al* (2004) reported that non- availability and high cost of improved seeds, lack of knowledge about seed treatment, plant protection measures and application of fertilizers at proper time were the major constraints faced by the respondents in the study area

Singh (2004) observed that rainfall, drought, lack of knowledge on improved dry land practices, lack of finance and low price of produce were registered as very severe constraints

Balasubramoni and Krishna (2004) inferred that among the production constraints, poor quality of planting materials and attack of pest and diseases were most important constraints mentioned by 55 per cent of the commercial rubber growers Non availability of skilled tappers was reported by 50 per cent of the respondents The third important constraint expressed by 47 per cent of rubber growers was loss of top soil due to erosion

Accordmg to Patel (2008), the major constraint expressed by all the organic vegetable growers were non- availability of labour and lack of research support for providing rationality of traditional organic practices Also, cent per cent of the farmers highlighted the problems in marketing such as fluctuation in prices of the commodities, lack of minimum support price and inaccurate weighing instruments used by the vegetable vendors

Sangeetha (2009) stated that 78 18 per cent of the respondents expressed that cost of water soluble fertilizer was higher than the normal fertilizer Fifty per cent of the respondents felt that technologies like drip irrigation, fertigation and chemical pesticides were expensive when compared to conventional farming

Rakesh (2010) reported that 50 per cent of the respondents faced problems with frequent cleaning of the filters and majority of the respondents expressed that they suffered out of damages caused by rodents (38 per cent) followed by low quality of dripping material (32 66 per cent) and difficulty in taking up intercultural operations (24 per cent)

Badodiya *et al* (2011) reported that among the various constraints faced by the respondents, high cost of inputs ranked first followed by lack of inputs and raw

materials, poor financial conditions, non–availability of loans in time, lack of proper training at grass root level and non–availability of appropriate literature

Gawai *et al* (2013) reported that lack of knowledge and water availability were the constraints faced by the farmers in adoption of biofertilizer

2 5 SUGGESTIONS FOR REFINEMENT OF TECHNOLOGY

Gangadharan (1993) in his study reported that development of low cost technologies for the control of pests and diseases was a solution suggested by 56 per cent of the farmers Forty nine per cent of the farmers suggested production and distribution of good quality planting materials

According to Kalavathy and Anithakumari (1998), organizing training programmes, utilizing media and extension workers to impart knowledge to farmers and providing adequate quality inputs and facilities at reasonable cost will be of much use in enhancing practice adoption by cowpea farmers

Hanjabam (2013) reported that, in terms of precision farming, a holistic Decision Support System (DSS) software package could be developed which enable the farmer to plan better and manage the field cultivation practices Firstly, it could help as a guide to make decision to whether or not to invest in precision farming Secondly, it could provide recommendations for variable rate of application of fertilizers

METHODOLOGY

3. METHODOLOGY

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

3 1 Research design

3 2 Locale of study

3 3 Selection of respondents

3 4 Operationalisation and measurement of dependent variables

3 5 Operationalisation and measurement of independent variables

3 6 Constraints in the adoption of KAU varieties and recommended practices and suggestions for refinement of technologies

3 7 Techniques employed in data collection

3 8 Statistical tools used for data analysis

3 1 RESEARCH DESIGN

Kerlinger (1978) defined, "Research design is the plan, structure and strategy of investigation so as to obtain answers to research questions and to control variance"

For conducting this study, ex–post facto design was used in which the researcher does not have direct control over the variables because their manifestations have already been occurred or because they are inherently not manipulatable

3 2 LOCALE OF STUDY

Thiruvananthapuram district was selected for the study because of the presence of College of Agriculture, Vellayam from where high yielding varieties of amaranthus and vegetable cowpea were released and distributed

3 3 SELECTION OF RESPONDENTS

Selection of respondents was through three stage random sampling procedure In the first stage, from the list of blocks having larger area under amaranthus and vegetable cowpea cultivation, three blocks were selected, namely, Nemom, Kazhakoottam and Vamanapuram from the eleven blocks of Thiruvananthapuram district In the second stage, in each block, from the list of panchayats having larger area under amaranthus and vegetable cowpea cultivation, one panchayat was selected, namely, Kalliyoor, Kazhakoottam and Pullampara In the third stage, two separate lists of farmers engaged in commercial cultivation of amaranthus and vegetable cowpea were prepared from which fifteen amaranthus growers and fifteen vegetable cowpea growers were selected randomly, thus making a total of ninety farmers Figure 1 shows the diagrammatic representation of selection of respondents and Figure 2 shows the locale of study

3 4 OPERATIONALISATION AND MEASUREMENT OF DEPENDENT VARIABLES

The objectives of the study necessitated to select the following dependent variables for the study namely Awareness, Knowledge and Adoption

3.4.1 Extent of Awareness of the Respondents

Awareness was operationalised as the extent to which respondents were familiar with the KAU varieties and selected recommended practices of amaranthus

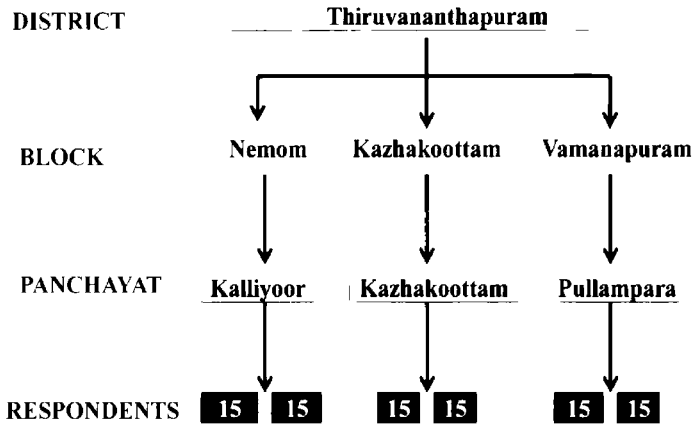

Figure 1 Selection of respondents

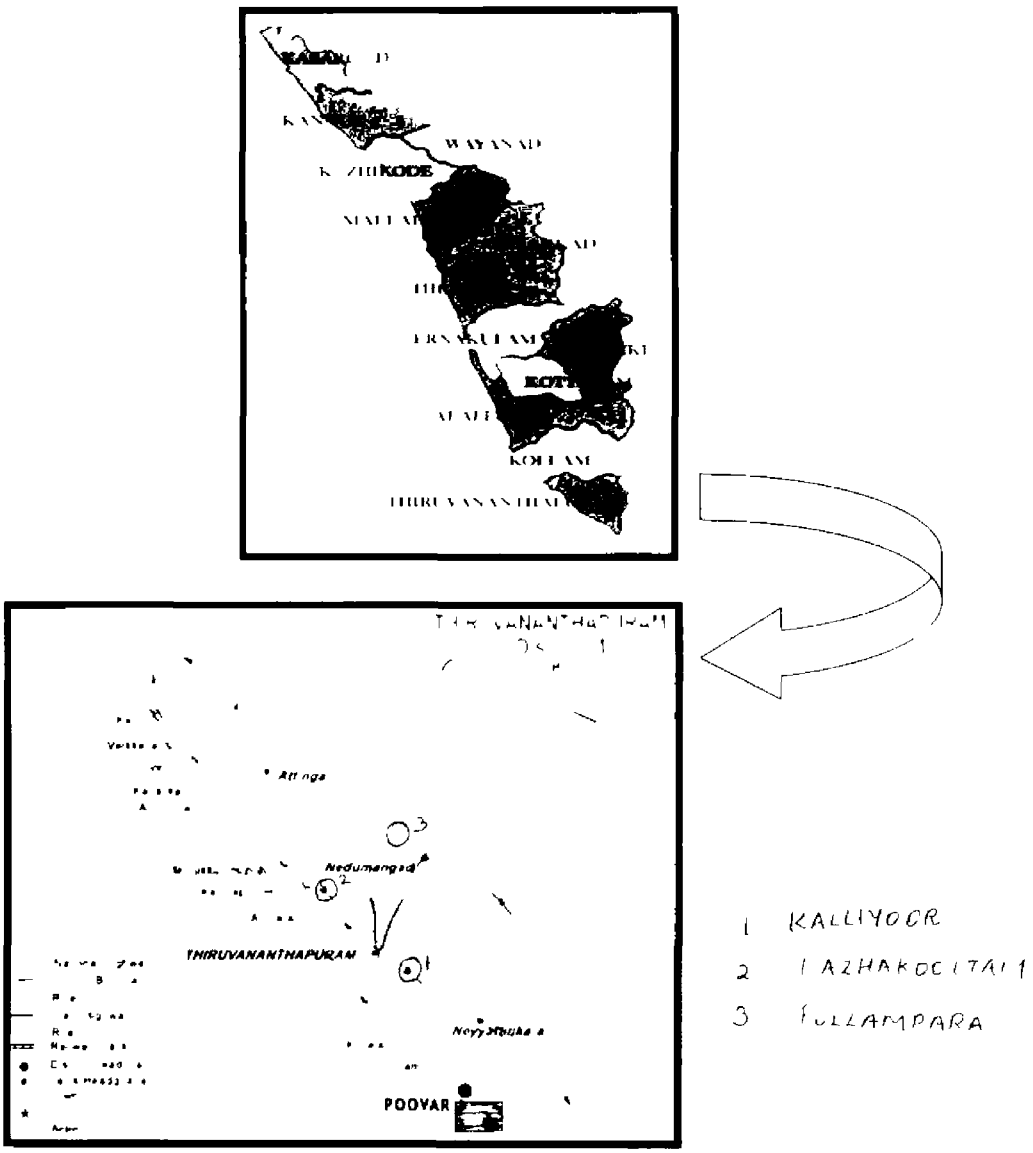

Figure 2 Map showing the locale of study

and vegetable cowpea Gangadharan (1993), Sriram (1997) and Sherief (1998) measured awareness on a two point continuum namely "aware" and "not aware"

In this study, the method followed by Jayawardana (2007) was accepted for measuring the awareness of the respondents about the KAU varieties and selected recommended practices of amaranthus and vegetable cowpea On the basis of review of literature, a list of questions was prepared The questions were pre-tested among 15 amaranthus farmers and 15 vegetable cowpea farmers in a non-study area in Chenkal panchayat of Parassala block From the list of questions, a set of 8 questions were selected for amaranthus and 10 questions were selected for vegetable cowpea on the basis of the variation in response obtained in pre-test which are given in Appendix III for amaranthus and Appendix IV for vegetable cowpea The corresponding malayalam translation of the set of questions are given in Appendix V for amaranthus and Appendix VI for vegetable cowpea

These questions were administered to the farmers and one score was given to every response of "yes" and zero to the response "no" The mean and standard deviation of the awareness score were calculated The respondents were categorized in to low, medium and high levels based on mean ± standard deviation

3.4.2 Knowledge Level of the Respondents

Knowledge, in the present study was operationalised as the extent of information possessed by the respondent about the KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

In the present study, a teacher made test was developed for measuring the knowledge of the respondents about the KAU varieties and selected recommended practices of amaranthus and vegetable cowpea using the procedure detailed below Statements were formulated based on review of literature and consultation with experts These statements formed the items to be included in the

knowledge test Eight items for amaranthus and ten items for vegetable cowpea were constructed to develop a knowledge test which is given in Appendix III for amaranthus and Appendix IV for vegetable cowpea The corresponding malayalam translation of the set of questions are given in Appendix V for amaranthus and Appendix VI for vegetable cowpea

These items in the form of questions were asked to the respondents to check whether they know the correct answer or not Correct and incorrect answers were given a score of 1 and 0 respectively The total knowledge score of each respondent was calculated by total number of items correctly answered by him.

The maximum score obtained by a respondent for the test was eight for amaranthus and ten for vegetable cowpea and minimum score was zero The mean and standard deviation of the knowledge score were calculated The respondents were categorized in to low, medium and high levels based on mean ± standard deviation

3.4.3 Extent of Adoption

Adoption was operationalised as the degree to which a farmer had actually followed the recommended practices of amaranthus and vegetable cowpea

To study the rate of adoption, a list of practices including recommended varieties was prepared based on the details given in KAU (2011) and Nair *et al* (2011) which was included in Appendix III for amaranthus and Appendix IV for vegetable cowpea The corresponding malayalam translation of the list of practices are given in Appendix V for amaranthus and Appendix VI for vegetable cowpea The extent of adoption was calculated using adoption quotient for measuring adoption behaviour as developed by Chattopadhyay (1963) and used by Singh and Singh (1967)

The Adoption Quotient for each respondent was calculated using the formula

$$AQ_i = \sum_{j\,1}^{N} \frac{(e_{ij} / P_j)}{N} \times 100$$

AQ_i = Adoption Quotient

e_{ij} = Extent of adoption of each practice

P_j = Potentiality of adoption of each

N = Total number of practices

Eight practices were selected for amaranthus and twelve practices were selected for vegetable cowpea and are given in Appendix 3 and 4 respectively

3 5 SELECTION, OPERATIONALISATION AND MEASUREMENT OF INDEPENDENT VARIABLES

Based on the objectives, review of literature, discussion with experts and observation made by the researcher, a list of socio–psychological and economic characteristics which have relationship with the selected dependent variables were identified along with their operational definitions A questionnaire was prepared to collect the responses from judges in a five point continuum with response pattern "Most relevant", "More relevant", "Relevant", "Less relevant" and "Least relevant" with scores 5,4,3,2, and 1 respectively A copy of the questionnaire is furnished in Appendix 1

Copies of the questionnaire with clear instructions for filling up were sent to thirty judges Twenty six judges responded The scores assigned by these judges were added up for each variable and furnished in Appendix II First ten variables having higher scores were selected as the independent variables for the study

Thus the socio–psychological and economic variables selected and their measuring device used were

Variables	Measuring device

Age	Scoring procedure based on census report of GOI (2011)
Education	Procedure developed by Singh (1993)
Experience in vegetable cultivation	Scoring procedure adopted by Sreedaya (2000)
Area under vegetable cultivation	Procedure suggested by Esakkimuthu (2012)
Contact with extension agency	Scoring procedure followed by Rubeena (2015)
Scientific orientation	Scale developed by Supe (1969)
Innovativeness	Procedure developed by Singh and Chowdhary (1977)
Mass media exposure	Procedure developed by Lakshmi (2000)
Economic motivation	Scale developed by Supe (1969)
Risk orientation	Scale developed by Supe (1969)

3.5.1 Age

Age was operationally defined as the number of years completed by the respondent at the time of investigation

The respondents were classified in to three categories, namely, young age, middle age and old age

Category	Age in Years	Score
Young age	< 35 years	1
Middle age	35 – 55 years	2
Old age	> 55 years	3

3.5.2 Education

Education referred to the extent of non-formal or formal learning possessed by the farmers It was measured by assigning scores for different levels of education The categorization of the respondents and the corresponding scores are given below with slight modifications

SL No	Category	Score
1	Illiterate	1
2	Primary school	2
3	High school	3
4	Higher secondary school	4
5	College education	5

3.5.3 Experience in Farming

Experience in farming referred to the total number of years a respondent had been engaged in vegetable cultivation The scoring was done in the following way

Sl No	Experience (Years)	Score
1	0 – 5	1
2	6 to 10	2
3	11 to 25	3
4	> 25	4

3.5.4 Area Under Vegetable Cultivation

In this study, area under vegetable cultivation was measured as the extent of area under vegetable cultivation in hectares

Sl no	Area under cultivation	Score
1	Up to 0 1 Ha	1
2	0 1 to 0 2 Ha	2
3	0 2 to 0 4 Ha	3
4	0 4 to 0 8 Ha	4
5	Above 0 8 Ha	5

3.5.5 Contact with Extension Agency

Contact with extension agency was operationalised as the degree to which farmers used to maintain contact with extension agencies The quantification of the variable is done based on the regularity of contact with extension agents

Sl No	Category	Regularly (2)	Occasionally (1)	Never (0)
1	Field Assistant			
2	Agricultural Assistant			
3	Agricultural Officer			
4	Progressive farmer			
5	University scientists			
6	Others			

3.5.6 Scientific Orientation

Scientific Orientation referred to the degree to which a farmer was oriented to the use of scientific methods in decision making and in farming

The scale consisted of 6 statements of which one was negative Responses were collected on a 5 point continuum–Strongly agree, Agree, Undecided, Disagree and Strongly disagree with scores of 5, 4, 3, 2, 1 respectively for positive statements and reverse for negative statement Possible score ranged from 6 - 30

Sl No	Statements	SA	A	UD	DA	SDA
1	New methods of farming give better results than the old methods					
2	The way of farming by our fore fathers is the best way of farming today					
3	Even the farmers with a lot of farming experience should use new methods of farming					
4	A good farmer experiences with new methods of farming					
5	Though it takes time for the farmer to learn new methods in farming it is worth the efforts					
6	Traditional methods of farming have to be changed in order to raise the living of the farmer					

3.5.7 Innovativeness

Innovativeness referred to the degree to which the respondents were relatively earlier in adopting new ideas Here the question asked was when the farmers would like to adopt an improved practice Scoring was done based on the relative earliness in adopting new ideas which ranged from 3 to 0 The response was scored as follows

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

3.5.8 Mass Media Exposure

Mass media exposure referred to the degree to which an individual had used mass media information sources

In this study, to know the extent of mass media exposure, different mass media sources were listed and the respondents were asked to indicate as to how often they used each of these The scoring was done as given below

Sl No	Source	Regularly (2)	Occasionally (1)	Never (0)
1	Radio			
2	Television			
3	Newspaper			
4	Bulletin			
5	Agrl magazines			
6	KIOSKs			
7	Mobile phones			
8	Internet			

The summation of the scores gave the score of mass media exposure

3.5.9 Economic Motivation

Economic motivation referred to the extent to which a person was oriented towards profit maximization and relative value he placed on monitory gains

Here the scale consisted of 3 statements Each statement was provided with five point response categories - Strongly agree, Agree, Undecided, Disagree and Strongly disagree, with scores 5, 4, 3, 2, 1 respectively The summation of the scores of all 3 statements gave the score of economic motivation The statements are given below

Sl No	Statements	SA	A	UD	DA	SDA
1	A farmer should work towards larger yield and economic returns.					
2	The most successful farmer is one who makes the highest profit					
3	A farmer must earn his living but the most important thing in life cannot be defined in economic terms					
4	A farmer should try any new farming idea which may earn him more money					
5	A farmer should grow amaranthus in addition to other crops in order to increase his monitory profit					
6	It is difficult for the farmer's children to make a good start unless he provides them with economic assistance					

3.5.10 Risk Orientation

Risk Orientation referred to the degree to which a farmer was oriented towards risk and uncertainty and had courage to face the problems in farming

Scale consisted of 6 statements Responses were collected on a on a five point continuum ranging from Strongly agree, Agree, Undecided, Disagree to Strongly

disagree with scores of 5, 4,3,2,1 respectively Scoring procedure was reversed in the case of negative statement The statements are given below

Sl No	Statements	SA	A	UD	DA	SDA
1	A farmer should grow a large number of crops to avoid greater risk 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 and 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 risk is high					
5	Trying an innovative organic method involves risk but it is worth					
6	It is better for a farmer not to follow the KAU recommended practices of amaranthus unless most others in the locality have used it with success					

3 6 CONSTRAINTS IN THE ADOPTION OF KAU VARIETIES AND RECOMMENDED PRACTICES AND SUGGESTIONS FOR REFINEMENT OF TECHNOLOGIES

Based on the discussion with the extension personnel and the participant farmer, the constraints faced by the farmers were collected Participatory Rural Appraisal and Focus Group Discussions which involved farmers, Agricultural Officers and agricultural experts were conducted in Kalliyoor, Kazhakoottam and Pullampara panchayats mainly to identify the constraints as perceived by the farmers and the suggestions for refinement of technologies The respondents were asked to record their extent of severity perceived on each statement of constraints The scoring was done on a three point continuum as more important, important and least important with score ranging from 3 to 1 The total score for each statement was calculated and ranking of constraints was done

3 7 TECHNIQUES EMPLOYED IN DATA COLLECTION

Personal interview method, Participatory Rural Appraisal and Focus Group Discussions were used for collecting data from the farmer respondents The draft of the interview schedule was pre- tested in a pilot study conducted in a non sample area and suitable modifications were made accordingly Excerpts from data collection and Focus Group Discussions is given in Plate 1 and Plate 2

3 8 STATISTICAL METHODS EMPLOYED

3.8.1 Percentage Analysis

To make comparisons, percentage analysis was done

3.8.2 Mean and Standard Deviation

The respondents were classified into categories based on scoring pattern into low, medium and high groups for the variables based on the mean scores and standard deviation after statistical analysis

3.8.3 Correlation Analysis

To study the relationship between independent variable and dependent variable, simple correlation analysis was done

Plate 1 Excerpt from Intro Reel 11

KALLIYOOR

KAZHAKOOTTAM

PUTTAMPARA

Plate 2 Conducting Focus Group Discussion in the study areas

RESULTS AND DISCUSSIONS

4. RESULTS AND DISCUSSIONS

The data obtained were classified, tabulated, and treated with statistical methods to get the results The discussions have been taken up simultaneously along with the results This chapter deals with the results based on the analysis of data obtained from the study and are presented under various headings keeping the objectives of study in mind

4 1 Extent of awareness of commercial vegetable growers about KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

4 2 Extent of knowledge of commercial vegetable growers about KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

4 3 Extent of adoption of KAU varieties and selected recommended practices of amaranthus and vegetable cowpea by the commercial vegetable growers

4 4 Profile characteristics of commercial growers of amaranthus and vegetable cowpea

4 5 Relationship between the profile characteristics of the commercial growers of amaranthus and vegetable cowpea with their extent of awareness, knowledge and adoption

4 6 Constraints faced by the farmers in the adoption of KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

4 7 Suggestions for refinement of technologies

4 1 EXTENT OF AWARENESS OF COMMERCIAL VEGETABLE GROWERS ABOUT KAU VARIETIES AND SELECTED RECOMMENDED PRACTICES OF AMARANTHUS AND VEGETABLE COWPEA

The awareness score obtained for the amaranthus and vegetable cowpea growers are given in Table 4

Table 4 Distribution of the respondents according to their awareness about the KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

(n = 45)

Category	Amaranthus			Vegetable cowpea		
	Score range (3-8)	Frequency	Percentage	Score range (1-10)	Frequency	Percentage
Low	<4 45	9	20 00	< 5 77	2	4 44
Medium	4 45– 6 89	25	55 56	5 77 – 9 97	40	88 89
High	> 6 89	11	24 44	> 9 97	3	6 67
Mean	5 67			7 87		
SD	1 22			2 10		

For amaranthus growers, the measured score range is from 3-8 while the expected score range is from 0-8 For vegetable cowpea growers, the measured score range is from 1-10 while the expected score range is from 0-10

An appraisal of Table 4 reveals that majority of the respondents had medium level of awareness Exactly 24 44 per cent of the amaranthus farmers had high level of awareness and 55 56 per cent had medium level But in the case of vegetable

cowpea farmers, only 6 67 per cent had high level of awareness and a majority of 88 89 per cent had medium level of awareness about the KAU varieties and selected recommended practices of vegetable cowpea Also, twenty per cent of the amaranthus growers and 4 44 per cent of vegetable cowpea growers had low level of awareness The results of the study which revealed that majority of commercial vegetable growers of amaranthus and vegetable cowpea belonged to medium level category of awareness is in agreement with the finding of Sasidaran (2015)

Distribution of amaranthus farmers according to their awareness about each practice as per package of practices recommendations is given in Table 5

Table 5 Distribution of amaranthus farmers according to their awareness about each practice as per package of practices recommendations (n = 45)

Sl.No.	Practice	Aware (Frequency)	Aware (%)
1	Seed rate	38	84 14
2	Spacing	13	29 54
3	Application of farmyard manure	45	100
4	Application of NPK fertilizers	45	100
5	Application of urea after harvest	2	4 37
6	Pests and diseases in amaranthus	40	89 24
7	Pest and disease control measures in amaranthus	37	82 97
8	High yielding varieties in amaranthus	39	87 61

Graphical representation of the data is presented in Figure 3 Analysis of the data in Table 5 clearly indicates that all the respondents were well aware about the application of farmyard manure and NPK (Nitrogen, Phosphorous and Potassium) fertilizers More than 80 per cent of the farmers were aware about the seed rate, high yielding varieties, major pests and diseases in amaranthus and the various pest and disease control measures The practice of recommended spacing was aware to only 29 54 per cent of the amaranthus growers The practice which was least aware to the amaranthus growers was the application of urea immediately after harvest This was because majority of the farmers adopted the practice of direct sowing in amaranthus and harvest by uprooting The practice of application of urea was recommended for harvest by cutting Since the farmers were harvesting by uprooting, application of urea immediately after harvest was not aware to them

The distribution of vegetable cowpea farmers according to their awareness about each practice as per package of practices recommendations is given in Table 6

Table 6 Distribution of vegetable cowpea farmers according to their awareness about each practice as per package of practices recommendations (n=45)

Sl.No.	Practice	Aware (Frequency)	Aware (%)
1	Seed rate	33	73 58
2	Spacing	36	80 46
3	Application of farmyard manure	45	100
4	Application of NPK fertilizers	45	100
5	Inoculation with rhizobium	28	62 59
6	Application of lime	35	78 15
7	Critical period of Weeding & irrigation	29	64 43

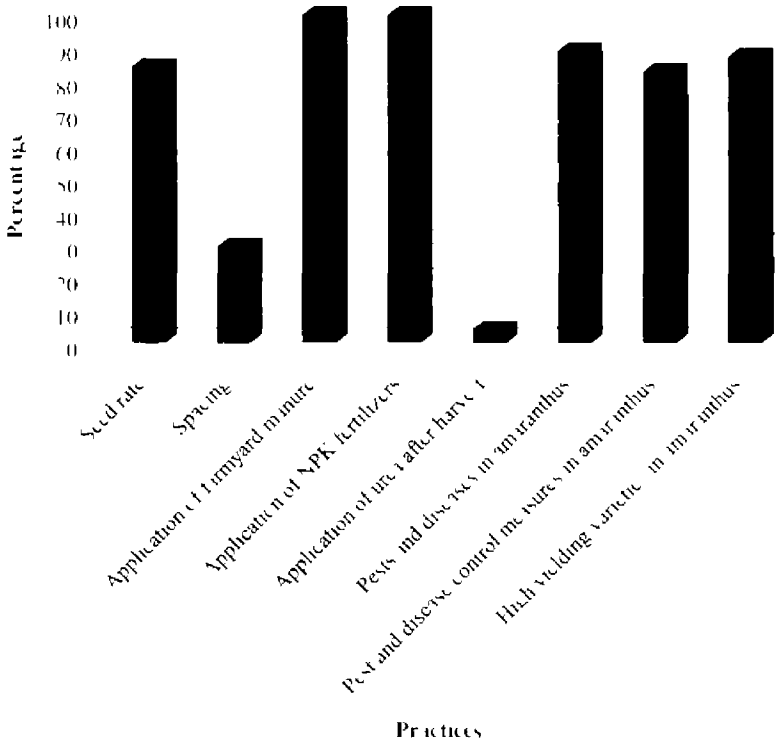

Figure 5 Distribution of amaranthus farmers according to their awareness about each practice as per pick pe of practices recommendations

8	Pests and diseases of vegetable cowpea	42	93 47
9	Pest and disease control measures in vegetable cowpea	38	84 35
10	High yielding varieties in vegetable cowpea	35	78 83

As in the case of amaranthus, all the vegetable cowpea growers had full awareness about the application of farmyard manure and NPK fertilizers More than 75 per cent of the respondents were aware about spacing, application of lime, high yielding varieties, pests and diseases and various control measures Inoculation with rhizobium was a practice which was least aware to the respondents (62 59 per cent)

Graphical representation of the data is presented in Figure 4

Majority of the commercial growers of amaranthus and vegetable cowpea had high experience in vegetable cultivation Also, they seek guidance from the extension personnels and the fellow farmers who had high exposure to mass media about the various cultivation practices in amaranthus and vegetable cowpea Apart from these, various training programmes were being conducted by VFPCK, Krishi Bhavans and College of Agriculture, Vellayani about the new technologies in vegetable cultivation Many farmers were members of VFPCK and various co-operative societies (Sahakarana Sanghams) and Farmer Producer Companies like 'Sanghamythri' which provided them an opportunity to mingle with other farmers and discuss the new technologies during various meetings and group discussions The organized field visits by the State Department of Agriculture, demonstrations and farm advisory services on vegetable cultivation also helped the farmers to become aware of the latest techniques These reasons might have contributed to fairly good results in the case of awareness about the KAU varieties and selected recommended practices of amaranthus and vegetable cowpea among the farmers

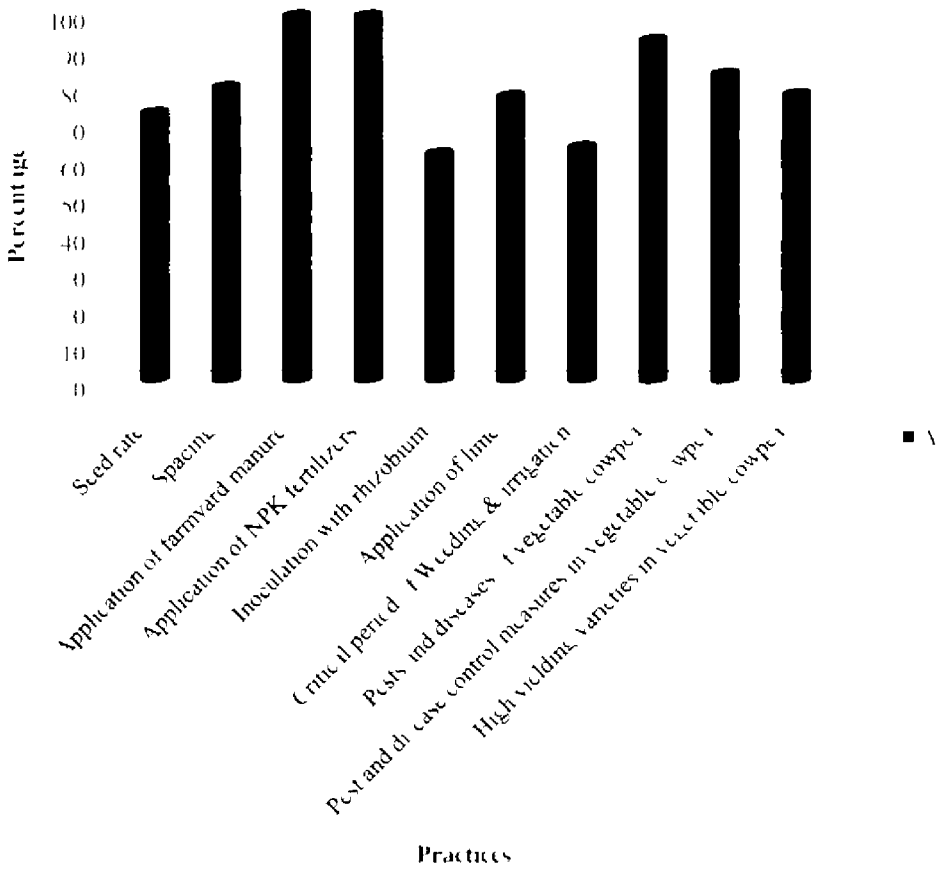

Figure 4 Distribution of vegetable cowpea farmers according to their awareness about each practice as per package of practices recommendations

4 2 EXTENT OF KNOWLEDGE OF COMMERCIAL VEGETABLE GROWERS ABOUT KAU VARIETIES AND SELECTED RECOMMENDED PRACTICES OF AMARANTHUS AND VEGETABLE COWPEA

The distribution of the respondents according to their knowledge about the KAU varieties and selected recommended practices of amaranthus and vegetable cowpea is given in Table 7.

Table 7 Distribution of the respondents according to their knowledge about the KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

(n = 45)

Category	Amaranthus			Vegetable cowpea		
	Score range (1-8)	Frequency	Percentage	Score range (2-10)	Frequency	Percentage
Low	<2 54	6	13 33	< 3 00	5	11 11
Medium	2 54-6 30	31	68 89	3 00– 8 24	33	73 33
High	> 6 30	8	17 78	> 8 24	7	15 56
Mean	4 42			5 62		
SD	1 88			2 62		

For amaranthus growers, the measured score range is from 1-8 while the expected score range is from 0-8 For vegetable cowpea growers, the measured score range is from 2-10 while the expected score range is from 0-10

Table 7 reveals that majority of the amaranthus growers (68 89 per cent) and vegetable cowpea growers (73 33 per cent) had medium level of knowledge followed

by high level (17 78 per cent and 15 56 per cent)and low level (13.33 per cent and 11 11 per cent) for amaranthus and vegetable cowpea respectively This finding is in line with that of Jaganathan (2004)

Awareness about the KAU varieties and the recommended practices had led to developmg an interest in gathering more information Medium level of mass media exposure and extension contact might have helped the commercial growers of amaranthus and vegetable cowpea to know more about the recommended practices

This finding is in agreement with the findings of Sidram (2008)

The distribution of amaranthus growers according to their knowledge about each practice as per package of practices recommendations is given in Table 8

Table 8 Distribution of amaranthus growers according to their knowledge about each practice as per package of practices recommendations (n= 45)

Sl. No.	Practice	Have knowledge (Frequency)	Have knowledge (%)
1	Spacing	3	7 34
2	High yielding variety of amaranthus	37	83 14
3	Application of NPK fertilizers	23	51 57
4	Application of Malathion	8	18 37
5	Pests and diseases of amaranthus	33	74 23
6	Use of neem oil & other neem based products	32	70 64
7	Application of urea immediately after harvest	2	4 86

8	Avoiding the planting of red amaranthus during heavy rains	44	98 69

Analysis of the data in Table 8 reveals that as much as 98 69 per cent of the respondents had knowledge about avoiding the planting of red amaranthus during heavy rain and 83 14 per cent knew about the high yielding variety of amaranthus More than 70 per cent knew about the pests and diseases of amaranthus and also the use of neem oil & other neem based products Less than 10 per cent of the respondents had knowledge about the spacing and application of urea immediately after harvest

Graphical representation of the data is presented in Figure 5

The distribution of vegetable cowpea growers based on their knowledge about each practice as per package of practices recommendations is given in Table 9

Table 9 Distribution of vegetable cowpea growers based on their knowledge about each practice as per package of practices recommendations (n=45)

Sl. No.	Practice	Have knowledge (Frequency)	Have knowledge (%)
1	Spacing	24	53 82
2	Seed rate	31	68 34
3	Seed inoculation with rhizobium	16	36 10
4	High yielding variety of vegetable cowpea	33	72 42
5	Application of NPK fertilizers	14	31 73
6	Critical irrigation time	18	40 24

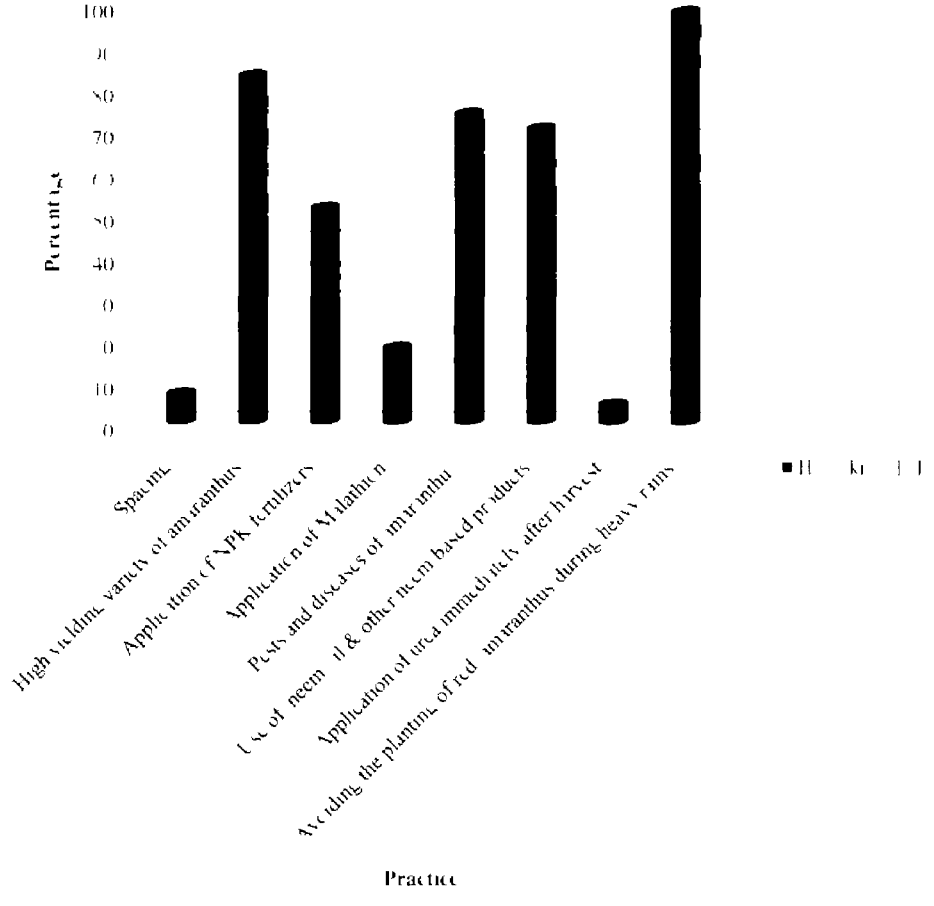

Figure 5 Distribution of amaranthus farmers according to their knowledge about each practice as per package of practices recommendations

7	Application of Bordeaux mixture	28	62 31
8	Pest and diseases of vegetable cowpea	33	73 74
9	Use of neem oil & other neem based products	32	71 38
10	Red pod variety of vegetable cowpea	25	56 12

Analysis of the data in Table 9 proves that in the case of vegetable cowpea growers, more than 70 per cent had knowledge about the high yielding varieties of vegetable cowpea, various pests and diseases of vegetable cowpea and use of neem oil & other neem based products Less than 50 per cent of the farmers had knowledge about seed inoculation with rhizobium, recommended dose of NPK fertilizers and critical irrigation time

The various media sources available such as television, newspaper and radio might have helped the commercial growers of amaranthus and vegetable cowpea to know more about the recommended agricultural practices in amaranthus and vegetable cowpea The contact with extension agencies and fellow farmers might have broadened their knowledge about the recommended practices The educational qualification of the respondents also played a major role in determining their knowledge level Educated farmers were likely to make better use of mass media channels and acquire various information about the cultivation practices

Graphical representation of the data is presented in Figure 6

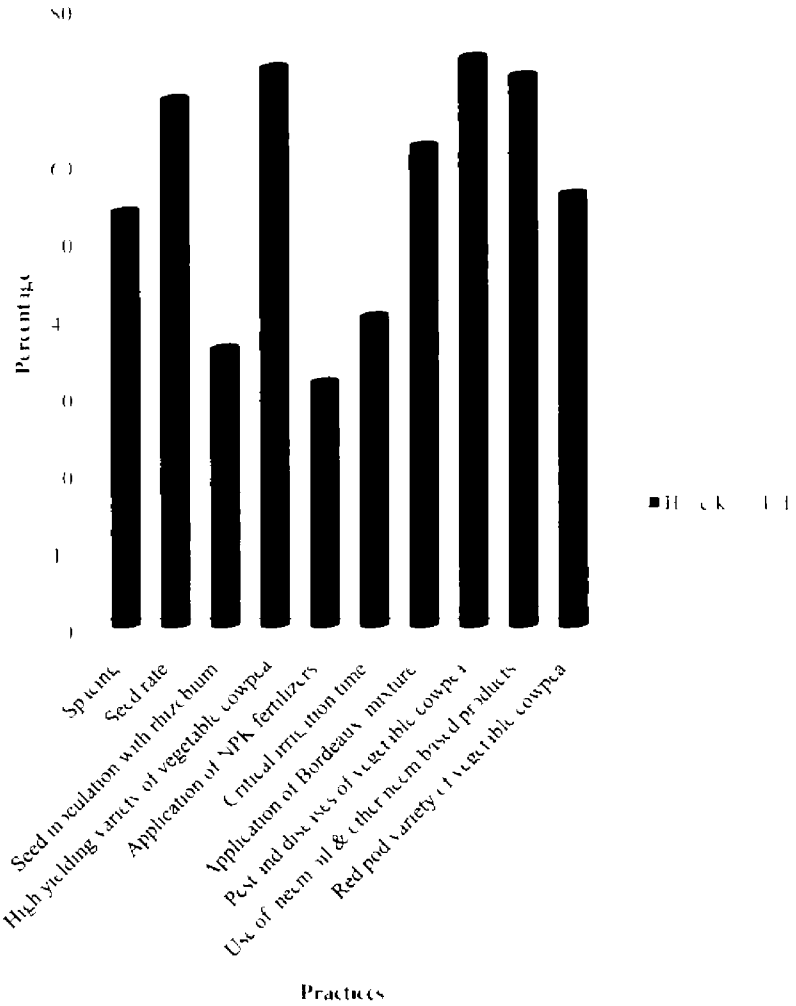

Figure 6 Distribution of vegetable cowpea farmers according to their knowledge about each practice as per package of practices recommendations

4 3 EXTENT OF ADOPTION OF KAU VARIETIES AND SELECTED RECOMMENDED PRACTICES

The distribution of the respondents based on their adoption index of KAU varieties and selected recommended practices of amaranthus and vegetable cowpea is given in Table 10

Table 10 Distribution of the respondents based on their adoption index of KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

(n= 45)

Category	Amaranthus			Vegetable cowpea		
	Score range (11 11-75 5)	Frequency	Percentage	Score range (16 67-91 67)	Frequency	Percentage
Low	<15 24	10	22 22	< 25 67	11	24 44
Medium	15 24 – 57 78	27	60 00	25 67 – 74 71	26	57 78
High	> 57 78	8	17 78	> 74 71	8	17 78
Mean	36 51			50 19		
SD	21 27			24 52		

The measured score range of adoption index for amaranthus growers is 11 11-75 5 and for vegetable cowpea growers is 16 67-91 67

The data in Table 10 reveals that majority of the amaranthus growers (60 per cent) and vegetable cowpea growers (57 78 per cent) were medium level in adoption, followed by 22 22 per cent of amaranthus growers and 24 44 per cent of vegetable

cowpea growers who were low adopters of the KAU varieties and selected recommended practices of amaranthus and vegetable cowpea Only 17 78 per cent of the amaranthus growers and vegetable cowpea growers belonged to high adoption category

The result is in line with the findings of Kamalakkannan (2003) and Yavanapriya *et al* (2014) which revealed that majority of the commercial vegetable growers had medium level of adoption of recommended technologies This might be because of the reason that majority of the respondents had medium level of awareness and knowledge about KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

The distribution of amaranthus growers based on their adoption of KAU varieties and selected recommended practices of amaranthus is given in Table 11

Table 11 Distribution of amaranthus growers based on their adoption of KAU varieties and selected recommended practices of amaranthus (n=45)

Sl. No.	Practice	Adopted (Frequency)	Adopted (%)
1	Variety (Arun, Co–1)	36	80 00
2	Spacing (30 x 20cm)	0	0
3	Application of Nitrogen (50 kg/ha)	10	22 31
4	Application of Phosphorous (50 kg/ha)	11	24 84
5	Application of Potash (50 kg/ha)	14	31 57
6	Application of farmyard manure (50 t / ha as basal dose)	32	71 36

7	Application of urea (1%) immediately after harvest	0	0
8	Application of Malathion against leaf webber (spray malathion 0 1 % or dust malathion 10 % DP)	0	0

In the case of amaranthus, all the respondents adopted the practice of direct sowing The crop was harvested thirty days after sowing by uprooting for marketing Thus transplanting was not done But in KAU (2011), package of practices recommendations for transplant amaranthus is given So from the above table, it could be seen that practices such as spacing and application of urea (1%) immediately after harvest were not adopted by any of the respondents As much as 80 per cent of the farmers adopted the recommended varieties of amaranthus, which were well accepted in the study area

The percentage of respondents who adopted N, P and K fertilizers were 22 31, 24 84 and 31 57 respectively which was less than 35 per cent Since the crop duration was only one month, the amount of fertilizers applied by the farmers was less than the recommended dose As much as 71 36 per cent of the farmers applied the recommended dose of farm yard manure which constituted poultry manure and cow dung

Malathion spray which was recommended under severe conditions of leaf webber attack was not practised by any of the respondents Instead of that, chemicals such as Radar were used by some farmers

Graphical representation of the data is presented in Figure 7

The distribution of respondents based on the extent of adoption of amaranthus varieties is presented in Table 12

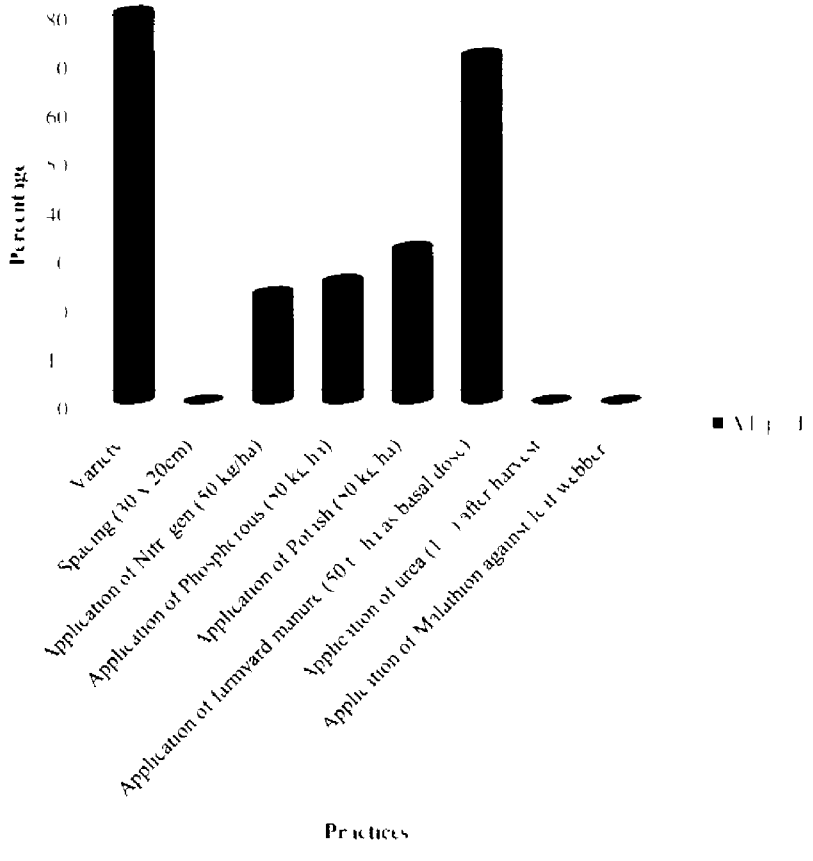

Figure 7 Distribution of farmers according to their adoption of KAU varieties and selected recommended practices of Amaranthus

Table 12 Distribution of respondents based on the extent of adoption of amaranthus varieties

Sl. No.	Variety	Adoption (%)
1	Arun	68
2	Co - 1	12
3	Other local and hybrid varieties	20

Eighty per cent of the farmers adopted the recommended varieties, Arun (68 per cent) and CO–1 (12 per cent) which were well accepted in the areas of study But the rest 20 per cent of the farmers cultivated other local and hybrid varieties because according to them, the red colour of Arun variety was gradually reducing which affected the market value of the crop They also opined that even though the local and hybrid varieties they cultivated yielded better than the recommended varieties, Arun variety tasted well when compared to other varieties

The distribution of respondents based on their adoption of KAU varieties and selected recommended practices of vegetable cowpea is given in Table 13

Table 13 Distribution of respondents based on their adoption of KAU varieties and selected recommended practices of vegetable cowpea (n=45)

Sl. No.	Practice	Adopted (Frequency)	Adopted (%)
1	Variety	30	67 54
2	Seed rate (4 – 5 kg/ha)	28	62 31
3	Spacing (2 x 2 m)	17	36 73
4	Application of farmyard manure (20	31	69 14

	t/ha)		
5	Seed inoculation with rhizobium	15	33 97
6	Application of Nitrogen (20 kg/ha)	19	42 27
7	Application of Phosphorous (30 kg/ha)	17	38 68
8	Application of Potash (10 kg/ha)	16	36 52
9	Pest control measures (as recommended by KAU)	23	51 10
10	Disease control measures (as recommended by KAU)	20	44 36
11	Use of pseudomonas	29	64 70
12	Application of neem cake	26	58 52

From the above table, it could be seen that as much as 67 54 per cent of the commercial vegetable cowpea growers adopted the recommended varieties Only 62 31 per cent adopted the recommended seed rate and 69 14 per cent adopted the recommended dose of farmyard manure Adoption percentage of recommended spacing was only 36 73 per cent because majority of them practised closer spacing to get increased yield Seed inoculation with rhizobium was done by only 33 97 per cent Use of rhizobium was less mainly due to the non–availability of the same Also, majority of the farmers were not exposed to the utility of rhizobium

The percentage of respondents who adopted the recommended dose of N, P and K fertilizers were 42 27, 38 68 and 36 52 respectively which was less than 50 per cent The rest adopted higher than the recommended dose About 51 per cent and 44

per cent of the respondents had taken recommended control measures against pests and diseases respectively Adoption of pseudomonas was 64 70 per cent and that of neem cake was 58 52 per cent The change in attitude of farmers towards the adoption of organic farming practices must have been the reason for this

Graphical representation of the data is presented in Figure 8

The distribution of respondents based on the adoption of vegetable cowpea varieties is given in Table 14

Table 14 Distribution of respondents based on the adoption of vegetable cowpea varieties

Sl. No.	Variety	Adoption (%)
1	Vellayani Jyothika	47 00
2	Lola	9 00
3	Vyjayanthi	4 00
4	Githika	7 00
5	Other local and hybrid varieties	33 00

From Table 14, it is inferred that a total of 67 per cent of the commercial vegetable cowpea cultivators adopted the recommended varieties, namely Vellayani Jyothika, Lola, Vyjayanthi and Githika Among them, Vellayam Jyothika was adopted by 47 per cent, Lola by 9 per cent, Vyjayanthi by 4 per cent, and Githika by 7 per cent As much as 33 per cent adopted other local and Hybrid varieties Lola and Vyjayanthi were the only two varieties which could withstand the extreme summer prevalent during April – May months This might have been the reason for their acceptance for adoption

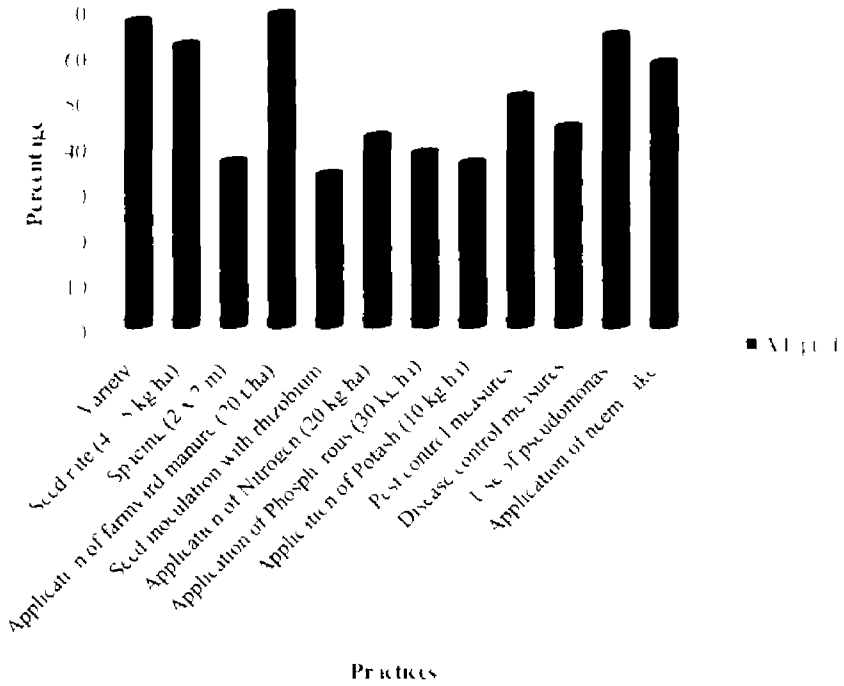

Figure 8 Distribution of farmers according to their adoption of KAU varieties and selected recommended practices of vegetable cowpea

4 4 PROFILE CHARACTERISTICS OF COMMERCIAL GROWERS OF AMARATHUS AND VEGETABLE COWPEA

A clear understanding of the socio–economic and psychological characteristics of the respondents would enable the investigator to interpret the data For this purpose, ten variables were selected and included in the study The profile characteristics of the respondents are discussed below

4.4.1 Age

Distribution of respondents based on their age is furnished in Table 15 and Figure 9

Table 15 Distribution of amaranthus growers and vegetable cowpea growers accordmg to their age (n = 45)

Category	Amaranthus		Vegetable cowpea	
	Frequency	Percentage	Frequency	Percentage
Young age (< 35 years)	0	0	0	0
Middle age (35– 55 years)	32	71 11	30	66 67
Old age (> 55 years)	13	28 89	15	33 33

As seen from Table 15, 71 11 per cent of the amaranthus growers and 66 67 per cent of the vegetable cowpea growers belonged to middle age category (35–55 years) As much as 28 89 per cent of the amaranthus growers and 33 33 per cent of the vegetable cowpea growers belonged to old age group (> 55 years) None of the respondents were below thirty five years of age

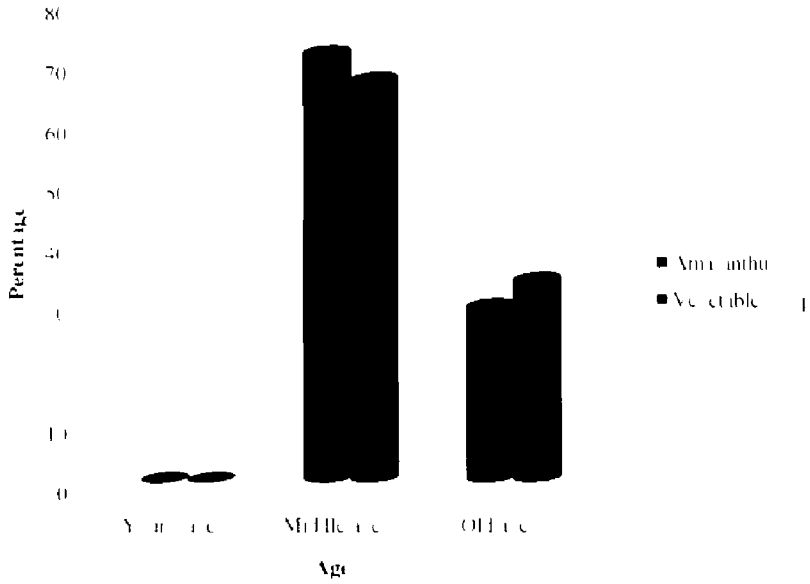

Figure 9 Distribution of amaranthus flowers and vegetable type flowers according to their age

Percentage of youngsters accepting agriculture as the primary occupation is less due to their higher educational qualifications and subsequent quest for seeking white collar jobs Youngsters even if they come to agriculture leave the field for seeking some other job and return to agriculture mostly at the middle age and after that they remain in the field of agriculture Retention of the farmers in the field of agriculture at the middle age is more Due to improved health and high age of life expectancy in Kerala, farmers above 55 years of age were also in good number

This finding is in agreement with the findings of Bhavya (2008) and Anupama (2014) and in contrast with the findings of Thiyagu (2011)

4.4.2 Education

Distribution of respondents according to their education is presented in Table 16 and Figure 10

Table 16 Distribution of amaranthus growers and vegetable cowpea growers according to their education (n = 45)

Category	Amaranthus		Vegetable cowpea	
	Frequency	Percentage	Frequency	Percentage
Illiterate	4	8 89	3	6 67
Primary school	12	26 67	13	28 89
High school	13	28 89	15	33 33
Higher secondary school	13	28 89	9	20 00
College education	3	6 66	5	11 11

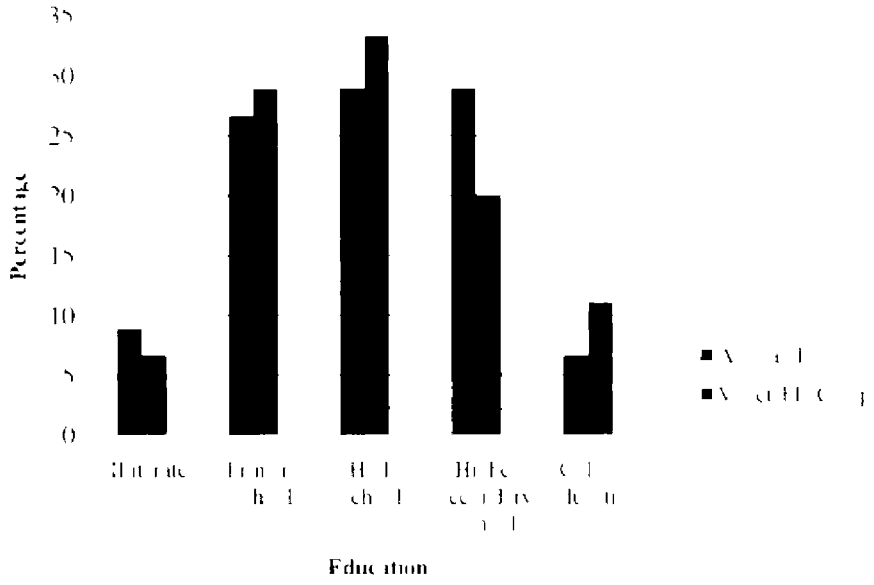

Figure 10 Distribution of amaranthus growers and vegetable cowpea growers according to their education

It is observed from Table 16 that in the case of commercial amaranthus cultivators majority of the respondents (28.89 per cent) had high school and higher secondary school education. Only 6.66 per cent had collegiate education and about 8 per cent were illiterate.

In the case of vegetable cowpea growers majority (33.33 per cent) of them had education up to high school level followed by 28.89 per cent of the farmers having primary school education. 20 per cent had education up to higher secondary school level. 11.11 per cent with college education and 6.67 per cent were illiterate.

The results of the study revealed that majority of the respondents were literate. This shows that today's farmers are educationally forward. This might have been due to the abundant educational opportunities available in Kerala.

This finding is in line with the findings of Sangeetha (2009).

4.4.3 Experience in Vegetable Cultivation

Distribution of respondents according to their experience in vegetable cultivation is presented in Table 17 and Figure 11.

Table 17. Distribution of amaranthus growers and vegetable cowpea growers according to their experience in vegetable cultivation (n = 45)

Experience (years)	Amaranthus			Vegetable cowpea		
	Score range (2-4)	Frequency	Percentage	Score range (2-4)	Frequency	Percentage
Low	2-2.45	9	20.00	2-2.33	10	22.22
Medium	2.46-2.99	17	37.78	2.34-2.99	17	37.78
High	3-4	19	42.22	3-4	18	40.00

Figure 11 Distribution of amaranthus growers and vegetable expert growers according to their experience in vegetable cultivation

Mean	3 22	3 27
SD	0 77	0 72

For both amaranthus growers and vegetable cowpea growers, the measured score range is from 2-4 while the expected score range is from 1-4

Majority (42 22 per cent) of the amaranthus growers were having high level of experience in vegetable cultivation followed by 37 78 per cent having medium level and only 20 00 per cent had low level of experience in vegetable cultivation

In the case of vegetable cowpea growers, 40 00 per cent of the respondents had high level of experience followed by 37 78 per cent having medium level of experience Only 22 22 per cent had low level of experience in vegetable cultivation

Since majority of the respondents were coming from farm families, they were engaged in farming operations from a very young age That was why majority of them had high farming experience

A similar trend was emphasized by Fayas (2003) and Hanjabam (2013)

4.4.4 Area Under Vegetable Cultivation

Distribution of respondents according to their area under vegetable cultivation is presented in Table 18 and Figure 12

Table 18 Distribution of amaranthus growers and vegetable cowpea growers according to their area under vegetable cultivation (n = 45)

Category	Amaranthus			Vegetable cowpea		
	Score range (1-3)	Frequency	Percentage	Score range (1-3)	Frequency	Percentage
Low (Up to 0 1 Ha)	<1 11	17	37 78	<1 38	9	20 00
Medium (0 1 – 0 4 Ha)	1 11-2 17	27	60 00	1 38-2 26	28	62 22
High (> 0 4 Ha)	> 2 17	1	2 22	>2 26	8	17 78
Mean	1 64			1 82		
SD	0 53			0 44		

For both amaranthus growers and vegetable cowpea growers, the measured score range is from 1-3 and the expected score range is from 1-5

Majority of the farmers were cultivating leased in lands A cursory view of Table 18 shows that 60 per cent of the amaranthus growers and 62 22 per cent of the vegetable cowpea growers belonged to medium category with respect to area under cultivation They were cultivating in the area ranging from 0 1 – 0 4 Ha Only 2 22 per cent of the amaranthus growers had more than 0 4 ha of land area which was very much less when compared to 17 78 per cent of the vegetable cowpea farmers who had high area under cultivation This result is in contrast with the findings of Sasidaran (2015)

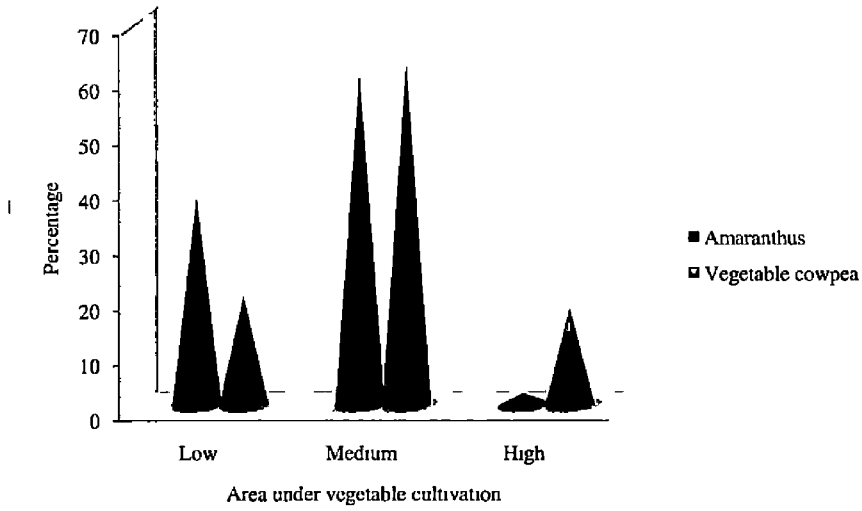

Figure 12 Distribution of amaranthus growers and vegetable cowpea growers according to their area under vegetable cultivation

4.4.5 Contact with Extension Agency

Distribution of respondents according to their contact with extension agency is presented in Table 19 and Figure 13

Table 19 Distribution of amaranthus growers and vegetable cowpea growers according to their contact with extension agency (n = 45)

Category	Amaranthus			Vegetable cowpea		
	Score range (5-11)	Frequency	Percentage	Score range (4-11)	Frequency	Percentage
Low	<5 49	10	22 22	<5 87	5	11 11
Medium	5 49 - 10 07	27	60.00	5 87- 9 55	31	68 89
High	> 10 07	8	17 78	>9 55	9	20 00
Mean	7 78			7 71		
SD	2 29			1 84		

The measured score range for amaranthus growers is 5-11 and for vegetable cowpea growers is from 4-11 Expected score range for both categories is 0-12

As seen from Table 19, as much as 60 per cent of the amaranthus growers had medium level of contact with extension agency followed by low (22 per cent) level and high (17 88 per cent) level of extension agency contact

In case of vegetable cowpea growers, majority (68 9 per cent) had medium level of extension agency contact followed by high (20 per cent) level and low (11 11 per cent) level of contact with extension agency

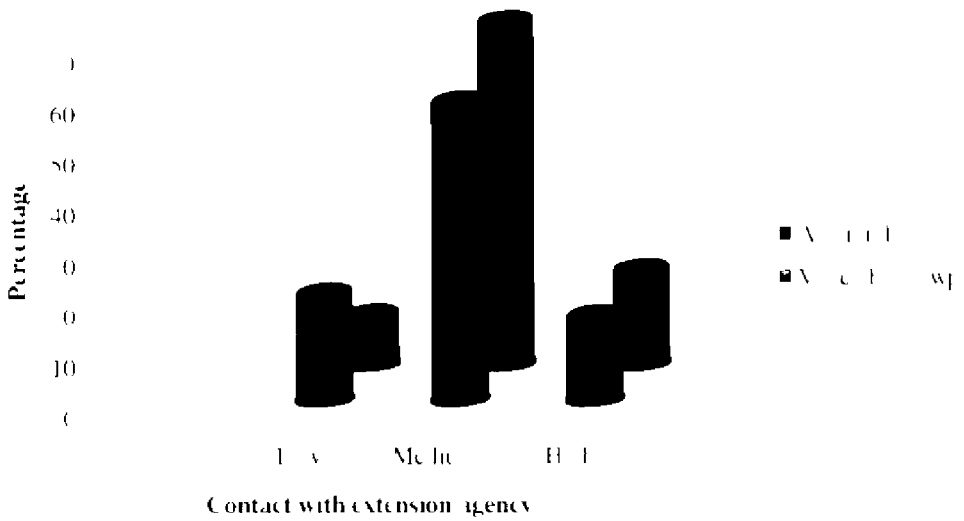

Figure 13 Distribution of tuberose growers and vegetable sweet corn growers according to their contact with extension agency

Distribution of farmers based on the frequency of extension contact was presented in Table 20

This result is in conformity with the findings of Reddy (2003)

Distribution of farmers based on the frequency of extension contact is presented in Table 20

Table 20 Distribution of farmers based on the frequency of extension contact with extension agency (n= 45)

	Regularly		Occasionally		Never	
Source	Amaranthus (%)	Vegetable cowpea (%)	Amaranthus (%)	Vegetable cowpea (%)	Amaranthus (%)	Vegetable cowpea (%)
Agricultural Assistant	71	82	29	8	0	10
Agricultural Officer	60	40	40	27	0	33
Progressive farmer	91	82	9	18	0	0
University scientists	27	22	35	11	38	67
Others	15	9	47	25	38	66

It is evident from Table 20 that 91 per cent of the commercial amaranthus growers contacted the progressive farmers in their areas for advices regarding amaranthus cultivation on a regular basis Exactly 71 per cent of the respondents had regular contact with Agricultural Assistant and 60 per cent with Agricultural Officer Only 27 per cent of them had regular contact with University scientist

In the case of commercial vegetable cowpea growers, 82 per cent of them contacted Agricultural Assistant and progressive farmers regularly Exactly 40 per cent of them had regular contact with the Agricultural Officer while only 22 per cent regularly contacted the University scientist

Farmers with farming as main occupation always had some extension contact to collect information on technology and to avail inputs They always sought information on items like new varieties of crops, various inputs and plant protection from the nearest sources available to them They went to distant centers or scientists only if they did not get information from the required sources

4.4.6 Scientific Orientation

The distribution of respondents based on their scientific orientation is presented in Table 21 and Figure 14

Table 21 Distribution of amaranthus growers and vegetable cowpea growers according to their scientific orientation (n= 45)

Scientific orientation	Amaranthus			Vegetable cowpea		
	Score range (19-29)	Frequency	Percentage	Score range (18-28)	Frequency	Percentage
Low	< 19 89	9	20 00	<20 86	10	22 22
Medium	19 89 - 25 31	26	57 78	20 86- 26 42	29	64 44
High	>25 31	10	22 22	>26 42	6	13 34
Mean	22 60			23 64		
SD	2 71			2 78		

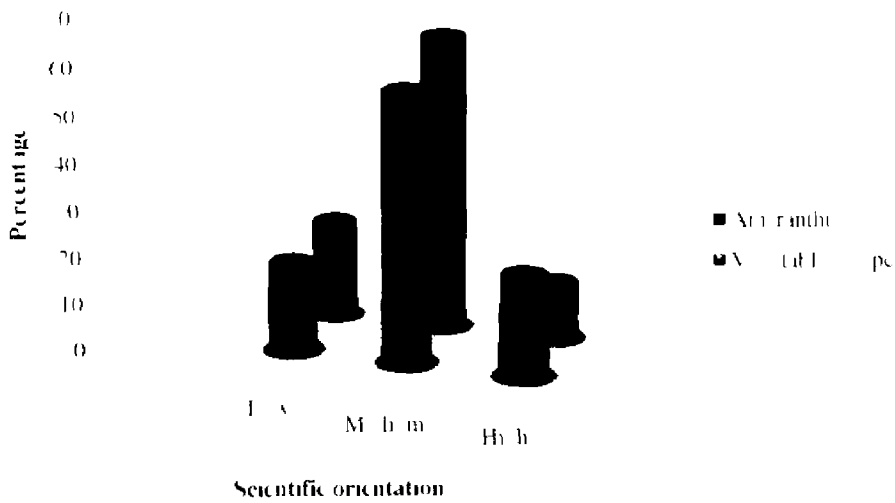

Figure 14 Distribution of Tanacetum flowers and vegetable type flowers according to their scientific orientation

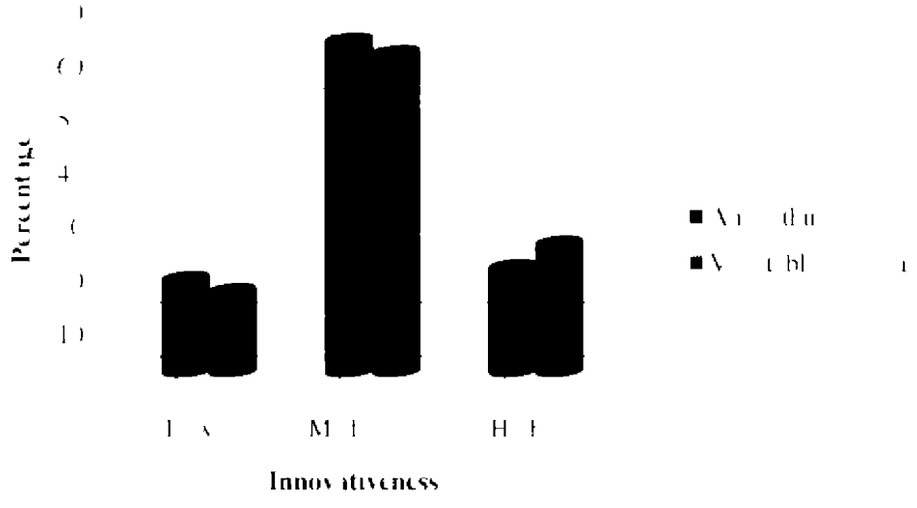

Figure 15 Distribution of amaranthus flowers in Vegetable type flowers according to their innovativeness

The measured score range for amaranthus growers is 19 29 and for vegetable cowpea growers is 18 28 Expected score range for both categories is 6 30

A perusal of Table 21 reveals that as much as 57 78 per cent of amaranthus growers and 64 44 per cent of vegetable cowpea had medium level of scientific orientation followed by high (22 22 per cent) level in case of amaranthus growers and low level (22 22 per cent) in case of vegetable cowpea growers

This study is in agreement with the findings of Oommen (2007)

4 4 7 Innovativeness

The distribution of respondents based on their innovativeness is presented in Table 22 and Figure 15

Table 22 Distribution of amaranthus growers and vegetable cowpea growers according to their innovativeness (n 45)

Innovativeness	Amaranthus			Vegetable cowpea		
	Score range (0 5)	Frequency	Percentage	Score range (1 3)	Frequency	Percentage
Low	1 55	8	17 78	1 42	7	15 56
Medium	1 55 2 99	28	62 22	1 42 2 76	27	60 00
High	2 99	9	20 00	2 76	11	24 44
Mean		2 27			2 09	
SD		0 72			0 67	

For amaranthus growers, the measured score range is 0 3 and for vegetable cowpea growers, it is 1-3 For both categories, the expected score range is from 1-3

It could be perceived from Table 22 that 62 22 per cent of the amaranthus growers were under medium innovativeness category followed by high (20 per cent) and low (17 78 per cent) level of innovativeness

Witnessing the vegetable cowpea growers' distribution, 60 per cent had medium level of innovativeness, 24 44 per cent had high level and 15 56 per cent had low level of innovativeness

Medium level of innovativeness among the farmers might have been due to the medium level of extension contact, economic motivation, and mass media exposure

A similar result was reported by Sasankan (2004) and Chinchu(2011)

4.4.8 Mass Media Exposure

The distribution of respondents based on their mass media exposure is presented in Table 23 and Figure 16

Table 23 Distribution of amaranthus growers and vegetable cowpea growers according to their mass media exposure (n = 45)

Innovativeness	Amaranthus			Vegetable cowpea		
	Score range (5-13)	Frequency	Percentage	Score range (4-14)	Frequency	Percentage
Low	<6 83	6	13 33	<5 74	5	11 11
Medium	6 83 11 65	24	53 33	5 74-10 48	32	71 11

High	>11 6 5	15	33 34	>10 48	8	17 78
Mean	9 24			8 11		
SD	2 41			2 37		

For amaranthus growers, the measured score range is 5-13 and for vegetable cowpea growers, it is 4-14 Expected score range for both categories is 8-24.

It is inferred from Table 23 that, in the case of amaranthus cultivators, 53 33 per cent of the respondents belonged to medium category with respect to mass media exposure followed by high (33 34 per cent) and low (13 33 per cent) category

Also, in the case of vegetable cowpea cultivators, 71 11 per cent of the respondents belonged to medium category followed by high (17 78 per cent) and low (11 11 per cent) category

This result is in line with the finding of Oommen (2007) and in contrast with the findings of Suthan (2003)

Table 24 Distribution of respondents based on the frequency of mass media contact

Source	Regularly		Occasionally		Never	
	Amaranthus (%)	Vegetable cowpea (%)	Amaranthus (%)	Vegetable cowpea (%)	Amaranthus (%)	Vegetable cowpea (%)
Radio	31	11	36	67	33	22
Television	64	36	36	58	33	11
Newspaper	29	33	48	40	23	27
Bulletin	13	10	18	14	69	76

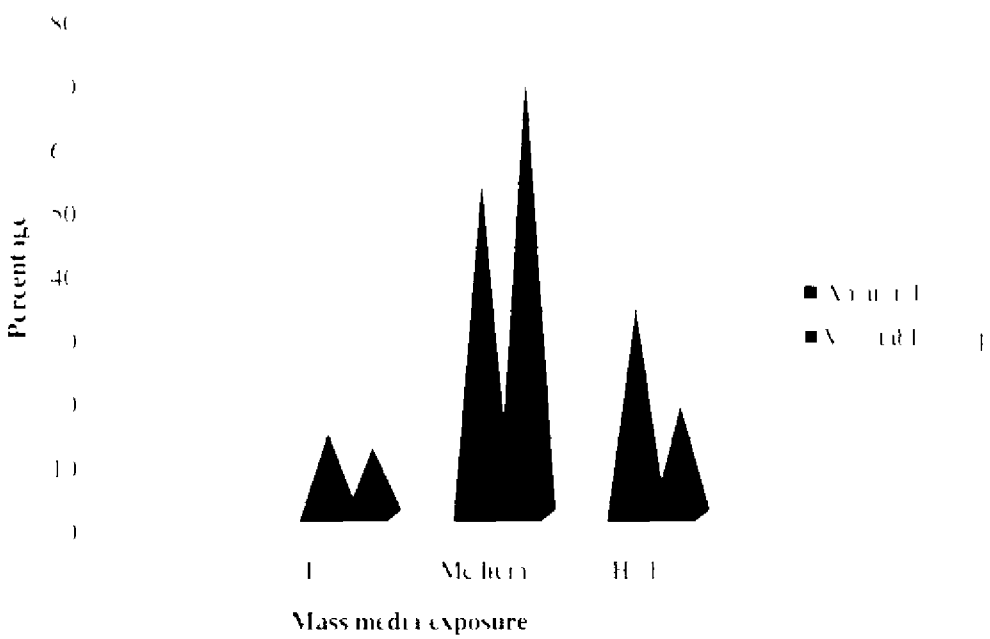

Figure 16 Distribution of amaranthus growers and vegetable export grower according to their mass media exposure

Agricultural magazines	20	9	24	47	56	44
KIOSKs	0	0	7	22	93	78
Mobile phones	2	0	0	9	98	91
Internet	4	3	10	6	86	91

Analysis of the results in Table 24 indicates that 64 per cent of the amaranthus growers and 36 per cent of vegetable cowpea growers were regularly exposed to television Among the various sources of mass media, television was found to be the most popular and dependable media followed by newspaper and radio for both amaranthus and vegetable cowpea growers This finding is in agreement with that of Mishra *et al* (2012) For gathering information on agricultural technology, farmers watched various farm programmes, read the farm information from newspaper and listened to various radio programmes None of the respondents were using KIOSKs regularly Many farmers did not utilize the agricultural services obtained through mobile phones Also, more than 85 per cent of the farmers had no knowledge about using computers and were not aware of the farm information available in the internet

4.4.9 Economic Motivation

The distribution of respondents based on their economic motivation is presented in Table 25 and Figure 17

Table 25 Distribution of amaranthus growers and vegetable cowpea growers according to their economic motivation (n = 45)

Category	Amaranthus			Vegetable cowpea		
	Score range (18-26)	Frequency	Percentage	Score range (16-28)	Frequency	Percentage
Low	<19 15	6	13 33	<17 86	4	8 89
Medium	19 15 - 24 67	25	55 56	17 86-24 06	35	77 78
High	> 24 67	14	31 11	>24 06	6	13 33
Mean	21 91			20 96		
SD	2 76			3 10		

For amaranthus growers, the measured score range is 18-26 and for vegetable cowpea growers, it is from 16 28 Expected score range for both categories is 6-30

From table 25, it was found that majority of the amaranthus growers (55 56 per cent) and vegetable cowpea growers (77 78 per cent) belonged to medium category with respect to economic motivation As much as 31 11 per cent of the amaranthus growers had high level of economic motivation which was very much higher when compared to 13 33 per cent of the vegetable cowpea growers who had high level of economic motivation Similarly, 13 33 per cent of the amaranthus growers belonged to low category of economic motivation and only 8 89 per cent had low level of economic motivation in the case of vegetable cowpea growers

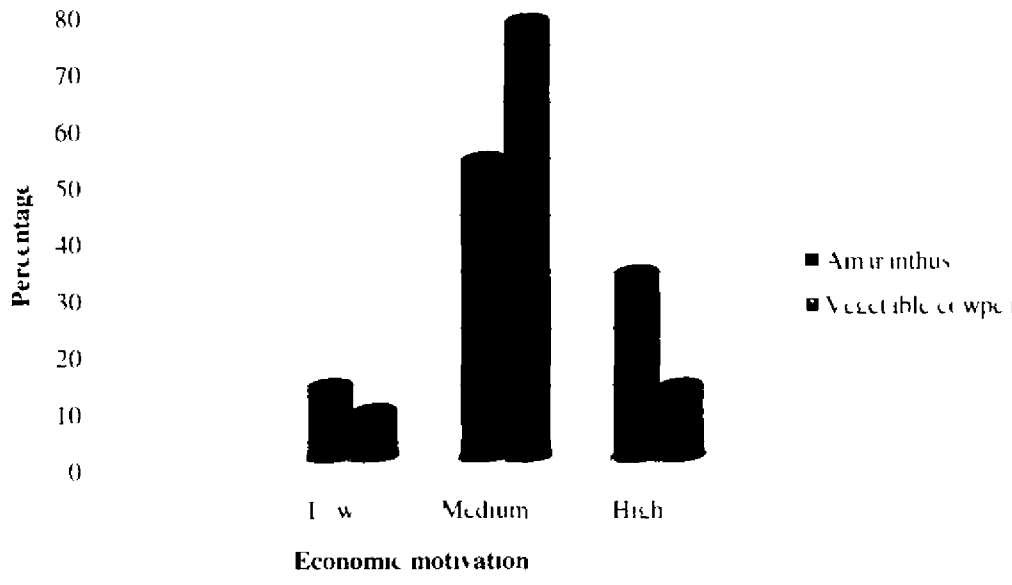

Figure 17 Distribution of amaranthus growers and vegetable cowpea growers according to their economic motivation

The main motive of the amaranthus and vegetable cowpea growers was to harvest maximum yield from the available land using improved technologies and moreover, many farmers had frequent contact with the extension agencies Medium level of innovativeness and mass media exposure also contributed to the medium economic motivation score

A similar trend was reported by Vennila and Annamalai (2002) and Bhavya (2008)

4.4.10 Risk Orientation

The distribution of respondents based on their risk orientation is presented in Table 26 and Figure 18

Table 26 Distribution of amaranthus growers and vegetable cowpea growers according to their risk orientation (n = 45)

Category	Amaranthus			Vegetable cowpea		
	Score range (11-19)	Frequency	Percentage	Score range (12-20)	Frequency	Percentage
Low	<12 99	4	8 89	<13 10	6	13 33
Medium	12 99 - 17 41	32	71 11	13 10- 17 52	31	68 89
High	> 17 41	9	20 00	>17 52	8	17 78
Mean	15 20			15 31		
SD	2 21			2 21		

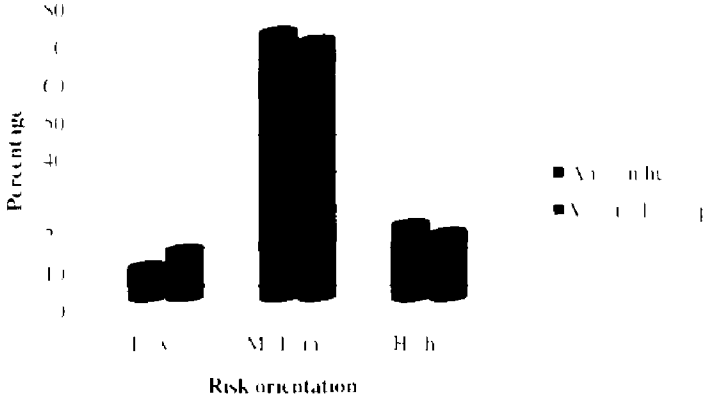

Figure 18. Distribution of Amaranthus flowers and vegetable cowpea flowers according to their risk orientation

For amaranthus growers, the measured score range is 11-19 and for vegetable cowpea growers, it is from 12-20 Expected score range for both categories is 6-30

It is evident from Table 26 that 71 11 per cent of the amaranthus growers had medium level of risk orientation, followed by high (20 per cent) level and low (8 89 per cent) level of risk orientation About 68 per cent of the vegetable cowpea growers registered medium risk orientation while 17 78 per cent belonged to high level and 13 33 per cent belonged to low level category of risk orientation This finding is in agreement with the findings of Suthan (2003) and Somanath (2009)

Vegetable cultivation itself was highly risky Cowpea was harvested within a period of three to four months while amaranthus within a period of one month Only if the conditions were favourable, they obtained a bumper harvest Otherwise it would be a complete failure

4 5 RELATIONSHIP BETWEEN THE PROFILE CHARACTERISTICS OF THE COMMERCIAL GROWERS OF AMARANTHUS AND VEGETABLE COWPEA WITH THEIR EXTENT OF AWARENESS, KNOWLEDGE AND ADOPTION

Correlation analysis was employed to assess the relationship of the profile characteristics of the respondents with their awareness, knowledge and adoption of the KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

4.5.1 Relationship Between the Profile Characteristics of the Commercial Growers of Amaranthus and Vegetable Cowpea and Awareness About KAU Varieties and Selected Recommended Practices of Amaranthus and Vegetable cowpea.

Relationship between the profile characteristics of the commercial growers of amaranthus and vegetable cowpea and awareness about KAU varieties and selected recommended practices of amaranthus and vegetable cowpea is presented in Table 27

Table 27 Relationship between the profile characteristics of the commercial growers of amaranthus and vegetable cowpea and awareness about KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

Sl. No.	Profile characteristics	Correlation coefficient (r) (With awareness)	
		Amaranthus	Vegetable Cowpea
1	Age	0 229	-0 077
2	Education	0 015	**0.301***
3	Experience	-0 062	0 047
4	Area under cultivation	-204	-0 212
5	Contact with extension agency	**0.557****	0 099
6	Scientific orientation	**0.589****	**0.494****
7	Innovativeness	**0.309***	**0.315***
8	Mass media exposure	**0.543****	0 134
9	Economic motivation	**0.548****	0 065
10	Risk orientation	0 041	0 027

*Significant at 5 per cent level

* *Significant at 1 per cent level

In the case of amaranthus and vegetable cowpea growers, scientific orientation and innovativeness were found to have a significant and positive relationship with awareness

Scientifically oriented farmers would have more eagerness to know about the improved KAU practices which might have forced them to contact various extension agencies and other sources of mass media which in turn might have increased their level of awareness This might be the reason for the significant and positive relationship of scientific orientation and awareness A similar result was reported by Gangadharan (1993) and Jaganathan (2004)

Innovativeness was found to have a significant and positive relationship with awareness which might have been due to the fact that innovative farmers were likely to derive more information regarding the improved varieties and improved practices The result is in line with the finding of Jayawardana (2007)

In the case of amaranthus growers, contact with extension agency, mass media exposure and economic motivation were found to have a significant and positive relationship with awareness This finding is in line with that of Gangadharan (1993) and Syamkumar (1999) The positive and significant relationship between contact with extension agency and awareness might be due to the reason that farmer who had regular contact with various extension agencies and those who participated in various extension activities might have got motivated themselves to gain more awareness about various cultivation aspects of the crop they cultivated

It was found that mass media exposure had a significant and positive relationship with awareness Information about various technologies were disseminated through various mass media sources High literacy rate and well established information network would have contributed to increased awareness The finding is in agreement with the finding of Sherief (1998)

The positive and significant relationship of economic motivation and awareness might have been due to the fact that the commercial amaranthus growers who were oriented to achieve maximum profit from amaranthus cultivation might have acquired more information about KAU varieties and selected recommended practices of amaranthus This result is in conformity with the finding of Syamkumar (1999)

Education was found to have a significant and positive relationship with awareness in the case of vegetable cowpea growers This might have been due to the fact that educated farmers were likely to make better use of various mass media and other information sources to acquire information about various cultivation practices A similar result was reported by Jayawardana (2007) and Sasidaran (2015)

4.5.2 Relationship Between the Profile Characteristics of the Commercial Growers of Amaranthus and Vegetable Cowpea and Their Knowledge About KAU Varieties and Selected Recommended Practices of Amaranthus and Vegetable cowpea.

Relationship between the profile characteristics of the commercial growers of amaranthus and vegetable cowpea and their knowledge about KAU varieties and selected recommended practices of amaranthus is given in Table 28.

Table 28 Relationship between the profile characteristics of the commercial growers of amaranthus and vegetable cowpea and their knowledge about KAU varieties and selected recommended practices of amaranthus and vegetable cowpea.

Sl. No.	Profile characteristics	Correlation coefficient (r) (With knowledge)	
		Amaranthus	Vegetable Cowpea
1	Age	-0 039	0 184
2	Education	0 244	**0.409****
3	Experience	-0 112	0 064
4	Area under cultivation	085	-0 294
5	Contact with extension agency	**0.483****	0 028
6	Scientific orientation	**0.490****	**0.417****
7	Innovativeness	**0.311***	**0.321***
8	Mass media exposure	**0.443****	0 087
9	Economic motivation	**0.319***	0 090
10	Risk orientation	0 286	-0 116

*Significant at 5 per cent level

* *Significant at 1 per cent level

A perusal of Table 28 reveals that scientific orientation and innovativeness were significantly and positively related to knowledge of commercial growers of amaranthus and vegetable cowpea growers This finding is in agreement with that of Manoj (2000) and Jaganathan (2004)

Contact with extension agency was found to have significant and positive relationship with knowledge about KAU varieties and recommended practices of amaranthus A similar result was reported by Thomas (2000) and Anupama (2014)

This might be due to the reason that amaranthus growers who had frequent contact with extension agencies were likely to acquire more knowledge about the various cultivation practices

The positive and significant relationship of scientific orientation with knowledge of KAU varieties and recommended practices of amaranthus and vegetable cowpea might be due to the fact that scientifically oriented farmers were more eager to know about the various cultivation practices Medium level of mass media exposure also might have helped to increase the knowledge level of farmers This finding is m line with the findings of Patel and Chauhan (2009)

Like wise, innovative farmers were likely to derive more knowledge on improved cultivation practices from different sources which might be the reason for the significant and positive relationship of innovativeness with knowledge for both categories of farmers A similar trend was reported by Venkatesan (2000) and Saktivel (2000)

It was found that mass media exposure had a significant and positive relationship with knowledge in the case of commercial amaranthus growers Information about various technologies were disseminated through various mass media sources Thus the farmers were able to acquire more knowledge about the various recommended cultivation practices A similar trend was reported by Thomas (2000)

Economic motivation was found to have significant and positive relationship with knowledge of KAU varieties and recommended practices of amaranthus A farmer seeking more monitory gain from amaranthus cultivation is likely to acquire more knowledge about the various cultivation practices which might be the reason for this relationship This finding is in conformity with the finding of Manoj (2000)

Education was found to have a significant and positive relationship with knowledge in the case of vegetable cowpea growers The educated farmers might have had more access to various sources of information Greater contact with extension agencies and other progressive farmers might have also increased their knowledge level A similar result was reported by Jaganathan (2004) and Sasidaran (2015)

4.5.3 Relationship Between the Profile Characteristics of the Commercial Growers of Amaranthus and Vegetable Cowpea and Adoption of KAU Varieties and Selected Recommended Practices of Amaranthus and Vegetable Cowpea.

Relationship between the profile characteristics of the commercial growers of amaranthus and vegetable cowpea and adoption of KAU varieties and selected recommended practices of amaranthus and vegetable cowpea is shown in Table 29

Table 29 Relationship between the profile characteristics of the commercial growers of amaranthus and vegetable cowpea and adoption of KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

Sl. No.	Profile characteristics	Correlation coefficient (r) (With adoption)	
		Amaranthus	Vegetable Cowpea
1	Age	-0 229	0 099
2	Education	0 041	**0.365***
3	Experience	-0 055	0 077
4	Area under cultivation	-0 203	-0 270
5	Contact with extension agency	**0.498****	0 152
6	Scientific orientation	**0.302***	**0.442****

7	Innovativeness	**0.345***	**0.326***
8	Mass media exposure	**0.428****	0 179
9	Economic motivation	0 146	0 127
10	Risk orientation	0 212	-0 126

*Significant at 5 per cent level

* *Significant at 1 per cent level

In the case of amaranthus and vegetable cowpea farmers, scientific orientation and innovativeness were found to have a significant and positive relationship with adoption Farmers who were scientifically oriented had correct perception about the new technologies The correct knowledge helped to create a favourable attitude towards the improved technologies which might have led to their adoption A similar result was reported by Gangadharan (1993) Also, innovative farmers might have had more knowledge about the recommended practices which might have led to better adoption of the same This finding was in agreement with the findings of Fayas (2003) and Jayawardana (2007)

In the case of amaranthus growers, contact with extension agency had a significant and positive relationship with adoption A similar result was reported by Wason *et al* (2009) Majority of the farmers had contact with extension agencies, attended various trainings conducted by Krishi Bhavans and participated in various extension programmes These would have increased their level of awareness and knowledge and developed a favourable attitude leading to adoption

Mass media exposure also showed a significant and positive relationship with adoption in the case of amaranthus growers Mass media play a vital role in information dissemination It is natural that farmers go through various mass media for getting farm information More information about a technology leads to better

adoption This finding is in agreement with the findings of Manoj (2000), Jaganathan (2004) and Sasidaran (2015)

In the case of vegetable cowpea farmers, education exhibited a significant and positive relationship with adoption This finding is in agreement with the findings of Majjusha (2000) and Sasidaran (2015) Through education, level of knowledge of the farmers might have enhanced which resulted in better adoption Also, educated farmers had an opportunity to adopt the KAU practices because of their greater exposure and interaction within and outside the social system So, it could be concluded that direct and indirect effects of education might have contributed to the positive and significant relationship with adoption

4 6 CONSTRAINTS IN THE ADOPTION OF KAU VARIETIES AND RECOMMENDED PRACTICES OF AMARANTHUS AND VEGETABLE COWPEA

Focus Group Discussions which involved farmers, Agricultural Officers and agricultural experts were conducted in Kalliyoor, Kazhakoottam and Pullampara panchayats mainly to identify the constraints as perceived by the farmers and also the possible solutions to overcome the constraints

The constraints identified were ranked on the importance based on their perception

Constraints in the adoption of KAU varieties and recommended practices of amaranthus and vegetable cowpea is presented in Table 30

Table 30 Constraints in the adoption of KAU varieties and recommended practices of amaranthus and vegetable cowpea

Sl. No	Constraints	Scores	Rank
1	Prevalence of pest and diseases	253	1
2	Lack of sufficient quantity of good quality seeds	231	2
3	High labour charges	228	3
4	High cost of inputs	214	4
5	Non –availability of inputs in time	209	5
6	Lack of marketing facilities	205	6
7	High transport charges	198	7
8	Labour scarcity	195	8
9	Inadequate extension support	171	9
10	Lack of credit facilities	122	10

Analysis of Table 30 shows that the most important constraint faced by the commercial growers of amaranthus and vegetable cowpea was the prevalence of pests and diseases In the case of amaranthus, leaf blight was the major disease identified In some areas, incidence of rust disease and leaf webber attack was also found In the case of vegetable cowpea, anthracnose, rust and yellow vein mosaic were identified as the major diseases The major pests found in vegetable cowpea were aphids, bugs and borers Even though they adopted the recommended as well as their own control measures, the problem of pests and diseases could not be controlled Many solutions were suggested to overcome this problem One suggestion was to establish plant health clinics to diagnose and develop suitable management strategy Establishment of disease surveillance system to monitor the disease incidence at the onset and to initiate early attention to prevent it was another suggestion Community based plant

protection system and conducting campaigns for soil analysis, pest monitoring and Agro Ecosystem Analysis (AESA) were also suggested to reduce the disease incidence

Lack of sufficient quantity of good quality seeds was identified as the second major constraint In the case of amaranthus as well as vegetable cowpea, a few farmers complained that the seeds they brought from College of Agriculture, Vellayani were not germinating In the case of amaranthus, some farmers opined that along with the reduction in red colour of Arun variety, there were cases when the leaf colour of Arun variety turned out to be a mix of red and green All these affected the market value of the crop and some farmers were forced to adopt other hybrid varieties Non-availability of the required seeds was also registered as a major problem The solutions suggested for this constraint were the implementation of the system of Quality Declared Planting Material (QDPM) where only the seeds undergone through a quality checking process (where seeds are checked for the moisture content, germination etc) would be distributed to the famers Development of suitable seed production plots (isolated and dedicated fields), popularization of Registered Seed Growers Programme, and enactment of Seed Act were the other suggestions provided by the various agricultural experts to overcome this problem

The third constraint as perceived by the farmers was high labour charges The wage rate in Kerala is relatively higher than the neighbouring states due to the existing socio–political situation Only way to solve this problem is mechanization Farm support services like Agro-Service Centers, Haritha Technical Support Services and Karmasenas could be strengthened as they provide machinery services at very cheap rate Also, use of precision farming technology could definitely reduce the labour charges to a certain extent

High cost of inputs was identified as another important constraint This further increases the cost of cultivation Majority of the respondents opined that

every year, the cost of inputs was getting increased not in proportion with the price of their produce The major suggestions provided for overcoming this constraint were popularisation of nano fertilizers and chemicals, in situ production of compost especially vermicompost and enrichment of organic manure

Next constraint was the non – availability of inputs in time According to agricultural experts, the solutions suggested were development of a workable action plan in group approach and bring out changes in the subsidy pattern, that is, allow the farmers to use it during the season Later on, by the expert evaluation, the subsidy may be released

Lack of marketing facilities was identified as the next constraint According to the Agricultural Officer of Kazhakoottam Krishi Bhavan, there were cases like 75 kg of vegetable cowpea wasted due to lack of marketing facilities Various suggestions were provided by the agricultural experts to solve this problem which included opening up Anand model outlets for procurement and distribution, opening up farmer retail outlets (thus avoiding middlemen), infrastructure for shelf-life improvement and development of a production plan in marketing which considers the various aspects such as what to produce, where to produce, when to produce, how to produce and how much to produce Government of Kerala state is taking steps to develop a production plan for marketing vegetables in this line (Mathrubhumi, 2016)

The seventh constraint identified was high transport cost The major suggestion provided for this constraint was group approach At first, a common place of pooling the resources needs to be found out From there, the products could be transported using shared vehicles / transport facility

Labour scarcity was another serious constraint as perceived by the farmers The farm labourers were slowly moving to other occupation like industries Hence farmers face labour scarcity A suggestion to solve this constraint was dignity

improvement of the farm labourers either by providing them training for a business establishment so that they become service providers or by user friendly machinery development so that they become operators than mere labourers Decent dress code may also be implemented for them

Inadequate extension support was mentioned as the next constraint To fill that gap, extension functionaries and scientists may interact with farmers, more extension functionaries may be trained in participatory extension methods and mass media contact may be taken advantage of

The last constraint identified was lack of credit facilities For that local branches of commercial banks may be contacted Also, microfinance system as followed by 'Kudumbashree' units may be implemented

4 7 SUGGESTIONS FOR REFINEMENT OF TECHNOLOGY

Based on the field experience of the researcher and consultation with the experts, the following suggestions are provided for refinement of technology

First suggestion is the development of a package of practices recommendation for direct sown amaranthus In the study areas, all the commercial amaranthus growers have been adopting the practice of direct sowing where they harvest the crop thirty days after sowing But package of practices recommendation is given only for transplant amaranthus

Second suggestion is the development of an amaranthus variety which is resistant to leaf blight since leaf blight is the major disease prevalent in the amaranthus fields

Third suggestion is the refinement of package of practices for vegetable cowpea A separate package of practices recommendation for vegetable cowpea is needed because the requirement of NPK fertilizers is more for the crop when compared to the recommended amount as perceived by majority of the farmers

4 8 OTHER SUGGESTIONS

For improving the rate of adoption of the recommended practices of amaranthus and vegetable cowpea, Front Line Demonstrations may be done in the farmers' field with the recommended package of practices where technical guidance may be given by the agricultural experts from the time of land preparation to harvest with subsequent follow ups

SUMMARY

5. SUMMARY

Amaranthus and vegetable cowpea are two important crops commercially cultivated by vegetable growers in Kerala Though these crops are commercially cultivated, most of the vegetable requirements in Kerala are met from other states This situation could be changed only by increased production of quality vegetables from the available cultivable areas in the state To increase the production and quality of vegetable crops, different research and developmental activities are being carried out by various agricultural institutions such as KAU and various production practices are being recommended With this in view, a research study was initiated with specific objectives to study the extent of awareness, knowledge and adoption of KAU varieties and selected recommended practices of amaranthus and vegetable cowpea and their relationship with selected socio-psychological and economic characteristics of commercial vegetable growers in Thiruvananthapuram district and also to identify the constraints in the adoption of KAU varieties and recommended practices, if any and bring out suggestions for refinement of technologies

For the present study, Thiruvananthapuram district was selected Selection of respondents was through three stage random sampling procedure In the first stage, from the list of blocks having larger area under amaranthus and vegetable cowpea cultivation, three blocks were selected, namely, Nemom, Kazhakoottam and Vamanapuram from the eleven blocks of Thiruvananthapuram district In the second stage, in each block, from the list of panchayats having larger area under amaranthus and vegetable cowpea cultivation, one panchayat was selected, namely, Kalliyoor, Kazhakoottam and Pullampara In the third stage, from the lists of farmers engaged in commercial cultivation of amaranthus and vegetable cowpea, fifteen amaranthus growers and fifteen vegetable cowpea growers were selected randomly, thus making a total of ninety farmers

The dependent variables selected for the study were awareness, knowledge and adoption Ten independent variables, namely, age, education, experience in vegetable cultivation, area under vegetable cultivation, contact with extension agency, scientific orientation, innovativeness, mass media exposure, economic motivation, and risk orientation were selected for the study based on judges' relevancy rating These variables were quantified with the help of available measurement procedures

The salient findings are presented below

5 1 AWARENESS

Majority of the amaranthus farmers (55 56 per cent) and vegetable cowpea farmers (88 89 per cent) had medium level of awareness about the KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

5 2 KNOWLEDGE

Majority of the amaranthus growers (68 89 per cent) and vegetable cowpea growers (73 33 per cent) had medium level of knowledge about the KAU varieties and selected recommended practices of amaranthus and vegetable cowpea

5 3 ADOPTION

Majority of the amaranthus growers (60 per cent) and vegetable cowpea growers (57 78 per cent) were medium level in adoption of KAU varieties and selected recommended practices

5 4 PROFILE CHARACTERISTICS OF COMMERCIAL GROWERS OF AMARANTHUS AND VEEGTABLE COWPEA

- Majority of the amaranthus growers (71 11 per cent) and vegetable cowpea (66 67 per cent) belonged to middle age category

- As much as 28 89 per cent of amaranthus growers and 33 33 per cent of vegetable cowpea growers had high school education
- As much as 42 22 per cent of the amaranthus growers and 40 per cent of the vegetable cowpea growers had high level of experience in vegetable cultivation
- Sixty per cent of the amaranthus growers and 62 22 per cent of the vegetable cowpea growers belonged to medium category (0 1-0 4 ha) with respect to area under vegetable cultivation
- Majority of the respondents (60 per cent of amaranthus growers and 68 89 per cent of vegetable cowpea growers) had medium level of contact with extension agency followed by low level (22 22 per cent) for amaranthus growers and high level (20 per cent) for vegetable cowpea growers
- More than half of the amaranthus growers (57 78 per cent) and vegetable cowpea growers (64 44 per cent) had medium level of scientific orientation
- Exactly 62 22 per cent of the amaranthus growers and 60 per cent of the vegetable cowpea growers had medium level of innovativeness followed by both the categories having high level of innovativeness (20 per cent for amaranthus growers and 24 44 per cent for vegetable cowpea)
- In the case of mass media exposure, majority of the respondents belonged to medium category for both crops but the percentage of amaranthus farmers belonging to the medium category was much low (53 33 per cent) when compared to the percentage of vegetable cowpea farmers (71 11 per cent)
- Majority of the farmers had medium level (55 56 per cent and 77 78 per cent for amaranthus and vegetable cowpea respectively) of economic motivation followed by low level of economic motivation (31 11 per cent for amaranthus growers and 13 33 per cent for vegetable cowpea growers)
- Regarding risk orientation, 71 11 per cent of the amaranthus growers and 68 89 per cent of vegetable cowpea growers had medium level

5 5 RELATIONSHIP BETWEEN THE PROFILE CHARACTERISTICS OF THE COMMERCIAL GROWERS OF AMARANTHUS AND VEGETABLE COWPEA WITH THE EXTENT OF AWARENESS, KNOWLEDGE AND ADOPTION

5.5.1Relationship with awareness

In the case of amaranthus and vegetable cowpea growers, scientific orientation and innovativeness were found to have a significant and positive relationship with awareness In the case of amaranthus growers, contact with extension agency, mass media exposure and economic motivation were found to have a significant and positive relationship with awareness Education was found to have a significant and positive relationship with awareness in the case of vegetable cowpea growers

5.5.2 Relationship with knowledge

In the case of commercial amaranthus growers, contact with extension agency, scientific orientation, innovativeness, mass media exposure and economic motivation were found to be significantly and positively related to knowledge While in the case of commercial vegetable cowpea growers, education, scientific orientation, and innovativeness, were found to be significantly and positively related to knowledge

5.5.3 Relationship with adoption

In the case of commercial amaranthus growers, contact with extension agency, scientific orientation, innovativeness and mass media exposure were found to be significantly and positively related to adoption While in the case of commercial vegetable cowpea growers, education, scientific orientation, and innovativeness, were found to be significantly and positively related to adoption

5 6 CONSTRAINTS IN THE ADOPTION OF KAU VARIETIES AND RECOMMENDED PRACTICES OF AMARANTHUS AND VEGETABLE COWPEA

Major constraints perceived by the farmers were prevalence of pest and diseases followed by lack of sufficient quantity of good quality seeds and high labour charges A few suggestions given to overcome these constramts include establishment of plant health clinics to diagnose and develop suitable management strategy, popularizing the system of Quality Declared Planting Material (QDPM) and mechanization

5 7 SUGGESTIONS FOR REFINEMENT OF TECHNOLOGY

Based on the field experience of the researcher and consultation with the experts, the following suggestions are provided for refinement of technology

- Development of a package of practices recommendations for direct sown amaranthus
- Development of an amaranthus variety which is resistant to leaf blight
- Refinement of package of practices recommendations for vegetable cowpea

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APPENDICES

APPENDIX - I

Selection of variables for the study

KERALA AGRICULTURAL UNIVERSITY
College Of Agriculture, Vellayani
Thiruvananthapuram – 695 522

Dr V B Padmanabhan
Professor

Department of Agrl Extension
Date 19-08-2015

Sir/ Madam

Sub P G Education-Research-Judges opinion-requested-reg

My P G student Miss Anju,K K has taken up a research project entitled "Technology utilization of amaranthus and vegetable cowpea in Thiruvananthapuram district " For this purpose the student researcher has listed out a number of socio- psychological and economic variables which may influence the farmers' awareness, knowledge, and adoption of cultivated varieties and recommended practices of amaranthus and vegetable cowpea

In this context I request you to kindly rate the listed variables for their relevancy by marking the appropriate column Although utmost care has been taken to make the list exhaustive, still there may be scope for addition of items Please do that if you think it necessary Kindly return your rating at the earliest convenience

Thanking you for your co-operation

Yours sincerely,

(Dr V B Padmanabhan)

OBJECTIVES

To study the extent of awareness, knowledge and adoption of cultivated varieties and recommended practices of amaranthus and vegetable cowpea and their relationship with selected socio-psychological and economic characteristics of commercial vegetable growers in Thiruvananthapuram district and also to identify the constraints in the adoption of recommended varieties and practices, if any and bring out suggestions for refinement of technologies

(Commercial vegetable grower refers to a farmer whose major income is from the sale of the vegetable crop cultivated in a minimum area of 20 cents)

Sl. No.	Variables	Most R	More R	R	Less R	Least R
1	**Achievement motivation** – refers to the striving of the respondent to do good work and attain a sense of accomplishment					
2	**Age** - defined as the number of years completed by the respondent at the time of investigation					
3	**Annual income** – defined as the total earning of the farmer and the members of the family in a year from the farm and other sources in rupees					
4	**Area under vegetable cultivation** - measured as the extent of area under vegetable cultivation in hectares					
5	**Availability of farm inputs** – refers to the availability of inputs to the farmer either by his own possession or by hiring it					
6	**Contact with extension agency** – It was operationalised as the degree to which farmers used to maintain contact with extension agencies					
7	**Coordination Ability** – The ability to co- ordinate farm activities is the degree to which an individual co- ordinates actions in a time dimension					
8	**Cosmopoliteness** – refers to the tendency of the respondents to be in contact with outside village on the belief that all the needs of an individual cannot be satisfied in their own village					
9	**Credit orientation** – refers to the favorable and positive attitude of the farmer towards obtaining credit from institutional sources					

10	**Economic motivation** - refers to the extent to which a person is oriented towards profit maximization and relative value he places on monitory gains					
11	**Education** refers to the extent of non – formal or formal learning possessed by the farmers					
12	**Environmental orientation** – Degree to which a farmer is concerned about his environment					
13	**Experience in vegetable cultivation** refers to the total number of years a respondent has been engaged in vegetable cultivation.					
14	**Extension contribution** refers to the extent of help and services by various extension agencies like Agriculture Department , Commodity Boards and Krishi Vigyan Kendras to the farmers in the form of various extension and educational activities that will help them in better cultivation					
15	**Extension participation** – refers to the frequency of participation in various extension activities					
16	**Family labour utilization** – Extent of utilization of the members of the family by respondents for farm activities					
17	**Family size** – the number of members in the family living together					
18	**Farm size** the total areas of the cultivated land possessed by the farmers at the time of conducting survey					
19	**Indebtedness** – refers to the total debt in terms of money as respondents owes to various money lending source such as private money lenders, relatives, co-operatives etc					
20	**Information utilization** – An individual contact with various sources of information					
21	**Innovativeness** refers to the degree to which the respondents are relatively earlier in adopting new ideas					
22	**Leadership quality** is operationally defined as the ability of the farmers to influence others co- operate in the attainment of a goal					

23	**Subsidiary occupation** – refers to the occupation other than agriculture from which a respondent receives maximum income					
24	**Management Orientation** – refers to the degree to which a farmer is oriented towards scientific farm management comprising of planning, production and marketing functions in his farm Higher score reveals a favorable management outlook of the respondent					
25	**Market Orientation** has been defined as the degree to which a farmer is oriented toward the market in terms of demand and price of his produce					
26	**Market perception** – Capacity of the respondent to identify the market trend to sell the produce for greater returns					
27	**Mass media exposure** refers to the degree to which an individual has been exposed to mass media information sources					
28	**Mass media participation** – refers to the frequency with which different mass media are utilized by the respondents for getting information					
29	**Occupation** for this study was operationalised as the main vocation and other vocations that the respondents had at the time of interview					
30	**Progressiveness** – Extent to which one is relatively early in venturing or putting the innovation to practice					
31	**Rational orientation** – extent of rationality and scientific belief of the respondent in relation to the different specialized components in the farm					
32	**Risk Orientation** – refers to the degree to which a farmer is oriented towards risk and uncertainty and has courage to face the problems in farming					
33	**Risk preference** -- Positive or negative effects or feeling towards risk held by a farmer towards farming in general					
34	**Scientific Orientation** refers to the degree to which a farmer is oriented to the use of scientific methods					

	in decision making and in farming					
35	**Self – Confidence** - Indicates the extent of feeling of one's own ability and resourcefulness in carrying out any activity which an individual desired to undertake					
36	**Self- reliance** – It is conceptually related to credit orientation and planning orientation Borrowing capital for introducing changes in farming and to do it in a well planned way, pre-supposes confidence in oneself along with realization that all environmental factors are not inscrutable supernatural forces beyond our control					
37	**Social participation** was operationalised as the degree of involvement of respondents in formal organizations as members and office bearers					
38	**Training attended** – Number of trainings in vegetable cultivation undergone by the respondent in last three years					

R- RELEVANT

Thank you

Name and designation

APPENDIX II

SCORES OBTAINED FOR EACH VARIABLE BY JUDGES' RELEVANCY RATING

Sl No	Variables	Scores
1	Achievement motivation	100
2	**Age**	**105**
3	Annual income	98
4	**Area under vegetable cultivation**	**112**
5	Availability of farm inputs	103
6	**Contact with extension agency**	**113**
7	Coordination ability	102
8	Cosmopoliteness	91
9	Credit orientation	93
10	**Economic motivation**	**118**
11	**Education**	**109**
12	Environmental orientation	90
13	**Experience in vegetable cultivation**	**106**
14	Extension contribution	103
15	Extension participation	104
16	Family labour utilisation	96
17	Family size	80
18	Farm size	93
19	Indebtedness	87
20	Information utilisation	103
21	**Innovativeness**	**118**
22	Leadership quality	93
23	Subsidiary occupation	91
24	Management orientation	104
25	Market orientation	105
26	Market perception	99
27	**Mass media exposure**	**106**
28	Mass media participation	90
29	Progressiveness	95
30	Rational orientation	88
31	**Risk orientation**	**115**
32	Risk preference	96
33	**Scientific orientation**	**106**
34	Self confidence	102
35	Self reliance	95
36	Social participation	85
37	Training attended	98

APPENDIX – III

INTERVIEW SCHEDULE

TECHNOLOGY UTILISATION OF AMARANTHUS IN THIRUVANANTHAPURAM DISTRICT

Block

Panchayat

Name of the respondent

Address

1. **Age**
2. **Educational Status**

Sl No	Category	
1	Illiterate	
2	Primary education	
3	High School	
4	Higher Secondary	
5	College education	

3. **Experience (No. of years)**
   - In amaranthus cultivation
4. **Area under cultivation**
   - Amaranthus

5. Contact with extension agency

Sl. No	Category	Regularly (2)	Occasionally (1)	Never (0)
1	Field Assistant			
2	Agricultural Assistant			
3	Agricultural Officer			
4	Progressive farmer			

5	University scientist			
6	Others			

6. Scientific Orientation

Sl No	Statements	SA	A	UD	DA	SDA
1	New methods of farming give better results than the old methods					
2	The way of farming by our fore fathers is the best way of farming today					
3	Even the farmers with a lot of farming experience should use new methods of farming					
4	A good farmer experiences with new methods of farming					
5	Though it takes time for the farmer to learn new methods in farming it is worth the efforts					
6	Traditional methods of farming have to be changed in order to raise the living of the farmer					

7. Innovativeness

When would you like to adopt innovative farming practices?

1) As soon as it is brought to knowledge
2) After I have seen some other farmers using it successfully in their farms
3) I prefer to wait and take my own time
4) Iam not interested in adopting improved farming practices

8. Mass media exposure

Sl No	Source	Frequently (3)	Occasionally (2)	Rarely (1)
1	Radio			
2	Television			
3	Newspaper			
4	Bulletin			

5	Agrl magazines			
6	KIOSKs			
7	Mobile phones			
8	Internet			

9. Economic Motivation

Please indicate your responses in the appropriate alternative SA – Strongly Agree, , A-Agree, UD-Undecided, DA-Disagree, SDA-Strongly Disagree

Sl No	Statements	SA	A	UD	DA	SDA
1	A farmer should work towards larger yield and economic returns					
2	The most successful farmer is one who makes the highest profit					
3	A farmer must earn his living but the most important thing in life cannot be defined in economic terms					
4	A farmer should try any new farming idea which may earn him more money					
5	A farmer should grow amaranthus in addition to other crops in order to increase his monitory profit					
6	It is difficult for the farmer's children to make a good start unless he provides them with economic assistance					

10. Risk Orientation

Please indicate your responses in the appropriate alternative SA – Strongly Agree, A-Agree, UD-Undecided, DA-Disagree, SDA-Strongly Disagree

Sl No	Statements	SA	A	UD	DA	SDA
1	A farmer should grow a large number of crops to avoid greater risk 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 and 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 risk is high					
5	Trying an innovative organic method involves risk but it is worth					
6	It is better for a farmer not to follow the KAU recommended practices of amaranthus unless most others in the locality have used it with success					

11. Awareness of farmers about the cultivation practices

Amaranthus

Sl No	Practices	Are you aware	
		Aware	Not aware
1	Seed rate		
2	Spacing		
3	Application of farmyard manure		
4	Application of NPK fertilizers		
5	Application of urea after harvest		
6	Pests and diseases in amaranthus		
7	Pest and disease control measures in amaranthus		
8	High yielding varieties in amaranthus		

12. Knowledge test for amaranthus farmers

1 What is the spacing needed for amaranthus?
2 Name a high yielding variety of amaranthus
3 What is the rate of NPK fertilisers to be applied for amaranthus (for 1 hectare)?
4 During severe cases of leaf webber incidence, 0 1 % of Malathion spray can be used Yes / No
5 Which are the important pests and diseases of amaranthus?
6 Name a neem based product used for pest control

7 Spraying 1 % urea immediately after each harvest will increase the yield Yes / No
8 Planting of red leaved varieties should be avoided during heavy rains Yes / No

13. Adoption of KAU varieties and selected recommended practices of amaranthus

1 Variety used

Sl No	Area cultivated
1	

Number of plants / ha

2 Spacing

Spacing	Area with corresponding spacing

Sl No	Category	Quantity (kg/ha)	Area of application
3	FYM		
4	Nitrogenous fertilizer • •		
5	Phosphatic fertilizers • •		

6	Potassium fertilizers • •		

Sl No	Practice	Time of application	No	Yes	Area of application
7	Urea spray	1 % spray after each harvest			

Sl No	Major pests	Control	No	Yes	Area of application
8	Leaf Webber	Malathion spray at the rate of 0 1 g in 100 ml			

14. Constraints perceived by farmers

SL No	Constraints	Most Important	Important	Least Important
1	Lack of sufficient good quality seeds			
2	Non – availability of inputs in time			
3	Prevalence of pest and diseases			
4	Lack of awareness and knowledge about high yielding varieties of amaranthus / vegetable cowpea			
5	High cost of inputs			
6	Labour scarcity			
7	Inadequate extension support			

8	Inadequate information about improved amaranthus / vegetable cowpea cultivation			
9	Lack of credit facilities			
10	High labour charges			
11	Inadequacy of capital			
12	High transport charges			
13	Lack of marketing facilities			
14	High perishability			
15	Lack of storage facility			

APPENDIX – IV

INTERVIEW SCHEDULE

TECHNOLOGY UTILISATION OF VEGETABLE COWPEA IN THIRUVANANTHAPURAM DISTRICT

Block

Panchayat

Name of the respondent

Address

1. **Age**
2. **Educational Status**

Sl No	Category	
1	Illiterate	
2	Primary education	
3	High School	
4	Higher Secondary	
5	College education	

3. **Experience (No. of years)**
   - In vegetable cowpea cultivation
4. **Area under cultivation**
   - Vegetable cowpea

5. Contact with extension agency

Sl. No	Category	Regularly (2)	Occasionally (1)	Never (0)
1	Field Assistant			
2	Agricultural Assistant			
3	Agricultural Officer			
4	Progressive farmer			
5	University scientist			
6	Others			

6. Scientific Orientation

Sl No	Statements	SA	A	UD	DA	SDA
1	New methods of farming give better results than the old methods					
2	The way of farming by our fore- fathers is the best way of farming today					
3	Even the farmers with a lot of farming experience should use new methods of farming					
4	A good farmer experiences with new methods of farming					
5	Though it takes time for the farmer to learn new methods in farming it is worth the efforts					
6	Traditional methods of farming have to be changed in order to raise the living of the farmer					

7. Innovativeness

When would you like to adopt innovative farming practices?

1) As soon as it is brought to knowledge
2) After I have seen some other farmers using it successfully in their farms
3) I prefer to wait and take my own time
4) Iam not interested in adopting improved farming practices

8. Mass media exposure

Sl No	Source	Frequently (3)	Occasionally (2)	Rarely (1)
1	Radio			
2	Television			
3	Newspaper			
4	Bulletin			
5	Agrl magazines			
6	KIOSKs			
7	Mobile phones			
8	Internet			

9. Economic Motivation

Please indicate your responses in the appropriate alternative SA – Strongly Agree, A-Agree, UD-Undecided, DA-Disagree, SDA-Strongly Disagree

Sl No	Statements	SA	A	UD	DA	SDA
1	A farmer should work towards larger yield and economic returns					
2	The most successful farmer is one who makes the highest profit					
3	A farmer must earn his living but the most important thing in life cannot be defined in economic terms					
4	A farmer should try any new farming idea which may earn him more money					
5	A farmer should grow vegetable cowpea in addition to other crops in order to increase his monitory profit					
6	It is difficult for the farmer's children to make a good start unless he provides them with economic assistance					

10. Risk Orientation

Please indicate your responses in the appropriate alternative SA – Strongly Agree, A-Agree, UD-Undecided, DA-Disagree, SDA-Strongly Disagree

Sl No	Statements	SA	A	UD	DA	SDA
1	A farmer should grow a large number of crops to avoid greater risk 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 and 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 risk is high					
5	Trying an innovative organic method involves risk but it is worth					
6	It is better for a farmer not to follow the KAU recommended practices of vegetable cowpea unless most others in the locality have used it with success					

11. Awareness of farmers about KAU varieties and selected recommended practices of vegetable cowpea.

Sl No	Practice	Are you aware	
		Aware	Not aware
1	Seed rate		
2	Spacing		
3	Application of farmyard manure		
4	Application of NPK fertilizers		
5	Inoculation with rhizobium		
6	Application of lime		
7	Critical period of Weeding & irrigation		
8	Pests and diseases of vegetable cowpea		
9	Pest and disease control		

	measures in vegetable cowpea		
10	High yielding varieties in vegetable cowpea		

12. Knowledge about the KAU varieties and selected recommended practices of vegetable cowpea.

1 What is the recommended spacing for vegetable cowpea?
2 What is the recommended seed rate for vegetable cowpea?
3 Do you know the method of seed inoculation with rhizobium ?
4 Name a high yielding variety of vegetable cowpea
5 Mention the rate of NPK to be applied for vegetable cowpea
6 Critical irrigation period in vegetable cowpea is 15 days after sowing and at the time of flowering Yes/ No
7 Soil drenching with 1 % Bordeaux mixture can prevent fungal diseases Yes / No
8 Which are the important pests and diseases of vegetable cowpea?
9 Name a neem based product used for pest control and the its method of application
10 Name a red pod variety of vegetable cowpea

13. Adoption of the KAU varieties and selected recommended practices of vegetable cowpea.

Potential area of cultivation

1 Variety used

Sl No	Area cultivated
1	

2 Seed rate

Seed rate	Area utilised

3 Spacing

Spacing	Area with corresponding spacing

Sl No	Category	Quantity (kg/ha)	Area of application
4	Farmyard manure		
5	Rhizobium (Seed inoculation)		
6	Nitrogen fertilizers • •		
7	Phosphatic fertilizers • •		
8	Potassium fertilizers •		

9 Pest control measures

9	Major pests	Control Measures	Not adopted	Adopted	Area of application
	Pea aphids	Spray Malathion 0 05 g in 100 ml OR Quinolphos 0 05 g in 100 ml			

	Pod borer	Carbaryl 0 2 g in 100 ml			

10	Major diseases	Control Measures	Not adopted	Adopted	Area of application
	Anthracnose Dry root rot	With Thiram @ 3 g / kg of seed Followed by Carbendazim spray at the rate of 0 05 g in 100 ml at 15, 30 and 45 days after seedling emergence Using *Trichoderma viridae* @ 4 g / kg of seed			

11	Seed treatment	Pseudomonas fluorescence @ 10 g / kg seed			
12	Soil treatment	Neem cake soil application at 20 kg / ha			

14. Constraints perceived by farmers

Sl No	Constraints	Most Important	Important	Least Important
1	Lack of sufficient good quality seeds			
2	Non – availability of inputs in time			
3	Prevalence of pest and diseases			
4	Lack of awareness and knowledge about high yielding varieties of amaranthus / vegetable cowpea			
5	High cost of inputs			
6	Labour scarcity			
7	Inadequate extension support			
8	Inadequate information about improved amaranthus / vegetable cowpea cultivation			
9	Lack of credit facilities			
10	High labour charges			
11	Inadequacy of capital			
12	High transport charges			
13	Lack of marketing facilities			
14	High perishability			
15	Lack of storage facility			

APPENDIX - V

കർഷകർക്കായുള്ള അഭിമുഖ പത്രിക.

തിരുവനന്തപുരം ജില്ലയിൽ

ചീരകൃഷിയിൽ കേരള കാർഷിക സർവ്വകലാശാലയുടെ

സാങ്കേതിക വിദ്യയുടെ ഉപയോഗം

ബ്ലോക്ക്

പഞ്ചായത്ത്

പേര്

വിലാസം

1 വയസ്സ്

2 വിദ്യാഭ്യാസ യോഗ്യത

ക്രമ നമ്പർ	വിഭാഗം
1	നിരക്ഷരൻ
2	പ്രൈമറി വിദ്യാഭ്യാസം
3	ഹൈസ്കൂൾ വിദ്യാഭ്യാസം
4	ഹയർ സെക്കന്ററി സ്കൂൾ വിദ്യാഭ്യാസം
5	കോളേജ് വിദ്യാഭ്യാസം

3 ചീരകൃഷിയിലുള്ള പരിചയം

4 ചീര കൃഷി ചെയ്യുന്ന ഭൂമിയുടെ വിസ്തൃതി

5 വിജ്ഞാന വ്യാപനവുമായുള്ള ബന്ധം

ക്രമ നമ്പർ	വിഭാഗം	എപ്പോഴും	വല്ലപ്പോഴും	ഒരിക്കലുമില്ല
1	ഫീൽഡ് അസിസ്റ്റന്റ്			
2	അഗ്രികൾചറൽ അസിസ്റ്റന്റ്			
3	കൃഷി ഓഫീസർ			
4.	പുരോഗമന കർഷകർ			
5	സർവ്വകലാശാലാ ശാസ്ത്രജ്ഞർ			
6	മറ്റുള്ളവർ			

6. ശാസ്ത്രീയ അവബോധം

ചുവടെ കൊടുത്തിട്ടുള്ള ഓരോ വാക്യത്തിനോടും എത്രമാത്രം താങ്കൾ യോജിക്കുന്നു അല്ലെങ്കിൽ വിയോജിക്കുന്നു എന്ന് വ്യക്തമാക്കുക

ക്രമ നമ്പർ	പ്രസ്താവന	SA	A	UD	DA	SDA
1	പുതിയ കൃഷിരീതികൾ പഴയവയെക്കാളും മെച്ചപ്പെട്ട ഫലം തരുന്നു					
2	പൂർവ്വികരുടെ കൃഷിരീതി-കളാണ് ഇന്ന് ഏറ്റവും കൂടുതൽ അനുയോജ്യമാ-യിട്ടുള്ളത്					
3	കൃഷിയുമായി വളരെയേറെ പരിചയമുള്ള കർഷകരും പുതിയ കൃഷിരീതികൾ ഉപയോഗിക്കേണ്ടതാണ്					
4	ഒരു നല്ല കർഷകൻ പുതിയ കൃഷിരീതികൾ സ്വീകരിക്കും					
5	കർഷകന് പുതിയ കൃഷിരീതികൾ പഠിക്കുവാൻ സമയം വേണ്ടിവരുമെങ്കിലും അതിന് അതിന്റേതായ ഗുണമുണ്ടാകും					
6	കർഷകന്റെ ജീവിതനിലവാരം മെച്ചപ്പെടുത്താൻ പഴയ കൃഷിരീതികൾ മാറേണ്ടതുണ്ട്.					

SA ശക്തമായി സമ്മതിക്കുന്നു

A സമ്മതിക്കുന്നു

UD അഭിപ്രായമില്ല

DA വിസമ്മതിക്കുന്നു

SDA ശക്തമായി വിസമ്മതിക്കുന്നു

7. നൂതന ആശയങ്ങളോടുള്ള ആഭിമുഖ്യം

താങ്കൾ എപ്പോഴാണ് നൂതന കൃഷി രീതികൾ പ്രാവർത്തികമാക്കുക ?

1 അറിവിൽപ്പെട്ട ഉടൻ

2 മറ്റു കർഷകർ അവരുടെ കൃഷിയിടങ്ങളിൽ വിജയകരമായി ഉപയോഗിക്കുമ്പോൾ

3 കാത്തിരുന്ന് എന്റെ തന്നെ സമയം എടുക്കുവാൻ താത്പര്യപ്പെടുന്നു

4 പുതിയ കൃഷിരീതികൾ പരീക്ഷിക്കുന്നതിൽ ഞാൻ തത്പരനല്ല

8. ബഹുജന മാധ്യമങ്ങളുമായുള്ള ബന്ധപ്പെടൽ

ക്രമ നമ്പർ	ഉറവിടം	ആവർത്തന തോത്		
		എപ്പോഴും	വല്ലപ്പോഴും	ഒരിക്കലുമില്ല
1	റേഡിയോ			
2	ടെലിവിഷൻ			
3	വർത്തമാന പത്രം			
4.	ബുള്ളറ്റിൻ			
5.	കാർഷിക മാസിക			
6	കിയോസ്ക്			
7	മൊബൈൽ ഫോൺ			
8	ഇന്റർനെറ്റ്			

9. സാമ്പത്തിക പ്രചോദനം

ചുവടെ കൊടുത്തിട്ടുള്ള ഓരോ വാക്യത്തിനോടും എത്രമാത്രം താങ്കൾ യോജിക്കുന്നു അല്ലെങ്കിൽ വിയോജിക്കുന്നു എന്ന് വ്യക്തമാക്കുക

ക്രമ നമ്പർ	പ്രസ്താവന	SA	A	UD	DA	SDA
1	കൂടുതൽ ഉൽപ്പാദനത്തിനും സാമ്പത്തിക നേട്ടത്തിനുമായി കർഷകൻ പ്രയത്നിക്കണം					
2	ഏറ്റവും കൂടുതൽ ലാഭമുണ്ടാ-ക്കുന്നകർഷകനാണ് ഏറ്റവും വിജയിയായ കർഷകൻ					
3	ഒരു കർഷകൻ ജീവിക്കാ-നുള്ളത് നിശ്ചയമായും സമ്പാദിക്കണംഎന്നാൽ ജീവിതത്തിലെ ഏറ്റവും പ്രധാനപ്പെട്ട സാമ്പത്തിക വാക്യങ്ങൾ വിവക്ഷിക്കാനാവില്ല					
4	ഒരു കർഷകൻ പുതിയ കാര്യങ്ങൾ പരീക്ഷിക്കണം ഇത് അദ്ദേഹത്തിന് കൂടുതൽ ലാഭം നേടാൻ സഹായിക്കും					
5	ഒരു കൃഷിക്കാരൻ ഗർഹികാ-വശ്യങ്ങൾക്കായും കൂടുതൽ ലാഭത്തിനായുംചീര കൂടുതലായി കൃഷി ചെയ്യണം					
6	കർഷകരുടെ മക്കൾക്ക് ജീവിതത്തിൽ ഒരു നല്ല തുടക്കം കുറിക്കാൻ സാമ്പത്തികസഹായം കൂടാതെ പ്രായോഗികമല്ല					

SA ശക്തമായി സമ്മതിക്കുന്നു A സമ്മതിക്കുന്നു

UD അഭിപ്രായമില്ല DA വിസമ്മതിക്കുന്നു

SDA ശക്തമായി വിസമ്മതിക്കുന്നു

10. നഷ്ട സാദ്ധ്യതാ അവബോധം

ചുവടെ കൊടുത്തിട്ടുള്ള ഓരോ വാക്യത്തിനോടും എത്രമാത്രം താങ്കൾ യോജിക്കുന്നു അല്ലെങ്കിൽ വിയോജിക്കുന്നു എന്ന് വ്യക്തമാക്കുക

ക്രമ നമ്പർ	പ്രസ്താവന	SA	A	UD	DA	SDA
1	ഒന്നോ രണ്ടോ വിളകൾ കൃഷി ചെയ്യുമ്പോൾ ഉള്ള അപകടം ഒഴിവാക്കുന്നതിനായി കർഷകൻ കൂടുതൽ വിളകൾ കൃഷി ചെയ്യണം					
2	നഷ്ട സാദ്ധ്യത കുറഞ്ഞതും കുറച്ച് ലഭിക്കുന്നതുമായ ലാഭത്തിന് പകരമായി കർഷകൻ കൂടുതൽ മാറ്റത്തിന് തയ്യാറായാൽ കൂടുതൽ ലാഭം നേടാം					
3	കൂടുതൽ വെല്ലുവിളികൾ ഏറ്റെടുക്കാൻ തയ്യാറുള്ള കർഷകന് ഒരു ശരാശരി കർഷകനേക്കാൾ കൂടുതൽ സാമ്പത്തിക നേട്ടം ഉണ്ടാക്കാൻ സാധിക്കും					
4	വിജയസാദ്ധ്യത ഉറപ്പുണ്ടെങ്കിൽ കർഷകൻ വെല്ലുവിളികൾ ഏറ്റെക്കുന്നത് നല്ലതാണ്					
5	നൂതനമായ ഒരു കൃഷിരീതി സ്വീകരിക്കുന്നതിൽ നഷ്ട സാദ്ധ്യത ഉണ്ടെങ്കിലും ലാഭകരമാണ്					
6	കേരള കാർഷിക സർവ്വകലാശാല നിർദ്ദേശിക്കുന്ന കൃഷിരീതികൾ കർഷകൻ തന്റെ ചുറ്റുപാടുള്ളവർ പ്രയോഗിച്ച് വിജയിച്ചിട്ടുണ്ടെങ്കിൽ മാത്രമേ സ്വീകരിക്കേണ്ടതുള്ളു					

ചീര കൃഷിരീതികളെ കുറിച്ചുള്ള അവബോധം

ക്രമ നമ്പർ	പ്രസ്താവന	താങ്കൾ ബോധവാനാണോ	
		അതെ	അല്ല
1	വിത്തിന്റെ അളവ് ശുപാർശ ചെയ്തിട്ടുണ്ട് എന്നറിയാമോ?		
2	വിത്തിന്റെ വിള പരിപാലന അകലം ശുപാർശ ചെയ്തി-ട്ടുണ്ട് എന്ന് അറിയാമോ ?		
3	കാലിവളം ഉപയോഗിക്കണം എന്നറിയാമോ?		
4	എൻ പി കെ വളങ്ങൾ ഉപയോഗിക്കണം എന്ന് അറിയാമോ ?		
5	വിളവെടുപ്പിനുശേഷം യൂറിയ ഉപയോഗിക്കണം എന്നറിയാമോ ?		
6	ചീരയിൽ കാണുന്ന പ്രധാന കീടങ്ങളെയും രോഗങ്ങളെയും കുറിച്ചുള്ള അറിവുണ്ടോ ?		
7	ചീരയുടെ രോഗ-കീട നിയന്ത്രണ മാർഗ്ഗങ്ങൾ ശുപാർശ ചെയ്തിട്ടുണ്ടെന്ന് അറിയാമോ ?		
8	ചീരയിൽ വികസിപ്പിച്ചെടു-ത്തിട്ടുള്ള അത്യുൽപ്പാദന-ശേഷിയുള്ള ഇനങ്ങൾ ഏതെല്ലാം എന്നറിയാമോ?		

ചീര കൃഷി രീതികളെക്കുറിച്ചുള്ള അറിവ് :

1 ചീരക്ക് ആവശ്യമായ വിത്തകലം എത്ര ?

2 അത്യുൽപ്പാദന ശേഷിയുള്ള ഒരു വിത്തിനം ഏത് ?

3 ഒരു ഹെക്ടറിലേക്ക് ആവശ്യമായിട്ടുള്ള നൈട്രജൻ, ഫോസ്ഫെറസ്, പൊട്ടാഷ് എന്നിവയുടെ അളവ് ?

4. ചീരയിലെ കൂടുകെട്ടിപ്പുഴുക്കളെ തുരത്താൻ മാലത്തയോൺ 0 1% വീര്യത്തിൽ തളിച്ചുകൊടുത്താൽ മതിയാകും - ശരി/തെറ്റ്

5 ചീരയിൽ കാണപ്പെടുന്ന പ്രധാന കീടങ്ങളും രോഗങ്ങളും ഏതെല്ലാം?

6 കീട നിയന്ത്രണത്തിന് ഉപയോഗിക്കാവുന്ന ഒരു വേപ്പ് അധിഷ്ഠിത ഉൽപ്പന്നം

7 ഓരോ വിളവെടുപ്പിനു ശേഷം ഉടൻ തന്നെ 1% വീര്യത്തിൽ യൂറിയ തളിക്കുന്നത് ചീരയുടെ വിളവ് കൂട്ടാൻ സഹായിക്കുന്നു ശരി/തെറ്റ്

8 മഴക്കാലങ്ങളിൽ ചുവന്ന ചീര നടുന്നത് കഴിയുന്നതും ഒഴിവാക്കണം ശരി/തെറ്റ്

ചീര കൃഷിയിൽ കാർഷിക സർവ്വകലാശാല നിർദ്ദേശിക്കുന്ന സാങ്കേതിക വിദ്യകളുടെ ഉപയോഗം.

1 കൃഷിക്കായി ഉപയോഗിക്കുന്ന വിത്തിനം ഏത് ?

ഉപയോഗിക്കുന്ന വിത്തിനം	സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം

2 വിത്തളവ്

- 15 - 2 കിലോ ഗ്രാം ഒരു ഹെക്ടറിൽ എന്ന നിരക്കിലാണോ ഉപയോഗിക്കുന്നത് ? അതെ/അല്ല
- അതെ എങ്കിൽ ശുപാർശ ചെയ്ത രീതിയിൽ വിത്തളവ് ഉപയോഗിക്കുന്ന സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം

താഴെ പറയുന്നവ എത്ര അളവിൽ വിളകൾക്ക് നൽകുന്നു ?

ക്രമ നമ്പർ	വളം	അളവ്	സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം
3	കാലി വളം		
4	നൈട്രജൻ വളം		
5	ഫോസ്ഫേറ്റ് വളം		
6	പൊട്ടാഷ് വളം		

7 യൂറിയ 1% വീര്യത്തിൽ വിളവെടുപ്പ് കഴഞ്ഞ് തളിക്കാറുണ്ടോ ?

ഉണ്ടെങ്കിൽ യൂറിയ തളിക്കുന്ന സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം

8 ഇലതുന്നനെതിരെ 1 മില്ലി മാലത്തയോൺ 100 മില്ലി വെള്ളത്തിൽ എന്ന തോതിൽ കലക്കി തളിക്കാറുണ്ടോ ?

ഉണ്ടെങ്കിൽ കീടനിയന്ത്രണം നടത്തുന്ന സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം ?

കർഷകർ നേരിടുന്ന പ്രശ്നങ്ങൾ :

ക്രമ നമ്പർ	പ്രശ്നങ്ങൾ	വളരെപ്രധാനപ്പെട്ടത്	പ്രധാന	പ്രാധാന്യം കുറഞ്ഞത്
1	കൃഷിക്കാവശ്യമായ ഗുണമേന്മയുള്ളവിത്തുകളുടെ ലഭ്യതക്കുറവ്			
2	കൃഷിക്കാവശ്യമായവസ്തുക്കളുടെസമയബന്ധിതമായ ലഭ്യതക്കുറവ്			
3	രോഗകീടങ്ങളുടെ വ്യാപനം			
4	അത്യുൽപ്പാദന ശേഷിയുള്ള ചീര ഇനങ്ങളെപ്പറ്റിയുള്ള അറിവില്ലായ്മ			
5	കൃഷക്കാവശ്യമായവസ്തുക്കളുടെ അധികവില			
6	തൊഴിലാളി ക്ഷാമം			
7	വിജ്ഞാന വ്യാപനത്തിലുള്ള പോരായ്മ			
8	ചീരയിലെ നൂതനകൃഷിരീതികളെക്കുറിച്ചുള്ള അറിവില്ലായ്മ			
9	വായ്പാസൗകര്യങ്ങളുടെ ലഭ്യതക്കുറവ്			
10	വർദ്ധിച്ച കൂലി			
11	മൂലധന അപര്യാപ്തത			
12	ഉയർന്ന ഗതാഗത നിരക്ക്			
13	വിപണന മാർഗ്ഗങ്ങളുടെ ലഭ്യതക്കുറവ്			
14	ഉയർന്ന നാശോന്മുഖത			
15	ശേഖരണകേന്ദ്രങ്ങളുടെ ദൗർലഭ്യം			

APPENDIX - VI

കർഷകർക്കായുള്ള അഭിമുഖ പത്രിക.

തിരുവനന്തപുരം ജില്ലയിൽ

വള്ളിപ്പയർ കൃഷിയിൽ കേരള കാർഷിക സർവ്വകലാശാലയുടെ

സാങ്കേതിക വിദ്യയുടെ ഉപയോഗം

ബ്ലോക്ക്

പഞ്ചായത്ത്

പേര്

വിലാസം

1 വയസ്സ്

2 വിദ്യാഭ്യാസ യോഗ്യത

ക്രമ നമ്പർ	വിഭാഗം
1	നിരക്ഷരൻ
2	പ്രൈമറി വിദ്യാഭ്യാസം
3	ഹൈസ്കൂൾ വിദ്യാഭ്യാസം
4	ഹയർ സെക്കന്ററി സ്കൂൾ വിദ്യാഭ്യാസം
5	കോളേജ് വിദ്യാഭ്യാസം

3 വള്ളിപ്പയർ കൃഷിയിലുള്ള പരിചയം

4 വള്ളിപ്പയർ കൃഷി ചെയ്യുന്ന ഭൂമിയുടെ വിസ്തൃതി

5 വിജ്ഞാന വ്യാപനവുമായുള്ള ബന്ധം

ക്രമ നമ്പർ	വിഭാഗം	എപ്പോഴും	വല്ലപ്പോഴും	ഒരിക്കലുമില്ല
1	ഫീൽഡ് അസിസ്റ്റന്റ്			
2	അഗ്രികൾചറൽ അസിസ്റ്റന്റ്			
3	കൃഷിഓഫീസർ			
4	പുരോഗമന കർഷകർ			
5	സർവ്വകലാശാലാ ശാസ്ത്രജ്ഞർ			
6	മറ്റുള്ളവർ			

6. ശാസ്ത്രീയ അവബോധം.

ചുവടെ കൊടുത്തിട്ടുള്ള ഓരോ വാക്യത്തിനോടും എത്രമാത്രം താങ്കൾ യോജിക്കുന്നു അല്ലെങ്കിൽ വിയോജിക്കുന്നു എന്ന് വ്യക്തമാക്കുക

ക്രമ നമ്പർ	പ്രസ്താവന	SA	A	UD	DA	SDA
1	പുതിയ കൃഷിരീതികൾ പഴയവയെക്കാളും മെച്ചപ്പെട്ട ഫലം തരുന്നു					
2	പൂർവ്വികരുടെ കൃഷിരീതി-കളാണ് ഇന്ന് ഏറ്റവും കൂടുതൽ അനുയോജ്യമാ-യിട്ടുള്ളത്					
3	കൃഷിയുമായി വളരെയേറെ പരിചയമുള്ള കർഷകരും പുതിയ കൃഷിരീതികൾ ഉപയോഗിക്കേണ്ടതാണ്					
4	ഒരു നല്ല കർഷകൻ പുതിയ കൃഷിരീതികൾ സ്വീകരിക്കും					
5	കർഷകന് പുതിയ കൃഷിരീതികൾ പഠിക്കുവാൻ സമയം വേണ്ടിവരുമെങ്കിലും അതിന് അതിന്റേതായ ഗുണമുണ്ടാകും					
6	കർഷകന്റെ ജീവിതനിലവാരം മെച്ചപ്പെടുത്താൻ പഴയ കൃഷിരീതികൾ മാറേണ്ടതുണ്ട്					

SA ശക്തമായി സമ്മതിക്കുന്നു

A സമ്മതിക്കുന്നു

UD അഭിപ്രായമില്ല

DA വിസമ്മതിക്കുന്നു

SDA ശക്തമായി വിസമ്മതിക്കുന്നു

7. **നൂതന ആശയങ്ങളോടുള്ള ആഭിമുഖ്യം.**

താങ്കൾ എപ്പോഴാണ് നൂതന കൃഷി രീതികൾ പ്രാവർത്തികമാക്കുക ?

1 അറിവിൽപ്പെട്ട ഉടൻ

2 മറ്റു കർഷകർ അവരുടെ കൃഷിയിടങ്ങളിൽ വിജയകരമായി ഉപയോഗിക്കുമ്പോൾ

3 കാത്തിരുന്ന് എന്റെ തന്നെ സമയം എടുക്കുവാൻ താത്പര്യപ്പെടുന്നു

4 പുതിയ കൃഷിരീതികൾ പരീക്ഷിക്കുന്നതിൽ ഞാൻ തത്പരനല്ല

8. **ബഹുജന മാധ്യമങ്ങളുമായുള്ള ബന്ധപ്പെടൽ.**

ക്രമ നമ്പർ	ഉറവിടം	ആവർത്തന തോത്		
		എപ്പോഴും	വല്ലപ്പോഴും	ഒരിക്കലുമില്ല
1	റേഡിയോ			
2	ടെലിവിഷൻ			
3	വർത്തമാന പത്രം			
4	ബുള്ളറ്റിൻ			
5	കാർഷക മാസിക			
6	കിയോസ്ക്			
7	മൊബൈൽ ഫോൺ			
8	ഇന്റർനെറ്റ്			

9. **സാമ്പത്തിക പ്രചോദനം**

ചുവടെ കൊടുത്തിട്ടുള്ള ഓരോ വാക്യത്തിനോടും എത്രമാത്രം താങ്കൾ യോജിക്കുന്നു അല്ലെങ്കിൽ വിയോജിക്കുന്നു എന്ന് വ്യക്തമാക്കുക

ക്രമ നമ്പർ	പ്രസ്താവന	SA	A	UD	DA	SDA
1	കൂടുതൽ ഉൽപ്പാദനത്തിനും സാമ്പത്തിക നേട്ടത്തിനുമായി കർഷകൻ പ്രയത്നിക്കണം					
2	ഏറ്റവും കൂടുതൽ ലാഭമുണ്ടാ-ക്കുന്നകർഷകനാണ് ഏറ്റവും വിജയിയായ കർഷകൻ					
3	ഒരു കർഷകൻ ജീവിക്കാ-നുള്ളത് നിശ്ചയമായും സമ്പാദിക്കണംഎന്നാൽ ജീവിതത്തിലെ ഏറ്റവും പ്രധാനപ്പെട്ട സാമ്പത്തിക വാക്യങ്ങൾ വിവക്ഷിക്കാനാവില്ല					
4	ഒരു കർഷകൻ പുതിയ കാര്യങ്ങൾ പരീക്ഷിക്കണം ഇത് അദ്ദേഹത്തിന് കൂടുതൽ ലാഭം നേടാൻ സഹായിക്കും					
5	ഒരു കൃഷിക്കാരൻ ഗർഹികാ-വശ്യങ്ങൾക്കായും കൂടുതൽ ലാഭത്തിനായുംവള്ളിപ്പയർ കൂടുതലായി കൃഷി ചെയ്യണം					
6	കർഷകരുടെ മക്കൾക്ക് ജീവിതത്തിൽ ഒരു നല്ല തുടക്കം കുറിക്കാൻ സാമ്പത്തികസഹായം കൂടാതെ പ്രായോഗികമല്ല					

SA ശക്തമായി സമ്മതിക്കുന്നു A സമ്മതിക്കുന്നു

UD അഭിപ്രായമില്ല DA വിസമ്മതിക്കുന്നു

SDA ശക്തമായി വിസമ്മതിക്കുന്നു

10. നഷ്ട സാദ്ധ്യതാ അവബോധം

ചുവടെ കൊടുത്തിട്ടുള്ള ഓരോ വാക്യത്തിനോടും എത്രമാത്രം താങ്കൾ യോജിക്കുന്നു അല്ലെങ്കിൽ വിയോജിക്കുന്നു എന്ന് വ്യക്തമാക്കുക

ക്രമ നമ്പർ	പ്രസ്താവന	SA	A	UD	DA	SDA
1	ഒന്നോ രണ്ടോ വിളകൾ കൃഷി ചെയ്യുമ്പോൾ ഉള്ള അപകടം ഒഴിവാക്കുന്നതിനായി കർഷകൻ കൂടുതൽ വിളകൾ കൃഷി ചെയ്യണം					
2	നഷ്ട സാദ്ധത കുറഞ്ഞതും കുറച്ച് ലഭിക്കുന്നതുമായ ലാഭത്തിന് പകരമായി കർഷകൻ കൂടുതൽ മാറ്റത്തിന് തയ്യാറായാൽ കൂടുതൽ ലാഭം നേടാം					
3	കൂടുതൽ വെല്ലുവിളികൾ ഏറ്റെടുക്കാൻ തയ്യാറുള്ള കർഷകന് ഒരു ശരാശരി കർഷകനേക്കാൾ കൂടുതൽ സാമ്പത്തിക നേട്ടം ഉണ്ടാക്കാൻ സാധിക്കും					
4	വിജയസാദ്ധ്യത ഉറപ്പുണ്ടെങ്കിൽ കർഷകൻ വെല്ലുവിളികൾ ഏറ്റെക്കുന്നത് നല്ലതാണ്					
5	നൂതനമായ ഒരു കൃഷിരീതി സ്വീകരിക്കുന്നതിൽ നഷ്ട സാദ്ധ്യത ഉണ്ടെങ്കിലും ലാഭകരമാണ്					
6	കേരള കാർഷിക സർവ്വകലാശാല നിർദ്ദേശക്കുന്ന കൃഷിരീതികൾ കർഷകൻ തന്റെ ചുറ്റുപാടുള്ളവർ പ്രയോഗിച്ച് വിജയിച്ചിട്ടുണ്ടെങ്കിൽ മാത്രമേ സ്വീകരിക്കേണ്ടതുള്ളു					

വള്ളിപ്പയർ കൃഷിയെക്കുറിച്ചുള്ള അവബോധം

ക്രമ നമ്പർ	പ്രസ്താവന	താങ്കൾ ബോധവാനാണോ	
		അതെ	അല്ല
1	വിത്തിന്റെ അളവ് ശുപാർശ ചെയ്തിട്ടുണ്ട്എന്ന് അറിയാമോ?		
2	വിത്തിന്റെ വിളപരിപാലന അകലം ശുപാർശ ചെയ്തിട്ടുണ്ട്എന്ന് അറിയാമോ?		
3	കാലിവളം ഉപയോഗിക്കണം എന്നറിയാമോ?		
4	എൻ പി കെ വളങ്ങൾ ഉപയോഗിക്കണം എന്ന് അറിയാമോ?		
5	പയർ നടുന്നതിന് മുമ്പ് റൈസോബിയം ഉപയോഗിച്ച് വിത്ത് പരിചരണം നടത്താം എന്ന് അറിയാമോ?		
6	കുമ്മായം ഉപയോഗിക്കണം എന്ന് അറിയാമോ?		
7	കള നിയന്ത്രണത്തിന്റേയും ജലസേചനത്തി ന്റേയും സമയത്തെക്കുറിച്ചുള്ള അറിവുണ്ടോ?		
8	വള്ളിപ്പയറിൽ കാണുന്ന പ്രധാന രോഗ കീടങ്ങളെ കുറിച്ചുള്ള അറിവുണ്ടോ?		
9	പയറിന്റെ രോഗകീട നിയന്ത്രണ മാർഗ്ഗങ്ങൾ ശുപാർശ ചെയ്തിട്ട് എന്ന് അറിയാമോ?		
10	വള്ളിപ്പയറിൽ വികസിപ്പിച്ചെടുത്തിട്ടുള്ള അത്യുൽപ്പാദനശേഷിയുള്ള ഇനങ്ങൾ ഏതെല്ലാം എന്ന് അറിയാമോ?		

വള്ളിപ്പയർ കൃഷിയെക്കുറിച്ചുള്ള അറിവ്

1 വള്ളിപ്പയറിന് നിർദ്ദേശിച്ചിട്ടുള്ള വിത്തകലം എത്ര ?

2 വള്ളിപ്പയറിന് നിർദ്ദേശിച്ചിട്ടുള്ള വിത്തിന്റെ അളവ് എത്ര ?

3 റൈസോബിയം ഉപയോഗിച്ചുള്ള വിത്ത് പരിചരണത്തെക്കുറിച്ചുള്ള അറിവുണ്ടോ?

4 വള്ളിപ്പയറിൽ വികസിപ്പിച്ചെടുത്തിട്ടുള്ള അത്യുൽപ്പാദന ശേഷിയുള്ള ഒരിനം

5 വള്ളിപ്പയറിന് ആവശ്യമായിട്ടുള്ള എൻ പി കെ വളങ്ങളുടെ അളവ് എത്ര ?

6 വള്ളിപ്പയറിൽ പ്രധാനമായും ജലസേചനം നടത്തേ സമയം വിത്തു നട്ടു കഴിഞ്ഞ് 15 ദിവസത്തിനു ശേഷവും പൂവിടുന്ന സമയത്തുമാണ്- അതെ/അല്ല

7 ഫംഗൽ രോഗങ്ങളെ തടയാൻ മണ്ണിൽ ഒരു ശതമാനം വീര്യത്തിൽ ബോർഡോക്സ് മിശ്രിതം ചേർത്താൽ മതിയാകും - ശരി/തെറ്റ്

8 വള്ളിപ്പയറിൽ കാണപ്പെടുന്ന പ്രധാന രോഗങ്ങളും, കീടങ്ങളും ഏതെല്ലാം?

9 കീടനിയന്ത്രണത്തിന് ഉപയോഗിക്കാവുന്ന ഒരു വേപ്പ് അധിഷ്ഠിത ഉൽപ്പന്നവും അത് ഉപയോഗിക്കുന്ന രീതിയും വ്യക്തമാക്കുക

10 ഒരു ചുവന്ന പയറിനം ?

വള്ളിപ്പയർ കൃഷിയിൽ സാങ്കേതികവിദ്യകളുടെ സ്വീകാര്യത

1. കൃഷിക്കായി ഉപയോഗിക്കുന്ന വിത്തിനം ഏത് ?

ഉപയോഗിക്കുന്ന വിത്തിനം	സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം

2 കൃഷിക്കായി ഉപയോഗിക്കുന്ന വിത്തളവ് ?

വിത്തളവ്	സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം

3 കൃഷിക്കായി ഉപയോഗിക്കുന്ന വിത്തകലം?

വിത്തകലം	സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം

താഴെ പറയുന്നവ എത്ര അളവിൽ വിളകൾക്ക് നൽകുന്നു ?

നമ്പർ	വളം	അളവ്	സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം
4	കാലിവളം		
5	റൈസോബിയം (വിത്ത് പരിചരണം)		
6	നൈട്രജൻ വളങ്ങൾ		
7	ഫോസ്ഫാറ്റിക് വളങ്ങൾ		
8	പൊട്ടാസ്യം വളങ്ങൾ		

9 താഴെ പറയുന്ന കീടനിയന്ത്രണ മാർഗ്ഗങ്ങൾ ഉപയോഗിക്കാറുണ്ടോ ?

കീടം	നിയന്ത്രണ മാർഗ്ഗം	ഇല്ല	ഉണ്ട്	ഉണ്ടെങ്കിൽ കീടനിയന്ത്രണം നടത്തുന്ന സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം
മുഞ്ഞ	മാലത്തയോൺ 1 മി ലിറ്റർ 100 മി ലിറ്റർ വെള്ളത്തിൽ എന്ന തോതിൽ കലക്കി തളിക്കാറുണ്ടോ? OR ക്യൂനാല്ഫോസ് 0 05 മി ലിറ്റർ 100 മി ലിറ്റർ വെള്ളത്തിൽ എന്ന തോതിൽ കലക്കി തളിക്കാറുണ്ടോ ?			
കായ് തുരപ്പൻ	മാലത്തയോൺ 1 മി ലിറ്റർ 100 മി ലിറ്റർ വെള്ളത്തിൽ എന്ന തോതിൽ കലക്കി തളിക്കാറുണ്ടോ ?			

10 താഴെ പറയുന്ന രോഗ നിയന്ത്രണ മാർഗ്ഗങ്ങൾ ഉപയോഗിക്കാറുണ്ടോ ?

രോഗം	നിയന്ത്രണ മാർഗ്ഗം	ഇല്ല	ഉണ്ട്	ഉണ്ടെങ്കിൽ രോഗ നിയന്ത്രണം നടത്തുന്ന സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം
ആന്ത്രാക്നോസ്	തൈറാം 3 ഗ്രാം ഒരു കി ഗ്രാം വിത്തിൽ എന്ന അളവിൽ പുരട്ടി ഉപയോഗിക്കാറുണ്ടോ ?			
	തൈ രൂപപ്പെട്ടതിനു ശേഷം കാർബന്റാസിം 0 05 മില്ലി 100 മി ലിറ്റർ വെള്ളത്തിൽ കലക്കി 15, 30, 45 ദിവസ ഇടവേളകളിൽ തളിക്കാറുണ്ടോ ?			
വേര് ചീയൽ	ട്രൈകോടെർമ 4 ഗ്രാം ഒരു കി ഗ്രാം വിത്തിൽ പുരട്ടി ഉപയോഗിക്കാറുണ്ടോ?			

11 താഴെ പറയുന്ന വിത്ത് പരിചരണ മാർഗ്ഗങ്ങൾ ഉപയോഗിക്കാറുണ്ടോ ?

വിത്ത് പരിചരണ മാർഗ്ഗങ്ങൾ	ഇല്ല	ഉണ്ട്	പരിചരിച്ച വിത്തുകൾ നടുന്ന സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം
കാർബന്റാസിം 0 05 വീര്യത്തിൽ വിത്തിൽ പുരട്ടാറുണ്ടോ ?			
സ്യൂടോമോണാസ് 10 ഗാം ഒരു കി ഗ്രാം വിത്തിൽ പുരട്ടി ഉപയോഗിക്കാറുണ്ടോ?			

12 താഴെ പറയുന്ന മണ്ണ് പരിചരണ മാർഗ്ഗങ്ങൾ ഉപയോഗിക്കാറുണ്ടോ ?

മണ്ണ് പരിചരണ മാർഗ്ഗം	ഇല്ല	ഉണ്ട്	മണ്ണ് പരിചരണം നടത്തുന്ന സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം
വേപ്പിൻ പിണ്ണാക്ക് ഒരു ഹെക്ടറിൽ 20 കിലോ ഗ്രാം എന്ന നിരക്കിൽ മണ്ണിൽ ചേർക്കാറുണ്ടോ ?			

കർഷകർ നേരിടുന്ന പ്രശ്നങ്ങൾ :

ക്രമ നമ്പർ	പ്രശ്നങ്ങൾ	വളരെപ്രധാനപ്പെട്ടത്	പ്രധാന	പ്രാധാന്യം കുറഞ്ഞത്
1	കൃഷിക്കാവശ്യമായ ഗുണമേന്മയുള്ളവിത്തുകളുടെ ലഭ്യതക്കുറവ്			
2	കൃഷിക്കാവശ്യമായവസ്തുക്കളുടെസമയബന്ധിതമായ ലഭ്യതക്കുറവ്			
3	രോഗകീടങ്ങളുടെ വ്യാപനം			
4	അത്യുൽപ്പാദന ശേഷിയുള്ള വള്ളിപ്പയർഇനങ്ങളെപ്പറ്റിയുള്ള അറിവില്ലായ്മ			
5	കൃഷിക്കാവശ്യമായവസ്തുക്കളുടെ അധികവില			
6	തൊഴിലാളി ക്ഷാമം			
7	വിജ്ഞാന വ്യാപനത്തിലുള്ള പോരായ്മ			
8	വള്ളിപ്പയറിലെ നൂതനകൃഷിരീതികളെക്കുറിച്ചുള്ള അറിവില്ലായ്മ			
9	വായ്പാസൗകര്യങ്ങളുടെ ലഭ്യതക്കുറവ്			
10	വർദ്ധിച്ച കൂലി			
11	മൂലധന അപര്യാപ്തത			
12	ഉയർന്ന ഗതാഗത നിരക്ക്			
13	വിപണന മാർഗ്ഗങ്ങളുടെ ലഭ്യതക്കുറവ്			
14	ഉയർന്ന നാശോന്മുഖത			
15	ശേഖരണകേന്ദ്രങ്ങളുടെ ദൗർലഭ്യം			

APPENDIX – VII

PACKAGE OF PRACTICES RECOMMENDATIONS FOR AMARANTHUS AND VEGETABLE COWPEA

AMARANTH (*Amaranthus* spp.)

Amaranth is the most popular leafy vegetable of Kerala. It can be grown throughout the year Avoid sowing or planting of red leaved varieties during periods of heavy rain

Varieties

Red Kannara Local, Arun and Krishnasree

Green Co-1, Co-2, Co-3, Mohini and Renusree

Seed rate. 1 5 to 2 0 kg ha^{1}

Preparation of land

Prepare the land by ploughing or digging followed by levelling Then shallow trenches of width 30-35 cm are made 30 cm apart Well rotten FYM is mixed with soil in the trenches Transplant 20-30 day old seedlings in the shallow trenches at a distance of 20 cm in two rows During rainy season planting shall be done on raised beds

Manuring

Apply 50 tonnes of FYM per ha as basal dose before planting After preparing trenches, apply N P_2O_5 K_2O @ 50 50 50 kg ha^{1} Another 50 kg of N can be applied at regular intervals as top dressing Spraying 1 per cent urea immediately after each harvest will increase the yield

Plant protection

As far as possible, avoid use of insecticides or fungicides In severe cases of leaf webber attack, spray malathion 0 1 per cent or dust malathion 10 per cent DP

COWPEA (*Vigna unguiculata*)

Cowpea can be grown throughout the year under Kerala conditions It can be grown as a floor crop in coconut gardens and as an intercrop in tapioca during May-Sept It can be grown as a pure crop in single-crop and double-crop rice fallows during rabi and summer seasons Cowpea can be grown in homestead gardens throughout the year and in kole lands of Thrissur district during summer where rice crop cannot be raised due to water scarcity

Season

Cowpea can be grown during any season As a rainfed crop, sowing is done in the month of June The most suitable time is after the first week of June During the second crop season (rabi), *i e*, September to December, cowpea can be grown as a fringe crop along the rice field bunds Sowing can be done on either side of bunds on the day of transplanting the paddy crop During summer, cowpea can be grown as a pure crop in rice fallows after the harvest of paddy

Varieties

1 *Vegetable type*

(a) *Bushy* Bhagyalakshmy, Pusa Barsathi, Pusa Komal

(b) Semitrailing. Kairali, Varun, Anaswara, Kanakamony (PTB-1), Arka Garima.

(c) *Trailing type* Sharika, Malika, KMV-1, Lola, Vyjayanthi, Manjeri Local, Vyalathur Local, Kurutholapayar, Vellayani Jyothika

2 *Grain type*

C-152, S-488, Pusa Phalguni, P-118, Pusa Do Fasli, Krishnamony (PTB-2), V-240, Amba (V-16), GC-827, CO-3, Pournami (summer rice fallows) and Shubhra (suited for cultivation in rice fallows during summer season in southern districts of Kerala), Sreya and Hridya (Summer rice fallows of Onattukara)

3 *Dual purpose type* Kanakamony (PTB 1) and New Era

Seeds and Sowing

Seed rate

For vegetable type

Bush 20-25 kg ha^{1}

Trailing 4-5 kg ha^{1}

For grain and dual purpose type

Broadcasting	60-65 kg ha^{-1} (45 kg ha^{-1} for Krishnamony)
Dibbling	50-60 kg ha^{1} (40 kg ha^{-1} for Krishnamony)
Spacing	25 cm x 15 cm Dibbling two seeds per hole
Bush	30 cm X 15 cm
Trailing	2 m X 2 m (on pandal @ three plants per pit)

Sowing:

Soaking seeds in 500 ppm thiourea solution, followed by two sprays of thiourea (one at vegetative and another at flowering stage) increased the yield of cowpea by 26 per cent and net return by 50 per cent.

Seed inoculation and pelleting

Cowpea seeds should be inoculated with *Rhizobium* and pelleted with lime *Rhizobium* cultures are available from the Assistant Soil Chemist, Microbiological Laboratory, Soil Testing Centre, Pattambi 679 306, Palakkad District The strains that are available at Pattambi are the two isolates (No 11 and No 12) developed by the Kerala Agricultural University

Procedure for lime pelleting

1 Add finely powdered (300 mesh) calcium carbonate to moist fresh Rhizobium treated seeds and mix for 1-3 minutes until each seed is uniformly pelleted

Dependmg on the seed size, the following quantity of lime as required

Small seeds 1 0 kg/10 kg of seed

Medium sized seeds 0 6 kg/10 kg of seed

Large sized seeds 0.5 kg/10 kg of seed

2 Spread out the pelleted seeds on a clean paper to harden Sow them as soon as possible However, lime pelleted seeds can be stored up to one week in a cool place prior to sowing

Spacing

For gram type and dual-purpose type, if dibbling is adopted, spacing of 25 cm between rows and 15 cm between plants is recommended with two seeds per hole For bush vegetable type, spacing of 30 cm between rows and 15 cm between plants is suitable For semi-trailing varieties, provide a spacing of 45 x 30 cm Trailing varieties can be sown in pits (@ 3 plants/pit) at 2 x 2 m spacing for trailing on pandal or in channels at 1 5 m x 45 cm spacing for trailing on trellis If broadcasting is adopted, the seeds can be sown broadcast over the field and channels drawn after sowing

Sowing

Plough the land thoroughly 2-3 times and remove weeds and stubbles Make channels of 30 cm breadth and 15 cm depth at 2 m apart to drain off excess rainwater

Manuring

FYM 20 t ha^{-1}

Lime 250 kg ha^{-1} (or dolomite 400 kg ha^{-1})

N 20 kg ha^{-1}

P_2O_5 30 kg ha^{-1}

K_2O 10 kg ha^{-1}

Lime may be applied at the time of the first ploughing Half the quantity of nitrogen, whole of phosphorus and potash may be applied at the time of final ploughing The remaining nitrogen may be applied 15-20 days after sowing

Aftercultivation

Hoeing at the time of application of the second dose of nitrogen will give adequate aeration to the soil and help the root system to spread easily For grain and dual-purpose varieties, decapitation is found to be advantageous as the crop shows trailing tendency For vegetable types, provide trellis or pandal for trailing

Irrigation

Giving two irrigations is highly beneficial, *i e* , at 15 days after sowing and at the time of flowering Irrigation at the flowering stage induces better flowering and pod set.

Plant protection

The fungus *Fusarium pallidoroseum* can be used for controlling black pea aphid Bran based fungus can be applied at the rate of 3 kg per 400 m^2 immediately after infestation is observed One application is sufficient

Anthracnose of cowpea *(Colletotrichum lindemuthianum)* causes water soaked lesions on leaves, which later become brown and enlarge to form circular spots The infection may spread to the petiole and young stem also Petiole infection results in defoliation Anthtracnose can be managed with seed treatment with Thiram @ 3g/kg of seed followed by Carbendazim spray @ 0 05 per cent at 15, 30 & 45 days after seedling emergence

Dry root rot of cowpea *(Macrophomina phaseolina)* infected plant suddenly wilts and dies The bark of the root and basal stem becomes fibrous The disease appears in patches and become severe during dry periods Dry root rot can be managed by seed treatment with *Trichoderma viride* @ 4g/kg of seed or Carbendazim 0 05 per cent of seed or *Psuedo-monas fluorescens* @ 10g/kg of seed or neem cake soil application @ 20 kg ha^{1}

Spray malathion (0 1 per cent) or quinalphos (0 05 per cent) for controlling pea aphids Spray carbaryl 0 2 per cent to protect the crop from pod borers Repeat the application, if infestation persists Apply the insecticides after harvesting mature pods and pick the pods only 10 days after the application of insecticides

IPM package against major pests of cowpea

1 Burning of trash before sowing

2 Selecting healthy seeds

3 Clean cultivation

4 Soil drenching with Bordeaux mixture1 per cent wherever fungal diseases are prevalent.

5 Treating the seeds with rhizobium culture @ 250 to 375 g ha^{-1} before sowing

6. Monitoring the field for incidence of pests/population of natural enemies especially at flowering stage (for *Aphis craccivora*, epilachna beetles and pod borers) and at pod formation stage for pod bugs

7 Adoption of mechanical methods of pest control such as application of ash at 10 DAS, keeping yellow sticky trap/yellow pan tray, collection and destruction of infested leaves, flower buds and pods and sweeping and destruction of the pests

8 Collection and release of potential natural enemies *viz*, grubs and adults of *Coccinella transversalis,Cheilo menes sexmaculatus,Harmonia octo maculata* and maggots of *Ischiodon scutellare*

9 Need based application of *F pallido-roseum* @ $7x10^6$/ml specifically for the management of *Aphis craccivora*

10 Need based application of neem kernel suspension (NKS) 5 per cent or chlorpyriphos 0.05 per cent at 45 DAS in the case of moderate incidence of *A craccivora*, pod borers and a second spray using NKS 5 per cent at 60 DAS if needed against pod borers and pod bugs Spraying quinalphos 0 03 per cent at 60 DAS in the field along with treatment in storage with dried powdered rhizome of Vayambu *(Acorus calamus)* 0 1kg/100kg seed

Spray 1per cent Bordeaux mixture in early stages to protect the crop from fungal diseases For protecting the crop from anthracnose, treat the seeds with carbendazim (0 05 per cent) and spray the crop with Bordeaux mixture 1 per cent or carbendazim 0 05 per cent

TECHNOLOGY UTILIZATION OF KAU PRACTICES OF AMARANTHUS AND VEGETABLE COWPEA IN THIRUVANANTHAPURAM DISTRICT

by

ANJU. K. K.

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ABSTRACT

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MASTER OF SCIENCE IN AGRICULTURE

Faculty of Agriculture

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ABSTRACT

The study entitled 'Technology utilization of KAU practices of amaranthus and vegetable cowpea in Thiruvananthapuram district' was conducted with the objective to study the extent of awareness, knowledge and adoption of KAU varieties and selected recommended practices of amaranthus and vegetable cowpea and their relationship with selected socio - psychological and economic characteristics of commercial vegetable growers in Thiruvananthapuram district and also to identify the constraints in the adoption of KAU varieties and recommended practices, if any and bring out suggestions for refinement of technologies

Ninety farmers engaged in commercial cultivation of amaranthus and vegetable cowpea were selected through three stage random sampling procedure The study was conducted in Kalliyoor, Kazhakoottam and Pullampara panchayats of Nemom, Kazhakoottam and Vamanapuram blocks respectively of Thiruvananthapuram district in Kerala Ten independent variables were selected based on judges' relevancy rating The dependent variables for the study were awareness, knowledge and adoption Constraints in the adoption of KAU varieties and selected recommended practices were recorded as perceived by the amaranthus and vegetable cowpea growers For refinement of technologies, the suggestions made by the Agricultural Officers, farmer respondents and Agricultural experts were included

The results of the study revealed that majority of the amaranthus growers and vegetable cowpea growers belonged to the middle age category, were literate and had high experience in vegetable cultivation Majority of the farmers belonged to medium category in the case of area under cultivation, risk orientation, contact with extension agency, scientific orientation, innovativeness, mass media exposure and economic motivation

Majority of the respondents had medium level of awareness (55 86 % for amaranthus growers and 88 89 % for vegetable cowpea growers), knowledge (68 89

% for amaranthus growers and 73 33 % for vegetable cowpea growers) and adoption (60 00 % for amaranthus growers and 57 78 % for vegetable cowpea growers) In the case of commercial amaranthus growers, contact with extension agency, scientific orientation, innovativeness and mass media exposure were found to be significantly and positively related to awareness, knowledge and adoption While in the case of commercial vegetable cowpea growers, education, scientific orientation and innovativeness were found to be significantly and positively related to awareness, knowledge and adoption Major constraints perceived by the farmers were prevalence of pest and diseases followed by lack of sufficient quantity of good quality seeds and high labour charges The suggestions given for refinement of the technology include development of a package of practices recommendations for direct sown amaranthus, development of an amaranthus variety which is resistant to leaf blight, and refinement of package of practices recommendations for vegetable cowpea

From the present study, it is concluded that the technology utilization of KAU practices of amaranthus and vegetable cowpea in Thiruvananthapuram district was high in the adoption of KAU varieties Adoption of other recommended KAU practices of amaranthus and vegetable cowpea can be increased by providing them proper awareness and training which would help the farmers in improving the production

സംഗ്രഹം

"തിരുവനന്തപുരം ജില്ലയിൽ ചീര, വള്ളിപ്പയർ എന്നിവയുടെ കൃഷിയിൽ കേരള കാർഷിക സർവ്വകലാശാലയുടെ സാങ്കേതിക വിദ്യയുടെ ഉപയോഗം" എന്ന ഗവേഷണ പഠനം ജില്ലയിലെ 3 പഞ്ചായത്തുകളായ കല്ലിയൂർ, കഴക്കൂട്ടം, പുല്ലമ്പാറ എന്നിവിടങ്ങളിൽ വാണിജ്യാടിസ്ഥാനത്തിൽ കൃഷി ചെയ്യുന്ന 45 വീതം ചീര കർഷകരിലും വള്ളിപ്പയർ കർഷകരിലും നടത്തുകയുണ്ടായി ഓരോ പഞ്ചായത്തിൽ നിന്നും 15 വീതം ചീരകർഷകരേയും വള്ളിപ്പയർ കർഷകരേയും തിരഞ്ഞെടുത്താണ് പഠനം നടത്തിയത്

കേരള കാർഷിക സർവ്വകലാശാല നിർദ്ദേശിച്ചിട്ടുള്ള ചീര, വള്ളിപ്പയർ ഇനങ്ങളെക്കുറിച്ചും ഈ വിളകളിൽ നിർദ്ദേശിച്ചിട്ടുള്ള കൃഷി രീതികളെക്കുറിച്ചും കർഷകരിലുള്ള അവബോധം, അറിവ്, പ്രയോഗത്തിലെ സ്വീകാര്യത, ഇവ വാണിജ്യാടിസ്ഥാനത്തിൽ കൃഷി ചെയ്യുന്നവരുടെ തിരഞ്ഞെടുക്കപ്പെട്ട സാമൂഹിക - മനശ്ശാസ്ത്ര- സാമ്പത്തിക ഘടകങ്ങളുമായുള്ള ബന്ധം, ഇവ സ്വീകരിക്കുന്നതിൽ കർഷകർ നേരിടുന്ന പ്രശ്നങ്ങൾ മനസ്സിലാക്കുക, കർഷകർക്ക് പ്രയോജനപ്രദമാകും വിധം സാങ്കേതിക വിദ്യകളിൽ മാറ്റത്തിനു വേണ്ട നിർദ്ദേശങ്ങൾ വരുത്തുക എന്നിവയാണ് ഈ ഗവേഷണ പഠനം കൊണ്ട് ഉദ്ദേശിക്കുന്നത്

ചീര, വള്ളിപ്പയർ കർഷകരുടെ കാര്യത്തിൽ ഭൂരിപക്ഷം പേർക്കും അവബോധം 55 86% (ചീര കർഷകർ), 88 89% (വള്ളിപ്പയർ കർഷകർ) എന്നീ ക്രമത്തിലും 68 89% (ചീര കർഷകർ), 73 33% (വള്ളിപ്പയർ കർഷകർ) എന്നീ ക്രമത്തിലും പ്രയോഗത്തിലെ സ്വീകാര്യത 60% (ചീര കർഷകർ), 57 78% (വള്ളിപ്പയർ കർഷകർ) എന്നി ക്രമത്തിലും ഇടത്തരം നിലവാരം പുലർത്തുന്നവരാണ് ചീര കർഷകരിൽ വിജ്ഞാന വ്യാപനവുമായുള്ള ബന്ധം, ശാസ്ത്രീയ അവബോധം, നൂതന ആശയങ്ങളോടുള്ള ആഭിമുഖ്യം, ബഹുജന മാധ്യമങ്ങളുമായുള്ള ബന്ധപ്പെടൽ എന്നിവ കൃഷിരീതികളെക്കുറിച്ചുള്ള അവബോധം, അറിവ്, പ്രയോഗത്തിലെ സ്വീകാര്യത എന്നിവയെ നേരിട്ട്

സ്വാധീനിച്ചപ്പോൾ വള്ളിപ്പയർ കർഷകരിൽ വിദ്യാഭ്യാസം, ശാസ്ത്രീയ അവ ബോധം, നൂതന ആശയങ്ങളോടുള്ള ആഭിമുഖ്യം എന്നിവയാണ് കൃഷിരീ തികളെക്കുറിച്ചുള്ള അവബോധം, അറിവ്, പ്രയോഗത്തിന്റെ സ്വീകാര്യത എന്നി വയെ നേരിട്ട് സ്വാധീനിച്ചു

രോഗ കീടങ്ങളുടെ വ്യാപനം, ഗുണ മേന്മയുള്ള വിത്തുകളുടെ ലഭ്യത ക്കുറവ്, വർദ്ധിച്ച കൂലി എന്നിവയായിരുന്നു കർഷകർ നേരിട്ട പ്രധാന പ്രശ്ന ങ്ങൾ സസ്യ ആരോഗ്യ ക്ലിനിക്കുകൾ സ്ഥാപിക്കുക, പ്രഖ്യാപിത ഗുണ നില വാരമുള്ള നടീൽ വസ്തുക്കൾ ലഭ്യമാക്കുക, യന്ത്രവൽക്കരണം മുതലായ വയിലൂടെ ഈ പ്രശ്നങ്ങൾ ഒരു പരിധിവരെ പരിഹരിക്കാം

ചീര, വള്ളിപ്പയർ എന്നിവയുടെ കൃഷിരീതികളുടെ പ്രയോഗത്തിലെ സ്വീകാര്യത വർദ്ധിപ്പിക്കുന്നതിനായി കേരള കാർഷിക സർവ്വകലാശാലയുടെ പാക്കേജ് ഓഫ് പ്രാക്ടീസസിൽ ചില അനിവാര്യ മാറ്റങ്ങൾ കൊണ്ടു വരേ ണ്ടതുണ്ട് കൂടാതെ ഇലപ്പുള്ളി രോഗത്തിനോട് പ്രതിരോധ ശേഷിയുള്ള ചീര യുടെ പുതിയ ഒരിനവും വികസിപ്പിച്ചെടുക്കേണ്ടിയിരിക്കുന്നു

തിരുവനന്തപുരം ജില്ലയിൽ വാണിജ്യ അടിസ്ഥാനത്തിൽ ചീര, വള്ളിപ്പയർ എന്നീ കൃഷിയിൽ കേരള കാർഷിക സർവ്വകലാശാല നിർദ്ദേശി ച്ചിട്ടുള്ള സാങ്കേതിക വിദ്യ പ്രയോഗങ്ങളിൽ സർവ്വകലാശാലയുടെ ഇനങ്ങ ളുടെ ഉപയോഗമാണ് മുന്നിട്ടു നിന്നത് കർഷകർക്ക് ശരിയായ അവബോധ വും, പരിശീലനവും നൽകുന്നതു വഴി സർവ്വകലാശാല നിർദ്ദേശിച്ചിട്ടുള്ള കൃഷി രീതികളുടെ പ്രയോഗത്തിലെ സ്വീകാര്യത വർദ്ധിപ്പിക്കാൻ സാധിക്കും