

**CONSTRAINT ANALYSIS OF FARMING ON HOUSE TERRACE AND
DISTRIBUTION OF GROW BAGS**

by

BINSA.B

(2014-11-224)

THESIS

**Submitted in partial fulfillment of the
requirement for the degree of**

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**DEPARTMENT OF AGRICULTURAL EXTENSION
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VELLAYANI, THIRUVANANTHAPURAM-695 522
KERALA, INDIA**

2018

DECLARATION

I hereby declare that this thesis entitled '**Constraint analysis of farming on house terrace and distribution of grow bags**' is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar title of any other university or society

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CERTIFICATE

Certified that this thesis entitled '**Constraint analysis of farming on house terrace and distribution of grow bags**' is a record of research work done independently by Mrs. Binsa. B (2014-11-224) under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to her.

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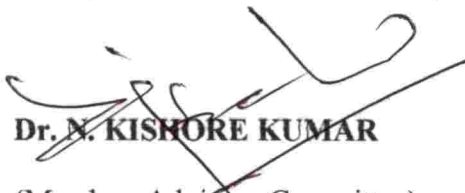
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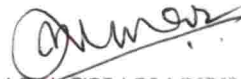
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Binsa.B

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LIST OF SYMBOLS AND ABBREVIATIONS USED

SYMBOLS	ABBREVIATIONS
%	Per cent
Q	Quartiles
μ	Mean
SD	Standard Deviation
@	At
NS	Non Significant
<i>et al.</i>	Co-workers
KAU	Kerala Agricultural University
VFPCK	Vegetable and Fruit Promotion Council – Keralam
SHM	State Horticulture Mission
KIIDC	Kerala Irrigation and Infrastructure Development Corporation
ACS	Average Choice Score

INTRODUCTION

1. INTRODUCTION

As the population of world has crossed over 7.5 billion nations are finding difficult to feed them. In India, the per capita availability of food grain is 510gm/day (Kalidas, 2016). Kerala which occupies only 1% of total area having a large population is facing extreme difficulty to feed its 34.8 million populations. Per capita availability of land in Kerala is only 0.13 ha. For our staple food, vegetables, milk etc. we depend on our neighbouring states. But the shocking incidence of malignancy due to high incidence of chemicals in fruits and vegetables forced us to think of at least our own vegetable cultivation on all available land including house terraces. It will utilize the small space effectively for agricultural practices. This will result in the organic production of vegetables, which is most relevant today, because of the high influence of pesticides and other toxics in the food.

Since the vegetables are ensuring the quantitative as well as qualitative (supply vitamins and minerals) needs of an individual, it is essential to ensure the availability of vegetables throughout the year even in processed forms (Metha *et al.*, 2002). For that vegetable production should be increased to meet the needs of the increased population.

Farming on house terrace is fast growing today among the city dwellers, which include not only vegetable cultivation but also poultry rearing, azolla cultivation, vermi composting etc. It is considered as one of the healthy hobbies to keep one happily engaged. This practice will also facilitate better space and resource utilization, household waste disposal, reduction in family expenditure, reduced pests and disease incidence, access to fresh and safe food products (Padmanabhan and Swadija, 2003).

Horticulture therapy is a method of healing many inborn as well as acquired diseases by involving the patients in different steps of cultivation of

vegetables as well as ornamentals. Such involvement in various activities will help to gain mental as well as physical confidence, which will help them to overcome the difficulties. The farming on house terrace is one of the base avenues where horticultural therapy can be practiced (Jules, 1986).

One of the major problems in urban areas is the management of solid waste and the disposal of waste water. Farming on house terrace is a great solution for this, which will convert these wastes into manures for the crops. Quality compost can also fetch good prices in the market. Waste water can be effectively used for irrigating the terrace garden, which will also act as manure.

In Kerala, there are lot of initiatives from Directorate of Environment and Climate Change, Kerala Irrigation and Infrastructure Development Corporation, State Horticulture Mission etc. to support and encourage the farming on house terrace in the form of men and material. Still people are facing a lot of constraints in this field. The present investigation is therefore taken up to analyze the constraints in farming on house terraces including the distribution of grow bags. The results of the study will help in eliminating the bottlenecks in the present set up of farming on house terraces and help the planners, policy makers and administrators to further strengthen the farming on house terraces. Specific objectives of the study are the following:

1. To identify the constraints in farming on house terraces and in the distribution of grow bags by the respondents
2. To study the consumption pattern of vegetables by urban families.
3. To assess the knowledge of the respondents in farming on house terrace
4. To assess the training need of respondents in farming on house terraces.
5. To study the profile characteristics of the respondents
6. To study the relationship between the selected profile characters and the selected other variables.

7. To study the perception of extension officials regarding the farming on house terraces

Scope of the study

The heuristic action mode to be employed in the generation of primary data regarding the participation of urban households in farming on house terrace would provide valid and scientific data on various aspects.

Limitation of the study

The study was conducted in selected seven wards of Thiruvananthapuram Corporation with 105 farmers, 15 extension officials and 30 office bearers of residents associations as respondents, and hence the findings of the study have limited scope of generalization. Also the data collected from the respondents may or may not be free from their biases and pre-conceptions. Within these limitations, sincere efforts have been taken by the researcher to make the study fruitful and systematic in order to attain the objectives of the study.

Presentation of the study

The report of the study has been given under five chapters. The first chapter deals with introduction, which includes the statements of problem, the objectives, the scope and the limitation of the study, are discussed. The second chapter deals with the review of studies related to the present study. The third chapter covers the methodology used in collecting the data and the further analysis. The fourth chapter deals with the result of the study and also discussion on the result in detail. The fifth and the final chapter present the summary of the study and the suggestions for the future research. The references, appendices and abstract of the thesis are given at the end.

REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

Review of the existing literature is very much essential since it provides a firm foundation for scientific investigation. It will help for the better understanding of the present study and will provide ideas for the interpretations of the findings. An extensive study on previous studies related to the field of the present investigation is an essential condition for the formation of hypothesis.

The collected literature relevant to the topic is presented in the following order.

2.1 Constraints

2.1.1 Classification of constraints

2.1.2 Constraints in agricultural production and technology

2.2 Urban agriculture

2.2.1 Farming on house terrace

2.2.2 Grow bag distribution

2.3 Consumption pattern of vegetables

2.4 Knowledge in farming on house terrace

2.5 Training need of respondents

2.6 Profile characteristics

2.7 Perception

2.1 CONSTRAINTS

2.1.1 Classification of constraints

Classification of constraints into several categories will be helpful to understand easily about the problems and difficulties faced by the respondents and to find better solutions for that.

Panghal et al. (1994) classified constraints into four categories, which are pertaining to inputs, to production, to marketing and to technical guidance.

Anonymous (2003) classifies the constraints of crop diversification into production constraints, technological constraints and marketing constraints.

Production constraints are the restraining factors which limit the production of vegetables and include factors like non availability of new and improved varieties, high cost of planting materials and other inputs etc.

Technological factors implies to the restraining factors which limits the adoption of improved production practices and includes lack of suitable production technologies and infrastructure facilities , absence of practical training etc.

Marketing constraints refers to the restraining factors which limit the respondents to obtain profit through the sales of products and it includes unauthorized marketing channel, lack of market demand etc.

In the present study, the constraints are classified into the constraints faced by the respondents in farming on house terrace and constraints faced by the respondents in distribution and usage of grow bag.

2.1.2 Constraints in agricultural production and technology

Anantharaman (1991) reported that cassava cultivation has certain constraints such as uncertainty in resource mobilization, production and marketing, shortage of labour during peak periods, and lack of timely and accurate information.

John (1991) reported that pepper cultivation has some constraints such as lack of government agency assistance for providing better guidance for farmers which results in the lack of knowledge and awareness.

Janadevan (1993) reported that major constraints faced by coconut farmers are high cost and non availability of labourers in time, lack of adequate financial assistance and timely supply of inputs.

Bhaskaran and Sushama (1994) reported that transfer of agricultural technologies in Kerala have some constraints such as lack of infrastructural facilities and functional linkages among the research, extension and farmers and inadequate training for farmers.

Sindhu (1995) reported that insufficient availability of good quality planting materials and technologically advanced infrastructure, lack of technical expertise and transporting facilities are the major constraints in capital intensive industry.

Bonny and Prasad (1996) reported that inadequate market facility is the most important constraint experienced in commercial vegetable cultivation.

Rodolfo (1996) reported that non availability of labourers during peak season as the major constraints faced by the respondents in the study.

Alagirisamy (1997) reported that the major constraints faced by the vegetable farmers are fluctuations in market price, inadequate supply of inputs and credit facilities, non availability of labour in time, incidents of pests and diseases etc.

Sivaprasad (1997) reported that lack of marketing facilities and assured price, non availability of credit as the major problems in sericulture enterprise.

Sherief (1998) reported that homegarden has lack of technical knowledge and credit facilities, low yield, high cost of labour and organic inputs, incidence of pests and diseases, etc. as the major constraints.

Thomas (1998) observed that during waste land development programme implementation, inadequate financial assistance and training, non availability of quality inputs, political interference were the major constraints.

Miller (2001) reported that the main constraints to expanding home gardens to fields for increasing productivity and income are the lack of adequate germplasm and soil fertility, risk of accidental fires and survival of seedlings in the dry season.

Resmy et al. (2001) reported that lack of technical knowledge and better information sources are the major constraints among coconut as well as banana growers.

Ongusumi et al (2002) reported that cowpea growers have some constraints that are non availability of financial assistance and transportation facilities and lack of market information

Thomas (2004) stated that major constraint in home garden is the lack of better marketing facilities where surplus cannot be marketed.

Singh (2004) stated some severe constraints such as the rainfall, drought, lack of technical knowledge and financial availability and low price of produce.

Thangaraja (2008) reported that fluctuations in the market price and high cost of labourers are the major constraints perceived by the respondents.

Pandit and Basak (2013) reported that the major constraints in commercial cultivation of vegetables like price fluctuation of vegetables in the market, which is faced by the farmers will adversely affect the vegetable production.

Anupama (2014) reported that the major constraint of the organic vegetable growers was the pest and disease attack.

Kumari and Laxmikant (2016) reported that the major constraint of beekeepers was the highest incidence of diseases and other hazards like bee pests.

2.2 URBAN AGRICULTURE

Mougeot (2000) reported that urban agriculture is an industry which is located within a city or metropolis which will help in the widening of city processes and distribution of different food and non-food products.

Huq *et al.* (2007) reported urban agriculture as an application of integrated approach which will consider the use of techno-socio-ecological combination measures to the climate change risks by building resilient urban spaces.

World Bank (2008) stated that growth originating from agriculture in reducing poverty is twice operative than that from other fields.

Barker (2009) reported that civilizations and cities are arises due to agriculture and agriculture is a prerequisite for survival.

Corrigan (2011) stated that urban agriculture is a solution for food insecurity for food insecure areas

Paneerselvam *et al.* (2014) defined urban agriculture as a practice of producing, processing and distributing food materials in or around a city.

Warren *et al.* (2015) summarizes that urban agriculture is an important practice which has the potential to ensure better livelihood by enhancing food and nutritional security through different mechanisms.

FAO (2016) reported urban agriculture as a method within or around the town for household food security, increasing freshness and for offering employment opportunities.

2.2.1 Farming on house terrace

Padmanabhan and Swadija (2003) reported that urban families can utilize their little space for cultivation by farming on house terrace which will provide fresh and safe vegetables by utilizing household biowastes and family labour.

Padmanabhan and Swadija (2003) reported that house terrace farming includes not only vegetable cultivation but also poultry rearing, azolla cultivation, and vermicomposting etc which will facilitate better space and resource utilization, household waste disposal, reduction of family expenditure, reduced pests and disease incidence, access to fresh and safe food.

Sreedaya (2004) reported that after involving in house terrace vegetable cultivation by utilizing household bio-waste and family labour, the health consciousness of urban house-wives improved to a great extent.

Sreedaya (2004) reported that the urban housewives were anxious about the pest and disease incidence, availability of inputs and about the safety of their house terrace, even though they are interested in house terrace cultivation of vegetables.

Sherief (2006) reported that terrace crops should be protected from pests and diseases without using chemical pesticides but using biological methods like biopesticides and traps, which will ensure safe products from terrace cultivation.

Sindhu (2009) reported that farming on house terrace was a good exercise, which would change the micro climate.

Vinu (2013) reported that fodder grass can also be cultivated on house terraces and new technologies and models regarding the terrace fodder cultivation are developed by Kannur KVK.

VFPCCK (2014) reported that urban homestead farming helps to utilise the recycled household waste efficiently for cultivation of crop through vermicomposting

Padmanabhan and Swadija (2015) reported that integration of various activities along with vegetable cultivation on house terraces have symbiotic and synergistic relationship among themselves.

2.2.2 Grow bag distribution

Padmanabhan and Swadija (2004) reported that plastic sacks, especially fertilizer sacs, are better than earthen pots for vegetable cultivation.

Sreedaya (2004) reported that fertilizer sacs are good for farming on house terrace.

Sindhu (2009) reported that grow bags have been a key attraction for the urban population for farming on house terrace. These bags are ideal for growing plants in limited space.

Roll staff (2010) reported that those who are having less space for cultivation, container gardening is a better solution.

Vinu (2013) reported that cultivation of fodder grass in grow bags on house terraces was more comfortable.

Shamsudin *et.al* (2014) reported that container gardening on a deck or patio can add color and ambiance to outdoor sitting areas

VFPCCK (2014) reported that grow bags with seedlings are ideal for terrace farming and growing plants in limited space.

FAO (2016) reported that urban gardens using containers are effective because of the possibility to conserve both soil and water as containers, which prevent run off of soil and excessive watering.

2.3 CONSUMPTION PATTERN OF VEGETABLES

Beegum (1991) reported that the vegetables are good source of water and minerals which helps to maintain acid – base balance in the body.

Swaminathan (1993) reported that green leafy vegetables are good source of carotene, ascorbic acid and calcium and beans and peas are good source of proteins.

Manson (1994) reported that those who consume more fruits and vegetables will have lower risk of getting heart stroke when compared to others.

Rajaya (1995) reported that processed fruits and vegetables production is increased in the years 1992-93 and 1993-94.

Epsy (1997) reported that the human resources are important for a nation. Healthy people will ultimately contribute to a healthier economy.

Ajitha (2000) reported that daily consumption of vegetables by the senior citizens in urban areas are more than in rural areas, but vice versa in the case of roots and tubers.

Bhattacharya (2001) reported that safe and nutritious food, physical and economic access to food at all time etc will result in food security.

Charanjit and Kapoor (2002) reported about the mistake in the theory that the processed foods are less healthy than fresh fruits and vegetables. It was said that processed fruits and vegetables have equivalent qualities.

Padmanabhan and Swadija (2003) reported that urban families can utilize their little space for cultivation by farming on house terrace which will provide fresh and safe vegetables.

Sreedaya (2004) stated that majority of the urban house wives had a good increase in the consumption of vegetables after starting farming on house terrace.

Sherief (2006) reported that farming on house terrace would change the consumption behaviour of urban households.

Ward (2013) stated that slum dwellers in the city of Cuttack, depend on organic vegetable cultivation to satisfy their dietary requirements.

Padmanabhan and Swadija (2015) reported that farming on house terrace would enhance the food security by ensuring safe and eco-friendly vegetable production and consumption.

Warren *et al.* (2015) summarizes that urban agriculture has the potential to ensure better vegetable production, thereby enhancing food and nutritional security through different mechanisms.

2.4 KNOWLEDGE

Ray (1991) stated two additional types of knowledge such as how-to-knowledge and principles knowledge in innovation process.

Sreedaya (2000) reported that KHDP farmers have more knowledge than those of IVDP about different aspects of vegetable cultivation.

Parvathy (2000) reported that the level of knowledge of women about various development programmes is increased due to training

Gandhi (2002) reported that vegetable growers of Karnataka have high knowledge level on IPM of tomato.

Jaganathan (2004) reported that majority of the vegetable growers of Kerala had medium level of knowledge regarding the organic agricultural practices.

Naik (2012) stated that 50% of the onion growers of Karnataka had medium level of knowledge regarding the agricultural practices of onion.

Tulsiram (2012) reported that majority of the sweet orange growers of Maharashtra had medium level of knowledge regarding the adoption of recommended cultivation practices.

Pandit and Basak (2013) stated that majority of the commercial vegetable growers (65.5%) had medium level of knowledge on vegetable production.

Hanjabam (2013) summarized that majority of the precision farmers had medium level of knowledge regarding precision farming.

Anupama (2014) reported that majority of the organic vegetable growers had medium level of knowledge regarding organic vegetable cultivation.

Manoj and Vijayaragavan (2014) reported that the farmer participation in FFS has helped them in the increase of knowledge regarding integrated nutrient management, water management and seed management.

Sebastian (2015) reported that majority of the home garden farmers had medium level of knowledge regarding horizontal and vertical diversifications for the economically dominant crops in home gardens.

Anju (2016) reported that majority of amaranthus growers (68.89%) and vegetable cowpea growers (73.33%) had medium level of knowledge regarding KAU varieties and selected recommended practices.

2.5 TRAINING NEED

Training need was operationally defined as the perceived level of training need for farming on house terrace by the urban households of selected wards of Thiruvananthapuram Corporation.

Syamkumar (1999) reported that training has an important role in extension intervention for sustaining rice production in Kerala.

Parvathy (2000) reported that the level of knowledge of women about various development programmes is increased due to training.

Kullayappa *et al.* (2008) reported that majority (43.34%) of the groundnut farmers had medium level of training needs followed by high (29.33%) and low (27.33%) level of training needs.

Khandare *et al.* (2009) reported that majority (55.84%) of the cotton growers had medium level of training needs of plant protection technologies of cotton.

Mande and Nimbalkar (2010) noticed that majority (58.00%) of the farm women needed medium level of training, while 30.00 percent and 11.23 per cent needed high and low training respectively in post harvest technologies.

Nitnaware *et al.* (2010) observed that majority (72.00%) of dairy owners had medium training needs in dairy farm followed by 13.33 per cent and 14.66 per cent dairy owners with low and high level of training needs respectively.

Singh *et al.* (2012) reported that majority (56.67%) of the cotton farmers had high training needs, followed by medium (22.50%) and low (20.83%) level of training.

Verma *et al.* (2013) summarized that majority of the marigold growers (61.66%) had medium level of training need, while 20.00 per cent and 18.34 per cent of the marigold growers had high and low level of training needs respectively.

Bhise and Kale (2014) reported that majority (39.00%) of the onion growers had medium level of training needs, followed by low level (35.00%) and high level of training needs (26.00%).

Pandya *et al.* (2014) observed that majority of the farm women prefer to receive training on specific areas like profitable farming of field crops, family health and hygiene and storage of food grains and pulses.

Kumari and Laxmikant (2016) reported that the training needs of beekeepers were highest in diseases and other hazards and protection of bee pests (85.83%).

2.6 PROFILE CHARACTERISTICS OF RESPONDENTS

2.6.1 Age

Author	Year	Review statement
Fayas	2003	Majority of the vegetable growers belonged to middle age category (35-50 years of age)
Jaganathan	2004	Majority of vegetable growers belonged to old age category (48%)
Oommen	2007	Majority of the respondents (television viewers) were old aged (50%) , middle aged were 28% and young age group were 22%
Jayawardhane	2007	84% of the coconut based homestead farmers are of old age category
Sudha	2008	52.5% of Precision Farming beneficiaries were in old age group, 33% in middle age group and 14.2%

		in young age group
Meena	2010	65% of the respondents (farmers) were in the middle age group
Chinchu	2011	67% of the farmers belonged to the age group 41-60, 20% belonged to below 40 and 13% belong to above 60 years
Dhayal <i>et al.</i>	2012	Age had a significant correlation with the information seeking behavior of the ber growers
Hanjabam	2013	80% of the precision farmers belonged to old age category and 63.33% of the conventional farmers are of middle age group
Paneerselvam <i>et al.</i>	2014	50 years is the average age among urban farmers of Coimbatore
Sebastian	2015	Retired government and non-government personnel are the majority of home garden farmers.

2.6.2 Educational status

Author	Year	Review statement
Jaganathan	2004	Majority of vegetable growers belonged to secondary education category (52%)
Atibioko <i>et al.</i>	2012	In the case of African urban farmers, there is a significant relationship between level of education and extent of adoption of farming practices
Mohapatra	2012	20% of the tribal farmers of Odisha had primary school education followed by middle school education(15%), high school education(11.25%) and college education(10%).

Krishnan	2013	Majority of the home garden farmers of Kerala (70%) had education from high school to degree level.
Paneerselvam <i>et al.</i>	2014	Majority of the urban farmers of Coimbatore had university degree
Sebastian	2015	Majority of the home garden farmers had high school education

2.6.3 Area of house terrace

Author	Year	Review statement
Jose	1998	In the case of vegetable growers , area has no significant relationship with knowledge
Sheela and Katteppa	1999	Area has inverse relationship with time spent on farm activities by farm women pursuing agriculture
Sindhu	2002	Cultivated area has significant and positive relationship with social cost and benefit in the case of vegetable growers

2.6.4 Family labour utilization

Author	Year	Review statement
Manju	1997	Family labour income has a significant relationship with family labour utilization
Sindhu	2002	Family labour utilization has significant and positive relationship with attitude towards vegetable cultivation and negative and significant correlation with annual income

Padmanabhan and Swadija	2003	Urban families would provide fresh and safe vegetables by utilizing household biowastes and family labour.
Sreedaya	2004	Family labour was highly utilized by majority (80%) of the urban farmers in house terrace cultivation
Mohapatra	2015	Majority of the farmers of Puri district of Odisha depend on family labour for different agricultural activities

2.6.5 Health consciousness

Author	Year	Review statement
Varma	1990	Religion, education, believes, culture and economic motivation are the major factors that determine the maintenance of the health of unemployed urban women
Park	1997	In the case of rural women, educational status and literacy rate are the most important tools to determine their nutritional status
Sundar	2004	Availability and access of food and absorption of food in the body are the major factors that influenced the food security in India
Sreedaya	2004	Majority (70%) of the urban house wives had high health consciousness inorder to consume the fresh and safe vegetables
Botchway <i>et al.</i>	2015	Positive and significant relationship between health consciousness and education among the non-medical students of Ghana.

Costa	2016	Better food and medical care with proper sanitation and housing will lead to the improvement of health status of old aged people
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2.6.6 Extension agency contact

Author	Year	Review statement
Himaja	2001	Majority of the SHG women farmers had medium level of extension agency contact followed by low level and high level
Reddy	2003	Majority of the sericulture farmers in Chittoor district of Andhra Pradesh were having medium level of extension agency followed by low and high levels
Reddy	2005	68% of the farmers of the watershed development programme in Raichur District of Karnataka state regularly contacted AAs followed by 60% of them contacting AAOs regularly. Also 54.67% and 46.67% of them regularly contacted NGO officials and Raita Sambarka Kendra respectively
Chavan <i>et. al.</i>	2010	Extension contact had significant correlation with the perceived effectiveness of agricultural programmes.
Krishnan	2013	KAU and agricultural department contribute 50% of the extension contribution for home garden farmers

2.6.7 Experience in farming on house terrace

Author	Year	Review statement
Sreedaya	2000	Farming experience has significant and positive relationship with knowledge in vegetable cultivation of self help groups in Thiruvananthapuram district
Jaganathan	2004	Majority of the organic farmers were having medium level of experience in vegetable cultivation
Zanu	2012	Farming experience showed a positive and significant relationship with the adoption of improved technologies by the farmers
Anju	2016	Majority of the amaranthus and vegetable cowpea growers had high level of experience in vegetable cultivation.

2.6.8 Extent of micro irrigation

Author	Year	Review statement
Shilpa Verma	2004	The adoption of micro-irrigation had no significant contribution to alleviating the problem of groundwater depletion in India.
Viola Devasirvatham	2009	sub-surface drip is more efficient than surface drip in water use efficiency and reduction of environmental impact
Narayanamoorthy	2007	Increased water saving and productivity of crops with reduced cost of cultivation are the major benefits of micro irrigation
Vaibhav and	2014	Drip irrigation act as a coping mechanism to

Susan		protect both the farmer and agriculture from the various problems
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2.6.9 Leisure time availability

Author	Year	Review statement
Tina <i>et.al</i>	2006	Social and recreational amenities were available to the young people, regardless of age, gender or geographical location among disadvantaged communities.
Patry <i>et.al</i>	2007	Access to too much leisure will results in increased stress rather than stress release. The relationship between leisure and daily stress severity is not linear. Ie, at first negative relationship between the two and then the relationship become positive
Bedini <i>et.al</i>	2011	Leisure participation and satisfaction with time for and quality of leisure will reduce perceived stress and increased quality of life in informal care givers.

2.6.10 Market perception

Author	Year	Review statement
Suthan	2003	Majority of the vegetable growers at Kunnathukal Panchayat had medium level of market perception
Jaganathan	2004	Majority of the organic vegetable growers had medium level of market perception which have positive and significant relationship with respondents' awareness and attitude towards the

		organic farming practices
Jayawardhana	2007	Majority (62%) of the coconut growers had medium level of market perception
Elakkia	2007	Majority of organic vegetable growers in Western Zone of Tamil Nadu had medium level of market perception followed by high and low levels
Anupama	2014	Majority of the organic vegetable growers had medium level of market perception followed by low and high levels of market perception.

2.6.11 Availability of inputs and infrastructural facilities

Author	Year	Review statement
Anantharaman	1991	Cassava farmers have no significant relationship between managerial efficiency and infrastructure facilities
Alagirisamy	1997	Inadequate supply of inputs and transport facilities are one of the major constraints faced by the vegetable farmers
Ongunsumi <i>et al</i>	2002	Non availability of inputs and other infrastructure facilities were expressed as major constraints in cowpea cultivation

2.6.12 Self-reliance

Author	Year	Review statement
Porchzian	1991	Significant relationship between self reliance and entrepreneurial behavior of the farmers of

		Coimbatore
Thenamudha	1996	Significant relationship between self reliance and entrepreneurial behavior of the vegetable farmers of Tamil Nadu
Seema	1997	Significant relationship between self reliance and entrepreneurial behavior of the agricultural students of KAU.

2.6.13 Relative advantage

Author	Year	Review statement
Rogers	1995	Defined relative advantage as the degree to which an innovation is perceived as being better than the idea it supersedes
Pennings	2015	Relative advantage is an observation of advantages and benefits of adopting a specific innovation
Munger	2015	Relative advantage is simply an explanation of the implications of the division of labour and opportunity cost
Beggs	2017	Comparative advantage will take economic costs into account, while absolute advantage wouldn't

2.8 PERCEPTION

From Layman's perspective, perception is defined as an act of being aware of one's environment through physical sensation which denotes an individual's ability to understand.

In the present study, perception was operationalized as the official's meaningful sensation about the worth and efficiency, sustainability, utilization of resources and constraints of farming on house terrace.

Pushpa *et al.* (1993) mentioned that satisfactory level of linkages was perceived as the important tool for Research-Extension-Clinteile Linkage.

Meera (1995) found that two group of farmers for important agricultural practices were differed significantly with respect to mean utility perception scores.

Sarkar (1995) reported that utility on the usefulness of agricultural development programs mainly depends on how effectively the farmers perceive them.

Michener *et al.* (2004) reported that social perception refers to constructing an understanding of the social world from the data we get through our senses.

Sreedaya (2000) reported that most of the officials of IVDP and KHDP were high perceivers of Self Help Groups.

BAU in their Annual Report (2005) on technology interventions of ATMA reported that out of four technologies, two such as improved variety of pigeon pea along with the use of bio-fertilizers and improved variety of mustard along with balanced dose of nutrients, were perceived as most appropriate by about 50% of the respondents.

Kumaran (2008) reported that majority of the farmers are having high level of perception on the government interventions on agrarian crisis.

Dethier and Effenberger (2012) stated that farmer organizations would benefit the farmers, who were not able to reach economies of scale and obtain credit and other services.

Sendilkumar (2012) summarized that after joining to the GALASA programme by the farmers, mean scores of all the dimensions of empowerment were increased greatly.

Singh and Premalatha (2014) reported that majority of the farmers perceived that they were highly benefited in terms of 'increase in knowledge' followed by 'gain in skills'.

Manoj and Vijayaragavan (2014) reported that the farmer participation in FFS has helped them in the increase of knowledge regarding integrated nutrient management, water management and seed management.

Preethi *et.al* (2014) defined perception as the process by which an individual gets stimuli through the various senses and interprets them.

Shiroya (2014) revealed that farming experience of farm women had positive and non significant correlation with perception about dairy occupation.

Chauhan (2015) revealed that majority (71per cent) of the farmers in Navsari district of South Gujarat had medium level of perception about low cost green house technology followed by 18 per cent and 11per cent had possessed low and high level of perception respectively.

Sonawane *et al.* (2015) reported that majority (59.16 %) of the crop insurance beneficiaries had low level of perception towards Crop Insurance Scheme.

Kesha Ram *et al.* (2015) found that education had positive and significant correlation with perception level of paddy growers in relation to environmental hazards.

Chauhan (2015) stated that land holding had positive and significant correlation with perception of the respondents about low cost green house technology.

METHODOLOGY

3. METHODOLOGY

Methodology is the systematic and theoretical analysis of the methods applied to the field of study which does not set out to provide solutions. Instead, a methodology offers the theoretical underpinning for understanding which method, set of methods, or best practices that can be applied to a specific case. This chapter deals with the methodology adopted for the present study and are presented under the following subheadings.

3.1 Research design

3.2 Locale of the study

3.3 Sampling procedure

3.4 Constraints faced by the respondents

3.5 Operationalisation and measurement of dependent variables

3.5.1 Consumption pattern of vegetables by the urban families

3.5.2 Knowledge of respondents in farming on house terraces

3.5.3 Training need of respondents

3.6 Operationalisation and measurement of independent variables

3.7 Perception of extension officials

3.8 Tools of data collection

3.9 Statistical tools for the study

3.1 RESEARCH DESIGN

There are different types of research designs for social science research. They are pre-experimental designs, experimental designs, quasi-experimental designs and ex-post facto designs. The present study was conducted by using the ex post facto research design. Ex post facto research design is defined as a quasi-experimental study which will examine how an independent variable, which present prior to the study, affects a dependent variable. Ex post facto study is also called as after-the-fact research, which is a category of research design where the investigation starts after the fact has occurred without interference from the researcher. The majority of social research is based on ex post facto research designs. It will also apply as a substitute for true experimental research in order to test hypothesis about cause and effect relationships.

3.2 LOCALE OF STUDY

The study was conducted in selected wards of Thiruvananthapuram Corporation. This location was purposefully selected because farming on house terrace was most prominent in these areas. Farming on house terrace is usually practiced in urban areas, where available land for cultivation is a major constraint. In Kerala, there are three corporations viz Thiruvananthapuram, Ernakulam and Calicut. Out of which Thiruvananthapuram is the second largest corporation with an area of 214.86km² and 100 wards. Ernakulam and Calicut corporations have 74 and 75 wards respectively. Also farming on house terrace was most prominent in Thiruvananthapuram Corporation. So Thiruvananthapuram Corporation was selected for the study.

The study was conducted in seven wards of Thiruvananthapuram Corporation. By consulting with the extension officials of KIIDC (Kerala Irrigation and Infrastructure Development Corporation) seven wards were selected with maximum farming on house terrace. They are:

THIRUVANANTHAPURAM CORPORATION

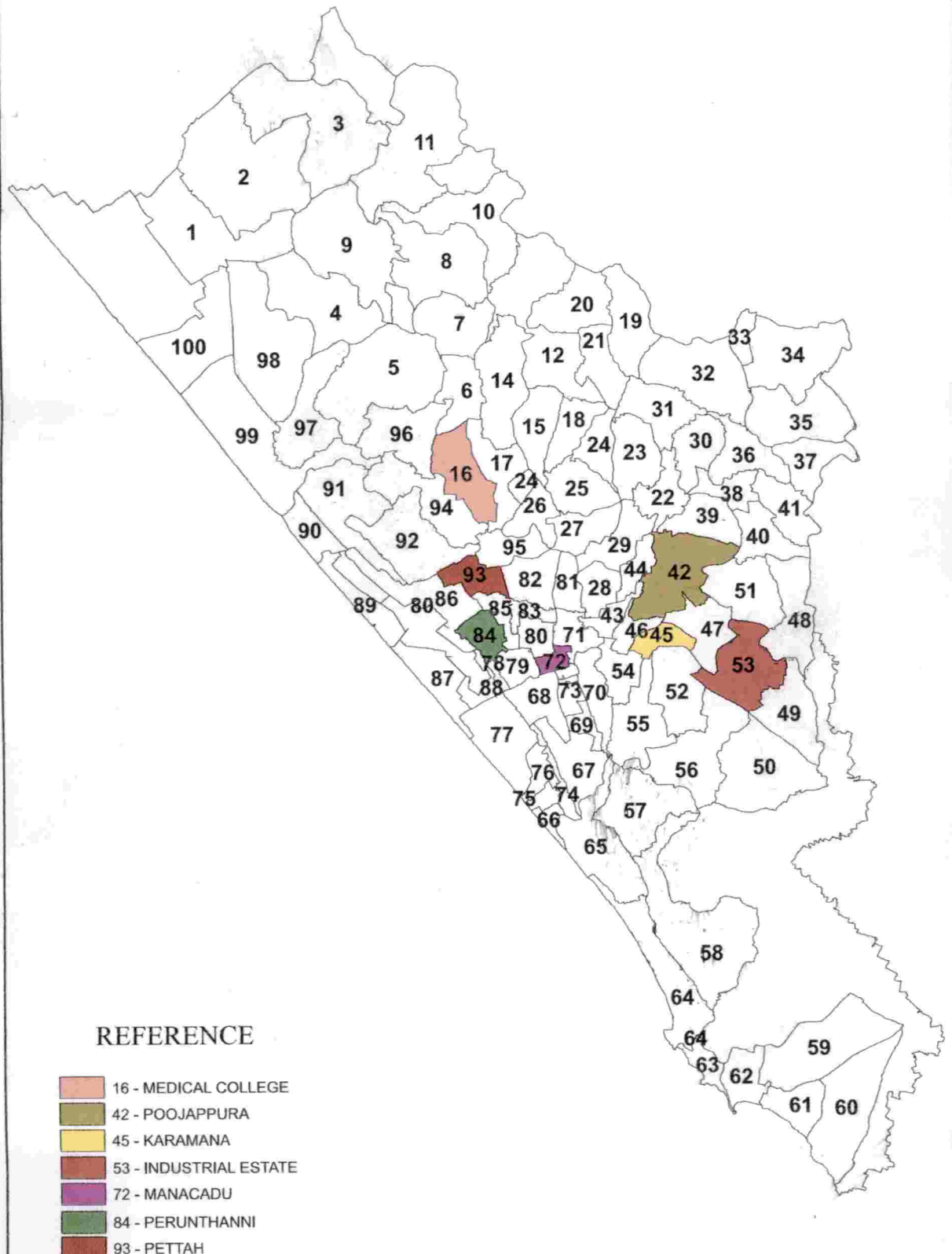


Fig. 1. Locale of the study

1. Poojappura
2. Pettah
3. Manacaud
4. Kumarapuram
5. Karamana
6. Industrial Estate
7. Enchakkal

3.3 SAMPLING PROCEDURE

There were three categories of respondents

1. Members of urban households involved in farming on house terraces.
2. Extension officials from State Horticulture Mission, Kerala Irrigation and Infrastructure Development Corporation, Vegetable and Fruit Promotion Council Keralam and City Corporation Krishi Bhavan.
3. Office bearers of residents associations of each ward

From each of the selected seven wards, 15 respondents were selected randomly forming a total of 105 respondents. Fifteen Extension officials involved directly in farming on house terraces were selected from State Horticulture Mission, Department of Agriculture, Department of Environment and Climate Change and any other agencies linked with farming on house terraces and five office bearers of residents associations of each wards limiting to a minimum of 30. Thus a total of 150 respondents were selected for the study.

3.4 CONSTRAINTS FACED BY THE RESPONDENTS

Constraints were operationally defined as the difficulties encountered by the respondents in farming on house terrace and in the distribution of grow bags.

In this study, Delphi technique was followed by the researcher to identify the constraints. This technique was developed by Dalkey and Helmer (1963) which was also followed by Prakash (1990) and Carson (2005). Delphi technique was used for the present study in order to obtain data on the three aspects such as identification of major constraints, breaking them into component constraints and ranking them. It had three steps which includes two steps for identification of constraints and the third step for rating them according to the priority of importance.

3.4.1.1 Step I

In this phase, respondents were asked to list out the major problems which they felt important while involving in farming on house terrace. Personal interview was conducted with farmers practicing farming on house terrace and extension officials involved directly in farming on house terraces.

3.4.1.2 Step II

All the constraints obtained during the first phase were pooled together and was again presented to all the respondents without any time lag. In this phase also data were collected through personal interview with the respondents. They were asked

- (1) to state if there is any change in previous responses.
- (2) to state their agreement or disagreement to all the expressed constraints.
- (3) to list out the more specific constraints if any.
- (4) to list out any other additional constraints.

3.4.1.3 Step III

In this phase, all the collected constraints were again pooled together after step II. The respondents were asked to rate them in a five point continuum based on

its importance ranging from ‘most important’, ‘more important’, ‘undecided’, ‘less important’ and ‘least important’. The scores assigned were 5,4,3,2 and 1 respectively.

Then the frequencies of respondents ranking each problem in each point of the continuum were found out. This was multiplied by weightage of each response category and was summed up to get the score of particular item. The constraint with the higher score value was considered as the most serious constraint, followed by other constraints in the order of decreasing score values based on the response. Thus the interview schedule would help to measure the perception of respondents about the constraints identified during the farming on house terrace and the distribution of grow bags.

3.5 OPERATIONALISATION AND MEASUREMENT OF DEPENDENT VARIABLES

3.5.1 Consumption pattern of vegetables by the urban families

It was operationally defined as the type and quantity of vegetables consumed per week by the respondent and his/her family members.

The food consumption pattern has been measured by different researchers using different measurement procedures.

Paul (1999) measured food consumption of pregnant women on a five point continuum. The foods were classified into five groups on the basis of the frequency of use, and the score card was assigned given below.

FREQUENCY OF USE	SCORE
Never	0
Occasionally	1
Less than 3 days in a week	2
More than 3 days in a week	3

Daily	4
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For each of the food groups, total scores were calculated (Reabrun *et.al.*, 1979), based on the percentage score obtained the food articles were further classified into four groups. Ajitha (2000) and Soumya (2001) also followed the same measurement procedure.

In the present study consumption pattern of vegetables was measured by the procedure developed by Sreedaya (2004) with slight modifications. The vegetables were divided into three categories, such as leafy vegetables, roots and tubers and others (other vegetables cultivated by the respondent on his house terrace). The respondents were asked to indicate the approximate quantity of vegetables they consumed per week before and after starting terrace cultivation of vegetables under these three subheads. Then the change in frequency of average consumption pattern after starting farming on house terrace was also found out.

3.5.2 Knowledge of respondents in farming on house terraces

Knowledge was operationally defined as the quantum of scientific information possessed on the subject namely farming on house terrace.

In the present study, knowledge of respondents on farming on house terrace was tested by using a teacher – made test based on Adhoc package of practices recommendations for organic farming: crops by KAU, 2009. Based on the review of literature and discussion with experts, a list of ten questions were prepared, five questions to test the knowledge on vegetable cultivation and five questions to test the knowledge on farming on house terrace. A score of three was given to the correct answer, two for partially correct answer and one for wrong answer. The sum of the scores obtained for the five questions indicated the knowledge on vegetable

cultivation of the respondents and sum of the score obtained for five questions indicated the knowledge on farming on house terrace of the respondent.

3.5.3 Training need of respondents

Training need was operationally defined as the perceived level of training need for farming on house terrace by the urban households of the selected wards from Thiruvananthapuram Corporation.

Different researchers, for assessment of training need followed different measurement procedure.

1. Training need score

RESEARCHER	MEASUREMENT PROCEDURE
Gill (1970)	Training need score = 1- average knowledge score where average knowledge score= Total knowledge score/(No. of questions x No. of respondents)
Allan (2000)	Training need score = 1- average knowledge score where average knowledge score= Total knowledge score/(No. of questions x No. of respondents)

2. Choice scores (ACS and TCS)

RESEARCHER	MEASUREMENT PROCEDURE
Bhatnagar (1984)	On the basis of the response of the respondents, priorities based on I,II and III choices could be tabulated and can be identified as training need. Following them total choice score (TCS) and average choice score (ACS), where ACS = $(CI \times 3) + (CII \times 2) + (CIII \times 1) / 3$ CI – First choice , CII – Second choice , CIII – Third choice

3. Training Need Quotient (TNQ)

RESEARCHER	MEASUREMENT PROCEDURE
Sharma and Singh (1966)	<p>It ranges from 0 to 100</p> $TNQ = OS_{ij} \times 100 / MS_{ij}$ <p>Where, OS_{ij} = Sum of observed scores of j^{th} individual for the i^{th} item</p> <p>MS_{ij} = Maximum score attributable to the i^{th} item rated by j^{th} individual</p>

In the present study the training need of the respondents on different aspects of farming on house terrace were measured using average choice score method, which was developed by Bhatnagar (1984). In addition, their preference on method, frequency, duration and venue of training were also studied.

3.6 OPERATIONALISATION AND MEASUREMENT OF INDEPENDENT

VARIABLES

3.6.1 Selection of profile characteristics of respondents

Based on objectives, review of literature, discussion with experts and observation, a list of 50 personal, socio-psychological, economic and situational variables were framed along with their operational definitions (Appendix I) as independent variables and were sent to 20 judges for eliciting their relevancy rating by the researcher in a five point continuum ranging from 'most relevant' to 'least relevant'. About 11 judges responded and the responses were taken for analysis. The scores were assigned as follows.

RESPONSE	SCORE
Most relevant	5
More relevant	4
Undecided	3
Less relevant	2
Least relevant	1

The total scores obtained for each variable was worked out and according to the expert opinion, variables having mean value above 4 were selected. The variables thus selected were:

- Age
- Educational status
- Family labour utilization
- Area of house terrace
- Experience in farming on house terrace
- Extent of micro irrigation
- Health consciousness
- Leisure time availability
- Extension agency contact
- Market perception
- Availability of inputs and infrastructure facilities
- Self-reliance

- Relative advantage

3.6.2 Measurement of profile characteristics

3.6.2.1 Age

Age was operationalized as the number of calendar years completed by the respondent at the time of the present investigation. This was measured by using the classification of respondents developed by Sindhudevi (1994) followed by Hanjabam (2013).

CATEGORY	AGE
Young (< or equal to 35 years)	1
Middle aged (36-55)	2
Old (> Or equal to 56 years)	3

3.6.2.2 Educational status

Educational status was operationalized as the highest academic qualification possessed by the respondent at the time of the present investigation. This was measured by using the scoring procedure developed by Singh (1989) with modifications.

CATEGORY	SCORE
Illiterate	1
Primary school	2
High school	3
College	4
Professional	5

3.6.2.3 Family labour utilization

Family labour utilization was operationalized as the extent of utilization/ involvement of family members of the respondents in various physical activities of farming on house terrace. The variable was measured by the procedure developed by Sindhu (2002) in the present study.

To find out and quantify the farmer's perception about the family labour utilization in farming on house terrace, the respondents were asked to state the extent to which they feel, whether there was utilization of family members in farming on house terraces and the responses were taken on a four point continuum.

CATEGORY	SCORE
To the fullest extent	4
As far as possible	3
To the least extent	2
Never	1

The sum of the scores of each statement was the score of the family labour utilization of the respondent and the score ranged from 11 to 44.

3.6.2.4 Area of house terrace

Area of house terrace is operationalized as the area of house terrace in square feet possessed by respondents. Different researchers have tried to measure cultivated area in different ways. In the present study, this variable was measured by using the classification procedure developed by the researcher for the purpose.

CATEGORY	SIZE OF HOLDING (sq.ft.)	SCORE
Low	<800	1
Medium	800-1500	2
High	>1500	3

3.6.2.5 Experience in farming on house terrace

Experience in farming on house terrace is operationalized as the number of completed years of experience of the respondents in farming on house terrace at the time of interview. In the present study, this variable was measured by using the method adopted by Fayas (2003) with modifications.

EXPERIENCE (years)	SCORE
Upto 10 years	1
11-25	2
Above 25	3

3.6.2.6 Health consciousness

It was operationalized as the awareness, knowledge and interest of the respondents about the safe vegetables, dietary requirements, personal hygiene and environmental sanitation.

It was measured by the procedure developed for the purpose. Based on the review of literature and discussion with experts, three main dimensions were formulated such as, personal hygiene, balanced nutrition and environmental sanitation in order to measure health consciousness. Based on these three dimensions, six statements were formulated, which consisted of both positive and negative, were included in the schedule.

These six statements were given to the respondents and the scoring was on a five – point continuum as ‘strongly agree’, ‘agree’, ‘undecided’, ‘disagree’ and ‘strongly disagree’ with weightages of 5,4,3,2 and 1 for positive statements and vice versa for the negative statements. The sum of the scores of each statement was the score of the health consciousness of the respondent and the score ranged from 6 to 30.

RESPONSE	SCORE
Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

3.6.2.7 Extent of micro irrigation

Extent of micro irrigation was operationalized as the extent to which the house terrace crops are irrigated using micro irrigation techniques. In the present study, this variable was measured by using the procedure developed by the researcher for the purpose. Five statements were formulated based on the experts’ opinion and the responses were obtained as ‘yes’ or ‘no’. Scores for these responses were as follows.

Sl.No.	Statement	Yes(1)	No(0)
1	Do you have micro irrigation facilities in your house terrace?		
2	Is there any fertigation process along with micro irrigation facilities?		
3	If micro irrigation facility is there, then which of the following are there?		

4	Drip irrigation		
5	Sprinkler irrigation		
6	Do you follow any other indigenous micro irrigation techniques?		

The sum of the scores of each statement was the score of the extent of micro irrigation of the respondent and the score ranged from 0 to 5.

3.6.2.8 Availability of inputs and infrastructure facilities

It was operationalized as the availability of inputs and infrastructural facilities which affect the farming on house terraces. In the present study, the variable was measured by using the scoring procedure developed by the researcher for the purpose.

A list of common inputs and infrastructure facilities were prepared based on the expert opinion and these were administered to the respondents. The scoring was on a five– point continuum as ‘very high availability’, ‘high availability’, ‘medium availability’, ‘low availability’ and ‘very low availability’ with weightages of 5,4,3,2 and 1 respectively. The sum of the scores of each item was the score of the availability of inputs and infrastructure facilities and the score ranged from 6 to 35.

RESPONSE	SCORE
Very high availability	5
High availability	4
Medium availability	3
Low availability	2
Very low availability	1

3.6.2.9 Leisure time availability

Leisure time availability was operationalized as the availability of time for leisure by the respondents in hours. In the present study, this variable was measured by the procedure developed by the researcher for the purpose.

RESPONSE (hours)	SCORE
<2	1
2-5	2
>5	3

The leisure time availability score for each individual was calculated by summing up the scores obtained.

3.6.2.10 Extension agency contact

Extension agency contact was operationalized as the degree to which the respondent maintained his contacts with different extension agencies or officials for getting knowledge about farming on house terrace. The scoring procedure adopted by Krishnamoorthy (1988) was followed in the present study to measure this variable, on two dimensions of the contact, in terms of frequency and purpose of contact. The total scores obtained by a respondent on both frequency and purpose of contact were taken as his score for contact with extension agencies.

The same measurement procedure was adopted by Meera (1995), Majjusha (2000) and Parvathy (2000). The scoring procedure was as follows.

FREQUENCY OF CONTACTS	SCORE
Never	1
Sometimes	2
Regularly	3
PURPOSE OF CONTACT	SCORE

Non-agricultural	1
Agricultural	2

The sum of the scores of each statement was the score of the extension agency contact of the respondent and the score ranged from 1 to 5.

3.6.2.11 Self-reliance

Self-reliance was operationalized as the ability of a respondent to depend on him/her for betterment of farming on house terrace and allied activities. In the present study, this variable was measured using the scoring procedure developed by the researcher for the purpose. The procedure consisted of five items. The respondents were asked to give their responses on a five – point continuum ranging from ‘strongly agree’ to ‘strongly disagree’. The scoring procedure followed was as follows for positive statement and reverse for negative statement.

RESPONSE	SCORE
Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

The self reliance score for each individual was calculated by summing up the scores on individual statement. The possible range of score of an individual in this scale was 5 to 25.

3.6.2.12 Market perception

Market perception was operationalized as the capacity of the respondent to identify the market trend to sell the produce from farming on house terrace for greater returns.

In the present study, this variable was measured by adopting the procedure developed for the purpose. The scoring procedure was as follows.

- Do you think a house terrace farmer will be able to sell his produce when he increases the production by adopting the recommended practices by KAU?

Yes - 1

No - 2

- Do you think that produce of the crop cultivated according to the recommended practices will fetch good price compared to those raised under traditional methods?

Low price – 1

Same price – 2

High price - 3

- How difficult will be to dispose off the produce of the crop cultivated following their recommended practices?

Very difficult – 1

Difficult - 2

Easy - 3

Very Easy - 4

3.6.2.13 Relative advantage

Relative advantage is operationalized as the degree to which the farming on house terrace and allied enterprises like vermicomposting, azolla cultivation, poultry

rearing etc is perceived as being better than conventional practice followed by the respondents.

In the present study, this variable was measured using the scoring procedure developed by the researcher for the purpose. The scoring procedure consisted of six statements. The respondents were asked to give their responses on a five – point continuum ranging from ‘strongly agree’ to ‘strongly disagree’. The scoring procedure followed was as follows for positive statement and reverse for negative statement.

RESPONSE	SCORE
Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

The relative advantage score for each individual was calculated by summing up the scores on individual statement. The possible range of score of an individual in this scale was 6 to 30.

3.7 PERCEPTION OF EXTENSION OFFICIALS

Perception is the process of understanding sensation based on the experience to signs (Taneja, 1989)

In the present study, it was operationalized as the extension official’s meaningful sensation about the worth and efficiency, sustainability, utilization of resources and constraints of farming on house terrace.

In the present study, perception of extension officials was measured by using the scoring procedure designed by the researcher for the purpose. The procedure consisted of ten statements. The respondents were asked to give their responses as 'strongly agree', 'agree', 'undecided', 'disagree' and 'strongly disagree'. The number of response for each category for each statement was taken and expressed as percentage. The scoring procedure followed was as follows for positive statements and reverse for negative statements.

RESPONSE	SCORE
Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

The perception score for each individual was calculated by summing up the scores on individual statement. The possible range of score of an individual in this procedure was 10 to 50.

3.8 TOOLS OF DATA COLLECTION

Separate interview schedules and questionnaires (Appendix III) were developed and used for collection of data from the different categories of respondents, that is from the members of urban households involved in farming on house terraces, extension officials from State Horticulture Mission, Kerala Irrigation and Infrastructure Development Corporation, Vegetable and Fruit Promotion Council Keralam and City Corporation Krishi Bhavan and office bearers of residents associations of each ward.

3.9 STATISTICAL TOOLS FOR THE STUDY

The collected data were scored, tabulated and analyzed using different statistical tools such as average, standard deviation, percentage analysis, quartile deviation and correlation analysis. Correlation analysis was done to test the relationship between dependent variables and independent variables.

RESULTS AND DISCUSSION

4. RESULTS AND DISCUSSION

This chapter deals with the result and findings of the study based on the analysis of the data obtained from the survey research. The data obtained were analyzed, tabulated and treated with the statistical tools to reach the results. The results and discussion of the study are presented here under the following headings.

- 4.1 Constraints faced by the respondents in farming on house terrace and in the distribution of grow bags
- 4.2 Consumption pattern of vegetables by the urban families
- 4.3 Knowledge of respondents in farming on house terraces
- 4.4 Training need of respondents in farming on house terrace
- 4.5 Profile characteristics of the respondents
- 4.6 Relationship between independent and dependent variables
- 4.7 Perception of extension officials regarding farming on house terrace
- 4.8 Recommendations for improvement

4.1 CONSTRAINTS FACED BY THE RESPONDENTS IN FARMING ON HOUSE TERRACE AND IN THE DISTRIBUTION OF GROW BAGS

4.1.1 Constraints faced by the respondents in farming on house terrace

Constraints were operationally defined as the difficulties encountered by the respondents in farming on house terrace and in the distribution of grow bags.

Respondents in farming on house terrace had certain constraints identified through Delphi technique, which have been tabulated and were presented under three subheadings as perceived by the

1. Respondents,
2. Extension officials and
3. Office bearers of residents associations of each ward.

These constraints have to be tackled in order to get better result from farming on house terrace.

Constraints generated through Delphi technique from step I and step II

1. Crop loss due to pests and diseases attack
2. Inadequate extension support and lack of proper training
3. Difficulty in getting good quality inputs such as seed materials, biocontrol agents, biopesticides etc
4. Seasonal variation
5. Frequent wetting of ceilings will cause leakage problems and floor would become dirty very fast
6. Difficulty in getting labour
7. Discouragement by the family members
8. Difficulty in getting water on house terraces
9. Lack of time for house terrace farming activities
10. Difficulty in getting good quality potting mixture especially with PGPR mix-1

11. Difficulty in transferring inputs from the ground to house terrace
12. Difficulty in cultivating trailing varieties on house terraces
13. Damaging of seedlings after transplantation
14. Bordeaux mixture (1%) once prepared couldn't be kept long.
15. Frequent damaging of drip emitters and difficulty to repair them.
16. Kitchen wastes can't be converted into organic manure due to the lack of physical facilities and technical knowhow.
17. Lack of availability of cowdung and cow's urine for the preparation of panchagavya and dasagavya.

From the above listed constraints, thirteen constraints were selected according to their intensity which is as follows:

Table 1. Constraints in farming on house terrace as perceived by the respondents

			n = 105
Sl. No.	Constraints	Score	Rank
1	Crop loss due to pests and diseases attack	409	I
2	Difficulty in getting good quality inputs such as seed materials, biocontrol agents, biopesticides etc	315	II
3	Difficulty in getting water on house terraces	280	III
4	Inadequate extension support and lack of proper training	267	IV
5	Frequent damaging of drip emitters and difficulty to repair them.	226	V
6	Difficulty in transferring inputs from the ground to house terrace	219	VI
7	Difficulty in getting good quality potting mixture especially with PGPR mix-1	204	VII

8	Seasonal variation	201	VIII
9	Lack of time for house terrace farming activities	187	IX
10	Frequent wetting of ceilings will cause leakage problems and floor would become dirty very fast	158	X
11	Difficulty in getting labour	145	XI
12	Kitchen wastes can't be converted into organic manure due to the lack of physical facilities and technical knowhow.	132	XII
13	Lack of availability of cowdung and cow's urine for the preparation of panchagavya and dasagavya.	114	XIII

Table 1 clearly shows different constraints that are faced by the respondents on farming on house terrace. Among these constraints major constraint was 'crop loss due to pests and diseases attack'. The other constraints were 'difficulty in getting good quality inputs such as seed materials, biocontrol agents, biopesticides etc', 'difficulty in getting water on house terraces', 'inadequate extension support and lack of proper training', 'difficulty in transferring inputs from the ground to house terrace', 'difficulty in getting good quality potting mixture especially with PGPR mix-1', 'seasonal variation', 'lack of time for house terrace farming activities', 'frequent wetting of ceilings will cause leakage problems and floor would become dirty very fast', 'difficulty in getting labour', 'kitchen wastes can't be converted into organic manure due to the lack of physical facilities and technical knowhow' and 'lack of availability of cowdung and cow's urine for the preparation of panchagavya and dasagavya'.

Even though the incidence of pests and diseases are comparatively lower in farming on house terrace, it was perceived as a major constraint. Also several private agencies were supplying low quality seed materials, biocontrol agents, biopesticides

etc to the farmers. Majority of the respondents were not able to buy the good quality inputs from credible sources like Agricultural University. In Thiruvananthapuram Corporation, Kerala Agricultural University campus is almost fifteen kilometer from the city. Also major outlets are not available in the city which create problem in getting quality inputs for farming on house terrace. Thereby respondents had to face problems in obtaining good quality inputs for the farming on house terrace activities. This low quality biocontrol agents and biopesticides used would not give enough control and this may be the reason for crop loss due to pest and disease attack.

Majority of the respondents were solely depending on the corporation water supply. Only a small number have bore well facilities. So the respondents had the issue in irrigating the crops frequently. In addition, problem in getting water on rooftop was also a difficulty.

In Thiruvananthapuram Corporation, lots of projects were there for encouraging farming on house terrace. Financial support was also there. Though lots of efforts and measure were being implemented, they were not successful in proper follow up activities. The enthusiasm showed in the initial establishment faded away later. These agencies also failed to impart training after identifying the training need analysis.

Frequent damaging of drip emitters such as clogging in the nozzles, improper working of the motor etc were the issues regarding the drip irrigation system. Respondents were not able to repair these damages and were forced to return to manual irrigation. In addition, frequent wetting of ceilings will cause leakage problems and floor become dirty very fast was also a constraint.

Lack of good quality potting mixture along with the biofertilizer PGPR mix-1, seasonal variation etc were also serious constraints for the respondents in farming on house terrace. Heavy rain, excess temperature etc seriously affected the crops on

house terraces. Some of the respondents shifted their crops to ground due to the recent heavy rains.

Majority of the respondents were middle and old aged people and were in need of labour. There was also difficulty in transferring inputs from the ground to house terrace. But lack of trained labour at the time of need was a constraint. Kitchen wastes can't be converted into organic manure due to the lack of physical facilities and technical knowhow was also perceived as a major constraint by the respondents. They also mentioned about the difficulty in getting cowdung and cow's urine for the preparation of panchagavya and dasagavya.

4.1.2 Constraints faced by the respondents and office bearers of residents associations in the distribution and usage of grow bags

Table 2. Constraints in the distribution and usage of grow bags as perceived by the respondents and office bearers of residents associations

			n = 135
Sl. No.	Constraints	Score	Rank
1	Low quality grow bags and potting mixture issued by the private agencies	485	I
2	Grow bags become damaged in every one or two crop seasons and difficulty in replacing them	360	II
3	High cost of grow bags	174	III
4	Difficulty in disposing damaged plastic grow bags	149	IV

Table 2 shows that the major constraint in the distribution and usage of grow bags as perceived by the respondents and office bearers of residents associations was 'low quality grow bags and potting mixture issued by the private agencies'. Normal

practice followed in the supply of grow bag is that the government institutions for promoting farming on house terrace would give tender to private agencies for providing grow bags along with potting mixture and seed materials to the urban households. Private agencies would acquire fund from government and would provide low quality grow bags and potting mixture. The low quality grow bags would tear easily and the low quality potting mixture would get hardened easily. Due to the hardening nature of the potting mixture, water couldn't be easily penetrated into it. Another issue was the placing of thermocol at the bottom of the grow bags instead of potting mixture. Above the thermocol, low quality potting mixture would be provided. Apart from this, other constraints were 'grow bags become damaged in every one or two crop seasons and difficulty in replacing them', 'high cost of grow bags' and 'difficulty in disposing damaged plastic grow bags'.

Cost of a grow bag ranges from 15 – 20 rupees and the cost of a sac ranges between three or five rupees. Since the grow bags were non-durable, the respondents prefer sac or locally available containers such as broken buckets, paint buckets, fertilizer sacs, plastic bottles etc. for solving this constraint. Five respondents were doing cultivation even on flex boards that was placed on the terrace floor above which potting mixture would be spread on.

'Difficulty in disposing damaged plastic grow bags' was also a constraint. Grow bags are typically made of plastic, which is not environmentally friendly. So these plastics have to be recycled efficiently in order to reduce environment pollution.

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4.1.3 Constraints faced by the extension officials in farming on house terrace and grow bag distribution

Table 3. Constraints in farming on house terrace and grow bag distribution as perceived by the extension officials

Sl. No.	Constraints	Score	n = 15
			Rank
1	Lack of timely availability of fund	73	I
2	lack of adequate number of officials for executing the project	64	II
3	Less participation of farmers in the training sessions	55	V
4	Difficulty to get good quality potting mixture	51	III

It is clear from table 3 that the major constraint in farming on house terrace and grow bag distribution as perceived by the extension officials were the ‘lack of timely availability of fund’ for executing the projects promoting farming on house terrace. When the fund shortage occurs, project couldn’t be executed effectively which resulted in the failure of the projects. The other constraints were ‘lack of adequate number of officials for executing the project’, ‘less participation of farmers in the training sessions conducted by the officials’ and ‘difficulty to get good quality potting mixture’.

4.2 CONSUMPTION PATTERN OF VEGETABLES BY THE URBAN FAMILIES

The study revealed that there was an increase in the consumption pattern of vegetables after starting farming on house terrace by the respondents.

4.2.1 Change in the consumption pattern of vegetables

Change in the consumption pattern of vegetables by the respondents and their family members per week was measured in terms of kilograms (Kg).

Table 4. Distribution of respondents and their family members based on their change in the consumption pattern of vegetables per week

n = 105			
SI No.	Category	Frequency	Percentage
1	Low (< 0.02)	21	20.00
2	Medium (0.02 – 0.1)	69	65.71
3	High (> 0.1)	15	14.29
	Total	105	100
Mean (μ) - 0.063 Kg		Standard deviation (SD) - 0.04 Kg	

It is clear from the table 4 and fig. 2 that majority of the respondents were included in the medium category of change in the consumption pattern of vegetables (65.71%) which was followed by low level category (20%) and high level category (14.29%) (Fig.2)

This shows that majority of the respondents had an increase in the consumption pattern of vegetables after starting farming on house terrace when compared to the situation before. Most of the respondents were actively involved in the farming on house terrace and were cultivating leafy vegetables such as green and red amaranth, curry leaves, moringa, puthina etc., tubers like tapioca and amorphoplallus and other vegetables like cucumber, snake gourd, bitter gourd, tomato, brinjal, tomato, chilli, cabbage, turmeric etc. These respondents were greatly

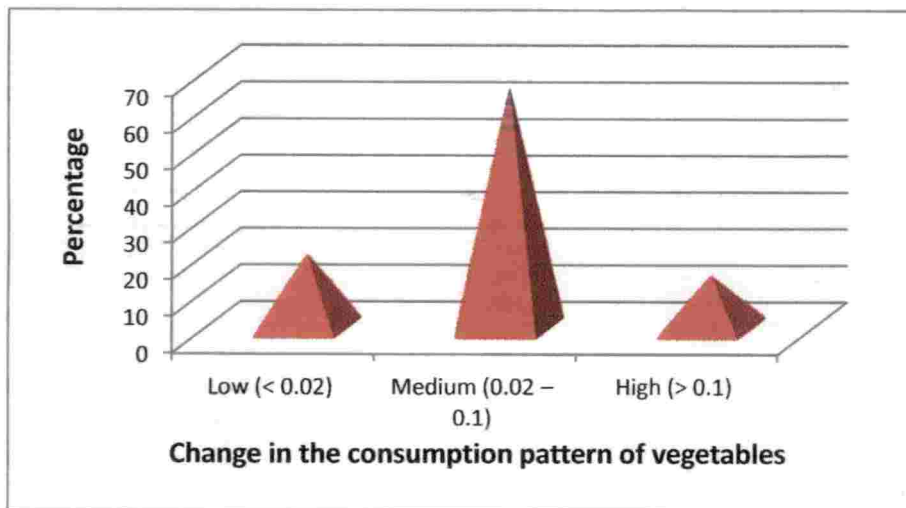


Fig 2. Distribution of respondents and their family members based on their change in the consumption pattern of vegetables per week (n=105)

interested and concerned about their health. So it was not a surprise that they avoided vegetables from outside and consumed safe and hygiene vegetables.

4.2.2 Consumption pattern of vegetables before and after starting farming on house terrace

Change in the frequency of average consumption pattern of vegetables (per week) before and after starting farming on house terrace were found out and are presented in table 5.

Table 5. Change in the frequency of average consumption pattern of vegetables (per week) before and after starting farming on house terrace

n = 105			
SI No.	Vegetables	Before starting farming on house terrace (days)	After starting farming on house terrace (days)
1	Leafy vegetables	1 - 2	3 - 4
2	Tubers	0 - 1	2 - 3
3	Others (if any)	3 - 4	6 - 7

From table 5, it is clearly understood that there occurred a good increase in the frequency of average consumption of vegetables after starting farming on house terrace. It was seen that the frequency of leafy vegetable consumption by the respondents before starting farming on house terrace was one or two days, which was increased to three or four days, tubers from one day to two or three days and other vegetables which include any vegetables either cultivated or purchase by the respondents from three or four days to six or seven days.

Since most of the respondents were cultivating amaranthus, which was one of the prominent leafy vegetables, it is quite natural that there occurred a good increase in the consumption pattern of leafy vegetables by the respondents. Since the tuber

crops like tapioca, yam etc were less frequently cultivated compared to other vegetable crops, there was only a slight increase in the frequency of consumption of them compared to other vegetables. This result was in confirmation with the findings of Sreedaya (2004), who reported that there occurred a good increase in the consumption pattern of vegetables by urban house wives after starting farming on house terrace.

4.3 KNOWLEDGE OF RESPONDENTS IN FARMING ON HOUSE TERRACES

Knowledge was operationally defined as the quantum of scientific information possessed on the subject namely farming on house terrace. In order to access the knowledge of the respondents, several questions were formulated using Adhoc package of practices recommendations for organic farming: crops by KAU, 2009 to test the knowledge on vegetable cultivation and the knowledge on farming on house terrace separately.

Table 6. Distribution of respondents based on their knowledge on vegetable cultivation (n=105)

n = 105			
SI No.	Category	Frequency	Percentage
1	Low (<Q1)	25	23.81
2	Medium (Q1-Q3)	65	61.90
3	High (>Q3)	15	14.29
Total		105	100
Q1 =11		Q3 =13	Range =7 - 15

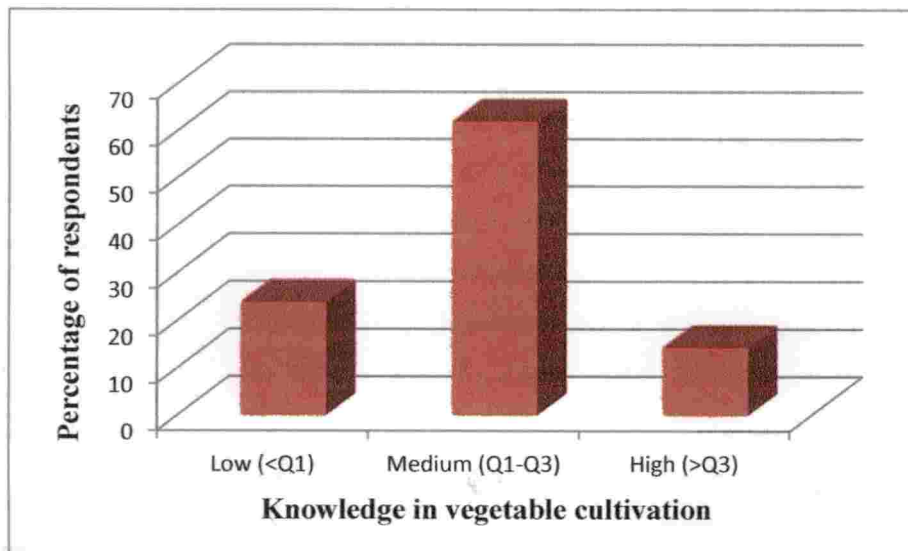


Fig 3. Distribution of respondents based on their knowledge in vegetable cultivation (n=105)

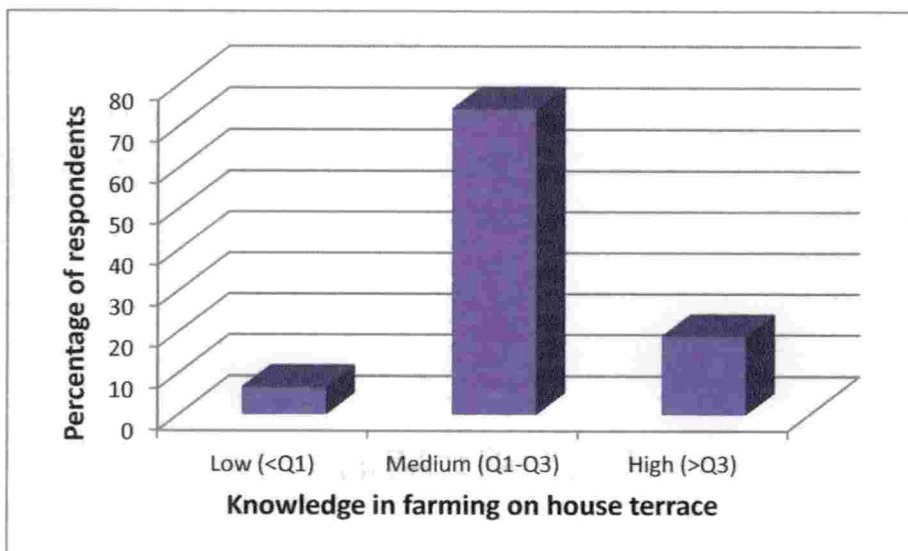


Fig 4. Distribution of respondents based on their knowledge in farming on house terrace (n=105)

Table 7. Distribution of respondents based on their knowledge on farming on house terrace

n = 105			
SI No.	Category	Frequency	Percentage
1	Low (<Q1)	7	6.66
2	Medium (Q1-Q3)	78	74.29
3	High (>Q3)	20	19.05
Total		105	100
Q1 =12		Q3 =14	Range =9 - 15

Table 6 shows that majority of the respondents (61.90%) had medium knowledge about vegetable cultivation which is followed by low (23.81%) and high (14.29%) level of knowledge about vegetable cultivation (Fig.3).

Table 7 shows that majority of the respondents (74.29%) had medium level of knowledge regarding house terrace cultivation of vegetables, where as 19.05% of the respondents had high level of knowledge and 6.66% of the respondents had low level of knowledge on farming on house terrace (Fig.4).

Most of the respondents were highly educated and had a high degree of knowledge regarding the importance of vegetable consumption and organic vegetable production on house terraces. Several questions were asked to the respondents based on Adhoc package of practices recommendations for organic farming: crops by KAU, 2009. 62% of them answered correctly which shows their knowledge. Apart from the scientific knowledge, indigenous knowledge of some of the respondents was appreciable like use of moringa leaf extract spray on vegetable crops for their better growth and yield, wrapping of vegetable seeds in wet cloth for easy germination,

sprinkling of turmeric powder or rice flour while sowing vegetable seeds would protect the seeds from ants etc.

From table 6 and 7, it was found that knowledge of the respondents on farming on house terrace was more than that of the knowledge on vegetable cultivation. This might be due to the high level of training given to the respondents by the extension officials of Kerala Irrigation and Infrastructure Development Corporation at the initial stage.

This finding is in contrary with the finding of Sreedaya (2004), who reported that knowledge of urban house wives on vegetable cultivation was more than that of the knowledge on farming on house terrace.

This finding is in confirmation with Sebastian (2015), who reported that majority of the home garden farmers had medium level of knowledge regarding horizontal and vertical diversifications for the economically dominant crops in home gardens.

4.4 TRAINING NEED OF RESPONDENTS IN FARMING ON HOUSE TERRACE

Training need was operationally defined as the perceived level of training need for farming on house terrace by the respondents of selected wards of Thiruvananthapuram Corporation.

4.4.1 Method of training preferred by the respondents

Table 8(a). Method of training preferred by the respondents

n = 105			
Sl. No.	Training methods	ACS	Preferences
1	Demonstration	95	1
2	Group discussion	90	2
3	Film shows/any other visual aids like ppt	81.67	3
4	Case study	78.33	4
5	Field trip	64.67	5
6	Role play	62.67	6
7	Lecture (without any visual aids)	46.67	7

(ACS – Average Choice Score)

Table 8(a) revealed that demonstration was the most preferred training method by the respondents (ACS = 95). This was followed by group discussion (ACS = 90), film shows (ACS = 81.67), case study (ACS = 78.33), field trip (64.67), role play (62.67) and lecture (46.67).

Demonstration which works on the principle of 'Seeing is believing' is one of the most effective training methods. Here the respondents were able to experience visual display of the way of doing different practices of farming on house terrace. This might helped them in the adoption of various practices, which might be the reason for the increase in consumption pattern of vegetables (Table 4). Group discussion was also an effective training method because it allows the open-ended

exchange of ideas among the members and which would facilitate learning, thinking, understanding, problem solving etc.

This finding is in contrary with the finding of Allan (2000), who reported that the most preferred training methods for medicinal plant growers were film shows which were followed by exhibitions.

4.4.2 Duration of training preferred by the respondents

Table 8(b). Duration of training preferred by the respondents

n = 105			
Sl. No.	Duration	ACS	Preferences
1	One day	100	1
2	Two days	91.67	2
3	Three-six days	41.67	3
4	One week	36.67	4
5	Two weeks	35	5
6	One month	35	6

(ACS – Average Choice Score)

Table 8(b) revealed that one day training was the most preferred duration of training by the respondents (ACS = 100). This was followed by two days training (ACS = 91.67), three to six days training programme (ACS = 41.67) and one week training programme (ACS = 36.67). Two weeks and one month training programmes were preferred by 35% of the respondents.

Most of the respondents were busy with their career and family. So they wouldn't be able to attend long-term training schedules. They only preferred short-term training programmes so that they could attend the programme without

compromising their career and family. That may be the reason for the preference of very short duration training programme by the respondents.

4.4.3 Frequency of training preferred by the respondents

Table 8(c). Frequency of training preferred by the respondents

n = 105			
Sl. No.	Frequency	ACS	Preferences
1	Once in six months	100	1
2	Once in a year	98.33	2
3	Once in two years	95	3
4	Once in two months	61.33	4
5	Once in a month	60	5
6	Once in three years	50.67	6
7	Once in more than three years	43.67	7

(ACS – Average Choice Score)

A perusal of table 8(c) reveals that the most preferred frequency of training by the respondents was once in 6 months (ACS = 100). This was followed by once in a year (ACS = 98.33), once in two years (ACS = 95), once in two months (ACS = 61.33), once in a month (ACS = 60), once in three years (ACS = 50.67) and once in more than three years (ACS = 43.67).

Most of the respondents were not prefer very frequent training. They were need training only once in six months or once in a year or once in two years. Most of the respondents were cultivating vegetables mostly and they were able to cultivate two crops by every six months. So if they were exposed to training once in every six

months, it would be ideal, which was also the most preferred frequency of training by respondents. This should be considered while developing training schedule.

This finding is in confirmation with Allan (2000) and Sreedaya (2004), who reported that most preferred frequency of training was once in six months by medicinal plant growers and urban house wives respectively.

4.4.4 Venue of training preferred by the respondents

Table 8(d). Venue of training preferred by the respondents

n = 105			
Sl. No.	Venue	ACS	Preference
1	Off campus	102.67	1
2	On campus	64	2

(ACS – Average Choice Score)

Table 8(d) reveals that the most preferred venue of training was a convenient place nearby the place of the respondents (ACS = 102.67) which was followed by the venue at Agricultural college (ACS = 91.67). Since most of the respondents were busy with their career and family, it was quite natural that they prefer a convenient place nearby.

This finding is in confirmation with Sreedaya (2004), who reported that off campus training was most preferred by the urban house wives.

4.4.5 Training subjects preferred by the respondents

Table 8(e). Training subjects preferred by the respondents

			n = 105
Sl. No.	Subjects of training	ACS	Preference
1	Plant protection	91	1
2	Preparation of botanical pesticides and fungicides like nicotine oil emulsion , neem oil emulsion and bordeaux mixture	89.67	2
3	Preparation of organic manures like vermicompost and cultivation of azolla	87.33	3
4	Preparation of potting mixture, time of sowing and time of transplantation	74.33	4
5	Manuring, usage of biocontrol agents like Trichoderma, Psuedomonas, PGPR mix-2 etc. and and biofertilizers like Rhizobium, PGPR mix-I etc.	74	5
6	Irrigation techniques	47.67	6
7	Grow bag filling and their suitable placement in terraces	46.33	7
8	Selection of suitable crops and their varieties	44.67	8

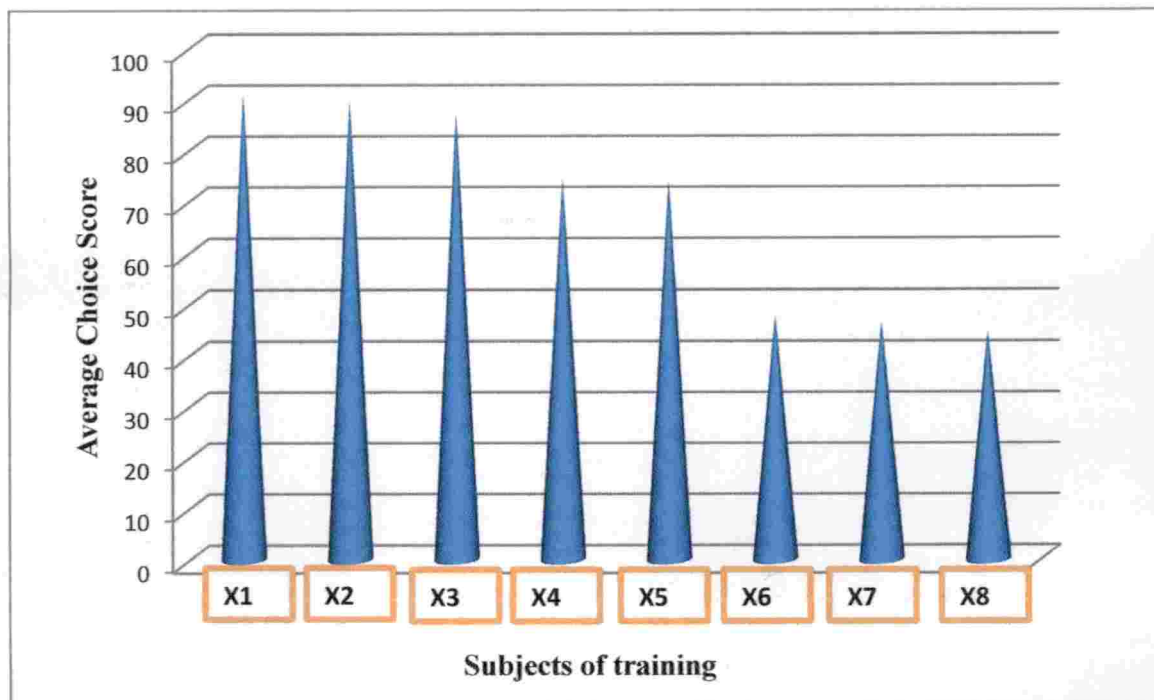


Fig 5. Training subjects preferred by the respondents

X1 - Plant protection

X2 - Preparation of botanical pesticides and fungicides like nicotine oil emulsion, neem oil emulsion, Bordeaux mixture etc.

X3 - Preparation of organic manures like vermicompost and cultivation of azolla

X4 - Preparation of potting mixture, time of sowing and time of transplantation

X5 - Manuring, usage of biocontrol agents like Trichoderma, Psuedomonas, PGPR mix-2 etc. and and biofertilizers like Rhizobium, PGPR mix-I etc.

X6 - Irrigation techniques

X7 - Grow bag filling and their suitable placement in terraces

X8 - Selection of suitable vegetables and their varieties

(ACS – Average Choice Score)

Table 8(e) shows that the most preferred subject of training by the respondents was plant protection (ACS = 91). This was followed by preparation of botanical pesticides and fungicides like nicotine oil emulsion, neem oil emulsion, Bordeaux mixture etc. (ACS = 89.67), preparation of organic manures like vermicompost and cultivation of azolla (ACS = 87.33), preparation of potting mixture, time of sowing and time of transplantation (ACS = 74.33), manuring, usage of biocontrol agents like *Trichoderma*, *Pseudomonas*, PGPR mix-2 etc. and biofertilizers like *Rhizobium*, PGPR mix-I etc. (ACS = 74), irrigation techniques (ACS = 47.67), grow bag filling and their suitable placement in terraces (ACS = 46.33) and selection of suitable vegetables and their varieties (ACS = 44.67) (Fig. 5)

Plant protection is an important aspect in farming on house terrace. Most of the respondents were worried about the pests and disease attack on their plants and were anxious about crop loss. Proper crop protection is very much essential to produce high quality crops with minimal wastage and maximum output. That might be the main reason behind the preference of 'plant protection' as the most preferred subject for training by the respondents.

Preparation of botanical pesticides, biopesticides and organic manures were also most preferred areas of training for the respondents. Health consciousness of the respondents might be the reason for their preference to get trained on these areas.

The finding is in confirmation with the findings of Sreedaya (2004) who reported that 'plant protection' was the most preferred subject for training by the urban housewives.

4.5 PROFILE CHARACTERISTICS OF THE RESPONDENTS

4.5.1 Age

Table 9. Distribution of respondents based on their age

n = 105			
SI No.	Age category	Frequency	Percentage
1	Young (< or equal to 35 years)	10	9.52
2	Middle aged (36-55)	50	47.62
3	Old (> Or equal to 56 years)	45	42.86
Total		105	100

From table 9, it is clear that majority of the respondents (47.62%) belonged to the middle aged category. The percentage of respondents belonged to old aged and young category were 42.86% and 9.52% respectively (Fig.6).

Even though majority of the respondents belonged to the middle aged category, old aged respondents were not less in number. Retired persons from government or non- government sectors were showing more enthusiasm towards farming on house terrace in order to spend their retired life wise fully by producing safe and eco-friendly vegetables for their family. This might be a recreational activity for those people.

4.5.2 Educational status

Table 10. Distribution of respondents based on their educational status

n = 105			
SI No.	Category	Frequency	Percentage
1	Illiterate	0	0

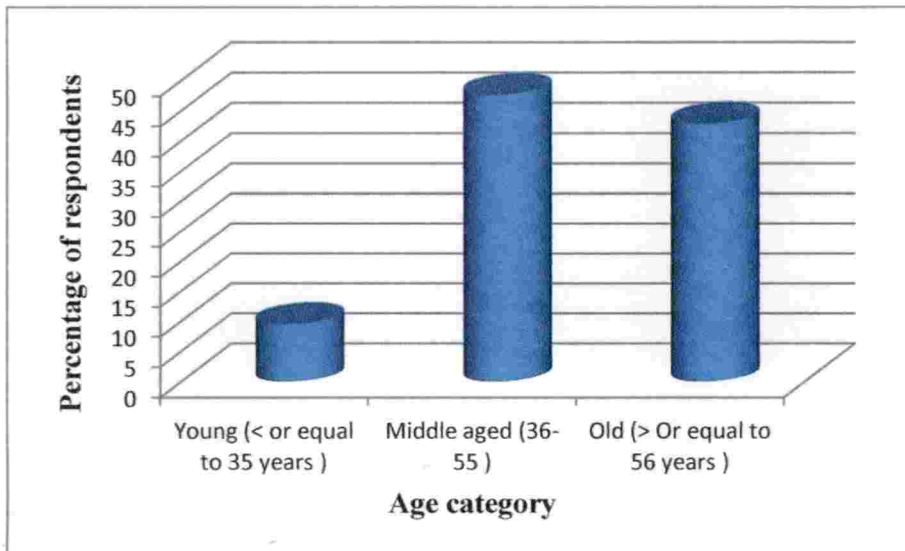


Fig 6. Distribution of respondents according to their age (n=105)

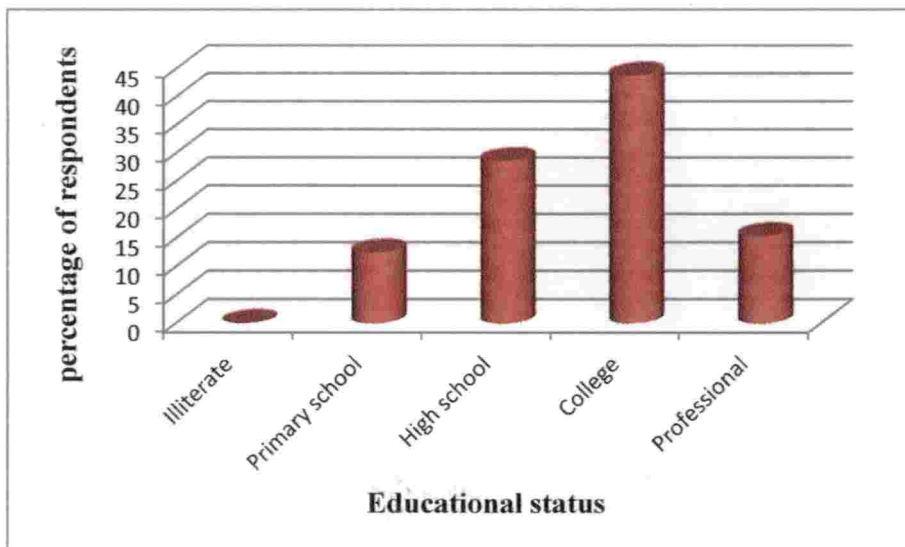


Fig 7. Distribution of respondents based on their educational status (n=105)

2	Primary school	13	12.38
3	High school	30	28.57
4	College	46	43.81
5	Professional	16	15.24
Total		105	100

A perusal of table 10 reveals that majority of the respondents (43.81%) were degree holders, 28.57% had high school education, 15.24% had professional degree and 12.38% had primary school education (Fig. 7). None of the respondents belonged to the illiterate category. This shows that most of the respondents were highly educated and thus had a high degree of knowledge regarding the importance of vegetable consumption and organic vegetable production on house terraces. This result was in confirmation with the findings of Paneerselvam *et al.* (2014) who reported that majority of the urban farmers of Coimbatore district of Tamilnadu were degree holders.

4.5.3 Family labour utilization

Table 11. Distribution of respondents based on their family labour utilization

			n = 105
SI No.	Category	Frequency	Percentage
1	Low (<Q1)	17	16.19
2	Medium (Q1-Q3)	68	64.76
3	High (>Q3)	20	19.04
Total		105	100
Q1 = 34		Q3 = 39	Range = 20 – 43

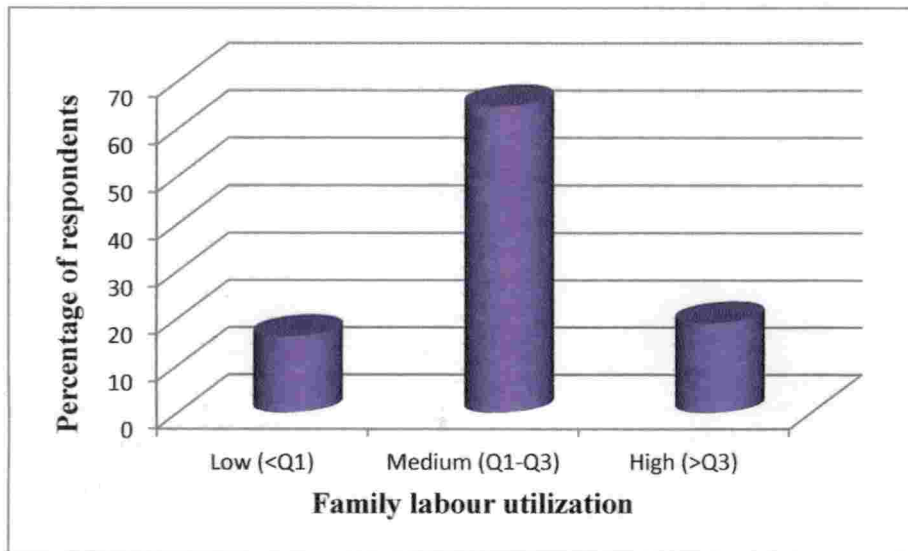


Fig 8. Distribution of respondents based on their family labour utilization (n=105)

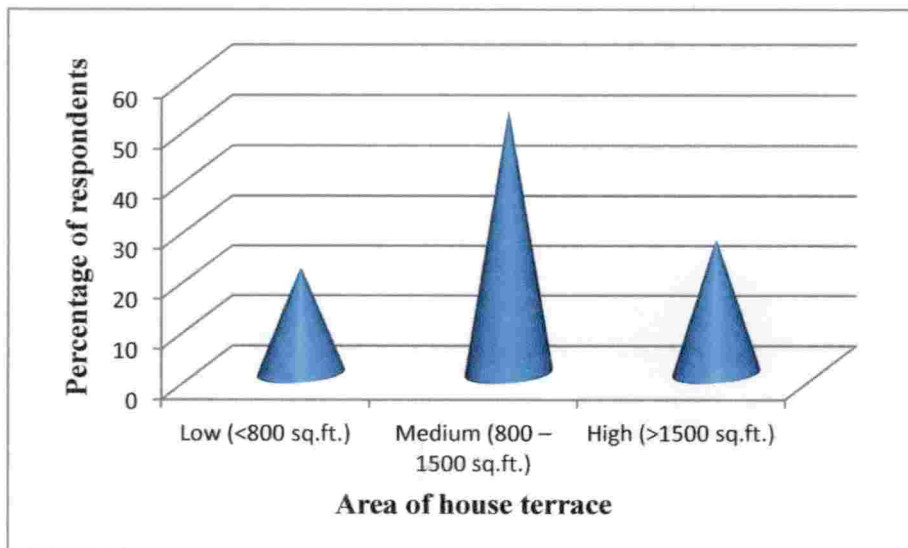


Fig 9. Distribution of respondents based on their area of house terrace (n=105)

Table 11 shows that majority of the respondents (64.76%) had medium level of family labour utilization, which was followed by high (20%) and low (17%) level of family labour utilization (Fig. 8). This family labour utilization was one of the major reasons behind the success of farming on house terrace. This would also enhance the bonding between the family members of the respondents. This result was in contrary with the findings of Sreedaya (2004) and Mohapatra (2015) who reported that family labour were highly utilized by majority (80%) of the urban farmers in house terrace cultivation and farmers of Puri district of Odisha respectively.

4.5.4 Area of house terrace

Table 12. Distribution of respondents based on their area of house terrace

n = 105			
SI No.	Area	Frequency	Percentage
1	Low (<800 sq.ft.)	22	20.95
2	Medium (800 – 1500 sq.ft.)	55	52.38
3	High (>1500 sq.ft.)	28	26.66
Total		105	100

It is clear from table 12 that majority of the respondents (52.38%) had medium level of area of house terrace, whereas 20.95% possess less area and 26.66% of respondents possess large area of house terrace (Fig. 9). This result which showed that 52.38 percent of respondents had medium sized home of 800-1500 sq.ft. This was also an indication of high health consciousness of people belonging to 'middle class' category who were doing their own efforts by involving in farming on house terraces. Whereas rich people would prefer to buy organic vegetables from organic shops.

4.5.5 Experience in farming on house terrace

Table 13. Distribution of respondents based on their experience in farming on house terrace

			n = 105
SI No.	Farming experience	Frequency	Percentage
1	Low (upto 10 years)	69	65.71
2	Medium (11 – 25 years)	26	24.76
3	High (Above 25 years)	10	9.52
Total		105	100

Table 13 shows that majority of the respondents (65.71%) had low level of farming experience on house terrace, followed by medium (24.76%) and high (9.52%) level of farming experience (Fig. 10). Most of the respondents started farming on house terrace recently by recognizing the importance of production of vegetables in their house terrace and some of them started for enjoying their retire life in a wiseful manner. KAU for the past few years have made huge efforts in finding out the pesticide residue in the vegetables collected from different markets. The sincere efforts taken by the team of scientists under All India Co-ordinated Research Project (AICRP) and Kerala government for conducting awareness programs regarding the pesticide residue and the ways of removal of residue might be the major reason for the recent breakthrough in farming on house terraces.

This result is in contrary with the findings of Anju (2016), who reported that majority of the amaranthus and vegetable cowpea growers had high level of experience in vegetable cultivation.

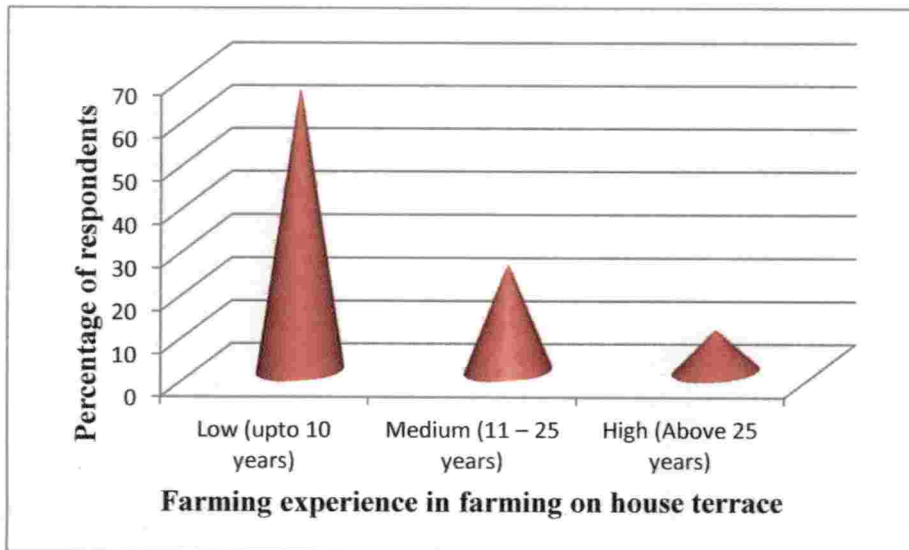


Fig 10. Distribution of respondents based on their experience in farming on house terrace (n=105)

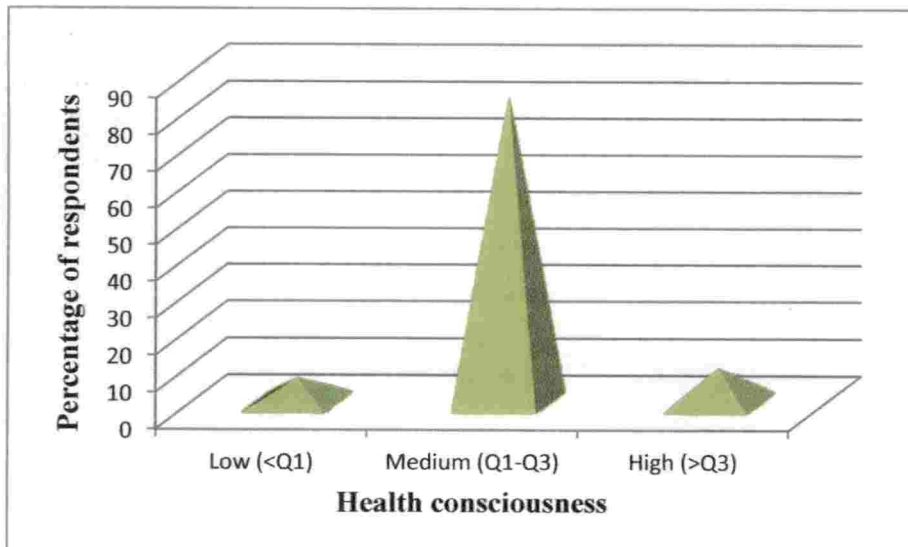


Fig 11. Distribution of respondents based on their health consciousness (n=105)

4.5.6 Health consciousness

Table 14. Distribution of respondents based on their health consciousness

n = 105			
SI No.	Category	Frequency	Percentage
1	Low (<Q1)	7	6.66
2	Medium (Q1-Q3)	88	83.81
3	High (>Q3)	10	9.52
Total		105	100
Q1 = 24		Q3 = 28	Range = 20 – 30

It is clear from table 14, majority of the respondents (83.81%) had medium level of health consciousness which was followed by high (9.52%) and low (6.66%) level of health consciousness (Fig. 11). Involvement in farming on house terrace itself was the best evidence for the positive attitude of respondents towards health consciousness. By farming on house terrace, they could produce and consume safe, eco-friendly and pesticide free vegetables.

4.5.7 Extent of micro irrigation

Table 15. Distribution of respondents based on their extent of micro irrigation

			n = 105
SI No.	Category	Frequency	Percentage
1	Low (<Q1)	34	32.38
2	Medium (Q1-Q3)	70	66.66
3	High (>Q3)	1	0.95
Total		105	100
Q1 = 3		Q3 = 4	Range = 1 – 5

Table 15 shows that majority of the respondents (66.66%) had medium level of extent of micro irrigation, which was followed by low (32.38%) and high (0.95%) level of extent of micro irrigation (Fig. 12). Most of the respondents had micro irrigation facilities like drip irrigation or wick irrigation. Most of them had wick irrigation, which was the most efficient and cost effective micro irrigation method. Homemade wick irrigation facilities could also seen in houses of some of the respondents, which was made of useless plastic bottles. Here coir pith covered by net is used as wick.

Table 16. Distribution of respondents based on their mode of irrigation

			n = 105
Mode of irrigation	Number of respondents	Percentage	
Drip irrigation	49	46.67	
Wick irrigation	32	30.48	
Manual irrigation	24	22.86	



Plate 1. Drip irrigation



Plate 2. Wick irrigation



Plate 3(a). Homemade wick irrigation



Plate 3(b). Homemade wick irrigation

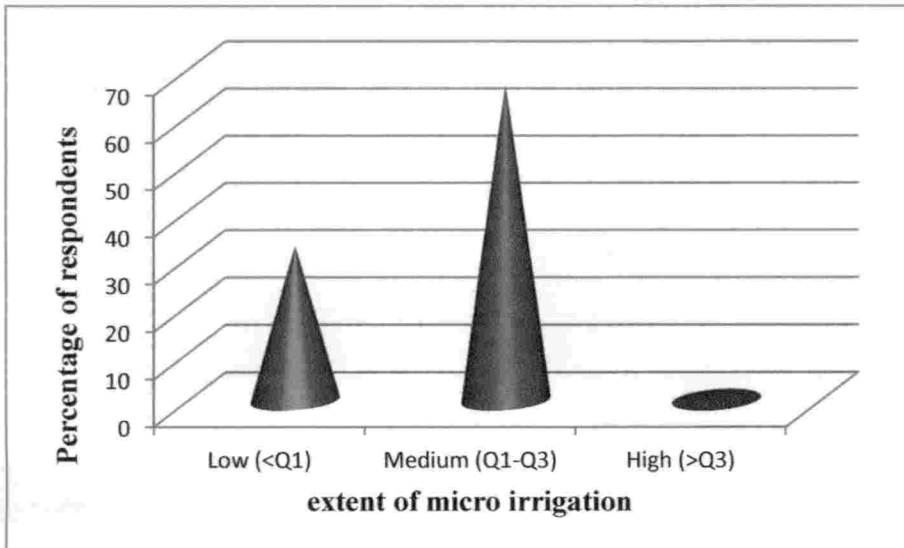


Fig 12. Distribution of respondents based on their extent of micro irrigation (n=105)

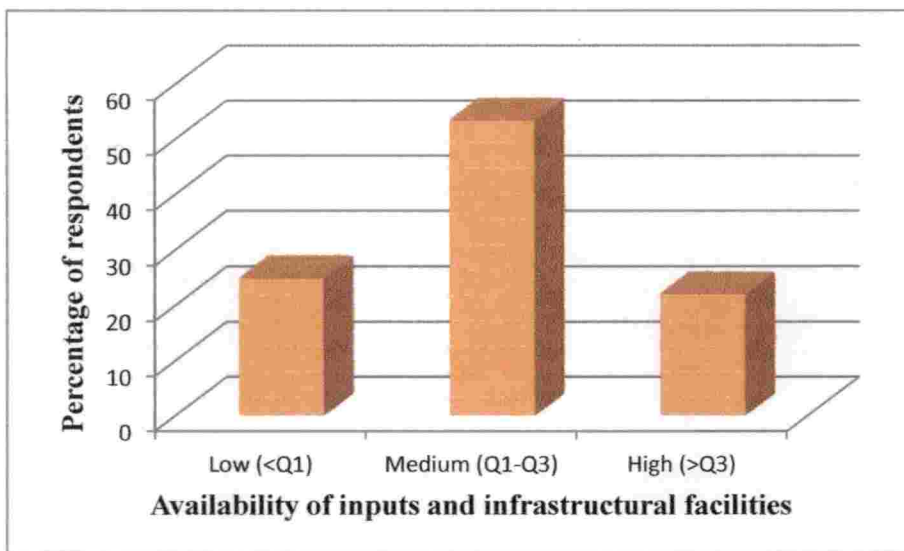


Fig 13. Distribution of respondents based on the availability of inputs and infrastructure facilities (n=105)

It is clear from table 16, majority of the respondents (46.67%) had drip irrigation facilities which was followed by wick irrigation (30.48%) and manual irrigation (22.86%).

4.5.8 Availability of inputs and infrastructure facilities

Table 17. Distribution of respondents based on the availability of inputs and infrastructure facilities

n = 105			
SI No.	Category	Frequency	Percentage
1	Low (<Q1)	31	29.53
2	Medium (Q1-Q3)	56	53.33
3	High (>Q3)	18	17.14
Total		105	100
Q1 = 15		Q3 = 25	Range = 6 – 34

Table 17 shows that majority of the respondents (53.33%) had medium availability of inputs and infrastructure facilities, which was followed by low (29.53%) and high (17.14%) availability of inputs and infrastructure facilities (Fig. 13). Regarding the quality of inputs and infrastructure facilities received, most of the respondents received low quality inputs and infrastructures from non credible sources. This was also a serious constraint as perceived by the respondents.

4.5.9 Leisure time availability

Table 18. Distribution of respondents based on their leisure time availability

n = 105			
SI No.	Leisure time availability	Frequency	Percentage
1	Low (<2 hrs)	9	8.57
2	Medium (2 – 5 hrs)	88	83.81
3	High (>5 hrs)	8	7.62
Total		105	100

Table 18 shows that majority of the respondents (83.81%) had medium availability of leisure time; whereas 8.57 % of respondents had low leisure time availability and 7.62% of respondents had high leisure time availability (Fig. 14). As the leisure time availability increases, availability of time for house terrace farming activities would also increase. So this result shows that there was medium availability of time for house terrace farming activities for the respondents.

4.5.10 Extension agency contact

Table 19. Distribution of respondents based on their extension agency contact

n = 105			
SI No.	Category	Frequency	Percentage
1	Low (<Q1)	24	22.86
2	Medium (Q1-Q3)	55	52.38
3	High (>Q3)	26	24.76
Total		105	100
Q1 =3		Q3 =4	Range = 2 – 4

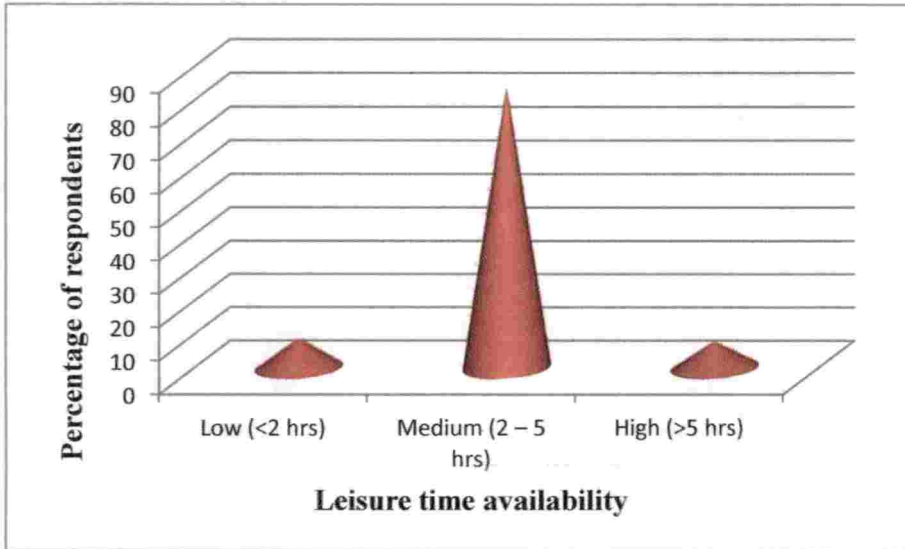


Fig 14. Distribution of respondents based on their leisure time availability (n=105)

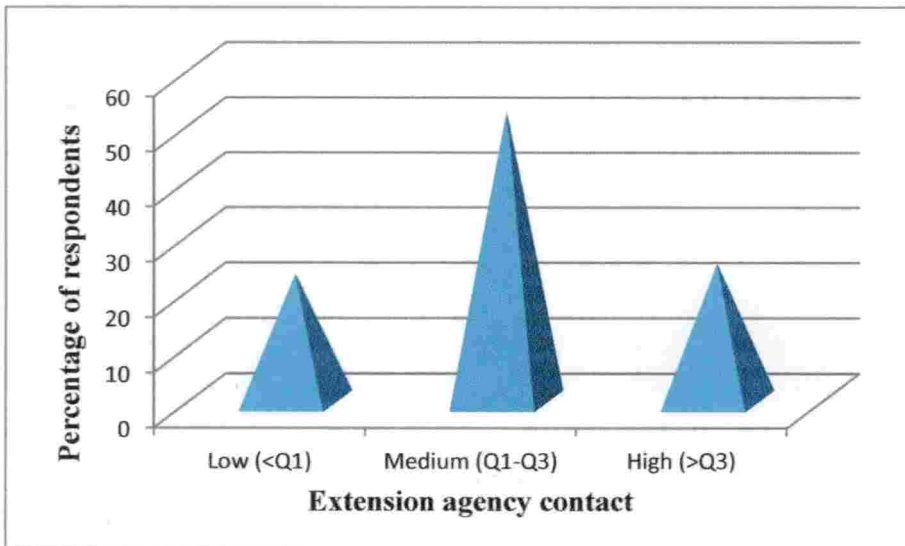


Fig 15. Distribution of respondents based on their extension agency contact (n=105)

Table 19 shows that majority of the respondents (52.38%) had medium level of extension agency contact, which was followed by high (24.76%) and low (22.86%) level of extension agency contact (Fig. 15). This high extension agency contact would help the respondents to acquire good quality inputs from credible agencies, to clear their doubts regarding farming on house terrace and to acquire knowledge regarding new technologies in farming on house terrace.

This result is in confirmation with the findings of Himaja (2001), who reported that majority of the SHG women farmers had medium level of extension agency contact followed by low level and high level.

4.5.11 Self-reliance

Table 20. Distribution of respondents based on their self-reliance

n = 105			
SI No.	Category	Frequency	Percentage
1	Low (<Q1)	25	23.81
2	Medium (Q1-Q3)	56	53.33
3	High (>Q3)	24	22.86
Total		105	100
Q1 = 19		Q3 = 22	Range = 10 – 25

A perusal of table 20 reveals that majority of the respondents (53.33%) had medium level of self-reliance, which was followed by low (23.81%) and high (22.86%) level of self-reliance (Fig. 16). Most of the respondents had the ability to depend on him/her for betterment of house terrace farming and allied activities. High educational status of the respondents coupled with their urban background had motivated them to be more self-reliant.

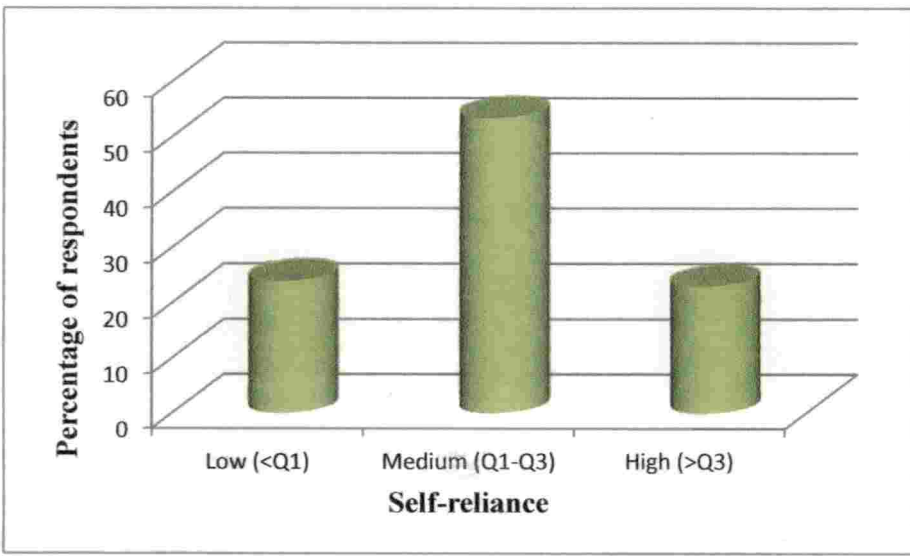


Fig 16. Distribution of respondents based on their self-reliance (n=105)

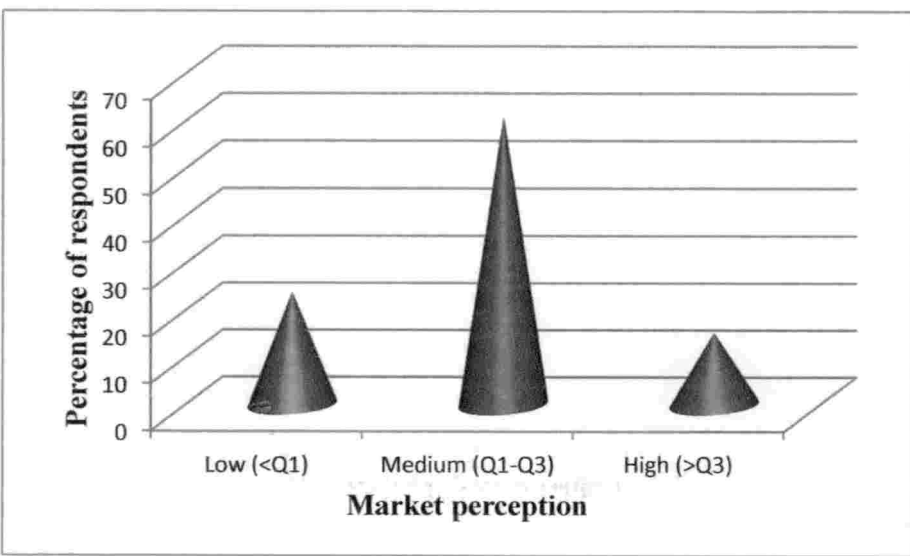


Fig 17. Distribution of respondents based on their market perception (n=105)

4.5.12 Market perception

Table 21. Distribution of respondents based on their market perception

n = 105			
SI No.	Category	Frequency	Percentage
1	Low (<Q1)	25	23.81
2	Medium (Q1-Q3)	64	60.95
3	High (>Q3)	16	15.24
Total		105	100
Q1 = 5		Q3 = 7	Range = 3 – 9

It is clear from table 21 that majority of the respondents (60.95%) had medium level of market perception; whereas 23.81% had low and 15.24% had high level of market perception (Fig. 17). Most of the respondents were doing farming on house terrace for self consumption and self satisfaction, not for commercial purpose. So according to them, market is only for purchasing products, not for selling products.

This result is in confirmation with the findings of Anupama (2014), who reported that majority of the organic vegetable growers had medium level of market perception followed by low and high levels of market perception.

4.5.13 Relative advantage

Table 22. Distribution of respondents based on the relative advantage

n = 105			
SI No.	Category	Frequency	Percentage
1	Low (<Q1)	10	9.52
2	Medium (Q1-Q3)	65	61.9
3	High (>Q3)	30	28.57
Total		105	100
Q1 =24		Q3 =28	Range =18 - 30

Table 22 shows that majority of the respondents (61.9%) had perceived medium level of relative advantage towards farming on house terrace, where as 28.57% of the respondents had perceived high and 9.52% of the respondents had perceived low level of relative advantage (Fig.18). Most of the respondents had comparatively high degree of relative advantage, i.e., farming on house terrace and allied enterprises like vermicomposting, azolla cultivation, poultry rearing etc which were perceived as being better than conventional practice followed by the respondents.

Some of the relative advantages of farming on house terrace mentioned by the respondents were:

- Protection from pests and diseases due to the elevated position
- Farming on house terrace was small space friendly and a best option for urban areas
- Green roof would improve the quality of air and effective use of rainwater would be there

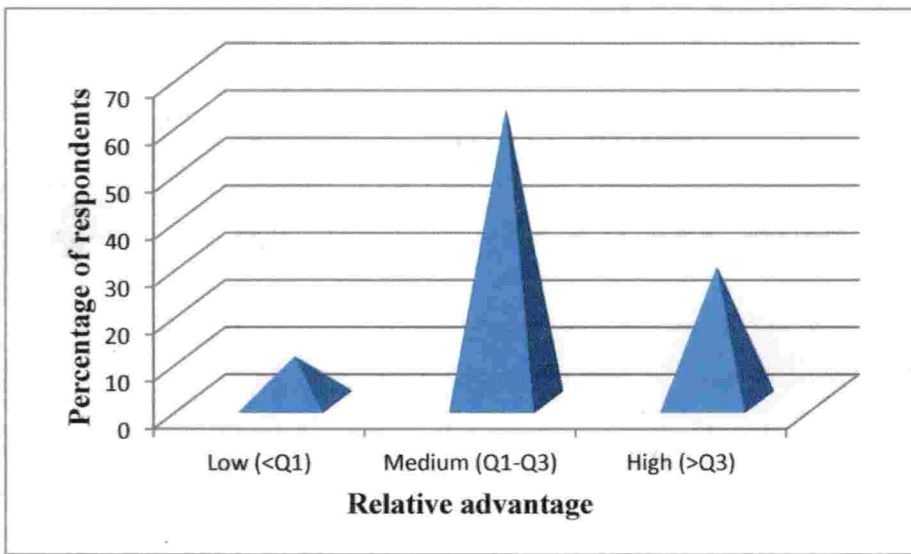


Fig 18. Distribution of respondents based on their relative advantage (n=105)

- Farming on house terrace would reduce the temperature inside the building

4.6 RELATIONSHIP BETWEEN INDEPENDENT AND DEPENDENT VARIABLES

4.6.1 Relationship between profile characteristics of the respondents and change in consumption pattern of vegetables by the respondents

Table 23. Relationship between profile characteristics of the respondents and change in consumption pattern of vegetables by the respondents

n = 105		
Variable No.	Profile characteristics	Correlation coefficient
1	Age	0.277 **
2	Education	0.335 **
3	Family labour utilization	0.179 NS
4	Area of house terrace	0.211 *
5	Experience in farming house terrace	0.123 NS
6	Extent of micro irrigation	0.244 *
7	Health consciousness	0.329 **
8	Leisure time availability	0.109 NS
9	Extension agency contact	0.254 **
10	Market perception	0.131 NS
11	Availability of inputs and infrastructure facilities	0.139 NS
12	Self-reliance	0.123 NS
13	Relative advantage	0.332 **

(* - Significant @ 5% level ** - Significant @ 1% level NS – Non Significant)

After finding out the correlation between the profile characteristics and change in consumption pattern of vegetables by the respondents, it was found that the change in consumption pattern of vegetables had positive and significant correlation with the variables like age, education, area of house terrace, extent of micro irrigation, health consciousness, extension agency contact, and relative advantage.

With the increase in age of the respondents, the consumption pattern of vegetables was found to increase. This might be due to the fact that, aged people would be more health conscious and prefer safe vegetables than others. This result is in confirmation with the findings of Ajitha (2000), who reported that daily consumption of vegetables by the senior citizens in urban areas are more than in rural areas.

In the case of education, it was found that with the increase in education of the respondents, consumption pattern of vegetables also increased. This might be due to the fact that the higher education would give more knowledge about the importance of vegetable consumption to the respondents.

Regarding area of house terrace, as the area increases, the consumption pattern of vegetables was also found to be increased. This might be due to the fact that when area increases, space to cultivate would also increase, then the production of vegetables would increase.

When the extent of micro irrigation increases, irrigation efficiency increases. This might have resulted in the increased production of vegetables. This might be the reason behind the increase in consumption pattern of vegetables when the extent of micro irrigation increases.

Health consciousness of the respondents would lead the respondents to consume more vegetables than non-vegetarian foods. This might be the reason behind the increase in consumption pattern of vegetables when the health consciousness of

the respondents increases. This result is in confirmation with the findings of Sreedaya (2004), who reported that health consciousness had positive and significant relationship with consumption pattern of vegetables.

Initiatives of various extension agencies in promoting farming on house terrace and in creating awareness about the nutritional importance of organic vegetables might be the reason for the increase in vegetable consumption pattern when the extension agency contact increases.

One of the relative advantages of farming on house terrace was the production of completely organic vegetables. This might be the reason for the increase in vegetable consumption pattern when the relative advantage increases.

4.6.2 Relationship between profile characteristics of the respondents and knowledge of respondents on vegetable cultivation

Table 24. Relationship between profile characteristics of the respondents and knowledge of respondents on vegetable cultivation

n = 105		
Variable No.	Profile characteristics	Correlation coefficient
1	Age	0.271 **
2	Education	0.351 **
3	Family labour utilization	0.103 NS
4	Area of house terrace	0.122 NS
5	Experience in farming on house terrace	0.338 **
6	Extent of micro irrigation	0.151 NS
7	Health consciousness	0.222 *
8	Leisure time availability	0.111 NS

9	Extension agency contact	0.295 **
10	Market perception	0.024 NS
11	Availability of inputs and infrastructure facilities	0.111 NS
12	Self-reliance	0.279 **
13	Relative advantage	0.283 **

(* - Significant @ 5% level ** - Significant @ 1% level NS – Non Significant)

After finding out the correlation between the profile characteristics and knowledge of respondents on vegetable cultivation, it was found that the knowledge on vegetable cultivation had positive and significant correlation with the variables like age, education, experience in farming on house terrace, health consciousness, extension agency contact, self-reliance and relative advantage.

As the age of the respondents' increases, their experience regarding vegetable cultivation may increase. This would result in the increase in knowledge of respondents regarding vegetable cultivation with the increase of age.

In the case of education, it was found that with the increase in education of the respondents, knowledge of respondents in vegetable cultivation also increased. Higher education might have helped the respondents to collect information from all sources. There were several expert systems for the farmers which would provide on-line information on different crop management issues like diagnosing and controlling commonly found insect-pests and diseases, crop economics and designing schedule for irrigation and fertilization application etc. Some of the examples for Expert systems are, ESIM (Expert System for Irrigation Management), DDIS (Distance Diagnostic and Identification System), PCEST (Pest Control Expert System for Tomato) etc.

As the experience in farming on house terrace increases, knowledge regarding vegetable cultivation would also increase. This result is in confirmation with the findings of Sreedaya (2000), who reported that farming experience has significant and positive relationship with knowledge in vegetable cultivation of self help groups in Thiruvananthapuram district.

Health consciousness of the respondents would lead the respondents to seek more information regarding the production and consumption of organic vegetables. Shocking incidence of malignancy due to high incidence of chemicals in fruits and vegetables forced the respondents to think about their own vegetable cultivation. This would also result in the increase in knowledge of respondents regarding vegetable cultivation.

Initiatives of various extension agencies in promoting farming on house terrace and in creating awareness about the nutritional importance of organic vegetables might be the reason for the increase in knowledge on vegetable production when the extension agency contact increases.

Self reliance of respondents would lead them to acquire self dependency in vegetable cultivation, which would further result in the seeking of knowledge regarding vegetable cultivation. This might be the reason behind the increase in knowledge on vegetable cultivation when self reliance increases.

Relative advantage of farming on house terrace will lead the respondents to seek more information regarding the vegetable cultivation. This might be the reason behind the increase in knowledge of vegetable cultivation when relative advantages increase.

4.6.3 Relationship between profile characteristics of the respondents and knowledge of respondents on farming on house terrace

Table 25. Relationship between profile characteristics of the respondents and knowledge of respondents on farming on house terrace

		n = 105
Variable No.	Profile characteristics	Correlation coefficient
1	Age	0.224*
2	Education	0.339**
3	Family labour utilization	0.136NS
4	Area of house terrace	0.036NS
5	Experience in farming on house terrace	0.296**
6	Extent of micro irrigation	0.271**
7	Health consciousness	0.321**
8	Leisure time availability	0.115NS
9	Extension agency contact	0.348**
10	Market perception	0.028NS
11	Availability of inputs and infrastructure facilities	0.182NS
12	Self-reliance	0.266**
13	Relative advantage	0.27**

(* - Significant @ 5% level ** - Significant @ 1% level NS – Non Significant)

After finding out the correlation between the profile characteristics and knowledge of respondents on farming on house terrace, it was found that the knowledge on farming on house terrace had positive and significant correlation with the variables like age, education, experience in farming on house terrace, extent of

micro irrigation, health consciousness, extension agency contact, self-reliance and relative advantage.

As the age of the respondents' increases, their experience regarding vegetable cultivation would also increase. This would also results in the increase in knowledge of respondents regarding farming on house terrace vegetable, which might be the reason behind the increase in knowledge on farming on house terrace when age increases.

In the case of education, it was found that with the increase in education of the respondents, knowledge of respondents on farming on house terrace also increased. Higher education might have helped the respondents to collect information from all sources.

It was found from table 23 that when there was an increase in experience in farming on house terrace, knowledge of the respondents in vegetable cultivation increases. Therefore, it was quite natural that the respondents who were interested in farming on house terraces had more knowledge regarding farming on house terrace.

Extent of micro irrigation of respondents indicates the updating of knowledge regarding farming on house terrace by the respondents. Because micro irrigation is somewhat a new technology in farming on house terrace. This might be the reason behind the increase in knowledge on farming on house terrace when micro irrigation potential increases.

Health consciousness of the respondents would lead the respondents to seek more information regarding the consumption of organic vegetables. This would also result in the increase in knowledge of respondents regarding farming on house terrace. This result is in confirmation with the findings of Greeshma (2017), who reported that health consciousness had positive and significant relationship with knowledge on farming on house terrace.

Initiatives of various extension agencies in promoting farming on house terrace and in creating awareness about the nutritional importance of organic vegetables might be the reason for the increase in knowledge on farming on house terrace when the extension agency contact increases.

Self reliance of respondents would lead them to acquire self dependency in vegetable cultivation, which would results in the seeking of knowledge regarding vegetable cultivation. This might be the reason behind the increase in knowledge on vegetable cultivation and farming on house terrace when self reliance increases.

Relative advantage of farming on house terrace would lead the respondents to seek more information regarding the farming on house terrace. This might be the reason behind the increase in knowledge on farming on house terrace when relative advantages increases.

4.7 PERCEPTION OF EXTENSION OFFICIALS REGARDING FARMING ON HOUSE TERRACE

Table 26. Distribution of extension officials based on their perception

			n = 15
SI No.	Category	Frequency	Percentage
1	Low (<Q1)	2	13.33
2	Medium (Q1-Q3)	7	46.67
3	High (>Q3)	6	40.00
Total		15	100
Q1 = 36.5		Q3 = 39	Range = 34 – 46

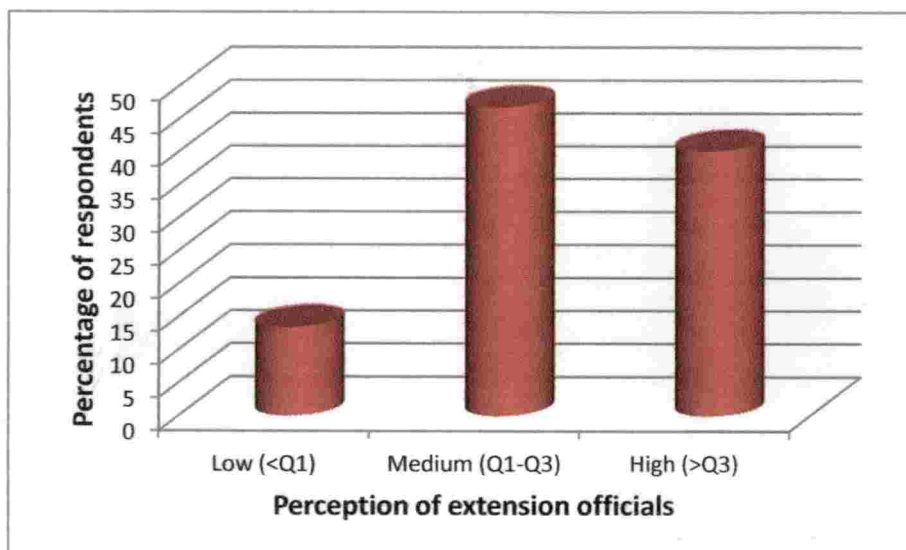


Fig 19. Distribution of extension officials based on their perception regarding farming on house terrace (n=15)



Table 26 shows that majority of the extension officials (46.67%) had medium degree of perception regarding the farming on house terrace, where as 40% had high degree of perception and 13.33% had low degree of perception regarding farming on house terrace (Fig.19). Perceptions regarding farming on house terrace were collected from the extension officials of State Horticulture Mission (SHM), Kerala Irrigation and Infrastructure Development Corporation (KIIDC), Vegetable and Fruit Promotion Council Keralam (VFPCCK) and City Corporation Krishi Bhavan.

Most of the respondents believed that farming on house terrace would produce safe and eco-friendly vegetables and would reduce the family expenditure to some extent. Some of the respondents believed that the farming on house terrace would lead to self sufficiency in vegetable production, while some others disagree with this statement. They argued that most of the urban households are doing farming on house terrace on small scale only. So self sufficiency in vegetable production might not be occurring with this little production. But almost all officials opined that the initial enthusiasm shown by the respondents would disappear as the time progress and would gradually neglect it. Only a small number of farmers continue the farming activities in full stretch even after few years.

Almost all officials agreed with the statement that the public was not aware of information regarding the agencies providing support services and infrastructural facilities. This shows the failure of extension activities regarding these services. Most of the officials believed that farming on house terrace was a recreational activity for those who involved in it and it would also provide horticultural therapy treatment to the mentally retarded children and physically handicapped members of the family. This shows a different face of farming on house terrace regardless of safe and eco-friendly vegetable production.

Majority of the officials disagreed with the statement that farming on house terrace was a threat to the safety of the house. But proper care must be ensured for the

protection of house such as placing grow bags above bricks which would allow easy flow of excess irrigation water; placing of grow bags in suitable position i.e., in areas having supporting walls below etc. most of the extension officials perceived that proper training and other infrastructural facilities were being provided to the urban households for doing farming on house terrace.

4.8 RECOMMENDATIONS FOR IMPROVEMENT

4.8.1 Recommendations by the respondents

Respondents of the study put forward certain suggestions in order to tackle the constraints that they were facing. They are listed below.

1. Service of the experts at the time of necessity must be ensured
2. Ensure the timely availability and quality of inputs and infrastructural facilities
3. Ensure frequent training programs along with improved techniques
4. Encourage residents' association wise healthy competitions like exhibitions and melas to support farming on house terrace

4.8.2 Recommendations by the extension officials

Extension officials from different institutions such as State Horticulture Mission (SHM), Kerala Irrigation and Infrastructure Development Corporation (KIIDC), Vegetable and Fruit Promotion Council Keralam (VFPCCK) and City Corporation Krishi Bhavan put forward certain suggestions to tackle the constraints in farming on house terrace and in the grow bag distribution. They are listed below.

1. Ensure the timely availability of fund for executing the projects
2. Ensure proper delegation of duties and responsibilities among the staff members

3. Increase the number of staff
4. Success stories of farming on house terrace needs to be regularly shared through publications, websites, television media etc.
5. Good quality seeds and planting materials should be made available to the farmers through various centers of Kerala Agricultural University, VFPCs and Krishi Bhavans
6. Encourage awareness programs
7. Adequate training programs should be given to the farmers
8. Awards can be given to recognize the achievers in farming on house terrace to spread and promote the spirit of success.

4.8.3 Recommendations by the researcher

1. The quality of extension activities should be improved with proper follow up and frequent monitoring.
2. Government agencies promoting farming on house terrace should ensure good quality inputs and infrastructural facilities to the urban households.
3. Encourage awareness programs about the residual effect of pesticides and malignancy caused due to the indiscriminate use of chemicals.
3. Residents' association leaders should take initiative
 - For ensuring good quality inputs and infrastructural facilities to their association members
 - For arranging proper training sessions for the association members according to their needs.
 - For producing organic manures by collecting kitchen wastes from the association members
4. Crop loss due to pests and diseases attack was perceived as the major constraint in farming on house terrace, which can be controlled to a great

extent by daily observation and by mechanical methods such as hand picking, mechanical traps etc.

5. High cost and the non- durable nature of grow bags were perceived as major constraints by the respondents, which can be solved by using locally available containers such as broken buckets, paint buckets, fertilizer sacs, plastic bottles etc can be used for farming on house terrace.

6. Tanks (either constructed or synthetic) on terraces for water storage will resolve the problem of water shortage for irrigation

7. Rope and pulley can be used for lifting the inputs from ground to terrace of the house.

8. Transplantation shock to seedlings can be reduced by putting a handful of azolla at the base of the seedling.

9. Only 75% of the container should be filled in order to facilitate easy irrigation.

10. Excess quantity produce may be collected from the individual houses by suitable measures.

11. During the field visit, the researcher could identify that some of the respondents were really worried about the safety of their house terrace. To overcome the constraint, the containers are to be arranged in line on the terrace ensuring wall underneath.

12. Place the grow bags/containers above bricks which would allow easy flow of excess irrigation water, which would protect the house terrace from leakage problems.

13. The involvement of youth in farming on house terrace was found to be low during the survey. Even though some young farmers are there, their contribution is not yet visible predominantly. So awareness should be given to youngsters for encourage farming on house terrace.

14. Create awareness among house wives, children etc in order to spread the concept of farming on house terrace to more areas.
15. Open outlets by the government agencies like Agricultural Universities and Departments. So that people could get quality inputs from credible sources.



Plate 4. White grow bags used as containers



Plate 5. Paint buckets used as containers



Plate 6. Old bath tub as a container for growing crops



Plate 7. Rubber baskets used for growing crops



Plate 8. Baby walker used for growing a crop



Plate 9. Thermocol baskets used as containers



Plate 10. Plastic pipe used for growing crops



Plate 11. Plastic sacs used as containers

SUMMARY AND CONCLUSION

5. SUMMARY

The tremendous change in population and urbanization leads to food insecurity, environmental insecurity and nutritional deficiency. The space/land available for cultivation was converted into buildings and roads, which drastically reduces the per capita land available for cultivation. The most efficient solution for this problem is the farming on house terrace. This would results in the fresh, safe and hygiene vegetables, which is the need of the day due to the high influence of pesticides and other toxics in the food. Keeping this in view, a study entitled “Constraint analysis of farming on house terrace and distribution of grow bags” was conducted in Thiruvananthapuram Corporation among the urban households involved in farming on house terrace with the following specific objectives:

- To identify the constraints in farming on house terraces and in the distribution of grow bags
- To study the consumption pattern of vegetables by urban families.
- To assess the knowledge and training need of respondents in farming on house terraces.

The study was conducted in seven wards of Thiruvananthapuram Corporation namely Poojappura, Pettah, Manacaud, Kumarapuram, Karamana, Industrial Estate and Enchakkal. One hundred and five members of urban households involved in farming on house terrace, fifteen extension officials from State Horticulture Mission, Kerala Irrigation and Infrastructure Development Corporation, Vegetable and Fruit Promotion Council Keralam and City Corporation Krishi Bhavan and thirty office bearers of selected residents associations of the selected wards were the respondents of the study.

A well structure questionnaire and interview schedule was used to collect data regarding farming on house terrace from the respondents. Four dependent variables

and thirteen independent variables were studied and analyzed with the help of several statistical tools such as average, frequency, percentage, quartile deviation and correlation.

The dependent variables were the consumption pattern of vegetables by the respondents, knowledge of respondents on vegetable cultivation and farming on house terrace and training need of respondents regarding farming on house terrace.

The independent variables identified for the study were age, education, family labour utilization, area of house terrace, experience in farming on house terrace, extent of micro irrigation, health consciousness, leisure time availability, extension agency contact, market perception, availability of inputs and infrastructural facilities, self-reliance and relative advantage.

The salient findings of the study are summarized below:

1. Regarding the constraints perceived by the respondents on farming on house terrace, 'crop loss due to pests and diseases attack' was perceived as the major constraint and 'low quality grow bags and potting mixture issued by the private agencies' was the major constraint in the distribution and usage of grow bags as perceived by the respondents and the office bearers of residents associations of each wards. 'Lack of timely availability of fund' was the major constraint in the farming on house terrace and grow bag distribution as perceived by the extension officials.
2. The consumption pattern of vegetables by the respondents revealed that majority (65.71%) of the respondents belonged to the medium category in consumption pattern of vegetables.
3. In the case of the knowledge of respondents in farming on house terrace, majority of the respondents belonged to the medium category of knowledge

on vegetable cultivation (61.9%) and knowledge on farming on house terrace (74.29%).

4. Considering the training need of respondents on farming on house terrace, plant protection was the most preferred subject for training by the respondents.
5. The frequency distribution of profile characteristics of the urban households involved in farming on house terrace in Thiruvananthapuram Corporation revealed that majority (47.62%) of the respondents belonged to the middle aged category and 43.81% of respondents are degree holders. Majority of respondents belonged to medium category in family labour utilization (64.76%), area of house terrace (52.38%), health consciousness (83.81%), extent of micro irrigation (66.66%), leisure time availability (83.81%), availability of inputs and infrastructural facilities (53.33%), extension agency contact (52.38%), market perception (60.95%), self-reliance (53.33%) and relative advantage (61.9%). Majority of the respondents belonged to lower category in experience in farming on house terrace (65.71%).
6. Correlation studies showed that age, education, area of house terrace, extent of micro irrigation, health consciousness, extension agency contact and relative advantage had a positive and significant relationship with the consumption pattern of vegetables by the respondents.
7. Age, education, experience in farming on house terrace, health consciousness, extension agency contact, self-reliance and relative advantage had a positive and significant relationship with the knowledge of respondents on vegetable cultivation.
8. Results of the correlation studies on knowledge of respondents on farming on house terrace revealed that age, education, farming experience on house terrace, extent of micro irrigation, health consciousness, extension agency

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contact, self-reliance and relative advantage had a positive and significant relationship

9. Regarding the perception of extension officials towards farming on house terrace, majority (46.67%) of the respondents had medium level of perception towards farming on house terrace.

Future line of research

The following aspects on farming on house terrace can be investigated in future:

1. Extend the investigation on farming on house terrace to other areas of Kerala or to other corporations of Kerala.
2. Identify various indigenous knowledge regarding farming on house terrace of the farmers across Kerala for the improvement of farming on house terrace.
3. Develop a new package of practices for farming on house terrace by incorporating the indigenous knowledge of the farmers.
4. Validate various organic plant protection measures and organic manures suited to farming on house terrace.

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APPENDICES

APPENDIX - I
KERALA AGRICULTURAL UNIVERSITY
College of Agriculture, Vellayani

Dr. G.S. Sreedaya
Assistant Professor, Vellayani.

Department of Agricultural Extension
Dated 17-8-2015

Dear Sir/Madam,

Mrs.Binsa B.,MSc. Student of this department under my guidance is undertaking a research study entitled "Constraint analysis of farming on house terrace and distribution of grow bags". In this connection she has collected few profile characters, which are likely to influence the farming on house terrace and constraints associated with it which were given in Annexure 1. It may be noted that you have been identified as a judge for rating the relevancy on a five point continuum of 'most relevant', 'more relevant', 'undecided', 'less relevant' and 'least relevant' by showing (✓) mark in the appropriate column. If you feel that any more important variables are left out, kindly add the same with your judgment.

I request you kindly spare some of our valuable time to go through these variables and give your valuable responses. Thanking you in advance for your kind contribution for completing this portion of her research work.

With regards,

Yours sincerely,

Dr. G.S. Sreedaya
Assistant Professor
Department of Agricultural Extension
College of Agriculture, Vellayani

ANNEXURE I

SL. NO	Variable	Definition	Most relevant	More relevant	Undecided	Less relevant	Least relevant
1	Age	Age was defined as the number of years completed by the respondent at the time of investigation					
2	Education	It refers to the extent of non-formal or formal learning possessed by the house terrace farmer					
3	Occupation	Defined as the main vocation and other vocations that the respondents had at the time of interview					
4	Family size	This refers to the number of members of either sex living in a household/family dependent on the head of the family					
5	Family labour utilization	It is defined as the extent of utilization/involvement of family members of the respondents in various physical activities of terrace farming					
6	Family support	It refers to the support that the farmer is getting from his family members					

7	Reduction in family expenditure	It refers to the reduction in family expenditure due to reduced purchase of vegetables from outside due to house terrace farming					
8	Extension contribution	It refers to the extent of help and services rendered by various extension agencies to the house terrace farmers					
9	Mass media contact	It refers to the extent to which the respondent was exposed to different mass media communications such as radio, newspaper and television					
10	Social media contact	It refers to the extent to which the respondent is oriented towards different social media like facebook, whatsapp and other applications like Adukkalathottam(https://www.facebook.com/groups/adukkalathottam/) , Krishibhoomi (https://www.facebook.com/pages/krishi-bhoomi) , Ente krishi(https://www.facebook.com/entekrishi) , Krishi naturals (https://www.facebook.com/krishinaturals) , Kerala krishi(https://www.facebook.com/keralakrishi)					
11	Irrigation	It is defined as the extent to					

	index	which the crop is being irrigated					
12	Micro irrigation potential	This refers to the extent to which the house terrace crops are irrigated using micro irrigation					
13	Market orientation	It refers to the degree to which a farmer is oriented towards the market in terms of demand and price of his produce					
14	Market perception	It refers to the capacity of the respondents to identify the market trend to sell the produce for greater returns					
15	innovativeness	It refers to the degree to which the respondent was relatively earlier in adopting new ideas					
16	Farming experience	It refers to the number of completed years of experience of the respondents in farming at the time of interview					
17	House terrace farming experience	It refers to the number of completed years of experience of respondents in house terrace farming					
18	Information seeking behavior	It refers to the information seeking behavior of respondents about house terrace farming					
19	Trainings undergone	It refers to the total number of trainings undergone by the respondents in house terrace					

		cultivation and related areas					
20	Economic motivation	It refers to the profit maximization and the relative value placed by the respondent on economic ends					
21	Health consciousness	It refers to the awareness, knowledge and interest of the respondent regarding safe vegetables dietary requirements, personal hygiene and environmental sanitation					
22	Scientific orientation	It is the orientation of the respondent towards the scientific methods of farming on house terraces					
23	Risk orientation	It refers to the degree to which the respondent is oriented towards encountering risks and to uncertainty in adopting new ideas in house terrace farming					
24	Information source utilization	Refers to the sources/channels from which the respondent got the information on terrace cultivation					
25	Progressiveness	Refers to an individual's relative higher receptivity to modern values and practices					
26	Area of house terrace	It refers to the area in square feet of the respondent's house terrace of respondent					
27	Self	It refers to the degree of faith,					

	confidence	the respondent has his own abilities, initiative and zeal to achieve his goal or aim					
28	Level of aspiration	It refers to the respondent's overall assessment of the concern for wishes and hopes for future or for the fears and worries about the future in her own reality world					
29	Management orientation	It refers to the degree to which the respondent was scientifically oriented towards planning, production and marketing aspects of vegetables					
30	Status need	It refers to the perception of respondents to the degree to which vegetable cultivation can bring status to the society					
31	Rational orientation	It refers to the extent of rationality and scientific belief of a house terrace farmer in relation to the different scientific recommendations applicable to house terrace farming					
32	Immediacy of returns	Refers to the degree to which vegetable cultivation could make immediate returns					
33	Persuasiveness	It refers to the ability to influence by argument, by					

		reason, inducement or to win over other persons to accept something to be true, credible commendable or worthy					
34	Availability of inputs	It refers to the availability of terrace farming inputs from the nearby sources					
35	Orientation towards competition	It refers to the basic motivating force which may lead the farmers to attain excellence in comparison to others in respective fields					
36	Credit orientation	It refers to the credit facilities available to the house terrace farmers					
37	Availability of infrastructure facilities	The infrastructure facilities responsible for providing agricultural inputs to farmers affect very much the functioning of farmers when the farmers undertake crop cultivation					
38	Conceptual skill	It refers to the farmer's ability to visualize, plan and integrate various activities in vegetable production and marketing in house terrace farming					
39	Leisure time availability	It refers to the availability of leisure time for the respondents from their jobs for doing house terrace farming activities					

40	Environmental orientation	Degree to which a farmer is concerned about his environment					
41	Achievement motivation	Refers to the striving of the respondent to do good work and attain a sense of accomplishment					
42	Cosmopolitaness	Refers to the tendency of the respondent to be in contact with outside their locality on the belief that all the needs of an individual can't be satisfied in their own locality					
43	Employment generation	Refers to the extent to which the farmer obtains additional employment opportunities					
44	Self-reliance	Refers to the ability of a farmer to depend on one's own self for introducing changes in his farming activities					
45	Professional contact	Defined as the contact the individual maintains with various agencies, agricultural officers, scientists and other officers with regard to house terrace farming					
46	Need satisfaction	Defined as achieving individual farmer's need and requirements by house terrace farming within a stipulated time					
47	Compatibilit	Degree to which the house					

	y	terrace farming is perceived as being consistent by the respondent with the existing values, past experiences and needs of potential adopters					
48	Relative advantage	It refers to the degree to which the house terrace farming is perceived as being better than purchasing vegetables from outside					
49	Attitude	Refers to the degree of positive or negative disposition of the respondent associated with house terrace farming					
50	Others, if any, please specify						

ANNEXURE II

Relevancy score of profile characters

1	Age	4.25
2	Education	4.125
3	Family labour utilization	4.5
4	Area of house terrace	4.2
5	Experience in farming on house terrace	4.125
6	Extent of micro irrigation potential	4.12
7	Health consciousness	4.5
8	Leisure time availability	4.375
9	Extension agency contact	4.125
10	Market perception	4.25
11	Availability of inputs and infrastructure facilities	4.125
12	Self-reliance	4.125
13	Relative advantage	4.32

APPENDIX – II

Selected statements for measuring perception of extension officials about farming on house terrace

1. Farming on house terrace produces safe and eco-friendly vegetables
2. Farming on house terrace leads to self sufficiency in vegetable production
3. Initial enthusiasm shown by the respondents disappears as the time progress
4. Farming on house terrace will reduce the family expenditure
5. Public is not aware of information regarding agencies providing support services and infrastructural facilities
6. Distribution of grow bags is streamlined though there were some problems initially
7. Farming on house terrace is a recreational activity for those who involved
8. Farming on house terrace is a threat to the safety of the house
9. Proper training and other infrastructural facilities are being provided to the urban households.
10. Farming on house terrace provides horticultural therapy treatment to the mentally retarded children and physically handicapped members of the family

APPENDIX - III

**KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF AGRICULTURE, VELLAYANI**

Constraint analysis of farming on house terrace and distribution of grow bags

Interview schedule

1. Name and address of the respondent :
2. Age in completed years :
3. Educational status :
4. Experience in farming on house terrace : years
5. A) Total cultivated area :
B) Area under house terrace cultivation :
6. Leisure time available for doing farming on house terrace (hours/day) :
7. Family labour utilization

Please put tick (√) mark in appropriate item

Sl.No.	Statement	To the fullest extent	As far as possible	To the least extent	Never
1	Do you feel that children should be involved in the farming on house terrace?				
2	To what extend you utilize your family members for this?				

3	If yes, check the following aspects				
a.	Preparation of potting mixture				
b.	Filling the grow bags				
c.	Sowing the seeds				
d.	Irrigation				
e.	Transplanting				
f.	Manuring				
g.	Identification of pests and diseases and their destruction				
h.	Harvesting				
i.	Marketing				

8. Self – reliance

Please indicate your opinion against the following statements

SA – Strongly Agree, A – Agree, U – Undecided, D – Disagree, SD – Strongly Disagree

Sl.No.	Statement	SA	A	U	D	SD
1	I would like to do farming activities as per my own initiative					
2	I would like to take important decisions based on my own will					
3	I get discouraged easily					
4	I am generally confident about my knowledge in farming on house terrace and allied activities					

5	I find myself worrying about something or others					
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9. Health consciousness

Please indicate your opinion against the following statements

SA – Strongly Agree, A – Agree, U – Undecided, D – Disagree, SD – Strongly Disagree

Sl.No.	Statement	SA	A	U	D	SD
1	The health could be maintained only if we take a balanced diet					
2	Only those who have clear vision about life would be concerned about the personal hygiene					
3	One should find time for cleaning his environment along with caring about his own health					
4	The children who would be brought up in a clean less and dirty atmosphere will physically as well as mentally ill					
5	One should throw away the household wastes outside, concerning about only himself and family					
6	One should be more concerned about the economic profits rather than personal and environmental hygiene and balanced diet					

10. Extent of micro irrigation

Please put tick (√) mark in appropriate item

Sl.No.	Statement	Yes	No
1	Do you have micro irrigation facilities in your farming on house terrace ?		
2	Is there any fertigation process along with micro irrigation facilities?		
3	If micro irrigation facility is there, then which of the following are there?		
4	Drip irrigation		
5	Sprinkler irrigation		
6	Do you follow any other indigenous micro irrigation techniques?		

11. Availability of inputs and infrastructure facilities

Please put tick (√) mark in appropriate item

Sl.N o.	Inputs and infrastructure facilities	Very high availability	High availability	Medium availability	Low availability	Very low availability
1	High quality seeds					
2	Grow bags					
3	Bio fertilizers					

4	Bio pesticides					
5	Portable pump set					
6	Rain shelters					
7	Green house					
8	Others if any (specify)					

12. Extension agency contact

Please indicate your frequency of contact and purpose of contact with each of the following extension personnel

Sl. No.	Extension agents	Frequency of contact			Purpose of contact	
		Never	Sometimes	Regularly	Non - agricultural	Agricultural
1	Agricultural officer					
2	Agricultural assistant					
3	Agricultural university					
4	Veterinary					

	doctor					
5	Irrigation department					
6	Corporation					
7	Co-operative society					
8	Field officers of bank					
9	Other dealers					

13. Market perception

- Do you think a house terrace farmer will be able to sell his produce if he increase the production by adopting the recommended practices?

Yes / No

- Do you think that produce of the crop cultivated according to the recommended practices will fetch good price compared to those raised under traditional methods?

Low price / same price / High price

- How difficult will be to dispose off the produce of the crop cultivated following their recommended practices?

Very difficult / difficult / Easy / Very Easy

14. Relative advantage

Please indicate your opinion against the following statements

SA – Strongly Agree, A – Agree, U – Undecided, D – Disagree, SD – Strongly Disagree

Sl.No.	Statement	SA	A	U	D	SD
1	This helps to give eco-friendly and safe vegetables					
2	I feel that farming on house terrace reduces family expenditure by reducing the purchase of products from outside					
3	Farming on house terrace is a tedious process					
4	The kitchen wastes could be effectively utilized through farming on house terrace of vegetables					
5	Farming on house terrace is a threat to the safety of house					
6	I feel satisfaction in farming on house terrace of vegetables which is a recreational activity than earlier					

15. Vegetable consumption pattern

Have you experienced any change in the vegetable consumption pattern in your family after starting farming on house terrace?

Vegetables used	Before starting farming on house terrace	After starting farming on house terrace
	Approximate quantity	Approximate quantity
Leafy vegetables		
1.Amaranthus		
2.Moringa		
3.Others if any (specify)		
Total		
Roots and tubers		
1.Amorphophallus		
2.Dioscorea		
3.Yam		
4.Tapioca		
5.Ginger		
6.Sweet potato		
7.Others if any(specify)		
Total		
Other vegetables		
1.Bittergourd		
2.Snakegourd		
3.Bhindi		
4.Brinjal		
5.Cowpea		
6.Tomato		
7.Chilli		
8.Others if any (specify)		
Total		

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16 a) Knowledge on vegetables and their cultivation

- How many grams of vegetables an adult man should take during a day?
(100, 300, 500)
- Bhindi is propagated by
(Direct sowing, transplanting, cuttings)
- Sakthi is a variety of
(Amaranthus, tomato, bhindi)
- Nicotine emulsion is a
(Chemical pesticide, biopesticide, biofertilizer)
- Leaf spot of Amaranthus which is prevailing in rainy days is a
(Disease, pest, neither of the two)

b) Knowledge on farming on house terrace of vegetables

- What will you do to control pests and diseases on farming on house terrace
(Apply chemical pesticides/should observe daily and mechanically destruct them/should not do anything)
- Compared to land cultivation, reduction in family expenditure due to farming on house terrace is
(More/less/neither of two)
- The suitable position for placing grow bags in house terrace
(Corners/anywhere/in areas having supporting walls below)
- The frequency of watering in farming on house terrace
(Once in a day/once in two days/morning and evening)

- Compared to land cultivation, the incidents of pest and disease in farming on house terrace is
(More/less/difficult to say)

17. Training need analysis

a) Method of training

Please indicate your extent of preference towards each of the following method of training.

Sl. No.	Training methods	Most preferred	Somewhat preferred	Least preferred
1	Lecture			
2	Group discussion			
3	Field trip			
4	Case study			
5	Role play			
6	Film shows			
7	Demonstration			
8	Others (specify)			

b) Duration of training

Sl. No.	Duration	Most preferred	Somewhat preferred	Least preferred
1	One day			
2	Two days			
3	3-6 days			
4	1 week			

5	2 weeks			
6	1 month			

c) Frequency of training

Sl. No.	Frequency	Most preferred	Somewhat preferred	Least preferred
1	Once in a month			
2	Once in two months			
3	Once in six months			
4	Once in a year			
5	Once in two years			
6	Once in three years			
7	Once in more than three years			

d) Venue of training

Sl. No.	Venue	Most preferred	Somewhat preferred	Least preferred
1	On campus			
2	Off campus			

e) Identification of training need

Please indicate the preference of your training need in the following subject matter areas related to the farming on house terrace

Sl. No.	Training subjects	Much needed	Somewhat needed	Not at all needed
1	Plant protection			
2	Preparation of botanical pesticides and fungicides like nicotine oil emulsion , neem oil emulsion and bordeaux mixture			
3	Preparation of organic manures like vermicompost and cultivation of azolla			
4	Preparation of potting mixture, time of sowing and time of transplantation			
5	Manuring, usage of biocontrol agents like Trichoderma, Psuedomonas, PGPR mix-2 etc. and biofertilizers like Rhizobium, PGPR mix-I etc.			
6	Irrigation techniques			
7	Grow bag filling and their suitable placement in terraces			
8	Selection of suitable crops			

	and their varieties			
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18. Identification of constraints

List out the constraints you had faced during the farming on house terrace

- 1.
- 2.
- 3.
- 4.

APPENDIX - IV

KERALA AGRICULTURAL UNIVERSITY

COLLEGE OF AGRICULTURE, VELLAYANI

Constraint analysis of farming on house terrace and distribution of grow bags

Perception of extension officials

Please indicate your opinion against the following statements

SA – Strongly Agree, A – Agree, U – Undecided, D – Disagree, SD – Strongly Disagree

Sl.No.	Statement	SA	A	U	D	SD
1	Farming on house terrace produces safe and eco-friendly vegetables					
2	Farming on house terrace leads to self sufficiency in vegetable production					
3	Initial enthusiasm shown by the respondents disappears as the time progress					
4	Farming on house terrace will reduces the family expenditure					
5	Public is not aware of information regarding agencies providing support services and infrastructural facilities					
6	Distribution of grow bags is streamlined though there was some problems initially					
7	Farming on house terrace is a					

	recreational activity for those who involved					
8	Farming on house terrace is a threat to the safety of the house					
9	Proper training and other infrastructural facilities are being provided to the urban households					
10	Farming on house terrace provides horticultural therapy treatment to the mentally retarded children and physically handicapped members of the family					

Name :

Designation :

Institution :

**CONSTRAINT ANALYSIS OF FARMING ON HOUSE TERRACE AND
DISTRIBUTION OF GROW BAGS**

by

BINSA.B

(2014-11-224)

Abstract of the

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

MASTER OF SCIENCE IN AGRICULTURE

Faculty of Agriculture

Kerala Agriculture University



DEPARTMENT OF AGRICULTURAL EXTENSION

COLLEGE OF AGRICULTURE

VELLAYANI, THIRUVANANTHAPURAM-695 522

KERALA, INDIA

2018

ABSTRACT

The present study entitled “Constraint analysis of farming on house terrace and distribution of grow bags” conducted in Thiruvananthapuram Corporation was carried out to identify the constraints in farming on house terraces and in the distribution of grow bags, to study the consumption pattern of vegetables by the urban families and to assess the knowledge and training need of respondents in farming on house terraces. The study was conducted in seven wards of Thiruvananthapuram Corporation namely Poojappura, Pettah, Manacaud, Kumarapuram, Karamana, Industrial Estate and Enchakkal. One hundred and five members of urban households involved in farming on house terrace, fifteen extension officials and thirty office bearers of selected residents associations of the selected wards were the respondents of the study.

A well structured questionnaire and interview schedule was used to collect data regarding farming on house terrace from the respondents. Four dependent variables and thirteen independent variables were studied and analyzed with the help of statistical tools such as average, frequency, percentage, quartile deviation and correlation.

Regarding the constraints perceived by the respondents on farming on house terrace, ‘crop loss due to pests and diseases attack’ was perceived as the major constraint and ‘low quality grow bags and potting mixture issued by the private agencies’ was the major constraint in the distribution and usage of grow bags as perceived by the respondents and office bearers of residents associations of each wards. ‘Lack of timely availability of fund’ was the major constraint in the farming on house terrace and growbag distribution as perceived by the extension officials.

The consumption pattern of vegetables by the respondents revealed that majority (65.71%) of the respondents belonged to the medium category in consumption pattern of vegetables and had a positive and significant correlation with variables like age, education, area of house terrace, extent of micro irrigation, health consciousness, extension agency contact and relative advantage.

Majority (61.9%) of the respondents belonged to the medium category in the knowledge of respondents on vegetable cultivation and had a positive and significant correlation with variables like age, education, farming experience on house terrace, health consciousness, extension agency contact, self-reliance and relative advantage.

In the case of knowledge on farming on house terrace, majority (74.29%) of the respondents belonged to the medium category and had a positive and significant correlation with variables like age, education, experience in farming on house terrace, extent of micro irrigation, health consciousness, extension agency contact, self-reliance and relative advantage.

Regarding the training need of respondents on farming house terrace, 'Plant protection' was the most preferred subject for training by the respondents.

It was found that majority (47.62%) of the respondents belonged to the middle aged category and 43.81% are degree holders. Majority of respondents belonged to medium category in family labour utilization (64.76%), area of house terrace (52.38%), health consciousness (83.81%), extent of micro irrigation (66.66%), leisure time availability (83.81%), availability of inputs and infrastructural facilities (53.33%), extension agency contact (52.38%), market perception (60.95%), self-reliance (53.33%) and relative advantage (61.9%). Majority of the respondents belonged to lower category in experience in farming on house terrace (65.71%).

Considering the perception of extension officials towards farming on house terrace, majority (46.67%) of the respondents had medium level of perception towards farming on house terrace.

Thus the study revealed that majority of the respondents belonged to the medium category in the case of consumption pattern of vegetables, knowledge on vegetable cultivation and knowledge on farming on house terrace. 'Plant protection' was the most preferred subject for training by the respondents. 'Crop loss due to pests and diseases attack' and 'low quality grow bags and potting mixture' were the major constraints as perceived by the respondents and office bearers of residents associations whereas 'lack of timely availability of fund' was the major constraint as perceived by the extension officials. Timely availability of fund and proper extension activities can tackle the constraints to a great extent.

സംഗ്രഹം

മട്ടുപാവ് കൃഷിയുടെയും ഗ്രോബാഗ് വിതരണത്തിന്റെയും പരിമിതി വിശകലനം

മട്ടുപാവ് കൃഷിയുടെയും ഗ്രോബാഗ് വിതരണത്തിന്റെയും പരിമിതികൾ കണ്ടെത്തുന്നതും, നഗരഗൃഹ ജനങ്ങളുടെ പച്ചക്കറി ഉപഭോഗമാതൃക പഠിക്കുന്നതും, നഗരഗൃഹ ജനങ്ങളുടെ മട്ടുപാവ് കൃഷിയെക്കുറിച്ചുള്ള അറിവും, പരിശീലന ആവശ്യകതയും മനസ്സിലാക്കുന്നതുമാണ് ഈ പഠനത്തിന്റെ പ്രധാന ലക്ഷ്യങ്ങൾ

പഠനം നടത്തിയിരിക്കുന്നത് തിരുവനന്തപുരം കോർപ്പറേഷനിലെ ഏഴ് വാർഡുകളിലാണ്. പൂജപ്പുര, പേട്ട, മണക്കാട്, കുമാരപുരം, കരമന, എസ്റ്റേറ്റ്, ഈഞ്ചക്കൽ എന്നിവയാണ് വാർഡുകൾ. മൊത്തത്തിൽ 150 പേരെയാണ് ഈ പഠനത്തിനായിതിരഞ്ഞെടുത്തത്. 105 നഗരഗൃഹ ജനങ്ങൾ 15 എക്സറ്റൻഷൻ അധികാരികൾ, കൂടാതെ 30 തിരഞ്ഞെടുക്കപ്പെട്ട റെസിഡന്റ്സ് അസോസിയേഷൻ അധികാരികൾ.

നന്നായി രൂപീകരിച്ച ഒരു അഭിമുഖപത്രത്തിന്റെ സഹായത്തോടെയാണ് ഉത്തരാർത്ഥികളിൽ നിന്നും വസ്തുതകൾ സ്വീകരിച്ചത്. ഈ പഠനത്തിൽ നാല് ആശ്രിത പരിവർത്തിത വസ്തുക്കളെയും പതിമൂന്ന് സ്വതന്ത്ര പരിവർത്തിത വസ്തുക്കളെയും സ്വീകരിച്ചിരിക്കുന്നു. കൂടാതെ ഗണിതരീതികളായ ശരാശരി, അനുമാനം, ആവർത്തനം, കോർട്ടെജ് വ്യതിയാനം, കോറിലേഷൻ എന്നിവ ഈ പഠനത്തിൽ ഉപയോഗിച്ചിട്ടുണ്ട്

നഗരഗൃഹ ജനങ്ങൾ അഭിമുഖീകരിക്കുന്ന പരിമിതികളുടെകാര്യത്തിൽ 'കീടരോഗ ആക്രമണം മൂലമുള്ള വിളനാശം' ആണ് ഏറ്റവും പ്രധാനപ്പെട്ട പരിമിതി. സ്വകാര്യ ഏജൻസികൾ വിതരണം ചെയ്യുന്ന ഗുണനിലവാരമില്ലാത്ത ഗ്രോബാഗുകളും നടീൽ മിശ്രിതവും ആണ് പ്രധാന പരിമിതി ശരിയായ സമയത്തുള്ള ഫണ്ടിന്റെ ദുർലഭ്യതയാണ് എക്സറ്റൻഷൻ അധികാരികൾ അഭിമുഖീകരിക്കുന്ന പ്രധാന പരിമിതി.

ഭൂരിഭാഗം നഗരകർഷകർക്കും ഇടത്തരം പച്ചക്കറി ഉപഭോഗമാണ് ഉള്ളത്. കൂടാതെ മട്ടുപാവ് കൃഷിയെക്കുറിച്ചും പച്ചക്കറി കൃഷിയെക്കുറിച്ചും ഇത്തരം പരിജ്ഞാനം ഉണ്ടായിരുന്നുവെന്നും കണ്ടെത്തി.

മട്ടുപാവ് കൃഷിയിലെ പരിശീലന ആവശ്യകതയുടെ കാര്യത്തിൽ 'വിള പരിപാലനം' ആണ് ഏറ്റവും കൂടുതൽ നഗരകർഷകർ പരിശീനം ആഗ്രഹിക്കുന്ന വിഷയം.

ഭൂരിപക്ഷം ഉത്തരാർത്ഥികളും മദ്ധ്യവയ്കരും, കോളേജ് വിദ്യാഭ്യാസം ലഭിച്ചിട്ടുള്ളവരായിരുന്നു. കൂടാതെ അവരിൽ ഭൂരിഭാഗം പേരും മട്ടുപാവ് കൃഷിയിൽ കുടുംബാംഗങ്ങളെ പ്രയോജനപ്പെടുത്തുന്നതിലും കൃഷിവിസ്തീർണ്ണത്തിലും, ആരോഗ്യപ്രബുദ്ധതയിലും, കണിക ജലസേചനക്ഷമതയിലും, ഒഴിവുസമയലഭ്യതയിലും, അസംസ്കൃത വസ്തുക്കളുടെയും പ്രാഥമിക സൗകര്യങ്ങളുടെ ലഭ്യതയിലും, വിജ്ഞാന വ്യാപന സ്ഥാപനങ്ങളുമായുള്ള സമ്പർക്കത്തിലും, മാർക്കറ്റ് നിരീക്ഷണത്തിലും, സ്വാശ്രയശീലത്തിലും, ആപേക്ഷിക നേട്ടത്തിലും ഇടത്തരം വിഭാഗത്തിൽ പെടുന്നവർ ആയിരുന്നു. എന്നാൽ മട്ടുപാവ് കൃഷിയുടെ പരിചയത്തിന്റെ കാര്യത്തിൽ കുറഞ്ഞവിഭാഗത്തിലാണ് ഭൂരിഭാഗം പേരും ഉൾപ്പെട്ടിരുന്നത്.

മട്ടുപാവ് കൃഷിയെക്കുറിച്ചുള്ള എക്സറ്റൻഷൻ അധികാരികളുടെ ധാരണ വിശകലനം ചെയ്യുമ്പോൾ, ഭൂരിപക്ഷം അധികാരികൾക്കും മട്ടുപാവ് കൃഷിയെക്കുറിച്ച് ഇടത്തരം ധാരണയാണ് ഉള്ളത്.

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