

**DETERMINANTS OF HOUSEHOLD FOOD SECURITY OF SELECTED
TRADITIONAL VEGETABLE GROWERS OF
THIRUVANANTHAPURAM**

by

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DECLARATION

I hereby declare that this thesis entitled “**Determinants of house hold food security of selected traditional vegetable growers of Thiruvananthapuram**” is a bonafide record of research 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, fellowship or other similar title, of any other university or society

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*Dedicated To
My Family*

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LIST OF ABBREVIATIONS

BMI	-	Body Mass Index
CED	-	Chronic Energy Deficiency
et al	-	and others
FAO	-	Food and Agricultural Organization
ICMR	-	Indian Council of Medical Research
IFAD	-	International Fund for Agriculture Development
MSSRF	-	M.S. Swaminathan Research Foundation
NIN	-	National Institute of Nutrition
NNMB	-	National Nutrition Monitoring Bureau
OECD	-	Organization for Economic Cooperation and Development
PDS	-	Public Distribution System
RDA	-	Recommended Dietary Allowances
SPFS	-	Special Programme for Food Security
SPSS	-	Statistical Package for Social Science
WHO	-	World Health Organization
WHR	-	Waist Hip Ratio
UNICEF	-	United Nations International Children's Emergency Fund
USDA	-	United States Department of Agriculture
VFPCK	-	Vegetable and Fruit Promotion Council Kerala

Introduction

1. INTRODUCTION

Food security as a concept originated in the mid 1970's in the discussion of International food problems at a time of global food crisis. India has entered the 21st century with food security as the main problem and nearly forty per cent of the Indian populations are without health care, safe drinking water and shelter. Government of India declared 2008-2009 as food security year. The Special Programme for Food Security (SPFS) is FAO's flagship initiative for reaching the goal of halving the number of hungry in the world by 2015. Currently there are 852 million food insecure people in the world (FAO, 2008). The main objective of SPFS is promotion of effective, tangible solution to the elimination of hunger, undernourishment and poverty.

Food security is defined as "access by all people at all times to the enough food for an active, healthy life". (Sarkar, 2000; USDA, 2000; Jhamtani and Singh, 2001; Singh et al., 2001; FAO, 1996; Purushothaman and Paul, 2003).

MSSRF (2001) has added another dimension to food security. According to them food availability, access and absorption are the three components that would ensure food security. The food security concept has been considered at three levels. They are macro, meso and micro level. Macro level consists of global, national and regional level. The meso level consists of district, city and village level and micro consists of families, household and individual level (George, 1999).

A household is food secure when it has access to the food needed for all its members to lead a healthy life and when there is no undue risk of losing such access.

Household food security in broader terms as explained by Varma (2001) means that the household has access to sufficient food both in quantity and quality to meet the nutritional requirements of all its members.

Household is the basic unit of a society and consumption expenditure is a major determinant of food security. A well functioning universal public distribution system (PDS) can be the means to ensure adequate physical access to food at affordable prices at the household level. Public distribution system is the biggest grain distribution programmes in the world assuring food security to trillions of households, especially during period of stress.

Monitoring food security can help to identify and understand the well being of the population. Although adequate food is available through markets, food security of the household level remains a challenge, especially among marginal vegetable growers. This condition is due to their low purchasing power and lack of accessibility to a variety of foods.

From the view point of an individual member in a household, food security may be defined as physical and economic access to balanced diet including the required micro nutrients, safe drinking water, primary education and shelter.

Vegetables are an important component of a healthy diet and, if consumed daily in sufficient amounts, could help prevent major diseases such as cardio vascular diseases and certain cancers. Vegetable provide a good source of income to the growers and play an important part in human nutrition.

Consumption of fruits and vegetables are recommended for ensuring micronutrient adequacy by nutritionists. Vegetable and Fruit Promotion Council and the Department of Agriculture, Kerala along with State Horticultural Mission are providing good support to the vegetable growers. So that the State will attain self sufficiency in vegetable production. It has to be investigated whether the above support and assistance on the part of the Government has led to an enhancement of their purchasing power and thereby household food security.

In this context the present study is proposed to assess the trends and analyze the determinants of household level food security among the selected traditional vegetable growers in the vegetable tract.

*Review
of
Literature*

2. REVIEW OF LITERATURE

The review of literature related for the study on “Determinants of household food security of selected traditional vegetable growers of Thiruvananthapuram” is presented under the following headings.

- 2.1 Concepts of food and nutrition security
- 2.2 Determinants of household food security
- 2.3 Causes of food and nutrition insecurity
- 2.4 Assessing food and nutrition security

2.1. Concepts of food and nutrition security

Food security is defined as a situation when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. (FAO, 2002).

According to Kumar (2010) food security is defined as access by all people at all times to sufficient food in terms of quality, quantity and diversity for an active and healthy life without risk or loss of that access. Food security is defined as “access by all people at all times to the enough food for an active, healthy life.” (Jhamtani and Singh, 2001; USDA, 2000; Purushothaman and Paul, 2003).

The three major dimensions of food security are food availability, food access and food absorption (MSSRF, 2001).

Household food security in broader terms as explained by Varma (2001) means that the household has access to sufficient food both in quantity and quality to meet the nutritional requirements of all its members. Households that are food secure are the ones capable of providing an adequate supply of nutritious and safe food on a sustainable basis to each member of the family (Prema, 2001).

Food security on a global scale, national scale and household level are the three levels of food security.

Food security on a global scale is important to analyze overall trends on a global scale and to understand which effects climate changes might have on agricultural production, fishery production and live stock production at the global level. This is important because these trends will translate into agricultural prices and will influence decisions of producers world wide (FAO, 1999).

Babu (2000) defined nutritional security as the condition when every person has a diet nutritionally adequate in quantity and quality and the food consumed is biologically utilized for a healthy living. According to Gross et al (2000), access of all people at all time to sufficient food, including adequate utilization and absorption, in order to be able to live a healthy and active life.

Nutrition security is achieved if “every individual has the physical, economic and environmental access to balanced diet that includes the necessary macro micro nutrients and safe drinking water, sanitation, environmental hygiene, primary health care and education so as to lead a healthy and productive life (World Food Summit, 1996).

Food security on a national level of analysis is equally as important, because the national level is where most agricultural policy decisions are made. It will be decided here if food security concerns are covered by imports and how

much financial resources are made available for national agricultural policies. Central elements of adaptation policies will be defined at the national level (FAO, 1999).

Food security on a household level is without a detailed look at the impacts at the household level; the analysis would lack an understanding of the difficulties and specific necessities each person faces in regard to food security. The most relevant level of explanation of the impact of climate change on food insecurity will be the household level.

The food system is a set of dynamic interactions between and within the biogeophysical and human environments that influences both activities and outcomes all along the food chain (FAO, 2007 b).

At the household level, food security is defined as access to food that is adequate in terms of quality, quantity and safety and cultural acceptability for all household members (Gillespie and Mason, 1991).

Radhakrishnan (2005) defined that the modern concept of food security goes far beyond the availability and accessibility of staple food. It includes the man's need for safe drinking water, clean surrounding environment and health coverage.

2.2. Determinants of Household food security

Ayinde et al (2006) indicated that the nature of food security worsened by the low level of formal education, income, and farm productivity.

Khan et al., (1994) reported that type and size of the family, education of mother and type of house are reported to be some of the socio- economic factors which determine the nutritional and health status of the population.

According to Ayalew (2006), poverty, health, food production, political stability, infrastructure, access to markets and natural hazards are some of the determinants of food security.

2.3. Causes of food nutrition insecurity

According to Vijayaraghavan et al (1998) factors influencing household food security include the purchasing power, availability of food at affordable prices, size of the land holding, agricultural production, unemployment status during all seasons and availability of public distribution system.

MSSRF (2001) reported that factors influencing food access and livelihood access are food consumption, poverty, employment, gender discrimination, caste discrimination and rural infrastructure. MSSRF (2001) reported that consumption, lack of disease and better absorption depend on rural health infrastructure available in a state.

Adhiguru and Ramaswamy (2003) observed that household food security stems from inadequate employment, low income, seasonal migration especially among tribal population, relatively higher food prices, geographic and seasonal mal distribution of food, poor social organization and large family size.

Household food security in the backward areas of Orissa was conducted by Vijayaraghavan et al (1998) and found that only eight percent of the households were food secure with respect to all food groups.

Nnakwe and Yegamma (2002) observed high percentage of food insecurity in the households with children in Coimbatore.

In a study conducted among the households of agricultural labourers of organized and unorganized sectors, Lawrence et al (2005) observed food insecurity without hunger and with moderate hunger among 33 to 40 percent of the households of unorganized sector.

Ayinde et al (2006) studied the food insecurity among rural farming households of Nigeria and indicated highest level of food insecurity incidence among female preschoolers compared with other members of households.

Vijayan (2003) found in the case study on the extent of household food security of selected 15 families of landless agricultural labourers that with reference to access, availability and utilization, all the families are found to be insecure.

Lawrence et al (2005) in her study among the agricultural labourer families found that the family type, family size, caste, income, land, educational status of the head, food expenditure are the factors that influence food insecurity.

Rekha et al (2007) observed gross nutritional insecurity among tribal expectant mothers of Ranchi district of Jharkand.

In a recent report published by MSSRF, it was pointed out that food insecurity worsened in urban and rural areas of the states like Maharashtra, Andhra Pradesh and Karnataka in six years till 2006, while it is improved in poor states like Bihar, and Uttarpradesh (The Hindu, 2010).

2.3.1. Poverty

Poverty is the primary cause of household food insecurity (Sabari, 2000 and Swaminathan, 2002).

Poverty has been recognized globally both as a cause and consequence of food insecurity and ill health (Selvaraj and Jayaprakashan, 2001). India defined poverty on the basis of calorie requirement and focused its attention on providing subsidized food and essential services to people below poverty line (Ramachandran, 2001). MSSRF (2001) through their study on food security in seven states of India (Bihar, Madhyapradesh, Rajasthan, Orissa, Utterpradesh, Jharkhand and Chattisgarh) found that poverty is one important cause of persistent food insecurity. Poverty encompasses different dimensions of deprivation that relate to human capabilities including consumption and food security, health, education, rights, voice, security, dignity and decent work (OECD, 2007).

2.3.2 Income

Maya and Rao (1991) had reported that income showed a direct relationship with nutritional status and morbidity among population groups.

According to Vijayaraghavan et al (1999) the factors which contribute to wide variation in household food security in backward areas of Orissa were found to be low per capita income, non- ownership of agricultural land and lower agricultural production.

Shah et al (1990) revealed that income levels play a role in determining the levels of intake of nutrients. Dandekar and Rath (1993) found that the number of people suffering from under nutrition in India vary between 40 percent and 60 percent. This is because the people do not have sufficient income for getting a minimum level of required nutrition.

Daniel et al (2004) observed better household food security among high and middle income families due to stable economic status and increased level of education with proper management of available resources.

2.3.3 Caste and religion

Ramanujan (2000) had reported that most of the scheduled tribe population are poor and are living on subsistence nutrition. He further observed that extreme poverty and food insecurity is common among them. Whether they belong to the occupational groups of cultivators or labour households and that the cultivators belonging to the scheduled tribes are poorer than those dependent on agricultural and non agricultural labour.

MSSRF (2000) after conducting a survey among the scheduled tribe population particularly in the states of Orissa and Madhyapradesh found that the scheduled tribes dependent upon natural forest for food in the seasons when crop could not be cultivated. Their conditions have worsened with the depletion and degradation of forests. Traditional sources of free food are no longer available. Purchased foods are neither available nor are affordable to them. Hence malnutrition and starvation are widely prevalent among them.

2.3.4 Discrimination by gender

There is a considerable gender difference in food distribution with in the household which has led to food insecurity among women. According to Chandhri and Wilson (2000), factors that determine food access by women in a household are economic, social and cultural factors. Joshi and Varsha (2000) are of the opinion that women in a patriarchal society like India, gives priority to her family members than herself. They have further explained that a woman subordinates her needs to the requirements of the family, her family social class, her economic position, her life course and her socialization conditions, her attitudes and behaviour.

Food security is further compounded by regional disparities and most importantly individual, family or intra household food distribution with in the households, women face the brunt of chronic malnutrition as they are affected by age old gender discrimination (Manonmani, 2001).

MSSRF (2000) through their study conducted in Orissa and Madhyapradesh found that gender discrimination with respect to food distribution is prevalent generally with in the households that they had surveyed.

Households, where in women have access to their own incomes and can exercise decision-making powers, tend to have an expenditure pattern different to the one existing in male dominated households. Research in several developing countries of Asia, Africa and Latin America has found that improvements in household food security and nutrition are associated with women's access to income and their role in household decisions on expenditure. This is because women tend to spend a significantly higher proportion of their income than men on food for the family (IFAD , 2004).

2.3.5. Employment

Food access depends on access to income and regular employment as stated by Anthony and Chatterjee (1999). Food shock among poor households of relocated colonies of Delhi mainly due to loss of employment was reported by Kumra et al (2003).

According to Rath (1999) not only the employment but also the qualities of employment and wage rates are important for poverty alleviation. He has further ascertained that casual employment leads to uncertain livelihood whether it is within agriculture. The author has also announced that the higher the existence of casual employment, the larger will be the risk of being out of employment and the risk of transient food access and food insecurity.

Unni and Jeemol (1997) have reported that, there has been casualisation of labour and workers move between employment and unemployment on a daily basis. If unemployment is more, there will be wide spread poverty. Urban Agriculture is now a potential source of employment in Japan (City farmer, 2009b).

2.3.6. Illiteracy

In the report published by MSSRF (2001) it has been indicated that causes of persistent food insecurity are illiteracy, poverty, discrimination and neglect.

Swamy et al (2000) in a study conducted among the farm women labourers of Bangalore observed poor nutritional status and deficit intake of all foods among them. This condition was found to be due to morbidity, illiteracy and low purchasing power, which are the root cause of nutrition insecurity.

2.3.7. Male- female wage differentials.

According to Sheriff and Abusaleh (1999) women earn less than men. Earning capacity of women which is less than that of men has an impact on the bargaining ability of women in the households.

Agnihotri and Satish (2000) reported that wage differentials exist in both agricultural and non-agricultural work, where men are paid more than the women for the same work. This would affect their food and nutrition security.

Ranade and Sudarshan (2001) reported that gender divergence in agricultural and non- agricultural work and in real wage rates creates gender inequalities in the access to necessities within households, including food.

2.3.8. Food and nutrient intake

Studies conducted by KAU among 225 toddlers residing in coastal, slum, suburban and rural areas of Kerala and found that there was all round deficiency in the consumption of foods except that of staple foods like cereals and roots and tubers among toddlers belonging to farming community and coastal areas respectively. The requirement for green leafy vegetables, milk and milk products, fat and sugar were found to be met only to less than 50 percent of RDA. Vegetable consumption of toddlers belonging to farming communities (>70%) and those belonging to backward district viz., Malappuram (>9%) were better than their counterparts residing in slum areas and other rural areas (Prema, 2000).

Swaminathan (2001) has stated that the households are not a homogenous unit and women and girl children tend to suffer from endemic hunger. He has endorsed that even with impressive production and productivity in agriculture, horticulture, dairy, poultry and fishery, the per capita consumption as well as the calorie intake of vast majority of the rural population especially women and children is alarmingly distressing.

UNICEF (2001) reported that the daily intake of calories by children and women in middle income, Indian families were low and that it was worse among lower- income groups; for example children in the pre- school age were found to consume only 685 kilo calories of energy against the RDA of 980 kilocalories. They have further stated that the average food intake by school age children was sufficient to meet only upto 80 percent of their total need. Adolescents were reported to be able to meet only 70 percent of their calorie requirement through the food that they consumed while on an average, adult women were able to meet only 89 percent of their calorie requirement of 2120 kilo calories. This international organisation has also remarked that besides calorie intake the nutritional as well as health status of children and women of India reflects the level of food insecurity.

2.3.9. Rural Urban difference:-

Arokiasamy and Rao (2001) conducted a study among 450 families consisting of 2276 individuals belonging to rural and urban households of Tamil Nadu. They found that dietary quality and quantity were better in urban households than in rural households. The households especially of the urban area consumed more amounts of protective foods, protein and energy rich foods as against the poor rural households. The above authors had further ascertained that possession of assets and female literacy were found to improve dietary habits and adequacy of diet consumed by urban households. Swaminathan (2002) was of opinion that inadequate livelihood opportunities in rural areas results in household nutrition insecurity.

Urban Agriculture is widespread throughout the world. An estimated 14 percent of the world's food is produced in urban areas (Armar-klemesuSmit, 2000; Sunil,2002). In Kathmandu, Nepal, 37 percent of food producers meet all their household vegetable needs and 11 percent of animal product needs through their own labour (Rees, 1997). In densely populated Hon Kong, 45 percent of local vegetable needs are met through intensive cultivation on only six percent of the land area (Smit, 2000). In Australia peri- UA constitutes as much as 25 percent of the total agricultural production in dollar terms. This production occurs on less than 3 percent of land used for agriculture in Australia's five main land states (Houston, 2005).

2.5 Assessing food and nutrition security

Several indicators and methods have been used to assess levels of household food security.

According to Harris (1991) assessment of household food security status or level involves measurement of household food availability and average household food consumption levels over a period of time.

According to USDA (2000) has opined that experience of hunger are closely related to household food insecurity and achieving freedom from hunger probably means much the same as attaining food security. Thus the above organization has suggested that a direct measure of hunger would be very significant in assessing food and nutrition security. They have suggested that to assess the hunger profile questions on quantity of food and quality of food consumed, anxiety in the household related to food and deprivation of food among individuals and social dimensions associated with acquiring food may be asked and answers may give an indication of food security. Questions concerning different aspects pertaining to women and children (viz., whether women consider that they cannot afford to eat, whether mothers can give their children a balanced meal and whether they feel that they are not eating enough because they cannot get access to enough food etc) can provide better results in examining the hunger profile of households, as explained by the United States Department of Agriculture.

George (1999) is of the opinion that anthropometric information are useful components because they are measured at individual levels and that changes in weight variations in preschool children could provide reasonably upto date assessment of changes in household food security.

George and Daga (2000) is of the opinion that food security at the household level is best measured by direct surveys of dietary intake.

Krishnakumar (2000) is of the opinion that food security of Kerala can be detected by measuring nutritional status of the population especially of the vulnerable sections.

The MSSRF (2002) has calculated food security of India using five indicators related to food availability, eight indicators related to food access and six indicators related to food absorption. The five indicators of food availability are deficit in food production over consumption, instability in cereal production, environmental sustainability index and number of people affected by floods, heavy rains, cyclones and percentage of area affected by drought to total geographical area. The food access indicators are average per consumption unit per day calorie intake, percentage of population consuming less than 1890 kcal per consumption unit per day, percentage of population below poverty line, percentage of persons in labourer households to the total production, rural infrastructure index, juvenile sex ratio, percentage of literate females to total female population and percentage of scheduled caste and scheduled tribe population to the total population. Food absorption indicators identified by them are, percentage of population with CED, life expectancy, percentage of severely stunted children under the age of five, percentage of severely wasted children under the age of five, infant mortality rate and health infrastructure index.

George and Daga (2000) are reported that 24 hour recall with one day weighment and monthly food purchase inventory for cereals and pulses are to be some of the specific methods.

Materials and Methods

3. MATERIALS AND METHODS

Methodology in the applied sense refers to various methods used by the researcher right from data collection and various techniques applied or followed for the interpretation and inference (Kumar, 2002).

The methodology adopted for the study entitled “Determinants of household food security of selected traditional vegetable growers of Thiruvananthapuram” is presented in this chapter under the following heads.

3.1. Locale of the study

3.2. Selection of the respondents

3.3. Formulation of research tools.

3.4. Variables selected for the study

3.5. Assessment of overall household food security

3.6. Assessment of nutritional status of micro sample

3.7. Statistical analysis

3.1. LOCALE OF THE STUDY

The locale of the study comprised of four blocks viz., Kazhakuttom, Nedumangad, Vamanapuram and Nemom of Thiruvananthapuram district, where a considerable percentage of traditional vegetable growers are available. From the selected four blocks Pothencode, Karakulam, Peringamala and Kalliyoor Panchayath were selected respectively from each block.

3.2. SELECTION OF THE RESPONDENTS

The respondents of the study were selected from the vegetable tract of the selected Panchayath. A total number of hundred growers; twenty five each from the four selected vegetable tract belonging to the respective panchayath were selected for the study. Random sampling method was followed to select the respondents from the available list of vegetable growers in the concerned Krishi Bhavans.

3.2.1 Selection of micro sample

- Thirty housewives who volunteered for the detailed study were selected from the hundred families in order to assess the nutritional status of the micro sample. Age range of 35- 45 years was the criteria fixed for the selection of women who volunteered for in depth study as micro sample from the selected hundred families. Their anthropometric measurements and morbidity pattern were recorded.

3.3. FORMULATION OF RESEARCH TOOLS

The research tools were formulated by reviewing the literature available. The research tools were suitably structured and pre- tested. The formulated schedules are:-

- Interview schedule - To assess socio- economic status (Appendix I)
- Dietary survey schedule- To assess the food consumption pattern (Appendix II).

- Household food production/ Purchase inventory to assess the food availability and accessibility.
- Checklist to assess the overall household food security formulated by USDA (2000) with necessary modification (Appendix III).
- Schedule to assess the nutrition and health status of the micro sample (Appendix IV).
- One day recall method- to assess the nutrient availability of micro sample (Appendix V).

3.4. VARIABLES SELECTED FOR THE STUDY

3.4.1. Personal characteristics and Socio economic status

As a primary means to determine the household food security a socio- economic survey was undertaken among the selected families. To elicit information on socio economic profile of the respondents, details regarding- age, religion, educational status, family income, family size, type of the family, land holding size, type of dwelling, source of water, sanitary facilities, total area under cultivation and family expenditure pattern were collected. A suitably structured questionnaire was developed and pre tested for conducting this survey and the information was collected by interviewing the selected vegetable growers.

3.4.2. Food consumption pattern and food use frequency

Data regarding food consumption pattern and food use frequency were assessed by administering a diet survey.

A household production and purchase inventory for three months period was also made to assess the food availability and accessibility. Average was taken to assess the household availability per month.

Based on the frequency of use of the various food items by the respondents percentage of total score for each food group were calculated separately using the formula suggested by Reaburn et al.(1979).

Percentage of total score for each food group:

$$\frac{R_1S_1 + R_2S_2 + R_3S_3 + \dots + R_nS_n}{n}$$

S_i = Scale of rating given for frequency of use of a food item ($i = 1, 2, 3, \dots, 6$)

R_i = Percentage of respondents coming under each frequency group ($i = 1, 2, 3, \dots, 6$).

n = Maximum scale rating ($n = 6$).

The frequency of use of food items were quantified; the daily used food items were given the score 6, those food items used thrice a week were given a score 5, twice a week as 4, once a week as 3, rarely as 2 and never used as 1.

3.5. ASSESSMENT OF OVERALL HOUSEHOLD FOOD SECURITY

Assessment of overall household food security of the hundred families was done using the food security or Hunger core module formulated by USDA (2000) with necessary modification. The food security data was collected using this format by interviewing the adult female of the family which was followed by scoring.

3.6. ASSESSMENT OF NUTRITIONAL STATUS OF MICRO SAMPLE

Nutritional status is defined as the state of health enjoyed as a result of nutrition (Kamath, 1986). It is one of the critical indicators of health, therefore regular nutritional assessment is important to measure the health status of the respondents (Mourya and Jaya, 1997).

Nutritional status can be defined as a condition of health of an individual as influenced by nutrient intake and utilization in the body (Sunita and Rita, 2005).

The method followed to assess the nutritional status includes anthropometric measurements and computation of food and nutrient intake of the respondents by 24 hour recall method.

3.6.1. Anthropometric measurements of the micro sample

For assessing the nutritional status of the respondents, anthropometric measurement is considered an effective measure (Elizabeth, 2005).

Anthropometry is the conventional bench mark method used for epidemiological purpose (Sachdev, 2003). Anthropometry provides the single most universally applicable inexpensive technique for assessing the size, proportions and composition of the human body. Anthropometry has been accepted as an important tool for the assessment of nutritional status (Vijayaraghavan, 1987).

Anthropometric measurements namely height, weight, waist circumference and hip circumference of the respondents were measured.

3.6.1.1. Height

The height of individual is influenced by both genetic and environmental factors. Height is affected only by long term nutritional deprivation and it is considered as index of chronic or long duration malnutrition (Srilakshmi, 2003).

To determine height, a measuring tape was fixed vertically on a smooth wall, perpendicular to the ground, taking care to see that the floor area was even and not rough. The subjects were asked to remove their foot wear and to stand with the centre of the back touching the wall, with feet parallel and heels, buttocks, shoulder and back of the head touching the wall. The head was held comfortably erect, the arms hanging loosely by the side. A smooth, thin ruler was held on the top of the head in the centre, touching the hair at right angle to the wall and the height read off from the lower edge of the ruler to the nearest 0.5cm. Each reading was taken twice to ensure correctness of the measurement.

3.6.1.2. Weight

Body weight is the most widely used sensitive and simplest reproducible anthropometric measurement. It indicates the body mass and is a composite of all body constituents like water, mineral, fat, protein and bone. It reflects more recent nutrition (Srilakshmi, 2003).

For weighing, platform weighing balance was used as it is portable and is convenient to use in the field. The weighing scale was checked periodically for accuracy. The scale was adjusted to zero before each measurement. The subjects having minimum clothing were asked to stand on the platform of the scale, without touching anything and look straight ahead. The weight was recorded to the nearest of 0.5kg. Each reading was taken twice to ensure correctness of the measurements.

3.6.1.3. Body Mass Index (BMI)

Body mass index is regarded as a good indicator of nutritional status. BMI is expressed as the ratio of weight to height square i.e., Weight (Kg)/ Height (m)². This was used as an indicator of nutritional status (James et al, 1988). From the recorded height and weight, body mass index was computed. Based on the BMI respondents were classified as underweight, normal and overweight.

$$\text{BMI} = \text{Weight (Kg)} / \text{Height (m)}^2$$

BMI appears to be the most practical way of measuring and comparing obesity for clinical and epidemiological purposes. (Bhave *et al.*, 2004).

3.6.1.4. Waist- Hip Ratio (WHR)

A measuring tape was used to measure the waist and hip circumferences of the micro sample.

According to Higgies et al., (2001) waist circumference is a highly sensitive and specific measure of central obesity. After documenting the waist and hip measurements of the respondents their WHR was calculated by dividing the circumference of the waist by the circumference of the hip (Chadha et al., 1995).

3.6.2. Morbidity pattern

Morbidity means the occurrence of disease or illness and can be regarded as an indicator of overall health of an individual. The occurrence of disease or illness among the respondents were assessed by ascertaining the manifestation of disease or illness of the respondents in the past six months prior to the interview using a checklist developed for the purpose.

3.6.3. Dietary particulars

3.6.3.1. Food consumption pattern

Rahman and Rao (2002) observed socio- economic and demographic factors play an important role on the pattern and consumption of food and nutrition. One day meal pattern along with ingredients used for preparations of the meals were collected to understand the food combinations used in their daily dietaries. Thus the quality of meals were evaluated with regard to food groups used in the three major meals viz; breakfast, lunch, dinner.

3.6.3.2. 24 hour recall survey

According to Rao (1996) recall method for any single day or two days would be as efficient a tool as that of seven days. In this recall method of oral questionnaire diet survey, a set of standardised cups, suited to local conditions were used.

The 24 hour recall method was used to assess by the respondents. For this, a set of cups and spoons were standardized by the investigator following the procedure given by Thimmayamma and Rao (2003). The respondents were asked about the type of food preparations they had for breakfast, lunch, teatime and dinner and the raw ingredients used for each of the preparations and the quantity consumed by them were then measured using the standardized cups. The cups were used to aid the respondents to recall the quantities prepared and eaten. Later the actual quantity of foods consumed by the respondents and its nutrient content were computed.

$$\text{Individual intake in terms of raw equivalent (g) =} \\ \frac{\text{Total raw amount for each ingredient (g) X Individual intake of cooked amount(g)}}{\text{Total cooked amount (g)}}$$

3.7. STATISTICAL ANALYSIS

Data analysis was done by using computer facility of College of Agriculture, Vellayani using Statistical package for Social Science (SPSS). The data collected were coded and consolidated and subjected to statistical analysis. The statistical procedures used were mean, percentage and chi square test.

Results

4. RESULTS

The results of the present study entitled “**Determinants of household food security of selected traditional vegetable growers of Thiruvananthapuram**” are presented under following headings.

- 4.1. Personal and socio economic characteristics of the respondents
- 4.2. Food consumption pattern and food use frequency of the respondents
- 4.3. Assessment of overall household food security / hunger core module
- 4.4. Food security status level of the respondents
- 4.5. Assessment of nutritional status of the micro sample

4.1. PERSONAL AND SOCIO- ECONOMIC CHARACTERISTICS OF THE RESPONDENTS

The socio- economic profile of the families was assessed using a structured schedule by interview method.

Personal and socio- economic characteristics of the respondents were analyzed with reference to age, religion, employment, family income, family type, educational status of the respondents, housing conditions, source of drinking water, sanitary facilities, possession of assets, total area under cultivation and family expenditure pattern. The data analyzed thus is presented in Table1.

Table1: Percentage distribution of respondents based on their age, religion, and family type.

Characteristics	Category	Percentage	Total
Age (Years)	≤ 35	12	100
	36- 55	49	
	≥55	39	
Religion	Hindu	74	100
	Christian	23	
	Muslim	3	
Family type	Nuclear	94	100
	Joint	6	
Family Size	0-2 members	4	100
	3-4 members	67	
	5-6 members	29	

As depicted in the above table 49 per cent of the respondents were 36- 55 years old, 12 per cent were below 35 years and 39 per cent were above 55 years. Majority of the respondents were in the middle age group. Religion plays a vital role in the food habits and preference. The table further revealed that among the 100 people surveyed 74 per cent were Hindus and 23 per cent were Christians and remaining three per cent were from Muslim community. The family type has been classified into nuclear and joint based on family composition. Joint families include parents, children, grand parents and other relatives and nuclear families have only parents and their children under the same roof. In this study 94 per cent of the respondents were from nuclear families. While, six per cent belonged to

joint families. Table 1 indicated that majority (sixty seven per cent) of the respondents belonged to families having 3 to 4 members. Twenty nine per cent of the respondents belonged to families having 5 to 6 members and only 4 per cent had two members in their family.

4.1.1. Educational status of respondents

The educational status of the respondents surveyed is presented in Table2.

Table2: Percentage distribution of respondents based on educational qualification.

Educational Status	Percentage
Upper Primary	28
High School	53
Pre degree	16
Degree	3
Total	100

N= 100

The educational status of the respondents revealed a higher literacy rate of Kerala. The majority (53 per cent) had studied up to high school, 28 per cent had only primary education 19 per cent had college education. No one was illiterate among the respondents which is quite encouraging.

4.1.2. Employment status of respondents

Table3: Percentage distribution of families according to the number of the persons employed.

Number of persons employed	Percentage
One	87
Two	8
Three	5
Total	100

N= 100

Number of persons employed in the families influence the total income of the family. Table 3 shows the employment status of the respondents. In majority (87 per cent) of the families, only one is employed. Eight per cent families had two earning members while 5 per cent families had three employed members.

As income and food security are found to be related to one another the monthly income of the families were assessed and the data is presented in Table4.

Table4: Percentage distribution of families based on monthly income.

Monthly income (Rs)	Percentage
980- 2935	16
2936-4893	19
4894- 7322	22
7323- 9787	37
9788- 19574	6
Total	100

N= 100

(Source: Modified version of Kuppaswamy's socio- economic profile, 2006)

Details in the table indicated that 37 per cent of the families had a monthly income ranging from Rs.7323- Rs.9787, while 16 per cent had an income ranging from Rs.980- Rs. 2935.

The economic status of families depends not only on their income, but also on the expenditure pattern. Expenditure is one of the determinants of the food security status of the families.

Table5: Percentage distribution of families based on monthly expenditure pattern.

Categories of expenditure	Rs.100- 500	Rs.501-1000	Rs.1000- 3000	No expenditure (Nil)	Total
Food	-	13	87	-	100
Clothing	62	25	13	-	100
Travel	70	18	5	7	100
Education	19	12	8	61	100
Medical	56	30	14	-	100
Savings	10	11	4	75	100

N= 100

From Table 5, it was observed that eighty seven per cent spent Rs.1000- 3000 for food. About 37 per cent of the respondents indicated that money earned by labour work was the main source of income to purchase food materials. About 22 per cent purchased food items by setting livestock and agricultural produce. Sixty two per cent of the respondents spent Rs. 100-500 for clothing since they used to buy on hire purchase. Seventy per cent of the respondents spent Rs. 100-500 for their travel expenses. Among the surveyed respondents, 56 per cent spent Rs. 100- 500 for health care. It is found that only very few families had savings account. Majority (75 per cent) of families did not have any savings which is quite disheartening.

Table 6: Percentage distribution of respondents based on possession of cultivable land

Area of cultivable land	Type of land		Percentage
	Owned	Leased in	
<25 cent	8	7	15
25 – 50 cent	21	25	46
51- 100cent	12	19	31
1 acre- 2 acre	-	8	8
Total	41	59	100

N= 100

As depicted in the table 6, 46 per cent of the respondents possessed 25- 50 cents of cultivable land of whom 21 per cent owned land and 25 per cent were cultivating in leased in land. Only eight per cent of the respondents possessed below two acre of cultivable land.

Table7: Percentage distribution of families based on possession of livestock.

Animals	Percentage
Cow	23
Goat	11
Nil	66
Total	100
Birds	Percentage
Hen	18
Nil	82
Total	100

N= 100

The table denoted that, 23 percent possessed cows, 11 per cent had goats and 18 per cent had poultry.

Table 8: Percentage distribution of families based on type of housing

Type of housing	Type of possession		Percentage
	Owned	Rented	
Tiles	53	5	58
Asbestos	27	-	27
Concrete	15	-	15
Total	95	5	100

N= 100

This table shows that, 95 per cent had their own homes and five per cent lived on rented homes. Type of housing revealed that fifty three per cent had tiled roofing, twenty seven per cent had asbestos roofing and fifteen per cent had concrete roofing. As per findings of the study majority of the respondents depended on well water (76 per cent). Twenty four per cent depended on water from public taps. Latrine or sanitation facility was available for all the respondents. It was found that waste from households was disposed by putting them to fire.

It was found that twenty two per cent of families surveyed were the beneficiaries of food distribution programmes through anganwadi and schools. The remaining percent of families did not participate in any food distribution programmes. Sixteen per cent families who fall below poverty line category availed the grains distributed under PDS.

Table 9: Percentage distribution of families based on quantity of production, consumption and sale of paddy and vegetables during the previous year.

Range	Production (percentage)		Household consumption (percentage)		Sale (percentage)	
	Paddy	Vegetables	Paddy	Vegetables	Paddy	Vegetables
<50kg	6	5	4	2	2	3
50- 100kg	18	32	7	5	11	27
100-500kg	12	27	4	9	8	18
Total	36	64	15	16	21	48

N= 100

It was observed that maximum production of vegetables ranged from 50- 100kg (32 per cent). Twenty seven per cent families produce vegetables more than 100kg. Twenty seven per cent of the respondents used to sell out vegetables. Only five per cent availed a portion of the produced vegetable for their home use. It was observed that with increase in production of vegetables, consumption of vegetable in households has decreased because most of the respondents cultivated on leased-in land. The respondents were forced to sell vegetable in bulk which they receive as wages to meet their household expenditure.

No storage facilities were seen in any of the household surveyed. Vegetables soon after the harvest were sold out. The selling channels were local market and Vegetable and Fruit Promotion Council Kerala (VFPCCK).

Table 10: Production of other food crops during last year

Crops	<50 Kg	50- 100Kg	100-500Kg	>500Kg	Nil	Total
Paddy	15	21	-	-	64	100
Roots & Tubers	58	-	-	-	42	100
Coconuts	16	-	-	-	84	100

N= 100

Production of roots and tubers was below 50 Kg among 58 per cent of the respondents as depicted in the Table 10. It was found from the table that 15 per cent cultivated paddy and their yield was also below 50 Kg. None of the respondents was engaged in rubber cultivation.

Table 11: Percentage distribution of vegetable cultivation

Vegetables	Kazhakuttom	Nedumangad	Vamanapuram	Nemom	Total
Chilly	6	21	8	11	46
Amaranth	15	23	23	20	81
Cowpea	13	18	12	21	64
Bitter gourd	16	10	10	18	46
Snake gourd	18	4	14	13	49
Cucumber	9	6	14	13	42
Bhindi	10	13	11	7	41
Ash gourd	0	0	0	3	3
Yam	8	8	8	6	30
Colacasia	7	4	4	5	20
Plantain	19	17	22	20	78
Little gourd	1	3	2	5	11
Brinjal	3	10	2	5	20

Tapioca	6	8	2	15	31
Ginger	3	0	0	0	3
Lesser yam	2	0	0	2	4
Cauliflower	0	0	0	1	1
Pumpkin	0	0	0	3	3

Based on the survey conducted among the vegetable growers in the selected tracts viz., Kazhakuttom, Nedumangadu, Nemom and Vamanapuram, it was found that chilli was grown in large scale at Nedumangad by 21 farmers among the total of 25 farmers surveyed. Kazhakuttom had the least chilli growers that is six farmers only.

In case of amaranth, Nedumangadu and Vamanapuram had the largest numbers of growers namely 23. The amaranth growers at Kazhakuttom and Nemom were 15 and 20 respectively of the total twenty five.

Most of the farmers sampled at Nemom (21 per cent) were growing cowpea. At Nedumangadu only 12 per cent farmers were observed to be cultivating cowpea on a commercial basis.

Among the farmers surveyed, Nemom had the highest number of bitter gourd growers (18 per cent) and least at Nedumangadu and Vamanapuram (10 per cent).

In Nedumangadu area there were few farmers engaged in snake gourd cultivation, while in Kazhakuttom area eighteen per cent were cultivating snake gourd.

Bhindi was found to be cultivated by 13 farmers at Nedumangadu whereas at Nemom 7 per cent farmers were cultivating this crop.

In case of yam, 8 per cent farmers each at Nedumangad, Kazhakuttom and Vamanapuram were growing this crop. At Nemom the number of yam growers was six per cent only.

Colocasia was found to be cultivated only very rarely at all the four areas surveyed and Kazhakuttom had the highest growers (7 per cent).

Nemom and Vamanapuram had 20 and 22 per cent plantain growers respectively and the other two places who had reasonable number of plantain growers (17 and 19 per cent).

Brinjal growers were maximum at Nedumangad (10 per cent) and minimum at Vamamapuram (two per cent).

At Nemom 15 farmers of the total 25, were cultivating tapioca whereas at Vamanapuram only one person was found to be cultivating this crop on large scale.

Ginger cultivation was very rare in all the areas surveyed and only Kazhakuttom was having ginger growers that too only three farmers.

Inorganic fertilizers were used for cultivation. None of the respondents followed organic cultivation. A scheme is being implemented to promote organic vegetable cultivation on a commercial scale and to attain self sufficiency in vegetable production. The major component of the scheme is including inorganic vegetable cultivation in selected villages; each village unit comprising of 15- 25 farmers cultivating vegetable jointly in area of 5 hectares (Farm guide, 2010). None of the respondents belonged to of the aforesaid scheme.

4.2. FOOD CONSUMPTION PATTERN AND FOOD USE FREQUENCY OF THE RESPONDENTS

Food consumption pattern was analysed with regard to food habits using food purchase inventory and food use frequency score.

a) Food habits of respondents

The food habit of the families surveyed and is presented in Table 12.

Table 12: Percentage distribution of the families based on food habits.

Habits	Percentage
Vegetarian	13
Non- Vegetarian	87

N= 100

Regarding the food habits, non- vegetarians (87 per cent) were found to dominate vegetarians (13 per cent). Eighteen per cent of the respondents avoided locally available nutritious foods such as custard apple, papaya and green leafy vegetables which were present in their own land. It is also noted that nine per cent of the respondents avoided commercially prepared food items. Since, they have to limit their family budget.

Table13: Percentage distribution of respondents based on frequency of taking meals daily.

Number of meals per day	Percentage
Once	9
Twice	14
Thrice	71
More than three times	6
Total	100

N= 100

Table13 shows the frequency of taking meals by the respondents in a day. It depicts that most of the respondents had meals thrice in a day i.e. seventy one per cent. Only few respondents had (nine per cent) one meal pattern and six per cent had meals more than three times in a day. Fourteen per cent respondents had food twice in a day.

Table14: Distribution of respondents based on meal skipping pattern.

Skipping meals	Percentage
Nil	79
Breakfast	18
Lunch	-
Dinner	3
Total	100

N= 100

This table indicated that seventy nine per cent of the respondents did not skip meals, while twenty one per cent skipped meals. Eighteen per cent respondents reported to skip breakfast. Most of the skippers were found to be adolescent girls.

Table 15 : Percentage distribution of families based on food use frequency

Food items	Daily	Thrice a week	Twice a week	Once a week	Rarely	Never
Cereals	100	-	-	-	-	-
Pulses	11	25	33	13	18	-
Leafy vegetables	0	4	30	25	41	-
Roots& Tubers	12	36	35	13	4	-
Other vegetables	64	23	10	3	0	-
Nuts& oil seeds	100	-	-	-	-	-
Fruits	13	10	3	6	68	-
Fish	56	7	13	6	0	18
Meat	0	0	0	26	56	18
Milk	100	-	-	-	-	-
Oils	100	-	-	-	-	-
Tea/ Coffee	100	-	-	-	-	-

N= 100

Among the respondents surveyed, cereals, nuts especially in coconuts, milk, oils and tea/ coffee were taken daily by hundred per cent and thirty three per cent consumed pulses twice a week. Forty one per cent of the respondents were consumed leafy vegetables rarely. Sixty four per cent consumed other vegetables daily. Both fruits and meat were rarely consumed. Being vegetarians eighteen per cent of respondents never consumed fish and meat.

Based on the percentage frequency, food groups included in the daily dietaries by the respondents were classified as most frequently used (percentage score above 90), medium frequently used (percentage scores 70 - 90) and less frequently used (percentage scores 50 – 70).

Table16: Frequency of use of foods among the respondents.

Most frequently used	Medium frequently used	Less frequently used
Cereals	Pulses	Fruits
Nuts (coconuts)	Roots and tubers	Meat
Milk	Other vegetables	Leafy vegetables
oils	Fish	
Tea/ coffee		

The above table indicated that cereals, coconuts, milk, oils, tea/ coffee are the most frequently used food items. Pulses, other vegetables, fish and roots and tubers were found to be the foods used in medium frequency. Fruits, leafy vegetables and meat were less frequently used foods.

The food availability and accessibility data was collected through food purchase inventory survey of three month duration and average was computed, which revealed that majority of respondents were not purchasing or procuring enough food needed to meet their requirement based on the recommended allowance for a balanced diet as suggested by ICMR.

The per capita availability per person per day represents the average quantity of different foods available for each person in a family based on the food purchase inventory.

The details of food purchased for three month during the survey period were consolidated. From this the average availability and requirement of different foods per person per day was worked out considering the family composition of hundred families. Mean actual intake of a family member was compared with the Recommended Dietary Allowance for a moderate worker as suggested by NIN (2000).

Table 17: Food availability per person per day

Food items	RDA for moderate worker (g)	Mean actual intake (g)	Adequacy	% of deficit
Cereals	520	427	-93	17.88
Pulses	50	44	-6	12.00
Vegetables	160	143	-14	10.63
Oils	45	47	2	-
Sugar	35	48	13	-
Fruits	60	32	-28	46.67
Milk	200	210	10	-

Table 17 reveals the percentage deficit of the required quantity of food items such as cereals, pulses, vegetables, oils, sugar, fruits and milk. It is found that milk consumption is adequate and a considerable percentage of deficits are seen with regard to fruit intake. It is discouraging to note that there is deficit in cereal intake too.

A lesser percentage deficit is seen in vegetable consumption. Intake of oil and sugar meet the required quantity.

The personal habits of the respondents were also studied. It was observed that eighteen per cent had the habit of alcohol consumption, seven per cent practiced pan parag chewing and twenty five per cent had the habit of smoking.

Table 18: Percentage distribution of respondents availing PDS

Commodities	Regularly	Rarely	Nil
Rice	5	95	-
Wheat	9	38	53
Sugar	84	16	-
Atta	-	31	69

N= 100

It was observed that, only few respondents availed rice and wheat from PDS. Eighty four per cent of the respondents bought sugar. Atta was rarely purchased.

4.3. ASSESSMENT OF OVERALL HOUSEHOLD FOOD SECURITY / HUNGER CORE MODULE

USDA (2000) had formulated a Food Security Hunger Core Module for assessing the severity of hunger and food insecurity within individual homesteads. The checklist consisted of 18 questions such as 'whether the families were worried their food would run out before they got money to buy more' and 'the food that bought did not last'. And 'that they did not have money to buy more'.

The above questions or statements printed out in the form of a questionnaire were used to assess the reasons for food insecurity and to categorize the selected respondents into different levels of food security/ insecurity coupled

with or without hunger. The questionnaire used for this purpose was presented in Appendix III. These statements were used to evaluate the food security of families having children or without children. Out of the 18 questions, 13 were put universally to all families, while 5 questions were directed only to families having children as suggested by USDA.

Each of the families was rated based on their responses giving one point for each of the positive responses. The total scores for each family were worked out, which gives the 'total raw scores'. The total scores obtained were then equated with the 'household scale score' suggested by USDA. These household's scale scores were then used to estimate the food security status category of the respondents surveyed. According to this categorization, families with household scale score of '0' was designated as 'food secure' and those who had values between 4.4 to 6.4 were called as 'food insecure without hunger'. Those who had values between 6.6 to 9.3 were referred to as 'food insecure with hunger'. Thus the households with or without children securing 'zero yes' responses would be called as 'food secure'. And those with 'one' and 'two yes' responses would be designated as ' food insecure without hunger' and families with children having ' yes responses' ranging from ' three to twelve' and households without children having 'yes responses' from ' three to seven' would be categorized as food insecure with 'hunger'.

Table19: Household food security Status level of the family surveyed

Number of Affirmative Responses		1998 food security scale values	Food Security Status Level		Percentage
(Out of 18) Households with children	(Out of 10) Households without children		Code	Category	
0	0	0.0	0	Food Secure	11
1		1.0			
2	1	1.2			
		1.8			
		2.2			
	2				
3	3	2.4	1	Food Insecure without hunger	62
4	4	3.0			
5	5	3.0			
6		3.4			
7		3.7			
		3.9			
		4.3			
		4.4			
8	6	4.7	2	Food Insecure with hunger, Moderate	18
9		5.0			
10	7	5.1			
11		5.5			
		5.7			
	8	5.9			
		6.3			
		6.4			

12					
13	9	6.6	3	Food Insecure with hunger, Severe	9
14		7.0			
15		7.2			
16	10	7.4			
17		7.9			
18		8.0			
		8.7			
		9.3			

The above table shows that out of hundred, eleven families were food secure and sixty two were food insecure without hunger. Families who are food insecure with moderate hunger were eighteen and with severe food insecurity were nine.

4.3.1. Association of Food security status level with selected socio- economic variables

Association of food security status level of the respondents with selected socio-economic variables like age, family type, educational qualification, monthly income, money expenditure on food, meals taken per day, skipping meals and utilization of PDS are shown below.

Table 20: Association of food security with selected socio- economic variables

Socio- economic variables	Chi-Square values
Age	22.494**
Family type	0.407*
Educational qualification	16.124**
Monthly income	46.412**
Expenditure on food	25.644**
Number of meals per day	1.945*
PDS utilization	11.724**

*significant at 5% level

**significant at 1 % level

It was observed that there was significant association between food security status level with all the selected socio- economic variables such as age, family type, educational qualification, monthly income, expenditure on food, number meals per day and PDS utilization.

Table 21: Determinants identified on the basis of food security status level

Food security status	Household with children	Household without children	Total	Determinants
Food secure	2	9	11	Monthly income Educational qualification Family type Expenditure on food Age Number of meals per day
Food Insecure without hunger	23	39	62	Monthly Income Age Expenditure on food Number of meals per day

				Family type
Food Insecure with hunger (moderate)	13	5	18	Monthly income PDS utilization
Food Insecure with hunger (Severe)	4	5	9	PDS utilization

The findings of the study revealed that age, family type, monthly income, educational qualification, number of meals per day and expenditure on food are the major determinants of food security. PDS utilization was also another determinant factor in food security.

4.4. FOOD SECURITY LEVEL OF THE RESPONDENTS

Food security was assessed based on the identified food security indicators. The major indicators were broadly household food availability, purchase pattern and short of money due to indebtedness etc. The food security indicators were quantified by giving scores for always as 1, sometimes as 2 and never as 3. The information gathered was tabulated and presented below.

Table 22: Percentage distribution of respondents based on food security indicators

Indicators for food security	Always	Sometimes	Never	Total
Household availability of food materials	11	71	18	100
Balanced meal consumption	-	64	36	100
Purchase pattern	17	83	-	100
Frequency of taking meals	14	77	9	100
Frequency of grain purchase	59	41	-	100
Substitution of inferior quality	-	97	3	100
Avoidance of legumes	4	16	80	100
Avoidance of fish/ meat	13	6	81	100
Short of money due to indebtness	37	63	-	100
Skipping meals	-	21	79	100
Chronic illness	3	34	63	100

Identified indicators for food security are shown in Table 22. It is found that eleven respondents did not have enough food materials to meet the daily requirements. Seventy one per cent had a little scarcity of food materials and eighteen per cent enjoyed the monthly purchase pattern. So they did not have scarcity.

Sixty four per cent of the respondents had balanced meal consumption sometimes. Frequency of taking meals is another indicator identified. Only 14 per cent of the families followed the same meal pattern always i.e., two meals per day. Seventeen per cent families used to have monthly purchase pattern which helps to be food secure to certain extent.

Thirty seven per cent of the families were holding debt so a portion of their income was forced to spent on repayment of debt.

It is found that thirty four per cent of the families had members with chronic illness which demands medical expenses that indirectly cut short the expenditure on food.

4.5. ASSESSMENT OF NUTRITIONAL STATUS OF THE MICRO SAMPLE

Assessment of nutritional status of thirty women was done by using anthropometric measurements, 24 hour recall method and observing the morbidity pattern.

4.5.1. Anthropometric measurements of the micro sample

Anthropometry is one of the most frequently used methods for assessing nutritional status. In this study, the anthropometric measurements recorded were height, weight and waist circumference and hip circumference. BMI was computed which is appended (Appendix IV).

Table 23: Percentage distribution of micro sample based on BMI

BMI CLASSIFICATION	NUMBER	PERCENTAGE
<18.50 Underweight	4	13.33
18.50-24.99 Normal	21	70
>=25 Overweight	5	16.66
Total	30	100

N= 30

(WHO, 2004)

It was observed that 13.33 per cent were underweight. 70 per cent were seemed to be normal and 16.66 per cent were overweight.

The waist hip ratio was computed by taking the waist and hip measurements which is shown in Table 24.

Table 24: Percentage distribution of sample based on waist- Hip ratio (WHR)

WHR	Number	Percentage
<0.8 (Low)	8	26.66
0.8 (Normal)	17	56.66
>0.8 (High)	5	16.66
Total	30	100

N= 30

(Source: Srilakshmi, 2003)

Among the micro sample surveyed, 26.66 per cent had low waist- hip- ratio, 56.66 per cent were observed to be normal in this aspect and 16.66 per cent had high waist-hip- ratio.

4.5.2. Morbidity pattern:

Table 25: Percentage distribution of micro sample based on morbidity pattern

Morbidity pattern	Number	Percentage
Diabetes	5	16.7
Blood pressure	4	13.3
Fatigue	4	13.3
Muscular pain	11	36.67
Respiratory infection	7	23.33
Skin problems	4	13.3
Eye infections	10	33.3

From the table 25, it was found that 36.67 per cent women suffering from muscular pain and 23.33 per cent women were having respiratory infection. 33.3 per cent women reported that they had eye infections.

4.5.3. 24hour recall method

24 hour recall method was done for assessing the actual food intake. The computed mean nutrient intake of the micro sample is given in table 26.

Table 26: Mean nutrient intake of the micro sample

Nutrients	Mean intake	RDA	% of RDA deficit
Energy (Kcal)	2029	2225	8.81
Protein (g)	33	50	34.00
Fat (g)	19	20	5.00
Iron (mg)	12.4	30	58.66
Calcium (mg)	328	400	18.00

From the table, it is clearly seen that major as well as micro nutrients did not meet Recommended Dietary Allowances (RDA). A higher percentage of RDA deficit were noted in protein and iron intake.

Discussion

5. DISCUSSION

The results presented in the previous chapter are discussed in this session with relevant empirical evidences, under the following headings.

5.1. Personal and socio- economic characteristics of the respondents

5.2. Food consumption pattern and food use frequency of the respondents

5.3. Assessment of household food security using food security/ hunger core module

5.4. Food security status level of the respondents

5.5. Assessment of nutritional status of the micro sample

5.1 PERSONAL AND SOCIO- ECONOMIC CHARACTERISTICS OF THE RESPONDENTS

Hundred traditional vegetable growers from the selected vegetable tract regions participated in the research study. Socio- economic and personal characteristics of the respondent have a definite bearing on the food security status level of the selected households. They represented to different socio-economic and personal variables such as age, religion, family size, type of family, educational status, employment status and family income.

Ghosh (2000) observed that social factors like religion, occupation, economic status, education, beliefs and culture had important bearing on health.

Rao (2001) viewed that people living in rural areas were not able to lead a life worthy due to poverty and their health conditions was the result of pernicious combinations of several socio- economic factors like unemployment, poor housing and sanitation etc.

Data on age of the respondents revealed that majority (49 per cent) belonged to the middle age range between 36- 55 years. It is very encouraging to note that twelve per cent of the respondents were in the younger age group below 35 years of age. The findings of the study agrees with the earlier study reported by Shiny (2004) that youngsters belonging to farm families were engaged in farming as self employment.

Majority of the respondents (74 per cent) belonged to Hindu religion and 23 per cent were Christians. This may be because; the Census data 2001 shows that Thiruvananthapuram district is predominated by Hindus followed by Christians and Muslims.

Majority of the families surveyed were nuclear (94 per cent). Only six per cent families had joint family system. It is observed by many researchers that the concept of nuclear family is becoming more and more common in our society and joint family system is fast disappearing (Saxena, 2003). Similar reports were given by Krishnaroopu (2003) and Renjini (2008) in their studies done in Thiruvananthapuram district. Joint family is declining these days especially in city like Thiruvananthapuram where the dwellers are mostly working class people migrated from different parts of Kerala.

Sixty seven per cent of the respondents hailed from small family consisting of three to four members. The rest of the respondents (29 per cent) were coming from 5 to 6 members. Similar reports are given by Krishnarooopa (2003) and Seethal (2011). Kerala is a state with high literacy and people are exposed to the benefits of having small family. Regarding the family size, Park (1997) had reported that average family size in India is four.

The educational status of the respondents revealed that nearly fifty three per cent had studied upto high school level and none of the respondents were found to be illiterate. The literacy rate being high in Kerala, it has also affected the family size as the family planning policy of Indian Government has been implemented successfully. Among the hundred families, 87 families were having one employed member. Majority of the female respondents were unemployed.

The employment status of the population is an important determining factor with respect to health and nutritional status as reported by Reddy *et al*, (1993). The present study also agrees with the earlier observation and census data available which indicates that the work participation rate of females has not increased as much as male in last decades in Kerala particularly in Thiruvananthapuram district (Eapen, 2000). Larsamma (2002) had found in her study that income was directly proportional to the number of persons employed in the family.

The economic profile of the respondents were also studied and the results revealed that majority of the respondents (37 per cent) hailed from Rs.7323- 9787

income group, and 16 per cent from Rs.980- 2935 income group. The source of income was from daily wages.

Family income is considered as an important determinant of food security. Results of the study showed that 87 per cent of the families spent an amount ranging from Rs.1000-3000 for food, 62 per cent spent Rs.100- 500 for clothing, and 70 per cent 100- 200 for travel expenses. The majority of the respondents spent no money for education since their children were availing the facilities of Government schools. According to Jaya et al (2000) family income also had a significant influence on the health practices. Mehta and Singh (2004) reported that women with a low health status had an extremely poor level of income

The area of cultivable land ranged from below 25 cents to within 2 acre. Majority of the families were engaged in amaranth, plantain, cow pea and snake gourd cultivation. Vegetable produced was used for household consumption by 18 per cent only. It was observed that with increase in production of vegetables, consumption of vegetable in household decreased because 59 per cent of the respondents cultivated on leased- in land. So they were compelled to pay back the money to the land owner soon after harvest. Fig. 1 & 2 shows the graphical representation of production, consumption and sale of paddy and vegetables during the previous year.

Dhillon and Kataria (2006) reported that due to low income and lack of knowledge they tend to sell their food crops at lower prices.

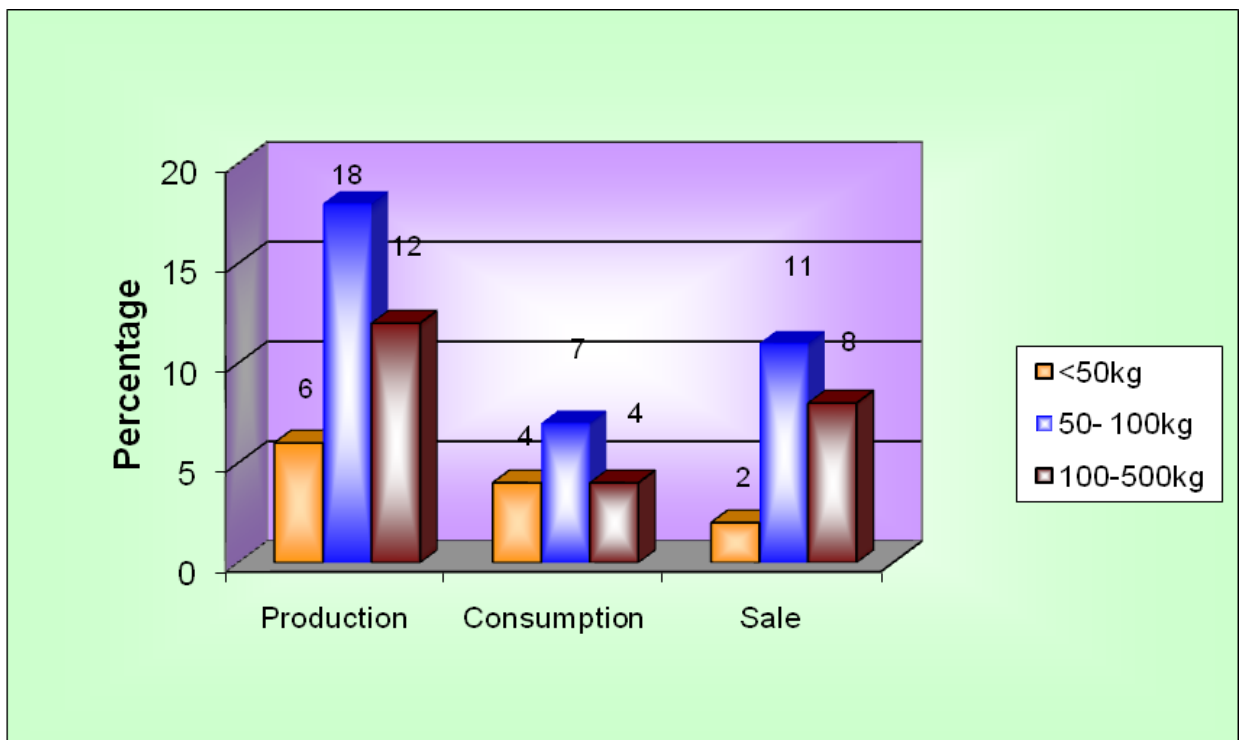


Fig1: Percentage distribution of family based on quantity of production, consumption and sale of paddy

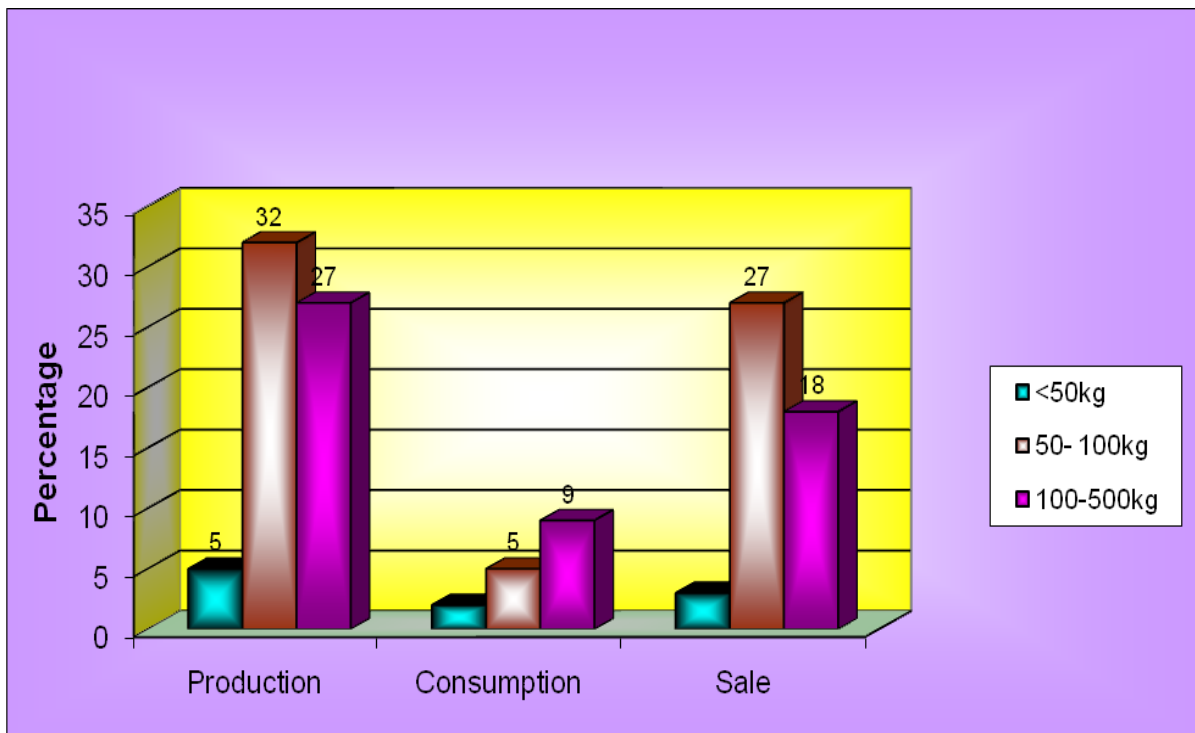


Fig2: Percentage distribution of family based on quantity of production, consumption and sale of vegetables

Ghoyal and Prashant (2003) reported that the nutritional status of an individual is affected by living conditions. It was found that 95 per cent had their own homes and five per cent lived on rented homes.

Results of the study revealed that 52 per cent possessed livestock. Milk as well as egg was seldom used for home consumption and major part of these food items were sold out for money.

UNICEF (2001) had reported that lack of ready access to water and poor environmental sanitation were important underlying causes of various types of infections resulting in malnutrition. This study shows that 24 per cent of the respondents depended on water from public taps. Seventy six per cent respondents depended on well water. They considered tap water inferior to well water. So they used well water for cooking purposes. Latrine or sanitation facility was available for all the respondents. It was found that waste from households was disposed by putting them to fire. Seventy eight per cent of the respondents were not participated in any food distribution programme.

According to Prema (1997) personal habits such as smoking and drinking alcohol was reported to have an influence on the occurrence of liver diseases. The present study showed that 18 per cent had followed the habit of consuming alcohol, 7 per cent had pan parag chewing and twenty five per cent had the habit of smoking. It seems that they were quiet unaware of the consequences of these habits. Similar reports are given by Naziya (2011).

5.2. FOOD CONSUMPTION AND FOOD USE FREQUENCY OF THE RESPONDENTS

Food consumption is another important determinant of nutritional status. An adequate or balanced diet provides all the essential nutrients in sufficient quantities to meet the needs of the body (ICMR, 1989).

Robison (1998) opined that a dietary habit of an individual in general has influence on his or her nutritional status.

According to Gift *et al* (2002) food habits of an individual are the characteristics repetitive act that he performs under the impetus of need to provide himself with nourishment and simultaneously to meet an assortment of social and emotional goals.

The results of the present study shows that 87 per cent were non vegetarians and 13 per cent were vegetarians. Consumption pattern of Keralities as reported by Kerala Statistical Institute (2000) also revealed that 98 per cent of the Keralities are habituated to non-vegetarian foods. Similar results were observed by Naziya (2011) in her study undertaken in Kalliyoor Panchayat where majority of farmers were noted as non vegetarians. Kerala being land near the seas, the availability of sea food is high and that could be the reason for the non vegetarian habit being more prevalent.

Three meals a day namely breakfast, lunch and supper was found to be the common pattern of the families surveyed (71 per cent). Food consumption pattern revealed gross inadequacies with respect to the women's diet as concerned. This result agreed with the findings of the survey conducted by NNMB (2002) that rural families in our state are not in the habit of including all the food components specifically required for a balanced diet as well as uniform distribution of cooked food among the family members.

According to Poongodi (2003) factors like food preferences, availability of food items in the locality, knowledge of nutritional values of certain food items, relative prices of food articles were all found to determine priorities in food expenditure.

Cereals, tubers and fish were the major items in the meals. In the present study rice was found to be the staple food in the diet. The result is in conformity with Parvati and Babita (2002), Shahbuddin (2003) and Preet and Bhavana (2005) who found that cereals especially rice continued to be the major staple food item among south Indians. Pulses, fish, other vegetables, roots and tubers were medium frequently used. Fruits, meat and leafy vegetables were less frequently used. Beverages such as health drinks, fruit juices and soft drinks were seldom used especially by the younger generation. Behrman and Deolkar (2006) found that seasonal variations in environmental conditions, food availability, food prices and labour demands have considerable impact on nutrition.

Lina (2005) reported that typical rural Kerala dietary pattern would be based on rice, tapioca, fish and coconut. The food use frequency score sheet was also included in the diet survey since the frequency of use of different food groups would give an indication to the adequacy of the family diet pattern as observed by Nelson et al., (2003).

Nickles et al (2002) found that skipping meals were generally due to low income. In this study it was found that 18 per cent respondents had the habit of skipping breakfast and only three per cent respondents had the habit of skipping dinner. But they used to have midmorning and evening tea from outside during working hours.

Minority of the respondents avoided commercially prepared food items. They avoided these food items for limiting their family budget. At the same time, the respondents avoided locally available nutritious foods such as custard apple, papaya and green leafy vegetables due to their poor nutrition knowledge.

The utilization of Public Distribution System (PDS) by the respondents was studied and it was found 95 per cent did not purchase rice regularly. Considering the quality of rice majority used to buy rice daily in simultaneously from the local shops on hire purchase. But they availed sugar and kerosene regularly from ration shop. According to Dreze (2001) PDS will reach the poorest subsistence farmer and at same time be a last resort price support for small or marginal farmers that will give him a minimum living standard. Fig. 3 shows the graphical representation of availing PDS.

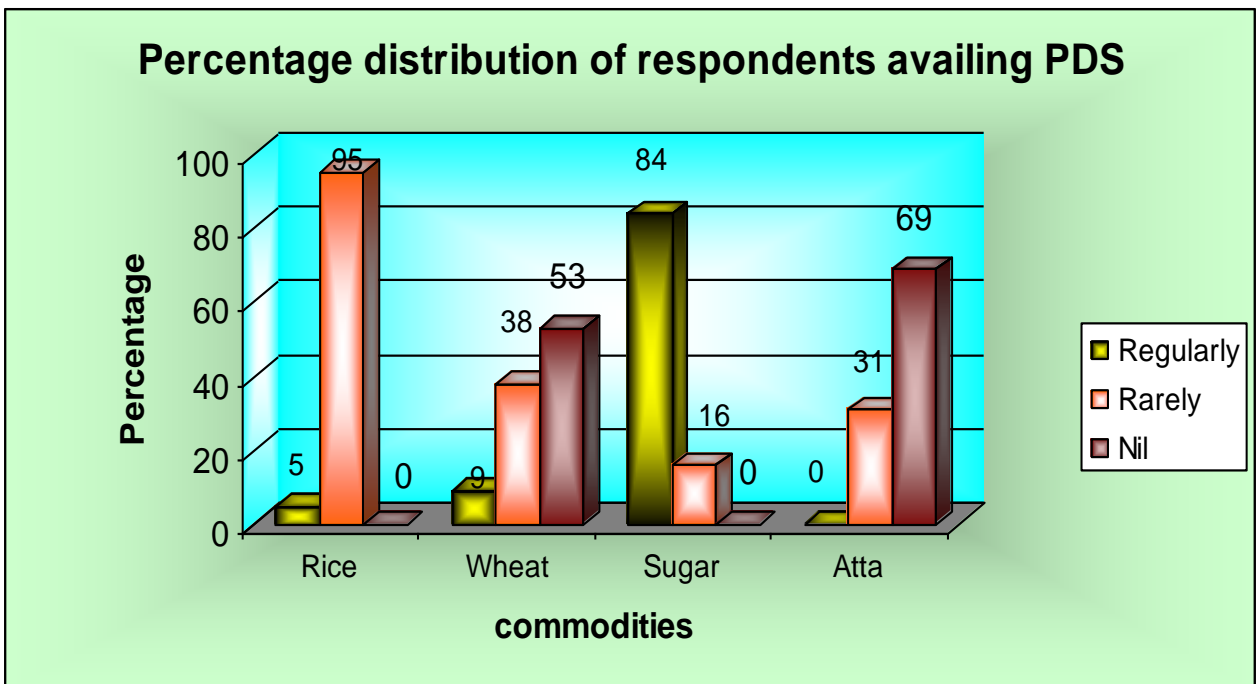


Fig3: Percentage distribution of respondents availing PDS

5.3. ASSESSMENT OF OVERALL HOUSEHOLD FOOD SECURITY / HUNGER CORE MODULE

USDA (2000) had formulated a Food Security Hunger Core Module for assessing the severity of hunger and food insecurity within individual homesteads. Food security in USA had revealed that 89.30 per cent of American households were 'food secure'. The remaining 10.70 per cent of US households (11.5 million) were 'food insecure' (USDA, 2000).

The result shows that a considerable percentage belonged to food insecure group which require corrective measures. It is suggested that nutrition intervention as well as awareness programmes for better coping mechanisms may improve the household food security. Fig. 4 shows the graphical representation of food security status level.

5.4. FOOD SECURITY STATUS LEVEL OF THE RESPONDENTS

The major indicators identified to assess the food security status level of the respondents were broadly household availability of food materials, purchase pattern and short of money due to indebtedness. A study conducted among rural households of Tamil Nadu by Silva et al., (2006) indicated that the farmers borrowed huge amount of money to invest in agriculture. But in Kerala, though farmers avail loans it was found that it will spend for other purposes.

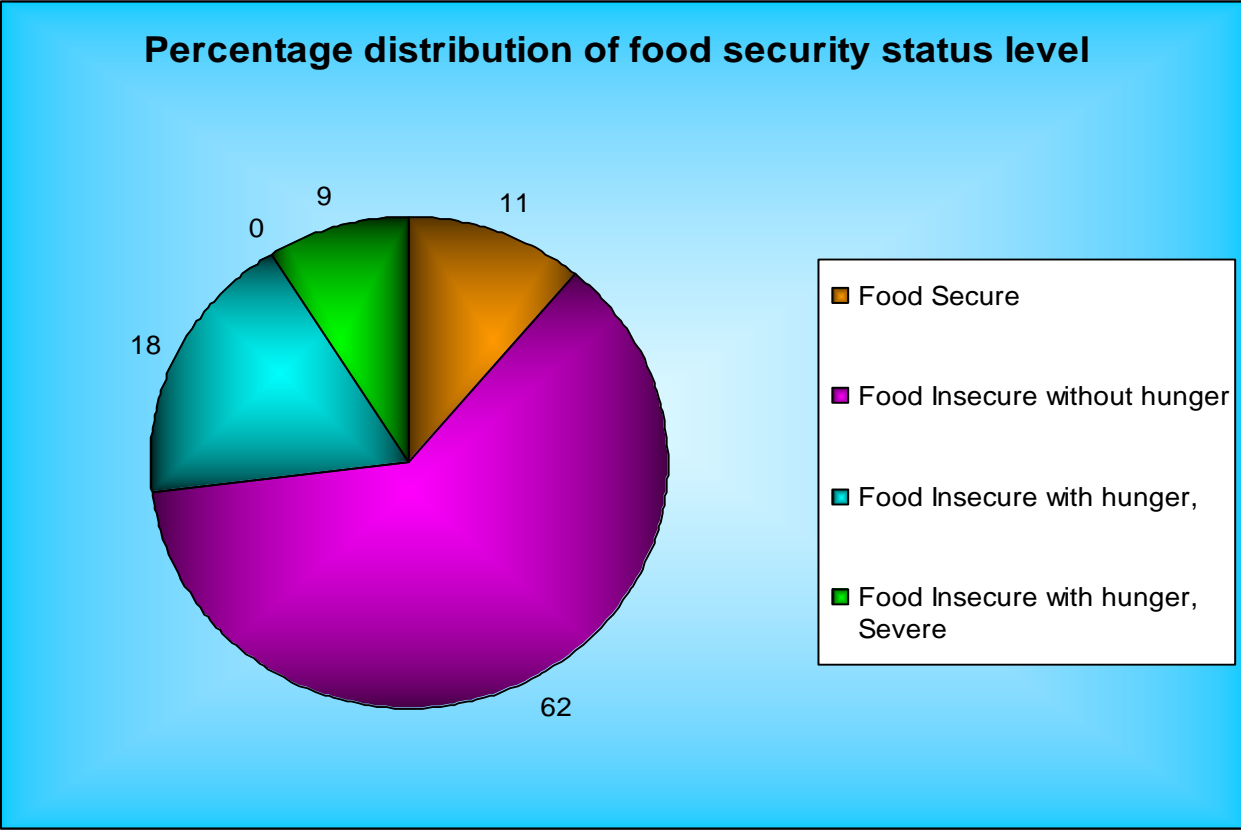


Fig 4: Percentage distribution of food security status level

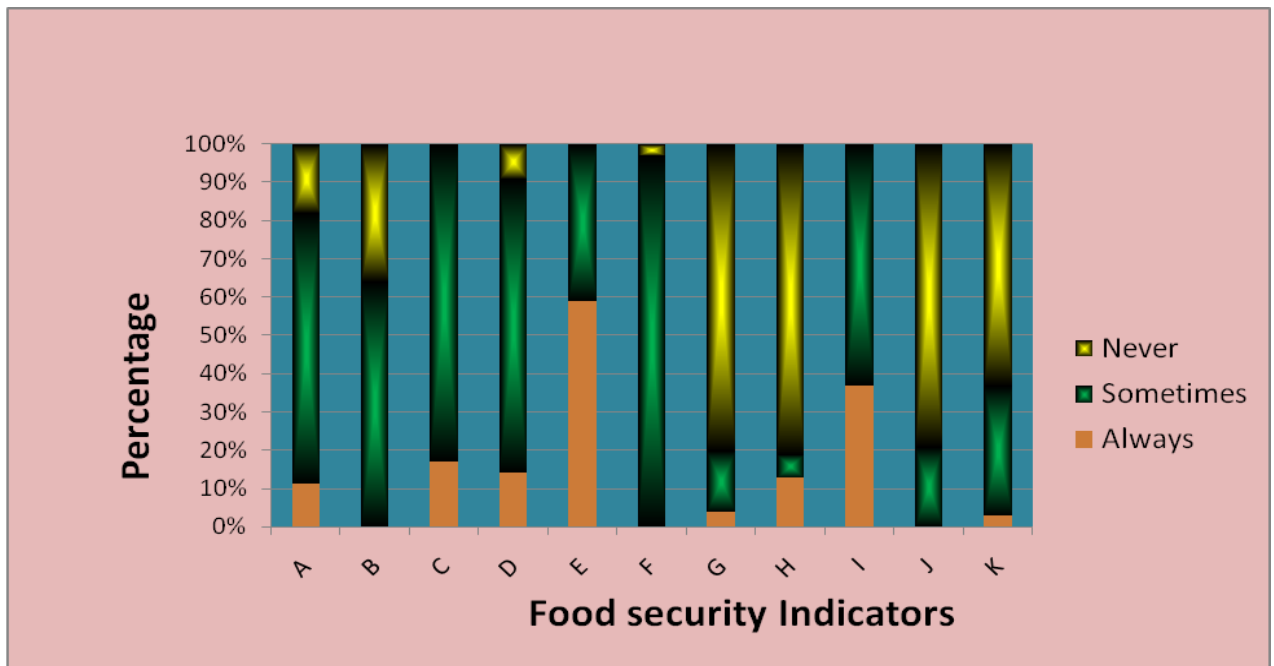


Fig 5: Percentage distribution of respondents based on food security indicators

A- Household availability of food materials; B- Balanced meal consumption; C- Purchase pattern; D- Frequency of taking meals; E- Frequency of grain purchase; F- Substitution of inferior quality; G- Avoidance of legumes; H- Avoidance of fish/ meat; I- Short of money due to indebtness; J- Skipping meals; K- Chronic illness.

5.5. ASSESSMENT OF NUTRITIONAL STATUS OF THE MICRO SAMPLE

Assessment of nutritional status of the micro sample was done by measuring anthropometry and analyzing the morbidity pattern. Twenty four hour recall method was used to find the food consumption pattern and food use frequency.

Nutritional anthropometry is the measurements of human body at various ages and it is based on the concepts that an appropriate amount should reflect any morphological variation due to significant functional and physiological change (Rao, 2002). Anthropometric measurements such as height, weight and waist hip ratio were taken into account for assessing the nutritional status of the micro sample.

Body mass index is regarded as a good indicator of nutritional status. Body Mass Index (BMI) is an indicator of body's energy stores as reported by Choudary and Solanki (2004). It was found from the study that among the micro sample, 70 per cent were normal, within the range 18.50- 24.99. It was also found 16.66 per cent were overweight and the remaining falls in the underweight category.

An increase in WHR indicates increased accumulation of abdominal fat. In this study, 26.66 per cent had low WHR and 56.66 per cent had normal WHR.

The morbidities are associated with one another and the occurrence of one leads to another. Assessment of morbidity of the respondents in the present study during the past six months revealed that majority were suffering from muscular pain and respiratory infections.

Oral health problems and other health problems such as blood pressure and diabetes were also reported. Chest infection associated with fever, cold and cough was the major complaint mentioned.

Food consumption is another important determinant of nutritional status. An adequate or balanced diet provides all the essential nutrients in sufficient quantities and proper proportions to meet the needs of the body (ICMR, 1989).

One day recall method survey was done to calculate the food and nutrient intake of the micro sample. Sunita and Singh (2002) conducted a study on SC adults in rural areas of Bihar and their food consumption pattern was found that their food and nutrient intake was lower than RDA which agrees with the findings of the present study. In this study, all the nutrients were deficit of Recommended Dietary Allowances (RDA). A higher percentage of RDA deficit were noted in protein and iron intake.

Summary

6. SUMMARY

The present study entitled “Determinants of household food security of selected traditional vegetable growers of Thiruvananthapuram” was conducted with an objective to assess the trend and to analyze the determinants of household food security among the traditional vegetable growers belonging to the selected vegetable tracts of Thiruvananthapuram.

The locale of the study was the four selected blocks namely Kazhakuttom, Nedumangad, Vamanapuram and Nemom of Thiruvananthapuram district where a considerable percentage of traditional vegetable growers are available. From the selected blocks Pothencode, Karakulam, Peringamala and Kalliyoor area were selected for the study. A total number of hundred growers; twenty five each from the four selected vegetable tract belonging to the respective blocks were selected for the study. Thirty women were selected as micro sample to investigate further on their food utilization.

An exploratory survey was done for the collection of data using suitably structured and pretested tools developed for the purpose.

Results of the study revealed that 12 per cent the respondents belonged to the age group of 35 years and were engaged in vegetable cultivation. Majority (74 per cent) of the respondents belonged to Hindu religion. Analysis of family structure revealed that 94 per cent of the respondents belonged to nuclear type of families.

Majority of the families had their own homes with tiled roof. Facilities of drinking water and sanitary latrines were available for all the respondents.

Twenty two per cent of families surveyed were the beneficiaries of food distribution programmes through anganwadi and schools. Eighteen per cent families who come under below poverty line category availed the grain distributed under PDS.

Regarding educational status, it was found that majority (53 per cent) of them had studied upto high school level. The employment status showed that 87 per cent of them belonged to one earning member family. The monthly income level showed that majority of the respondents was having income within the range of Rs.7323- Rs.9787.

Dietary habits of the respondents indicated that all of them were habitual non-vegetarians. Among them cereals, nuts and oil seeds, milk were most frequently used. Fruits and meat were rarely consumed.

Minority of the respondents avoided commercially prepared food items. At the same time, the respondents avoided locally available nutritious foods such as custard apple, papaya and green leafy vegetables due to their poor nutritional knowledge. Beverages such as health drinks, fruit juices and soft drinks were seldom used especially by the younger generation. Twenty one per cent had the habit of skipping meals. It was observed that 18 per cent had the habit of alcohol consumption and seven per cent practiced pan parag and twenty five per cent had the habit of smoking.

The area of cultivable land ranged from below 25 cents to within 2 acre. Majority of the families were engaged in amaranth, cow pea and snake gourd cultivation. Vegetable produced was used for household consumption by 18 per cent only. It was observed that with increase in production of vegetables, consumption of vegetable in household was decreased by 59 per cent of the respondents cultivated on leased- in land.

From the purchase inventory, it was observed that majority of the respondents were not procuring enough staple food needed to meet their requirement based on the ICMR recommended allowance.

Majority of the respondents availed only kerosene and sugar from PDS. Wheat and rice were rarely purchased from PDS considering the quantity of the grain.

Food security status level was computed by giving scores to the food security core module suggested by USDA (2000). It was found that 62 per cent were food insecure without hunger. Eighteen per cent were food insecure with hunger (moderate) and 9 per cent were food insecure with hunger (severe) condition. Only 11 per cent belonged to food secure group.

The findings of the study revealed that age, family type, monthly income, educational qualification, number of meals per day and expenditure on food and PDS utilization are the major determinants of the food security.

The nutritional status of micro sample (30 women) was analyzed to find out food utilization. Classification of BMI revealed that 13.33 per cent were under weight, seventy per cent were seen to be normal and 16.66 per cent were overweight. 26.66 percent had low waist- hip- ratio (WHR) and 56.66 per cent belonged to the normal range.

Assessment of morbidity pattern revealed that 36.67 per cent women were suffering from muscular pain and 23.33 per cent were having respiratory infections. 33.3 per cent women reported that they had eye infections.

Mean nutrient intake of the micro sample revealed that major as well as micro nutrients did not meet Recommended Dietary Allowances (RDA). A higher percentage of RDA deficit was noticed in protein and iron intake.

Food security status level had high significant association with some selected socio-economic variables like age, family type, educational qualification, monthly income, money expenditure on food and PDS utilization.

The result shows that a considerable percentage belonged to food insecure group which require corrective measures. It is suggested that nutrition education as well as motivation programmes for supplementing the family income may be executed to improve the household food security.

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Appendices

APPENDIX- 1
KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF AGRICULTURE, VELLAYANI
DEPARTMENT OF HOME SCIENCE

INTERVIEW SCHEDULE USED TO ELICIT INFORMATION OF PERSONAL DATA FROM THE RESPONDENTS

1. Name and address :
2. Age :
3. Religion : Hindu/ Christian/ Muslim
4. Family size : a) 1-2 b)3-4 c)5-6
5. Family type : Nuclear/ Joint
6. Family composition

Sl. No	Sex	Age	Relationship with respondent	Education	Occupation	Income

7. Land possessed : Cents/ acre/ nil

a) Area of cultivated land :

b) Crops cultivated in your land :

c) Details of livestock possessed

No. of animals : Cow/ Goat/ Pig

No. of birds : Hen/ Duck

8. Mostly cultivated vegetables items

Sl. No	Vegetables	Area
1.	Chilli	
2.	Amaranth	
3.	Cowpea	
4.	Bitter gourd	
5.	Snake gourd	
6.	Tomato	
7.	Cucumber	
8.	Bhindi	
9.	Ash gourd	
10.	Yam	
11.	Colacasia	
12.	Plantain	
13.	Little gourd	
14.	Brinjal	

15.	Tapioca	
16.	Ginger	
17.	Lesser yam	
18.	Cauliflower	
19	Pumpkin	

9. Monthly expenditure of the family

Items	Amount spent
Food	
Clothing	
Travelling	
Education	
Entertainment	
Health care	
Savings	
Miscellaneous	

10. Type of house : Own/ Rented

11. Housing condition : Tiles/ Asbestos/ Concrete

12. Source of drinking water : Pipe/ Well water

13. Availability of latrines, drainages : Yes/ No

If yes, Sanitary latrine/ pit type/ soak pit/ open area

APPENDIX – II
KERALA AGRICULTURAL UNIVERSITY
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DEPARTMENT OF HOME SCIENCE

**SCHEDULE USED FOR COLLECTING DATA PERTAINING TO THE
 FREQUENCY OF USE OF FOODS**

1. Name of the respondent :
2. Food habit : Vegetarian/ Non- vegetarian
3. Frequency of using different food items :

Food items	Daily	Thrice a week	Twice a week	Once a week	Rarely	Never
<u>Cereals</u>						
- Rice						
- Rice flakes						
- Wheat						
- Maida						
- Atta						
- Suji						
- Vermicelli						
- Ragi						
<u>Pulses</u>						
- Red gram						
- Bengal gram						

- Green gram						
- Black gram						
- Cowpea						
- Green peas						
- Soya bean						
- Horse gram						
<u>Leafy vegetables</u>						
- Amaranth						
- Drumstick leaves						
- Cabbage						
- Coriander						
- Curry leaves						
- Spinach						
- Chekkkurmanis						
<u>Roots & Tubers</u>						
- Beet root						
- Carrot						
- Onion, big						
- Onion, Small						
- Potato						
- Tapioca						
- Yam						
<u>Other vegetables</u>						
- Ashgourd						
- Bitter gourd						

<ul style="list-style-type: none"> - Beans - Cauli flower - Cucumber - Drumstick - Ladies finger - Mango green - Papaya - Plantain - Snake gourd <p><u>Nuts & oil seeds</u></p> <ul style="list-style-type: none"> - Coconut - Cashew nut - Ground nut - Gingelly seeds <p><u>Fruits</u></p> <ul style="list-style-type: none"> - Amla - Apple - Banana ripe - Grapes blue - Grapes green - Gauva - Lime - Mango ripe - Papaya ripe - Pine apple 						
---	--	--	--	--	--	--

<ul style="list-style-type: none"> - Orange <p><u>Fish</u></p> <p><u>Meat & Poultry</u></p> <ul style="list-style-type: none"> - Beef - Chicken - Liver - Egg, duck - Egg, hen - Mutton <p><u>Milk & Milk products</u></p> <ul style="list-style-type: none"> - Milk, buffalo - Milk, Cow - Milk, Goat - Curd - Buttermilk - Skimmed milk <p><u>Fats & oils</u></p> <ul style="list-style-type: none"> - Coconut oil - Palm oil - Ghee/ butter <p><u>Tea/ Coffee</u></p>						
---	--	--	--	--	--	--

4. How many times, meals are taken in a day?
 a) Once b) Twice c) Three d) More than Thrice
5. Does anyone in the family skip meals? YES/ NO If yes, who
 If yes, which meal: breakfast/ lunch/ dinner
6. Do anyone consume left over foods : Yes/ No If yes, who
 If yes, details

7. Food consumed for each meal last day

Meal	Menu	Quantity
Early morning		
Breakfast		
Midmorning		
Lunch		
Mid afternoon		
Tea- time		
Dinner		

8. Do you avoid/ omit any foods? Yes/ No

Foods avoided	Reasons

9. Details of quantity of food crops produced, sold and consumed during last year

Items	Production	Sold	Consumed
Rice			
Tapioca			
Cowpea			
Yam			
Ash gourd			
Bitter gourd			
Banana			
Amaranth			
Spinach			
Coconut			

10. Availing PDS facility

Food materials	Regularly	Rarely
Rice		
Whole wheat		
Sugar		
Atta		
Others specify,		

**APPENDIX III
KERALA AGRICULTURAL UNIVERSITY
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DEPARTMENT OF HOME SCIENCE**

FOOD SECURITY/ HUNGER CORE MODULE OF USDA

1. “(I/We) worried whether (my/our) food would run out before (I/we) got money to buy more.” Was that often true, sometimes true, or never true for (you/your household) in the last 12 months?

- Often true
- Sometimes true
- Never true
- DK or Refused

2. “The food that (I/we) bought just didn’t last, and (I/we) didn’t have money to get more.” Was that often, sometimes, or never true for (you/your household) in the last 12 months?

- Often true
- Sometimes true
- Never true
- DK or Refused

3. “(I/we) couldn’t afford to eat balanced meals.” Was that often, sometimes, or never true for (you/your household) in the last 12 months?

- Often true
- Sometimes true
- Never true
- DK or Refused

[IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK Q5 - 6;

OTHERWISE SKIP TO 1st-Level Screen.]

4. "(I/we) relied on only a few kinds of low-cost food to feed (my/our) child/the children) because (I was/we were) running out of money to buy food." Was that often, sometimes, or never true for (you/your household) in the last 12 months?

- Often true
- Sometimes true
- Never true
- DK or Refused

5. "(I/We) couldn't feed (my/our) child/the children) a balanced meal, because (I/we) couldn't afford that." Was that often, sometimes, or never true for (you/your household) in the last 12 months?

- Often true
- Sometimes true
- Never true
- DK or Refused

[IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK Q7; OTHERWISE SKIP TO Q8]

6. "(My/Our child was/The children were) not eating enough because (I/we) just couldn't afford enough food." Was that often, sometimes, or never true for (you/your household) in the last 12 months?

- Often true
- Sometimes true
- Never true
- DK or R

7. In the last 12 months, since last (name of current month), did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?

Yes

No (SKIP 8a)

DK or R (SKIP 8a)

8a. [IF YES ABOVE, ASK] How often did this happen---almost every month, some months but not every month, or in only 1 or 2 months?

Almost every month

Some months but not every month

Only 1 or 2 months

DK or R

9. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?

Yes

No

DK or R

10. In the last 12 months, were you every hungry but didn't eat because you couldn't afford enough food?

Yes

No

DK or R

11. In the last 12 months, did you lose weight because you didn't have enough money for food?

Yes

No

DK or R

12. In the last 12 months, did (you/you or other adults in your household) ever not eat for a whole day because there wasn't enough money for food?

Yes

No (SKIP 13)

DK or R (SKIP 13)

13. [IF YES ABOVE, ASK] How often did this happen---almost every month, some months but not every month, or in only 1 or 2 months?

Almost every month

Some months but not every month

Only 1 or 2 months

DK or R

[IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK 13-16; OTHERWISE SKIP TO END.]

14. The next questions are about children living in the household who are under 18 years old. In the last 12 months, since (current month) of last year, did you ever cut the size of (your child's/any of the children's) meals because there wasn't enough money for food?

Yes

No

DK or R

15. In the last 12 months, did (CHILD'S NAME/any of the children) ever skip meals because there wasn't enough money for food?

Yes

No (SKIP 14a)

DK or R (SKIP 14a)

16. [IF YES ABOVE ASK] How often did this happen---almost every month, some months but not every month, or in only 1 or 2 months?

Almost every month

Some months but not every month

Only 1 or 2 months

DK or R

17. In the last 12 months, (was your child/ were the children) ever hungry but you just couldn't afford more food?

Yes

No

DK or R

18. In the last 12 months, did (your child/any of the children) ever not eat for a whole day because there wasn't enough money for food?

Yes

No

DK or R

APPENDIX III
KERALA AGRICULTURAL UNIVERSITY
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DEPARTMENT OF HOME SCIENCE

Number of Affirmative Responses		1998 food security Scale values	Food Security Status Level	
(Out of 18) Households With Children	(Out of 10) Households Without Children		Code	Category
0	0	0.0	0	Food secure
1		1.0		
2	1	1.2	1	Food Insecure without hunger
		1.8		
	2	2.2		
3		2.4		
4		3.0		
5	3	3.0		
6		3.4		
7	4	3.7		
		3.9		
	5	4.3		
		4.4		

8		4.7	2	Food Insecure with hunger, Moderate
9	6	5.0		
10		5.1		
11		5.5		
12	7	5.7		
		5.9		
		6.3		
	8	6.4		
13		6.6	3	Food Insecure with hunger, Severe
14		7.0		
15	9	7.2		
16		7.4		
17		7.9		
18	10	8.0		
		8.7		
		9.3		

N=100

Source: Calculated by ERS from August 1998 Current Population Survey Food Security Supplement data

APPENDIX III
KERALA AGRICULTURAL UNIVERSITY
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DEPARTMENT OF HOME SCIENCE

HOUSEHOLDS WITH COMPLETE RESPONSES:
FOOD SECURITY SCALE VALUES AND STATUS LEVELS
CORRESPONDING TO NUMBER OF AFFIRMATIVE RESPONSES

Number of Affirmative Responses		1998 food security Scale values	Food Security Status Level		Percentage
(Out of 18) Households With Children	(Out of 10) Households Without Children		Code	Category	
0	0	0.0	0	Food secure	11
1		1.0			
2	1	1.2			
	2	1.8			
		2.2			
3		2.4	1	Food Insecure without hunger	62
4		3.0			
5	3	3.0			
6		3.4			
7	4	3.7			
		3.9			
		4.3			
	5	4.4			

8		4.7			
9		5.0			
10	6	5.1			
11		5.5			
12	7	5.7			
		5.9			
		6.3			
	8	6.4	2	Food Insecure with hunger, Moderate	18
13		6.6			
14		7.0			
15	9	7.2			
16		7.4			
17		7.9			
18	10	8.0			
		8.7			
		9.3	3	Food Insecure with hunger, Severe	9

N=100

Source: Calculated by ERS from August 1998 Current Population Survey Food Security Supplement data

APPENDIX IV
KERALA AGRICULTURAL UNIVERSITY
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DEPARTMENT OF HOME SCIENCE

**SCHEDULE TO ELICIT NUTRITIONAL ASSESSMENT OF MICRO
SAMPLE**

Name and address :

Age :

Type of family :

ANTHROPOMETRIC MEASUREMENTS

(a) Height :

(b) Weight :

(c) Waist measurement :

(d) Hip measurement :

(e) Body Mass Index :

MORBIDITY DETAILS

Diabetes

Blood pressure

Fatigue

Muscular pain

Respiratory infections

Skin problems

Eye problems

Other health problems

APPENDIX V
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**SCHEDULE TO ASSESS INDIVIDUAL DIETARY CONSUMPTION OF THE
MICRO SAMPLE**

1. Name :
2. Age :
3. Specify : Vegetarians/ Non- vegetarians/ Others

Actual food intake of the respondent (24 hour recall method)

Meal pattern	Menu	Raw quantity of each ingredients	Individual intake
Break fast			
Lunch			
Tea time			
Dinner			

APPENDIX VI
KERALA AGRICULTURAL UNIVERSITY
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DEPARTMENT OF HOME SCIENCE

AGE AND ANTHROPOMETRIC VALUES OF MICRO SAMPLE

Sl. No	Age	Wt. (kg)	Ht. (cms)	BMI
1	38	52	152	22.50
2	36	55	158	22.03
3	40	60	161	23.15
4	42	60	158	24.04
5	45	65	160	25.39
6	41	55	161	21.22
7	36	58	158	23.24
8	45	50	161	19.29
9	44	62	165	22.78
10	45	65	168	23.03
11	36	46	155	19.16
12	35	50	164	18.58
13	45	48	160	18.75
14	43	65	155	27.03
15	41	48	153	20.51
16	36	45	154	18.99

17	38	43	157	17.48
18	44	67	160	26.17
19	38	45	151	19.74
20	42	45	157	18.29
21	43	40	150	17.78
22	37	54	154	22.78
23	39	48	157	19.51
24	36	58	158	23.29
25	38	65	159	25.69
26	44	60	164	22.30
27	41	55	165	20.21
28	40	50	161	19.31
29	39	42	157	17.07
30	37	68	153	29.05

Abstract

**DETERMINANTS OF HOUSEHOLD FOOD SECURITY OF SELECTED
TRADITIONAL VEGETABLE GROWERS OF
THIRUVANANTHAPURAM**

by

ATHULYA M. S

(2009-16-106)

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

**Master of Science in Home Science
(Food Science and Nutrition)**

Faculty of Agriculture

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2012

ABSTRACT

The present study was carried out in the four selected blocks namely Kazhakuttam, Nedumangad, Vamanapuram and Nemom of Thiruvananthapuram district, where a considerable percentage of traditional vegetable growers are available. From the selected four blocks Pothencode, Karakulam, Peringamala and Kalliyoor panchayath were selected respectively from each block. A total number of hundred growers; twenty five each from the four selected vegetable tract belonging to the respective blocks comprise the sample. From the hundred families, thirty women were selected as the micro sample and their nutritional status were assessed.

The objective of the study was to assess the trend and to analyse the determinants of house hold food security among the traditional vegetable growers belonging to the selected vegetables tracts of Thiruvananthapuram district.

Tools were constructed to ascertain the socio- economic status and personal characteristics of the respondents. Monthly expenditure on different food items were observed by purchase inventory. Food use frequency, food consumption pattern and food habits of the family were studied with the help of diet survey.

For the micro sample, anthropometry measurements, actual food and nutrient intake and morbidity details were recorded.

A considerable percentage of the respondents in the study reported the use of leased in land for cultivation.

The food availability and accessibility data was collected through food purchase inventory survey of three months, which revealed that majority of the respondents were not purchasing or procuring enough food needed to meet their requirement based on the recommended allowances for a balanced diet as suggested by ICMR (1999).

As far as the micro sample was considered, it was found that their diet did not meet the Recommended Dietary Allowances (RDA). A high percentage of RDA deficit was noted in protein and iron intake.

The result of the study revealed that based on food security hunger core module formulated by USDA (2000), shows that 11 families were found to be food secure and 62 per cent were food insecure without hunger. Families who are food insecure with moderate hunger were eighteen per cent and with severe food insecurity were nine per cent.

The findings of the study revealed that age, family type, monthly income, educational qualification, number of meals per day and expenditure on food and PDS utilization are the major determinants of the food security. Majority of the respondents availed only kerosene and sugar from PDS. Wheat and rice were rarely purchased from PDS considering the quantity of grain.

Therefore it can be concluded that a considerable percentage belonged to food insecure group and that requires appropriate corrective measures. Hence it is suggested that nutrition education as well as motivation programmes for supplementing the family income may be executed to improve the house hold food security.