

**FOOD CONSUMPTION PATTERN AND NUTRITIONAL  
STATUS OF FARM WOMEN IN  
THRISSUR DISTRICT**

By

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**THESIS**

Submitted in partial fulfilment of the  
requirement for the degree of

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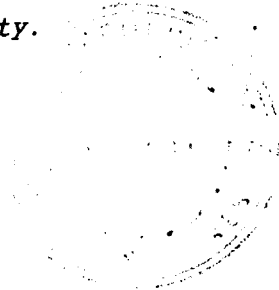
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**1996**

## **DECLARATION**

I hereby declare that this thesis entitled "Food consumption pattern and nutritional status of farm women in Thrissur district" is a bonafide record of research work done by me during the course of research and that this thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title of any other University or Society.

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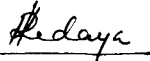
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P.K. UDAYA

*Dedicated to my  
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# *Introduction*

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## INTRODUCTION

Agriculture is the mainstay of the rural economy and livelihood in almost all developing nations. It is a key sector in Indian economy and a source of livelihood for more than 70 per cent of the total population (Mahajan, 1990; Johl and Sidhu, 1990 and Sinha, 1992). The characteristic feature of agriculture in India is that farming is a family enterprise where farm work is done by the members of the family on unpaid basis (Srivastava, 1992).

Our agricultural policy is still dominated by the false view that farmers are men, women are only house-wives. Women play an important role in agricultural production in India and their contribution to crop production constitutes roughly 50 to 60 per cent. Although women contribute significantly they remain inactive and dependent (Verma, 1995). In addition to this, farm women often face the double drudgery of being both the major contributor to the family income as well as being responsible for household and family maintenance. Even though Indian women are considered the backbone of Indian farming they have never been given the status of a farmer ((Sinha, 1992; Verma, 1995).

As half of India's population consists of women, the prosperity and growth of the nation depends on the status and development of its women (Srivastava, 1992; Malaviya and Rani, 1990). There was a time in ancient India when women held a place of pride, but in today's modern world, farm women are literally slaves

in the male dominated society (Malaviya and Rani, 1990). Farm women are considered to be submissive, illiterate, ignorant, assetless females who have been trapped in the webs of tradition and customs (Singh and Bhattacharya, 1990). The status of farm women is much lower than that of their male counterparts largely because of their customary male dominance in the society, inherent shyness, lack of opportunities and very poor accessibility to modern technologies.

The farm women performing agricultural operations which involve drudgery and physical labour are usually overburdened and undernourished. The nutritional status of farm women is extremely poor because of the low dietary intake and high energy output, for wage earning, child bearing and child rearing. The extremely high workload of the woman and the inadequate intake of nutritious foods have deleterious effects on her health and nutritional status (Seralathan *et al.*, 1993).

Of the many factors that contribute to the family welfare, nutrition plays an important role. Malnutrition prevalent among low income population has created a sense of urgency about generalising reliable data on food and nutrition, so that the results of the study will yield clues for the formation of appropriate action programmes to increase the consumption of cheap and locally available nutritious foods. On the basis of the results, nutrition education programme can be implemented for farm women with regard to rudiments of nutrition, emphasising the role of good nutrition in improving work capacity. Hence, the present study was undertaken with the following objectives:



1. To assess the socio-economic and food consumption pattern of farm families,
2. To study the nutritional status of farm women,
3. To find out the factors influencing the nutritional status of farm women and suggest measures to improve their nutritional status.

# *Review of Literature*

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## **REVIEW OF LITERATURE**

In this chapter an attempt has been made to review the literature relevant to the study on food consumption pattern and nutritional status of farm women in Thrissur district.

The review has been done in sections as indicated below:

1. Agricultural situation in India
2. Role of women in Agriculture
3. Socio-economic condition of the farm families
4. Nutritional status of farm families
5. Factors influencing the nutritional status and dietary habits of farm families
6. Food consumption pattern of farm families

### **2.1 Agricultural situation in India**

Small farmers who owned landholdings upto five acres constituted nearly 70 per cent of the total number of the farmers in India (Saikia, 1982). A similar report by Pandey (1989) stated that the small and marginal farmers with holdings less than two hectares represented about 74.6 per cent of the total land holdings. Hota (1984) pointed out that poor constituted 75 per cent of the total household of the villages with 50 per cent living below the poverty line and they were mainly agriculturists owning one acre or less of land. According to Batt and Koshy (1984) marginal farmers and agricultural labourers were the largest and poorest section of

farming community. About 70 per cent of the Indian population directly depended on agriculture and there was a need for indirect participation and involvement of farmers at all levels of food production (Venkitaraman, 1985).

Agriculture is the backbone of the Indian economy and about two-third of the population directly depended on agriculture (Sekar and Subramaniam, 1986). The authors also opined that resource use was an important issue in deciding the existing opportunities in agriculture for economic growth and welfare of farm families. Singh and Inderjit (1988) observed that many households in South Asia relied on farming for their livelihood.

India has nearly 100 million farming families which constituted 25 per cent of the global farming population and for them agriculture is a way of life as well as the primary means to livelihood (Swaminathan, 1995). According to Swaminathan (1996), percapita availability of arable land in India is shrinking. Agriculture including crop and animal husbandry, forestry and agro-forestry, fisheries and agro industries provided livelihood to over 70 per cent of India's population.

## **2.2 Role of women in Agriculture**

Women played important role in the country's economic growth especially in agricultural production. However, the tasks that rural women performed in a subsistence agricultural framework were unpaid because these tasks were socially recognised as the part of 'housekeeping' or home-making and were not considered

productive ones (Jahanara, 1974). Women were the most undernourished economically, the most vulnerable and socially the most depressed groups of workers in society (Patel, 1982). Women performed tasks essential to any society's survival, from raising children to giving food and to feed their families (UNICEF, 1985). Jhurani (1985) stated that multiple roles played by women inside and outside the house formed a part of their role. Indian women are contributing a major share in the national economy through their various roles (Bhardwaj and Kumar, 1987). Achanta (1983) reported that women played a pivotal role in agricultural activities from time immemorial. Women contributed to farming either in their own land or as hired labour.

Venkatachalam (1983) quoted that all over the country, the cattle were being looked after by women in rural areas. As a house-wife and mother, the lady of the house was concerned with utilisation of milk and milk products at home. According to Silva (1984) and Ly (1988) women had important role in post harvest operation, food processing, poultry and animal rearing and many other activities related to agriculture. Devi and Reddy (1984) stated that women performed a variety of tasks both in the farm as well as at home. They took part in allied agricultural roles, kitchen gardening, poultry, milking cattle, washing cattle, cleaning cattle shed and taking care of sick cattle. In a report published by NIN (1985) it had been stated that dual stress and conflicting demands of the women in and outside home have adverse effects on their health status.

Farm women, according to Sisodia (1985) contributed to Indian agriculture by providing labour in agricultural production; being responsible for the management of cattle and other farm animals and as decision makers. India's working women contributed about 89 per cent in the informal labour sector (Arunachalam, 1985). The findings of Ahsan (1986) revealed that 75 percent of females in two villages of Bangladesh were involved in both homestead and field agriculture. The author had also pointed out that the women spent 30 per cent of their time in agricultural activities. He also pointed out that women from small farms spent more time in field agriculture, while women from larger farm households spent more time in homestead agriculture and landless females were more involved with agricultural activities for earning direct income.

According to Ghosh (1987) the work the women did within and outside the home affected their health. Saradamani (1987) studied the women's involvement in labour and rice production in Kerala, Tamil Nadu and West Bengal. The study revealed that women made crucial contribution to the production and processing of rice. Live stock was the only means through which rural women contributed to their family's needs (Lily, 1987).

Pandey *et al.* (1988) observed that women worked between 9 and 14 hours a day and in general had only a supportive role in agricultural decisions. The authors also stated that the size of operational holding and ratio of crops to total cropped area were positively and significantly related to the employment of rural women. Axin (1988) opined that women provided skill and labour for agricultural production, subsistence of food, water and firewood for their families.

Devadas *et al.* (1990) found that the work load of women in agriculture was very much higher than that of men. Manjulatha (1993) stated that more than 60 per cent of the agricultural operations were performed by women in India.

Nair (1990a) showed that women worked for longer hours and contributed more on terms of total labour energy that was spent by the family members. According to the author, on account of deeply entrenched social customs, taboos and prejudices, women's work continued to be invisible and confined more to non-monetary activities. Women were considered to be the invisible work force in agriculture even though they were the essential productive workers in India's economy (Sen, 1990). He also stated that the religious, economic and kinship structures of the Indian society demarcated the social domain of female and male in terms of inside/outside dichotomy. Sundari (1990) stressed that the position of Indian women was characterised by arduous working condition and low wages.

Mrunalini (1992) in a study conducted among women in the East Godavari district of Andhra Pradesh revealed that irrespective of landholdings category, women participated in the household operations which comprised housekeeping, food related and family care related operations. Hard labour, low wages and uncertainty in employment were the characteristic of the working condition of women quarry workers (Sheela, 1993). According to Grover and Grover (1993) the rural women had an adequate control over the means of production and were highly dependent on recruitment of the labour force.

According to Parthasarthy (1995) women's development held the key to total development, via, the effects on literacy, health and nutrition.

### **2.3 Socio-economic condition of the farm families**

Saxena (1986) found that nuclear families were better than joint families in health and development. Nuclear type of families were observed not only among the different socio-economic strata of Kerala State (Thomas, 1989a; Varghese, 1989; Usha *et al.*, 1990; Seshadrinath, 1993; Augustine, 1993 and Jayanthakumari, 1993), but also among various tribal communities of Kerala (Thomas, 1989b and Indira, 1993). In a study conducted among farm families in Trivandrum district it was reported that majority were Hindus and belonged to the scheduled caste (Thomas 1989a). The author also reported that majority of the farm families were large sized



consisting of 5-10 members. A similar report was given by Usha *et al.* (1990) and Augustine(1993). In contrast to this, Jayanthakumari (1993) indicated that majority of the farm families were medium sized. Nagammal (1989) and Cherian (1992) also reported a similar finding in their studies.

Panicker(1979) reported that literacy rate of agricultural labourers in Kerala was found to be 72 per cent. Thomas (1989a) in a study conducted among farm families revealed that majority of the adult members were literate. A study conducted by Usha *et al.* (1990) among the agricultural labourers of Trivandrum district revealed that 16 per cent of the mothers were illiterate when compared to men. About 60 per cent of the women had Upper Primary and High School education while only 54.67 per cent of the male members had the same level of education. Adiseshiah (1994) reported that rural women lagged behind in literacy than men. Mathew (1994) revealed that the female literacy rate in rural areas of Karnataka and Tamil Nadu was lower than in the urban areas. The literacy level of poultry farm women of Bangalore district and Salem district revealed that 54.1 per cent and 11.4 per cent of large and small farmers respectively attained secondary school education (Vaidehi and Joshi, 1995).

Bhatti (1987) reported that poultry in rural Pakistan were mainly reared by women as a spare time occupation. Singh *et al.* (1988) studied the participation of rural women in agriculture in the hills of Uttar Pradesh and revealed that they were employed in different activities in crop and livestock enterprises such as sowing

paddy, transplanting, threshing and winnowing, grass cutting, feeding and milking of animals. Longe (1988) reviewed the role of women in food production in Nigeria and observed that more than 45 per cent of the rural population engaged in the production of both crops and livestock were women. The author also revealed that women dominated the farming business and were able to provide enough food for their families and for sale thereby gaining income for the family. Thomas (1989a) in a study among farm families of Trivandrum district reported that 62 per cent of women were not engaged in any occupation and 2.67 per cent of the housewives were earning members.

Nair (1990b) observed that as much as 79.40 per cent of women workers were engaged in agricultural activities mainly as agricultural labourers. Usha *et al.* (1990) stated that in Kerala, women labourers besides being solely responsible for the cultivation of food crops, monitor the food storage, cook the food and generally apportion food helpings to family members according to their requirement and availability. Women constituted 48.16 per cent of India's total population and 83 per cent women were involved in agriculture related pursuits as cultivators and labourers (Census of India, 1991). According to Grover and Grover (1993) about 47 per cent of rural women were classified as agricultural labourers and 34 per cent as cultivators. The corresponding values for men were 20 and 44.

Khan and Sharma (1971) classified the farmers into three categories viz., small farmers (upto 2 hectares) medium (2-4 hectares) and big farmers

(about 4 hectares). Economic activities of the farmers may vary as a result of difference in the size of landholdings, since land was one of the chief determinants of the resource position and risk bearing, biochemical and technological innovative capacities of the farmers (Grabowsky, 1987). The size of the landholdings i.e., large, small, medium, marginal and landless labour exercised a commanding influence on work participation of rural women (Arora, 1990). According to Minocha (1995) nearly two thirds of rural population consisted of small and marginal farmers and landless labourers.

Acharya (1982) pointed out that marginal farmers had varying levels of income depending on the nature of land. Thomas (1989a) revealed in a study among farm families of Trivandrum district that majority of the families had a monthly income below Rs.1000/-. A higher inequality was observed in the distribution of income in relation to the farm size and employment by Singh and Singh (1991). Off-farm employment played an important role in expanding income for households constrained by limited land and water and with larger number of residents (Rief and Cochrame, 1991).

Moorthy *et al.* (1983) and Devadas and Easwaran (1986) reported that nearly 84 per cent and 90 per cent of the monthly income was spent on food by the rural households in Hyderabad and Tamil Nadu respectively. Usha *et al.* (1990) revealed in their study that majority of the families spent 51-70 per cent of their monthly income on food.

## 2.4 Nutritional status of farm families

Nicol and Phillips (1976) revealed that Nigerian farmers were habituated to diets relatively low in protein. According to Pandey *et al.* (1977) deficient calorie intake was the main nutritional problem among the farm women resulting in malnutrition. Low calorie intake was observed among the low income labour class categories in Punjab by Aujla *et al.* (1983). Kaur and Sood (1988) studied the dietary pattern and nutritional status of women residing in Hoshiarpur and found that the diet of the women were deficient in many of the important protective nutrients. Leonard (1989) observed a decreased energy intake among small scale farmers of Peru. Usha *et al.* (1990) also observed a similar deficient energy intake among the farm women as well as reported a high incidence of vitamin and mineral deficiencies. Pinstrup *et al.* (1991) pointed out that most of the farm households in South India were found to consume 80 per cent of the recommended calorie intake. Except cereals all the food groups and nutrients were deficient in the diet of farm women in Coimbatore district (Seralathan *et al.*, 1993).

According to Maeyer and Adiels Tegman (1985) iron depletion continued to be one of the major nutritional deficiency as observed all over the world with a very high prevalence in India. Vijayalakshmi *et al.* (1987) reported that among the nutritional diseases iron deficiency anaemia was a major concern in many developing countries. Ghosh (1987) and Kishwar (1988) reported that nutritional anaemia was widespread among women of child bearing age and contributed significantly to

maternal morbidity and mortality. Usha *et al.* (1990) reported that anaemia was one of the main causes of maternal mortality. Seralathan *et al.* (1993) in their study among farm women in Coimbatore district found that 16 per cent suffered from severe anaemia and clinical studies showed that vitamin-A and iron deficiency diseases were rampant. The authors also revealed that 8 per cent and 32 per cent of farm women suffered from chronic energy deficiency (CED) - grade III and CED - grade I respectively based on body mass index classification. A study conducted by Karuna and Prema (1993) to assess the nutritional status of women engaged in fish vending in Thiruvananthapuram district revealed that 33.33 per cent had different grades of deficiency.

## **2.5 Factors influencing the dietary habits and nutritional status**

Alanberg (1973) had revealed that there was a powerful influence of income and agriculture on the nutritional status. He had further reported that economic, educational and other opportunities also influenced the nutritional status. According to Robinson (1975) nutritional status was the condition of health as it was related to the use of food by the body. Edgar (1976) believed that the lack of food was a major cause of illness and malnutrition. Ghosh (1977) had pointed out that, the main factors responsible for malnutrition are poor socio-economic condition, large families, ignorance of parents about the nutritional requirements of children and prejudices against certain foods. Panicker (1979) reported that adverse circumstances such as unemployment, economic distress and natural calamities affected the level of food

intake. Suiter and Hunter (1980) stated that the nutritional status of an individual was influenced by factors such as physiological influences and also by thoughts, beliefs and emotions.

A research work carried out in different parts of India by ICMR (1984) had revealed that an adequate diet or a balanced diet which provided all the essential nutrients in sufficient quantities and in proper proportions to meet the needs of the body would result in optimum nutritional status. Seasonal nature of consumption was considered as one of the cause of poor nutrition among agricultural labourers (Niedzialek, 1983). Thimmayamma (1983) reported that larger family size resulted in improper food distribution among family members of agricultural labourers mainly due to low purchasing power and faulty food habits. According to Kusin *et al.* (1984) food availability was one of the causal factors of low consumption.

Behrumram and Deolalikar (1986) opined that the seasonal variations in environmental conditions, food availability, food prices and labour demands in rural areas of developing countries produced considerable variations in food consumption pattern and also in the nutrition and health status of the people. Devadas and Easwaran (1986) opined that food habits of the people were dependant on availability of food.

Socioeconomic factors such as land holdings, income and expenditure of food had a positive influence on healthy living of farmers (Nazmul and Ahmed, 1986).

Mary (1986) found that highest incidence of malnutrition was usually found among the household with lowest purchasing power. A similar report was also given by Batt *et al.* (1987). Tanner (1987) stated that a relationship existed between landholdings and prevalence of malnutrition. According to Krishna (1988) nutritional status was an indicator of socio-economic well being of a community. Raghuramulu (1993) reported that nutritional status was determined by the dynamic situation that reflected the summation overtime, the daily balance between nutrient supply and demand. Swaminathan (1995) pointed out that persistence of under and malnutrition is largely due to inadequate purchasing power which in turn arises from a low growth rate in livelihood opportunities. Poverty is the primary cause of hunger and of chronic food insecurity and these in turn are caused by iniquitous asset distribution (Swaminathan, 1996).

## **2.6 Food consumption pattern**

According to Gopalan (1979) earlier studies indicated that excess consumption of fish and tapioca was common in the dietary patterns of the Keralites. Studies conducted by Geervani (1983) to compare the food and nutrient intake of families with different sources of income indicated a higher intake of milk and milk products and consequently calcium in the families who derived income from only dairy than the families with agriculture as sole source of income. Wong *et al.* (1985) reported that more protein were included in the dietaries of families as the family income increased.

A study conducted by Devadas and Easwaran (1986) in the rural households of India revealed that the female head of the family cooked and distributed the food giving priority to the male head and preschool children. The authors also pointed out that festive occasions facilitated adequate food intake.

Ramadevi (1986) in a study conducted in Andhra Pradesh revealed that consumption of milk and other vegetables was more in irrigated areas where double rice crops are grown. Nutrients like calories, thiamine and iron intakes were comparatively higher in sorghum growing areas while fat, calcium and vitamin C intakes were more in rice growing areas. Mathai (1988) found that with higher and more regular income the consumption pattern of the families changed in quality and quantity without any consequent modification in the variety of dishes. Sharma (1989) conducted food consumption studies in rural areas of Uttar Pradesh and found that the consumption of sugar, jaggery, oil seeds and vegetables were low in the diets of villagers.

A study conducted by Usha *et al.* (1990) among farm families in Trivandrum showed that all the families were non-vegetarians, fish being the important non-vegetarian food in their daily diet. Sreenivasan (1991) reported that the consumption level of cereals, pulses, vegetables, milk and milk products and oils were very low among the agricultural labourers and artisans. Cherian (1992) in a study conducted among the agricultural labourers of Trivandrum district found that rice, tapioca, fish,



coconut, locally cultivated vegetables, milk, cooking oils and sugar were the main items in their daily diet. Rao (1993) pointed out that during the last 10-15 years there has been no significant change in the consumption pattern of the households despite an impressive increase in food production in the country.

## *Material and Methods*

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## **MATERIALS AND METHODS**

This chapter deals with methods and procedures followed in the various phases of research and they are given under the following heads:

1. Locality of the study
2. Selection of samples
3. Plan of study
4. Methods selected for study
5. Statistical analysis

### **3.1 Locality of the study**

The area under the jurisdiction of Thrissur district formed the locality of the study. All the three subdivisions of Thrissur district viz., Thrissur, Wadakancherry and Irinjalakuda were selected. From each subdivision two panchayats were selected at random and from each panchayat, two wards were selected at random. Thus, twelve wards were selected from Thrissur district for the study.

### **3.2 Sample selection**

#### **3.2.1 Selection of farm families**

With the help of the Krishi Bhavan officials the lists of farm families in each of the selected wards were prepared and from these lists a sample of ten families from each ward was selected at random. Thus, a total of 120 farm families were selected for the study.

For conducting detailed study of the farm families, one ward was selected at random from the four selected wards of each subdivision and four families were selected at random from the lists of the farm families of each such selected ward. Thus, 12 farm families were identified for detailed study.

### **3.2.2 Selection of farm women**

From each of the selected farm families one woman between the age group of 18 and 45 years was identified for the study. Thus, a total of 120 farm women formed the sample for the study.

From each of the selected farm families one woman was identified and thus 12 farm women were selected as the sub sample for conducting detailed study.

### **3.3 Plan of study**

The study envisaged the following plan of work:

- i. A baseline survey to monitor the socio-economic condition of the family,
- ii. A dietary survey of the families to assess the food consumption pattern of the farm families,

- iii. Assessment of nutritional status through -
  - a. Anthropometric measurements like height and weight of farm women,
  - b. Food weighing survey to assess the actual food intake,
  - c. Clinical examination to identify the deficiency symptoms,
  - d. Biochemical estimation of blood for haemoglobin level.
- iv. Analysis of the data using suitable statistical methods

### **3.4 Methods selected for study**

The data pertaining to the socio-economic status and dietary pattern of the families were collected by direct interview method using structured and pretested questionnaires. According to Lindzey (1954), interview method consisted of face to face verbal interchange in which the interviewer attempts to elicit information or expression of opinion or belief from another person. Devadas and Kulandaivel (1975) pointed out that interview method was a systematic approach by which a person entered more or less imaginatively into an inner life of a comparative stranger. Interview method was reported to be the most suitable way since it proceeded systematically and recorded the collected information quickly (Bass *et al.*, 1979).

In this study, the investigator presented each topic by means of specific questions. Care was taken to continue the dialogue until the information obtained were sufficient to satisfy the research objectives.

Anthropometric indices, presence of clinical deficiency signs, dietary assessment, actual food intake and biochemical estimation were widely used as direct parameters of nutritional status (Aebi, 1983). Nutritional status could be achieved through using one or combination of several methods. Hence, in the present study, following methods were used to assess the nutritional status of farm women:

- a. Recording of anthropometric measurements like height and weight
- b. Monitoring actual food intake
- c. Conducting clinical examination
- d. Estimating the haemoglobin level of blood

Anthropometry had been accepted as an important tool for assessment of nutritional status (Weisell and Francois, 1982; Vijayaraghavan, 1987, and Sharma & Kalia, 1990). The extent of height deficit in relation to age as compared to regional standards could be regarded as a measure of the limitations of malnutrition. Similarly, comparison of weight-for-age values with regional standards at corresponding ages would help to determine the degree of underweight in a community (Gopaldas and Seshadri, 1987). According to Swaminathan (1987) body weight was still the most ideal measure for assessment of nutritional status. According to Kaul and Nyamongo (1990) a change in body weight may be the result of change in the health of an individual change in dietary supplies or even changes in one's physical activity. Hence, in the present study anthropometric measurements like height and weight of all the farm women were recorded.

Body Mass Index (BMI) expressed as the ratio of weight (kg) to height (m) square is a good indicator of nutritional status of adults (NIN, 1991, 1991-92). In order to assess the chronic energy deficiency of the farm women body mass index was calculated by using the formula

$$\text{BMI} = \frac{\text{Wt(kg)}}{\text{Ht}^2(\text{m})}$$

Diet surveys constitute an essential part of any complete study of nutritional status of individual or groups, and provides essential information on nutrient intake levels, source of nutrition, food habits and attitudes (Gopaldas and Seshadri, 1987).

Weighment method of diet survey according to Gore *et al.* (1977) could give accurate values of dietary intake than recall method. According to Thimmayamma and Rao (1981) food weighment was laborious and time consuming and was much dependent on availability of food at home. Food consumption survey provided data on the type and amount of food consumed by a representative sample of survey population (Schofield, 1985).

Among the diet survey methods commonly employed for determining dietary intake of population, the conventional seven day weighment method had been considered as the most reliable by Swaminathan *et al.* (1967) and Rao (1975). Rao (1975) also pointed out that any single day or two day weighment method would be as efficient a tool as that of seven days. Mari (1985) had stated that actual food consumption within the family through one day weighment could be

better mentioned in microsamples. Hence, in this study one day weightment survey was conducted among the sub samples to determine their actual food and nutrient intake.

Clinical examination is an important, practical and sound method of assessing the nutritional status of a community (Jelliff, 1966 and Kamath, 1986). Swaminathan (1986) opined that clinical examination was the most important part of nutritional assessment since it provided direct information of signs and symptoms of dietary deficiencies prevalent among people. In the present study, clinical examination of twelve farm women was conducted to assess the signs and symptoms of nutritional deficiencies.

Biochemical investigations represented the most objective assessment of the nutritional status of an individual providing pre-or sub clinical information (Sausberlich <sup>et al.</sup> 1977). Daphna (1979) pointed out that biochemical tests were of utmost importance in the assessment of individual nutriture. Of the several biochemical parameter, WHO in its technical reports on nutritional surveillance recommended only haemoglobin for the assessment of nutritional status and suggested that other examinations be used only for follow up purposes. In this study also biochemical estimation of blood for haemoglobin level was carried out among the sub samples to identify the prevalence of anaemia.



### 3.5 Conduct of study

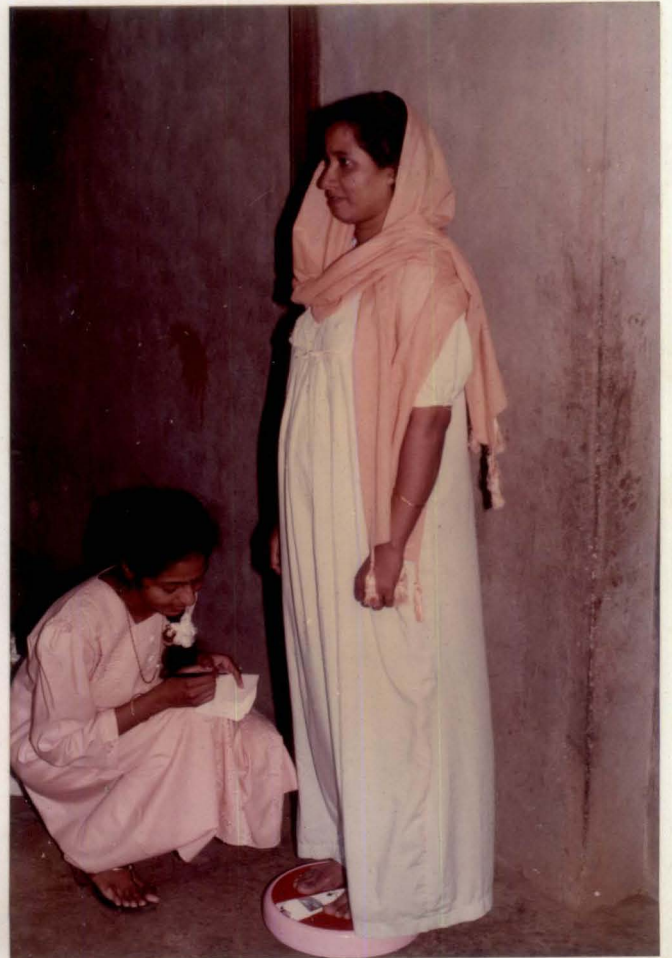
To elicit information on the socio-economic status and dietary habits of the families, two questionnaires were developed. The schedule to assess the socio-economic status comprised of informations on type of family, family size, distribution of family according to age and sex, educational status and occupational status of the family members, details of land holdings, crops cultivated, domestication of animals, monthly income, monthly expenditure pattern, living conditions, savings, social participation and information source utilization.

The schedule to aim the dietary habits and food consumption pattern of the families included food expenditure pattern, frequency of use of foods, methods of preparing foods, cooking methods for various foods, foods given during special occasions, diet during illness, infant feeding practices, methods of storage of foods, foods preserved and daily meal pattern. Both these questionnaires were pre-tested before field application and the details are presented in Appendix I and II respectively.

Anthropometric measurements like height and weight of 120 farm women (Plate 1 and 2) were taken as suggested by Jelliffe, (1966) and the details of the procedure adopted are given in Appendix III.

Plate 1 Height of the respondent

Plate 2 Weight of the respondent



A one day food weighment survey (Plate 3 and 4) was conducted among the subsample consisting of twelve farm women and the schedule used to assess the actual food intake is given in Appendix IV. The nutrients available from the food consumed was computed using the food composition tables (Gopalan *et al.*, 1995).

Clinical examination of twelve farm women was conducted with the help of a qualified physician (Plate 5). Schedule used for this purpose is given in Appendix V.

The haemoglobin level of twelve farm women was determined by the cyanmethaemoglobin method (NIN, 1983) (Plate 6) and the procedure is given in Appendix VI.

### **3.6 Statistical analysis**

In order to assess the influence of quantitative independent variables in the dependent variables, coefficient of correlation was worked out. In case of discrete independent variables, analysis of variance was done to know their influence on dependent variables.

Plate 3 Weighment of raw food

Plate 4 Weighment of cooked food



Plate 5 Clinical assessment

Plate 6 Haemoglobin estimation





## *Results*

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## **RESULTS**

The results of the study on the food consumption pattern and nutritional status of farm families of Thrissur district are presented under the following headings:

1. Socio-economic profile of the farm families
2. Food consumption and dietary pattern of the farm families
3. Nutritional status of farm women

### **4.1 Socio-economic profile of the farm families**

The socio-economic profile of the farm families was studied with respect to their religion, caste, type of family, family size, composition of the family, educational status, occupational status, monthly income, land holdings, cultivation of food crops, domestication of animals, monthly expenditure pattern, housing conditions, details of loan, savings, type of fuel and social participation.

#### **4.1.1 Type of family, Religion, Caste and Family size**

Table 1 reveals that 78.33 per cent of the families were Hindus and the remaining belonged to the Christian (19.17%) and Muslim (2.5%) communities. About 88 per cent belonged to the forward caste. Table also showed that 62.5 per cent of the families were of the nuclear type. Regarding the family size, 65 per cent of the farm families were in the size group of 3 to 5 and 20.83 per cent in the size group of 6 to 8. Only 10.83 per cent had more than eight members in their families.

Table 1 Details of religion, caste, type of family and family size

Sl. No.	Details	Number of families	Per cent
<b>1</b>	<b>Type of family</b>		
	Joint	45	37.50
	Nuclear	75	62.50
	Total	120	100.00
<b>2</b>	<b>Religion</b>		
	Hindu	94	78.33
	Christian	23	19.17
	Muslim	3	2.50
	Total	120	100.00
<b>3</b>	<b>Caste</b>		
	Forward	106	88.33
	Backward	14	11.67
	Total	120	100.00
<b>4</b>	<b>Family size</b>		
	< 3	4	3.33
	3-5	78	65.00
	6-8	25	20.83
	> 8	13	10.83
	Total	120	100.00

Among the farm families, 93.33 per cent were headed by male members and the rest by female members either due to the expiry of the husband or due to divorce.

#### **4.1.2 Age-Sex distribution of families**

The composition of 120 families surveyed is given in Table 2. As much as 51.71 per cent of the population were in the age group of 18 to 45 years and comprised of 48.58 per cent male and 54.74 per cent female members. The percentage of children below 15 years was 19.10 per cent and people above 55 years constituted 16.93 per cent of the total population.

#### **4.1.3 Educational status of adults**

Table 3 indicates the details regarding the educational status of adult members of the farm families. Among the 246 male and 259 female members, only 4.06 per cent and 3.09 per cent male and female members were illiterate. About 37 per cent of the male as well as female members had studied upto the high school level and 24.39 per cent male and 27.80 per cent female members had received college level education. It could be seen that none of the male or female members between the age group of 18 and 45 years were illiterate. Only 1.63 per cent of the male members had attained technical level of education.

#### **4.1.4 Educational status of children and adolescents**

Details regarding the educational status of children and adolescents are given in Table 4. Among the children between 0 and 4 years of age, 40 per cent boys

Table 2 Age-Sex distribution of families

Age (years)	Male (Members)	Female (Members)	Total (Members)
> 55 yrs	58 (18.29)	51 (15.59)	109 (16.93)
45-55	34 (10.72)	29 (8.87)	63 (9.78)
18-45	154 (48.58)	179 (54.74)	333 (51.71)
16-18	10 (3.15)	6 (1.83)	16 (2.48)
5-15	42 (13.25)	28 (8.56)	70 (10.87)
0-4	20 (6.31)	33 (10.09)	53 (8.23)
	317 (49.22)	327 (50.78)	644 (100)

Numbers in parentheses are percentages

Table 3 Educational status of adults

Educational status	Age in years							
	18-45		45-55		>55		Total	
	M	F	M	F	M	F	M	F
Lower Primary	4 (2.60)	6 (3.35)	10 (29.41)	14 (48.27)	32 (55.17)	28 (54.90)	46 (18.70)	48 (18.53)
Upper Primary	20 (12.99)	16 (8.94)	7 (20.59)	8 (27.59)	8 (13.79)	9 (17.65)	35 (14.23)	33 (12.74)
High School	71 (46.10)	87 (48.60)	12 (35.29)	6 (20.69)	8 (13.79)	5 (9.80)	91 (36.99)	98 (37.84)
College	55 (35.71)	70 (39.11)	4 (11.77)	1 (3.45)	1 (1.73)	1 (1.96)	60 (24.39)	72 (27.80)
Technical	4 (2.60)	0	0	0	0	0	4 (1.63)	0
Illiterate	0	0	1 (2.94)	0	9 (15.52)	8 (15.69)	10 (4.06)	8 (3.09)
Total	154 (100)	179 (100)	34 (100)	29 (100)	58 (100)	51 (100)	246 (100)	259 (100)

M - Male    F - Female    Numbers in parentheses are percentages

Table 4 Educational status of children and adolescents

	Age in years							
	0-4		5-15		16-18		Total	
	B	G	B	G	B	G	B	G
Balwadi	8 (40.00)	16 (48.48)	-	-	-	-	8 (11.11)	16 (23.88)
Lower Primary	-	-	20 (47.62)	16 (57.14)	-	-	20 (27.78)	16 (23.88)
Upper primary	-	-	7 (16.67)	4 (14.29)	-	-	7 (9.72)	4 (5.97)
High School	-	-	15 (35.71)	8 (28.57)	2 (20.00)	-	17 (23.61)	8 (11.94)
College	-	-	-	-	8 (80.00)	6 (100.00)	8 (11.11)	6 (8.96)
Not attending	12 (60.00)	17 (51.52)	-	-	-	-	12 (16.67)	17 (25.37)
Total	20 (100)	33 (100)	42 (100)	28 (100)	10 (100)	6 (100)	72 (100)	67 (100)

B - Boys G - Girls Numbers in parentheses are percentages

and 48.48 per cent girls were attending balwadi. Among the children between 5 and 15 years of age, 47.62 per cent boys and 28.57 per cent girls had high school level of education and the rest had upper primary education. All the adolescent girls and 80 per cent adolescent boys between 16 and 18 years of age had attained college level education.

#### **4.1.5 Occupational status of adults**

The details regarding the occupational status of adults are given in Table 5. The table showed that out of the total population only 28.12 percent were engaged in agriculture. Sex wise nearly 47 per cent male and 11 per cent female members were engaged in such type of occupation. More than 50 per cent did not have any work while this was 18.7 per cent among men and 81.47 per cent among women. Only a minority of 4.16 per cent and 7.92 per cent were engaged in government job and private job respectively.

#### **4.1.6 Distribution of respondents by marital, educational and occupational status**

The details furnished in Table 6 reveals that 66.67 per cent of the respondents were married and 31.67 per cent were unmarried. Details regarding educational status revealed that about 48 per cent of the respondents had education upto high school level and 36 per cent had college education. The table also revealed that majority (78 per cent) of the respondents were engaged in housework and only 14.17 per cent were engaged in agriculture.



Table 5 Occupational status of adults

Occupation	Age in years								Grand Total
	18-45		45-55		>55		Total		
	M	F	M	F	M	F	M	F	
Government job	11 (7.14)	5 (2.79)	4 (11.77)	1 (3.45)	-	-	15 (6.10)	6 (2.32)	21 (4.16)
Private job	33 (21.43)	3 (1.68)	2 (5.88)	1 (3.45)	1 (1.72)	-	36 (14.63)	4 (1.54)	40 (7.92)
Agriculture	42 (27.27)	17 (9.50)	26 (76.47)	7 (24.14)	47 (81.04)	3 (5.88)	115 (46.75)	27 (10.42)	142 (28.12)
Coolie	2 (1.30)	-	1 (2.94)	-	-	-	3 (1.22)	-	3 (0.59)
Business	14 (9.09)	-	-	-	-	-	14 (5.69)	-	14 (2.77)
Agriculture and Private job	-	-	1 (2.94)	-	-	-	1 (0.41)	-	1 (0.20)
No work	36 (23.38)	143 (79.89)	-	20 (68.96)	10 (17.24)	48 (94.12)	46 (18.70)	211 (81.47)	257 (50.89)
Continuing education	16 (10.39)	11 (6.14)	-	-	-	-	16 (6.50)	11 (4.25)	27 (5.35)
	154 (100)	179 (100)	34 (100)	29 (100)	58 (100)	51 (100)	246 (100)	259 (100)	505 (100)

M - Male

F - Female

Numbers in parentheses are percentages

Table 6 Distribution of respondents by marital, educational and occupational status

Details	No. of respondents	Percentage
<b>Marital status</b>		
Married	80	66.67
Unmarried	38	31.67
Widow	1	0.83
Divorcee	1	0.83
Total	120	100.00
<b>Educational status</b>		
Lower Primary	3	2.50
Upper Primary	16	13.33
High School	58	48.33
College	43	35.83
Total	120	100.00
<b>Occupational status</b>		
House work	93	77.50
Continuing education	6	5.00
Government job	3	2.50
Agriculture	17	14.17
Private job	1	0.83
Total	120	100.00

#### **4.1.7 Availability of land**

Table 7 depicts the availability of land and the way it was received by the family. Majority of the families (62.5%) owned more than 100 cents of land. About 64 per cent of the families inherited the property from their parents whereas nearly 26 per cent of the families purchased the land.

#### **4.1.8 Cultivation of food crops**

Details regarding the cultivation of food crops are given in Table 8. From the table it was clear that all the families cultivated paddy in their land and majority of the families (83.34%) cultivated other crops like coconut, banana, arecanut or vegetables along with paddy. Only 16.66 per cent of the families cultivated only paddy.

#### **4.1.9 Income distribution of the selected families**

The details regarding the monthly income of the families is shown in Table 9. About 63 per cent of the families had a monthly income ranging from Rs. 1000-4000 and 21.67 per cent had a monthly income ranging from Rs. 4000 to Rs. 8000. Only 3.34 per cent of the farm families had a monthly income of above Rs. 8000. About 13 per cent received an income of less than Rs. 1000/- per month.

#### **4.1.10 Kitchen garden and availability of land**

Of the 120 families, 65 per cent did not have a kitchen garden (Table 10) and the rest (35%) who had kitchen garden cultivated mostly vegetables. Regarding

Table 7 Details on availability of land

Area (cents)	Number of families	Per cent	Hold of land	Number of families	Per cent
21-40	5	4.17	Purchased	31	25.83
41-60	9	7.50	Inherited	77	64.17
61-80	12	10.00	Purchased and inherited	12	10.00
81-100	19	15.83			
> 100	75	62.50			
Total	120	100.00	Total	120	100.00

Table 8 Details of cultivation of food crops

Crops cultivated	Number of families	Per cent
Paddy	20	16.66
Paddy and coconut	45	37.50
Paddy and banana	9	7.50
Paddy and arecanut	2	1.67
Paddy, coconut and banana	16	13.33
Paddy, coconut and arecanut	11	9.17
Paddy, banana and arecanut	2	1.67
Paddy, banana, coconut and arecanut	9	7.50
Paddy, banana, others (vegetables, tapioca etc.)	4	3.33
Paddy, coconut, banana and others	2	1.67
Total	120	100.00

Table 9 Income distribution of the selected families

Monthly income	Number of families	Percentage
<500	2	1.67
500-1000	13	10.83
1000-2000	37	30.83
2000-3000	22	18.33
3000-4000	16	13.33
4000-5000	8	6.67
5000-6000	3	2.50
6000-7000	9	7.50
7000-8000	6	5.00
8000-9000	2	1.67
>9000	2	1.67
Total	120	100.00

Table 10 Details regarding kitchen garden and domestication of animals

Details	Number of families	Per cent
<b>Details regarding kitchen garden</b>		
Have kitchen garden	42	35.00
Do not have kitchen garden	78	65.00
Total	120	100.00
<b>Details regarding domestication of animals</b>		
Yes	94	78.33
No	26	21.67
Total	120	100.00
<b>Income from domestication of animals</b>		
Income obtained	75	62.50
No income	45	37.50
Total	120	100.00

domestication of animals, 78.33 per cent of the families had domestic animals mainly cow and hen. Nearly 63 per cent of the families got income from these domestic animals.

#### **4.1.11 Housing condition of the families**

Details of the housing condition of the farm families are presented in Table 11. It was revealed that all the families had their own house and all the houses were pucca, had separate kitchen, lavatory facilities and electricity facilities. About 51 per cent of the houses had more than six rooms and 48 per cent had three to five rooms. About 72 per cent of the houses were tiled and almost all the households had their own well. Majority of the houses did not have proper drainage facilities. About 86 per cent of the families had recreational facilities like radio, T.V. etc. About 74 per cent of the families did not own a vehicle for transport.

#### **4.1.12 Monthly expenditure pattern**

Details regarding the monthly expenditure pattern for various items like food, clothing, shelter, transportation, recreation, electricity, furniture and health are presented in Table 12. Nearly 91 per cent of the families spent 10-60 per cent of their monthly income on food. Almost all the families spent less than 10 per cent of their income on clothing, electricity and personal expenditure. Majority of the families did not spend money for recreation, health, fuel and remittance. None of them spent money for shelter, water, furniture and luxury items. About 51 per cent of the families spent less than 10 per cent of their income for education.



Table 11 Details of housing conditions

Facilities	Number of families	Per cent
<b>i. Type of house</b>		
a) Own	120	100.00
Rented	0	0.00
b) No. of rooms		
One	0	0.00
Two	1	0.83
3-5	58	48.33
> 6	61	50.83
c) Kutcha	0	0.00
Pucca	120	100.00
d) Tiled	86	71.67
Terraced	34	28.33
Thatched	0	0.00
<b>ii. Other characteristics</b>		
a) Separate kitchen		
Yes	120	100.00
No	0	0.00
b) Source of drinking		
Water		
Own well	118	98.33
Nearby house	2	1.67

Contd....

Table 11 contd...

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c) Lavatory facilities		
Present	120	100.00
Not present	0	0.00
d) Drainage facilities		
Present	32	26.67
Not present	88	73.33
e) Electricity facilities		
Present	120	100.00
Not present	0	0.00
f) Recreational facilities		
Present	103	85.83
Not present	17	14.17
g) Transport facilities		
Present	31	25.83
Not present	89	74.17

---

Table 12 Monthly expenditure pattern

Expenditure per cent	Food	Clothing	Shelter	Transport	Water	Recreation	Education	Electricity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
No expenditure	-	-	120 (100.00)	37 (30.83)	120 (100.00)	63 (52.50)	55 (45.83)	-
<10	1 (0.83)	118 (98.33)	-	80 (66.67)	-	56 (46.67)	61 (50.83)	119 (99.17)
10-20	17 (14.17)	2 (1.67)	-	3 (2.50)	-	1 (0.83)	4 (3.33)	1 (0.83)
20-30	26 (21.67)	-	-	-	-	-	-	-
30-40	26 (21.67)	-	-	-	-	-	-	-
40-50	26 (21.67)	-	-	-	-	-	-	-
50-60	14 (11.66)	-	-	-	-	-	-	-
60-70	7 (5.83)	-	-	-	-	-	-	-
70-80	2 (1.67)	-	-	-	-	-	-	-
>80	1 (0.83)	-	-	-	-	-	-	-
Total	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)

Contd....

Table 12 contd....

Furniture	Health	Fuel	Luxury items	Personal expenditure	Remittance	Savings	Others
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
120 (100.00)	107 (89.17)	73 (60.83)	120 (100.00)	1 (0.83)	82 (68.33)	54 (45.00)	2 (1.67)
-	13 (10.83)	42 (35.00)	-	119 (99.17)	22 (18.33)	57 (47.50)	3 (2.50)
-	-	4 (3.33)	-	-	5 (4.17)	3 (2.50)	16 (13.33)
-	-	-	-	-	6 (5.00)	6 (5.00)	35 (29.16)
-	-	1 (0.83)	-	-	1 (0.83)	-	33 (27.50)
-	-	-	-	-	1 (0.83)	-	21 (17.50)
-	-	-	-	-	1 (0.83)	-	8 (6.67)
-	-	-	-	-	1 (0.83)	-	2 (1.67)
-	-	-	-	-	1 (0.83)	-	-
120 (100)	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)

Numbers in parentheses are percentages

#### **4.1.13 Details of saving**

Survey conducted revealed that only 56 per cent of the families had the habit of saving money. Table 13 showed that majority (78%) of the families put their savings in the post office and 52.24% saved only less than Rs. 100 a month.

#### **4.1.14 Indebtedness**

From the survey it was found that only 29 per cent of the families borrowed money from government or government agencies like bank (Table 14). It was revealed that majority (51%) borrowed money from bank and about 37 per cent of the families took loan for agricultural purposes.

#### **4.1.15 Type of fuel**

The survey conducted revealed that all the households used wood as the major source of fuel (Table 15). Nearly 66 per cent of the families used only wood and 16 per cent used wood and LPG gas. About 65 per cent of the families collected fuel from their surroundings and the rest purchased from outside.

#### **4.1.16 Social participation of farm families**

Table 16 furnishes details regarding the social participation of farm families. It showed that only 25.44 per cent of the families were members of co-operative society or Mahila Samajam and only 22.58 per cent of the members attended the meetings conducted by these organisation regularly.

Table 13 Details regarding saving

Mode of saving	Number of families	Amount saved	Number of families
Post Office	52 (77.61)	≤ 100	35 (52.24)
		100-200	16 (23.88)
Bank	2 (2.99)	200-300	7 (10.45)
		300-400	5 (7.46)
		400-500	-
		≥ 500	4 (5.97)
Chitty	13 (19.40)		
	67 (100)		67 (100)

Numbers in parentheses are percentages

Table 14 Details regarding loan

Source of loan	Number of families	Purpose	Number of families	Amount	Number of families	
Co-operative Society	17 (48.57)	Agriculture	13 (37.14)	≤ 5000	11 (31.43)	
				5,000-10,000	5 (14.29)	
Bank	18 (51.43)	House construction	16 (45.71)	10,000-20,000	6 (17.14)	
				Cattle	5 (14.29)	
				Machine (mill)	30,000-40,000	5 (14.29)
					40,000-50,000	2 (5.71)
	35 (100)		35 (100)		35 (100)	

Numbers in parentheses are percentages

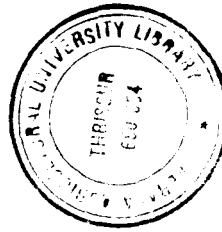
Table 15 Details regarding type of fuel

Sl. No.	Type	Number of families	Per cent
1	Only wood	79	65.83
2	Wood and cowdung	7	5.83
3	Wood and kerosene	12	10.00
4	Wood, kerosene, gas	2	1.67
5	Wood and gas	19	15.84
6	Wood, cowdung, kerosene	1	0.83
		120	100.00



Table 16 Details regarding social participation of farm families

Details	Number of families	Per cent
<b>a) Member of:</b>		
i) Co-Operative society	26	21.67
ii) Mahila Samajam	5	4.17
iii) Not a member of any organisation	89	74.16
<b>Total</b>	<b>120</b>	<b>100.00</b>
<b>b) Frequency of attending the meeting</b>		
i) Always	7	22.58
ii) Mostly	6	19.35
iii) Sometimes	15	48.39
iv) Never	3	9.68
<b>Total</b>	<b>31</b>	<b>100.00</b>



#### **4.1.17 Information source utilisation**

The study conducted revealed that all the families obtained information mainly from their friends and their neighbours. Regarding the use of media as a source of information, the surveyed families obtained information through different medias which included newspaper, radio, T.V., cinema and meetings. Most of the families also consulted agricultural officers to get relevant and latest informations concerned with agriculture.

#### **4.1.18 Epidemics prevalent**

It was observed that the areas surveyed witnessed no epidemics for the past one year.

### **4.2 Food consumption and dietary pattern of the farm families**

Food consumption and dietary pattern of the farm families were assessed with regard to the food expenditure, frequency of use of different foods, meal pattern, cooking practices, cooking methods followed, storage practices, infant feeding practices, food preservation and foods given during special conditions, occasions and diseases.

Among the families surveyed all were found to be non-vegetarians.

✓

#### **4.2.1 Staple food**

It was found that all the families consumed rice as the staple food.

#### 4.2.2 Food expenditure pattern

Table 17 reveals the details regarding monthly expenditure of the families on different food items. It was found that most of the families did not spend any money for the purchase of cereals (56.67%) leafy vegetables (74.2%), roots and tubers (67.5%) and milk and milk products (68.33%). Upto 20 per cent of the total food expenditure was incurred for the purchase of pulses (96.7%), other vegetables (80.9%) egg (70.8%), tea, papad etc. (99.16%). It was found that 43.3 per cent of the families did not spend money for the purchase of fats and oils and about 42 per cent of them spent 20 per cent. It could be seen that upto 20 per cent of the total food expenditure was incurred for the purchase of spices and condiments and sugar and jaggery by all the families.

Table 18 depicts the correlation between the independent variables viz. family size, income of the family, percapita income, land area and food expenditure of the families. The results indicated that all the variables had positive significant influence over the food expenditure of families.

The analysis of variance was done to study the variables such as type of family, educational status, occupational status of head of family and occupational status of respondent and the results are presented in Table 19. The results indicated that none of these variables significantly influenced the food expenditure of farm families.

Table 17 Details regarding expenditure on food items

Food items	Nil	Upto 10 (%)	10-20 (%)	20-30 (%)	>30 (%)	Total
Cereals	68 (56.67)	45 (37.50)	6 (5.00)	-	1 (0.83)	120 (100)
Pulses	-	30 (25.00)	86 (71.70)	4 (3.30)	-	120 (100)
Leafy veg	89 (74.20)	31 (25.80)	-	-	-	120 (100)
Roots & Tubers	81 (67.50)	39 (32.50)	-	-	-	120 (100)
Other veg	17 (14.16)	44 (36.67)	53 (44.17)	6 (5.00)	-	120 (100)
Fruits	68 (56.67)	51 (42.50)	1 (0.83)	-	-	120 (100)
Milk and milk products	82 (68.33)	0	22 (18.33)	16 (13.33)	-	120 (100)
Egg	35 (29.20)	85 (70.80)	-	-	-	120 (100)
Meat	21 (17.50)	72 (60.00)	27 (22.50)	-	-	120 (100)
Fish	2 (1.67)	41 (34.16)	44 (36.67)	30 (25.00)	3 (2.50)	120 (100)

Contd....

Table 17 contd..

Nuts & oil seeds	-	120 (100.00)	-	-	-	120 (100)
Spices and condiments	-	116 (96.70)	4 (3.30)	-	-	120 (100)
Fats & oils	52 (43.30)	16 (13.30)	50 (41.70)	2 (1.70)	-	120 (100)
Sugar and jaggery	-	101 (84.20)	19 (15.80)	-	-	120 (100)
Others	-	52 (43.33)	67 (55.83)	1 (0.83)	-	120 (100)

Numbers in parentheses are percentages

Table 18 Correlation between food expenditure of the families and independent variables

Variable No.	Independent variables	Correlation
1	Family size	0.294**
2	Income of the family	0.700**
3	Percapita income	0.490**
4	Land area	0.497**

\*\* Significant at 1% level

Table 19 ANOVA (Mean square) for food expenditure

Variables	M.S.
Type of family	0.261 <sup>NS</sup>
Educational status of respondent	0.539 <sup>NS</sup>
Occupational status of head of family	0.248 <sup>NS</sup>
Occupational status of respondent	1.271 <sup>NS</sup>

NS - Not Significant

### 4.2.3 Frequency of intake of various foods

The details of frequency of intake of various foods by the farm families are presented in Table 20. The table showed that all the families used cereals, milk and milk products, nuts and oil seeds, spices and condiments, fats and oils, sugar and jaggery, other food items like coffee, tea, papad etc. in their daily diet. None of the families included leafy vegetables, roots and tubers, fruits, egg and meat daily. Though all the families were non-vegetarians, about 19 and 18 per cent of the families never included egg and meat respectively in their diet.

The frequency of use of different food items among the farm families was assessed by the formula suggested by Reaburn *et al.* (1979) and presented in Table 21. The maximum score of 100 per cent was obtained for cereals, milk and milk products, nuts and oil seeds, spices and condiments, fats and oils, sugar, jaggery and other food items which included coffee, tea etc. The percentage of food frequency scores obtained for roots and tubers, fish and other vegetables were 72.97, 70.36 and 71.54 respectively and the lowest percentage score was obtained for meat.

Based on the percentage frequency scores obtained for different food items, the foods were classified into three groups viz. most frequently used (% score - above 75%), medium frequently used (% score - 50-75%) and less frequently used (% score - below 50).



Table 20 Frequency of intake of various foods

	Daily	W <sub>4</sub>	W <sub>3</sub>	W <sub>2</sub>	W <sub>1</sub>	O	N	Total
Cereals	120 (100.00)	-	-	-	-	-	-	120 (100)
Pulses	6 (5.00)	22 (18.33)	35 (29.16)	37 (30.83)	19 (15.83)	1 (0.83)	-	120 (100)
Leafy veg	-	1 (0.83)	13 (10.83)	12 (10.00)	13 (10.83)	81 (67.50)	-	120 (100)
Roots & Tubers	-	4 (3.33)	19 (15.83)	53 (44.17)	43 (35.83)	1 (0.83)	-	120 (100)
Other veg	51 (42.50)	38 (31.67)	10 (8.33)	16 (13.33)	0	5 (4.17)	-	120 (100)
Fruits	-	7 (5.83)	18 (15.00)	16 (13.33)	6 (5.00)	73 (60.83)	-	120 (100)
Milk and milk products	120 (100.00)	-	-	-	-	-	-	120 (100)
Egg	-	2 (1.67)	10 (8.33)	18 (15.00)	27 (22.50)	40 (33.33)	23 (19.17)	120 (100)
Meat	-	-	-	1 (0.83)	21 (17.50)	76 (63.33)	22 (18.33)	120 (100)

Contd.....

Table 20 contd...

Fish	20 (16.67)	16 (13.33)	27 (22.50)	17 (14.17)	33 (27.50)	5 (4.17)	2 (1.67)	120 (100)
Nuts & oil seeds	120 (100.00)	-	-	-	-	-	-	120 (100)
Spices and condiments	120 (100.00)	-	-	-	-	-	-	120 (100)
Fats & oils	120 (100.00)	-	-	-	-	-	-	120 (100)
Sugar and jaggery	120 (100.00)	-	-	-	-	-	-	120 (100)
Others	120 (100.00)	-	-	-	-	-	-	120 (100)

W<sub>4</sub> - Weekly four times    W<sub>3</sub> - Weekly thrice    W<sub>2</sub> - Weekly twice    W<sub>1</sub> - Weekly once

N - Never    O - Occasionally    Numbers in parentheses are percentages

Table 21 Frequency score (%) on different food items

Food items	Score
Cereals	100.00
Pulses	65.34
Leafy vegetables	42.25
Roots and tubers	72.97
Other vegetables	71.54
Fruits	42.26
Milk and milk products	100.00
Egg	47.74
Meat	36.31
Fish	70.36
Nuts and oil seeds	100.00
Spices and condiments	100.00
Fats and oils	100.00
Sugar and jaggery	100.00
Others	100.00

Table 22 gives the frequency of use of different foods among the farm families on the basis of the percentage score. The most frequently used food items were cereals, milk and milk products, nuts and oil seeds, spices, and condiments, fats and oils, sugar and jaggery. Pulses, roots and tubers, other vegetables and fish were <sup>the</sup> medium frequently used food items while leafy vegetables, fruits, eggs and meat were used to a lesser extent by the farm families.

#### **4.2.4 Meal pattern**

The analysis of the meal pattern of farm families revealed that 70.83 per cent of the families did not plan their meal pattern in advance. Among the families who planned their meals in advance, majority (68.57%) planned on the basis of the availability of foods and the rest according to the likes and dislikes of the family members.

It was found that majority (95%) of the families did not maintain any accounts for food expenditures. Rest of the families maintained the accounts either in written form or in memory. Among the families who kept accounts, most of them kept it on a monthly basis.

It was observed from the study that all the families cooked food twice a day and consumed food three times a day. Majority did not maintain any specific time schedule for the meals. In all the families cooking was done by the female members. It was

Table 22 Classification of various food items by percentage score of use

Sl. No.	Frequency of use	Food items
1	Most frequently used	Cereals, milk and milk products, nuts and oil seeds, spices and condiments, fats and oil; sugar and jaggery, other food items
2	Medium frequently used	Pulses, roots and tubers, other vegetables, fish
3	Less frequently used	Leafy vegetables, fruits, egg, meat

found that 61.7 per cent of the families were in the habit of drinking water without boiling and none of the farm families changed their food pattern on the basis of religious beliefs.

Most of the families (67.5%) did not eat any raw food while the rest consumed cucumber, tomato, onion and papaya.

When the preference given for the family members for giving meals was analysed, it was observed that 57.5 per cent of families gave first preference to the male members of the family and 34.2 per cent gave preference for the head of the family. Only 4.20 per cent families had their meals together..

Regarding the use of left over foods it was found that 53.3 per cent of the families used such type of foods.

#### **4.2.5 Other culinary practices**

Table 23 reveals the methods of preparing dry food articles like cereals and pulses prior to cooking by the respondents. It was observed that 74.17 per cent of the families adopted the practice of cleaning, winnowing and then washing, while 25.83 per cent only washed cereals and pulses just before cooking without winnowing. About 36 per cent of the families washed the cereals and pulses several times until water was clear and 50.83 per cent washed thrice and the rest (13.33%) washed only twice.

Table 23 Details of preparing various food articles prior to cooking (cereals)

Sl. No.	Methods	Number of families	Per cent
<b>i</b>	<b>Dry food articles</b>		
	a) Washing & drying soon after purchase	-	-
	b) Washing just before cooking	31	25.83
	c) Cleaning/winnowing and then washing	89	74.17
	<b>Total</b>	<b>120</b>	<b>100.00</b>
<b>ii</b>	<b>Washing</b>		
	a) Once	-	-
	b) Twice	16	13.33
	c) Thrice	61	50.83
	d) More than 3 times and until water is clear	43	35.83
	<b>Total</b>	<b>120</b>	<b>100.00</b>

About 57 per cent of the families used aluminium utensils and earthen pots for cooking and only 20.83 per cent used steel vessels also along with aluminium and earthen vessels.

All the families used ordinary hearth for cooking and only a minority of the families used kerosene stove (11.67%), smokeless chulah (6.67%) and petroleum gas (17.5%) for cooking.

Table 24 gives information regarding the methods of preparing perishable foods. It was noted that 84.17 per cent of the families washed the vegetables after cutting and 43.33 per cent cut them into small pieces, 37.5 per cent into large pieces whereas 19.17 per cent of the families cut the vegetables according to the type of preparation. Majority (62.5%) of the families washed roots and tubers after cutting. All the families washed leafy vegetables before cutting. About 50 per cent of the families cut the leafy vegetables into small pieces. Regarding the use of fruits, 91.67 per cent washed it before cutting. All the families washed both fish and meat after cutting.

#### **4.2.6 Cooking methods followed for various foods**

Among the various cooking methods adopted by the farm families, boiling was found to be predominant. Cereals were mainly boiled in excess water and strained. Majority of the families followed the boiling and shallow fat frying method for fish (98.33%) and egg (80.83%). Milk was boiled before using by all the families surveyed. The details of cooking methods adopted by the farm families for cooking different items are presented in Table 25.



Table 24 Methods of preparing various perishable foods

Food items	Do not use	Use without washing	Washing before cutting	Washing after cutting	Washing before & after cutting	Total	Large	Small	Both large & small	Total
Vegetables	-	-	4 (3.33)	101 (84.17)	15 (12.50)	120 (100)	45 (37.50)	52 (43.33)	23 (19.17)	120 (100)
Roots & Tubers	-	-	-	75 (62.50)	45 (37.50)	120 (100)	48 (40.00)	57 (47.50)	15 (12.50)	120 (100)
Leafy vegetables	-	-	120 (100.00)	-	-	120 (100)	52 (43.33)	60 (50.00)	8 (6.67)	120 (100)
Fruits	-	10 (8.33)	110 (91.67)	-	-	120 (100)	76 (63.33)	40 (33.33)	4 (3.33)	120 (100)
Fish	2 (1.67)	-	-	118 (98.33)	-	120 (100)	48 (40.68)	70 (59.32)	-	118 (100)
Meat	22 (18.33)	-	-	98 (81.67)	-	120 (100)	47 (47.47)	52 (52.53)	-	99 (100)

Numbers in parentheses are percentages

Table 25 Cooking methods followed for various foods

Cooking methods	Cereals	Pulses	Roots and tubers	Other vegetables	Leafy vegetables	Fruits	Meat	Fish	Egg	Milk and milk products	Others
Boiling	-	50 (41.67)	19 (15.83)	-	39 (32.50)	-	37 (30.83)	-	-	120 (100.00)	-
Boiling and straining	61 (50.83)	-	-	-	-	-	-	-	-	-	-
Boiling, straining and steaming	59 (49.17)	-	-	-	-	-	-	-	-	-	-
Boiling and shallow fat frying	-	-	22 (18.33)	-	6 (5.00)	-	4 (3.33)	118 (98.33)	97 (80.83)	-	-
Boiling and deep fat frying	-	-	-	-	-	-	-	-	-	-	120 (100)
Boiling and absorption	-	70 (58.33)	25 (20.83)	26 (21.67)	23 (19.17)	-	27 (22.50)	-	-	-	-

Contd....

Table 25 contd..

Boiling, absorption and shallow fat frying	-	-	54 (45.00)	94 (78.33)	8 (6.67)	-	11 (9.17)	-	-	-	-
Absorption	-	-	-	-	40 (33.33)	-	11 (9.17)	-	-	-	-
Absorption and shallow fat frying	-	-	-	-	4 (3.33)	-	8 (6.67)	-	-	-	-
Steaming	-	-	-	-	-	120 (100.00)	-	-	-	-	-
Do not use	-	-	-	-	-	-	22 (18.33)	2 (1.67)	23 (19.17)	-	-
Total	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)	120 (100)

Numbers in parentheses are percentages

#### **4.2.7 Infant feeding practices**

The infant feeding practices adopted by the respondents are presented in Table 26. It was revealed that 57.97 per cent of the mothers gave breast milk as the first food to the baby. About 63.77 per cent of the mother started feeding the baby from the first day of delivery itself and thus it was revealed that these mothers gave colostrum to the baby. Rest of the mothers gave breast milk after the third day. Almost all the mothers fed the baby as and when they cried. Majority (71.01%) of the mothers gave breast milk for one to two years and most of them (79.71%) started weaning when the child was 3 to 5 months.

#### **4.2.8 Foods given during special conditions**

It was seen that special foods other than breast milk were included in the diets of infants in all the families. The foods usually included were ragi, arrowroot and banana powder. Tin foods were also sometimes included. Preschool children were given biscuits and milk along with adult foods. No special foods were given to adolescents and to the aged. During pregnancy and lactation, in addition to increased intake of the normal foods, milk was also included in the daily diet by all the families.

#### **4.2.9 Foods prepared for special occasions**

Birthdays, marriages and festivals were the special occasions when special items were included in the diet. Usually majority of the families (78.33%) preferred vegetarian preparations during festive occasions. An addition of one or two vegetable

Table 26 Infant feeding practices

Particulars	No. of respondents	Percentage
<b>First food given to the baby:</b>		
Breast milk	40	57.97
Honey	14	20.29
Others	15	21.74
Total	69	100.00
<b>Initiation of breast feeding:</b>		
First day	44	63.77
After three or four days	25	36.23
Total	69	100.00
<b>Whether colostrum given:</b>		
Yes	44	63.77
No	25	36.23
Total	69	100.00
<b>Duration of breast feeding:</b>		
More than two years	12	17.39
Until next pregnancy	8	11.59
1 to 2 years	49	71.01
Total	69	100.00
<b>Age of weaning:</b>		
3 to 5 months	55	79.71
6 to 8 months	14	20.29
Total	69	100.00

preparations, pulse preparation, papads, payasam, fried foods etc. were the change of diet from the normal pattern. And the rest of the families included non-vegetarian items during festive occasions.

#### **4.2.10 Diet during illness**

It was observed that, in all the families, semi-solid foods like rice gruel was given during illness. Fried foods were avoided.

#### **4.2.11 Storage of foods**

Most common storage method among the farm families were found to be drying and storing in tight containers for cereals and pulses.

#### **4.2.12 Preservation of foods**

It was found that all the families preserved vegetables like bittergourd, chillies and mango either in the dried form or as pickles when available in plenty. Other preservation methods were not adopted by the farm families.

#### **4.2.13 Daily meal pattern**

All the families included cereals for breakfast. For lunch, cereals, vegetable preparations, curds or buttermilk were the main items. Nearly 17 per cent of the families included fish in their daily diet. And for dinner, again, cereals and vegetable preparations were included.

### **4.3 Nutritional status of farm women**

Nutritional status of farm women in the age group of 18-45 years was ascertained through anthropometric studies, actual food intake, biochemical estimation and clinical examinations.

#### **4.3.1 Anthropometric measurements of the respondents**

Anthropometric measurements like height and weight of all the 120 respondents were taken.

The height of the respondents taken ranged between 149 cm to 165 cm with an average of 156.3 cm. The weight of the respondents ranged from 37 kg to 65 kg with a mean of 48.47 kg. Majority of the respondents were undernourished when their weight for age was compared with ICMR (1994) standards. A correlation between the weight and height of the respondents revealed that there is no significant change in the weight with change in height (See Appendix VIII).

#### **4.3.2 Body Mass Index of respondents**

To assess the chronic energy deficiency among farm women body mass index (BMI) of the 120 selected farm women (Appendix VIII) were calculated using the formula:

$$\frac{\text{Wt (kg)}}{\text{Ht}^2 \text{ (m)}}$$

Results showed that 78.33 per cent of the farm women were normal with BMI between 18.5 and 25.0, while the rest belonged to either different grades of chronic energy deficiency (19.17%) or obese groups (2.5%) (Table 27). The percentage distribution of farm women based on BMI is presented in Figure 1.

Regarding the factors influencing the nutritional status of the respondents (nutritional status indicated by the BMI values) Table 28 revealed that factors such as family size, income, percapita income and food expenditure did not have a significant correlation with the Body Mass Index. Analysis of variance was done to know the influence of type of family, educational status of respondent, occupational status of head of family, occupational status of respondent and land owned on body mass index and the results are abbreviated in Table 29. It was noted that occupational status of the respondent and land area had a significant influence over the nutritional status.

#### **4.3.3 Actual food intake**

A one day food weighment survey was conducted among 12 farm women by the weighment method to determine their actual food intake and to assess the quantity of food consumed.

The quantity of each food item was compared with the Recommended Dietary Allowance (RDA) suggested by **ICMR** (1984) and were statistically examined and the results are provided in Table 30. It may be noted that the intake of cereals,



Table 27 Body Mass Index of the respondents

BMI Class	Presumptive diagnosis	No. of persons	Percentage
< 16	CED Grade III (Severe)	2	1.67
16-17	CED Grade II (Moderate)	2	1.67
17-18.5	CED Grade I (Mild)	19	15.83
18.5 - 20.0	Low weight Normal	48	40.00
20.0 - 25.0	Normal	46	38.33
25.0 - 30.0	Obese. Grade I	3	2.50
Total		120	100.00

Fig.1. Percentage distribution of farm women based on BMI

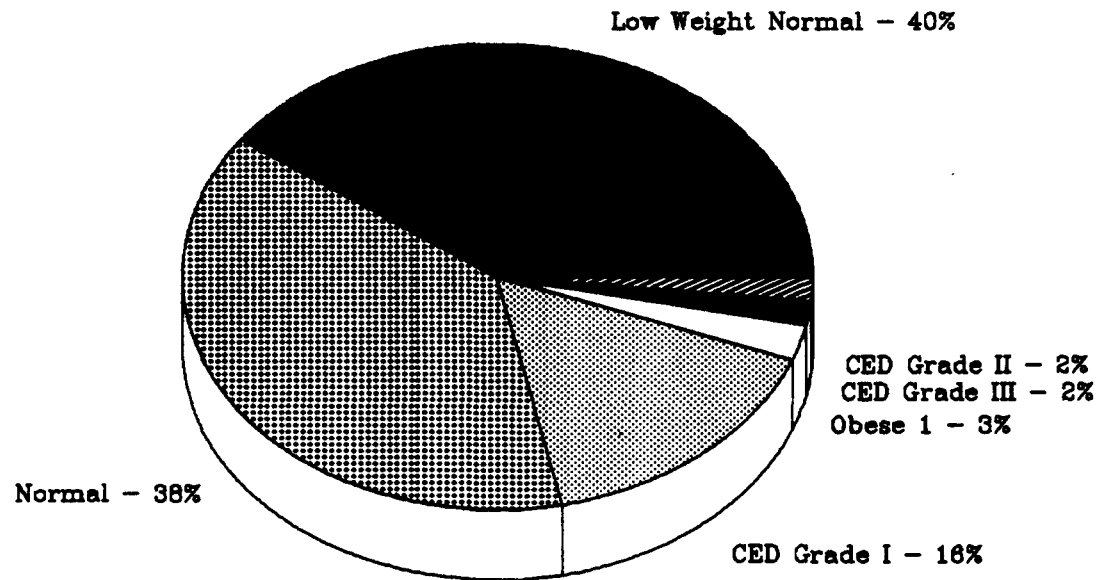


Table 28 Correlation between Body Mass Index and independent variables

Variable No.	Independent variables	Correlation coefficient (r)
1	Family size	-0.051 <sup>NS</sup>
2	Income of family	-0.018 <sup>NS</sup>
3	Percapita income	0.035 <sup>NS</sup>
4	Food expenditure	0.039 <sup>NS</sup>

NS - Not Significant

Table 29 ANOVA (Mean square) for Body Mass Index

Variables	M.S.
Type of family	0.083 <sup>NS</sup>
Educational status of respondent	0.851 <sup>NS</sup>
Occupational status of head of family	2.709 <sup>NS</sup>
Occupational status of respondent	14.240 <sup>**</sup>
Land area	9.331 <sup>*</sup>

\* Significant at 5% level    \*\* Significant at 1% level

NS - Not Significant

Table 30 Mean food intake of respondents in comparison with recommended dietary allowance (RDA)

Food group	Mean $\pm$ SE (g)	RDA (g)	% RDA	t value compared with RDA
Cereals	358.17 $\pm$ 82.65	440	81.40	3.29**
Pulses	16.21 $\pm$ 15.71	25	64.84	1.86 <sup>NS</sup>
Green leafy vegetables	6.66 $\pm$ 23.09	100	6.66	13.43**
Other vegetables	86.25 $\pm$ 60.27	40	215.63	2.55*
Roots and Tubers	46.67 $\pm$ 41.52	50	93.34	0.27 <sup>NS</sup>
Fruits	90.42 $\pm$ 81.59	30	301.40	2.46*
Milk and milk products	247.5 $\pm$ 93.33	150	165.00	3.47**
Fats and oils	46.25 $\pm$ 22.71	30	154.16	2.37*
Flesh foods, Fish	7.92 $\pm$ 14.69	30	26.40	4.99**
Egg	4.16 $\pm$ 14.43	30	13.86	5.94**
Sugar & Jaggery	26.66 $\pm$ 9.04	20	133.30	2.45*

\* Significant at 5% level

\*\* Significant at 1% level

NS - Non Significant

green leafy vegetables, flesh foods and eggs were significantly lower than the prescribed levels. The intake of other vegetables, fruits, milk and milk products, fats and oils, sugar and jaggery were found to be significantly higher than the prescribed levels. The intake of pulses and roots and tubers did not differ significantly from the RDA suggested by ICMR (1984). The percentage of food intake in comparison with the RDA is illustrated in Figure 2.

#### **4.3.4 Nutrient intake**

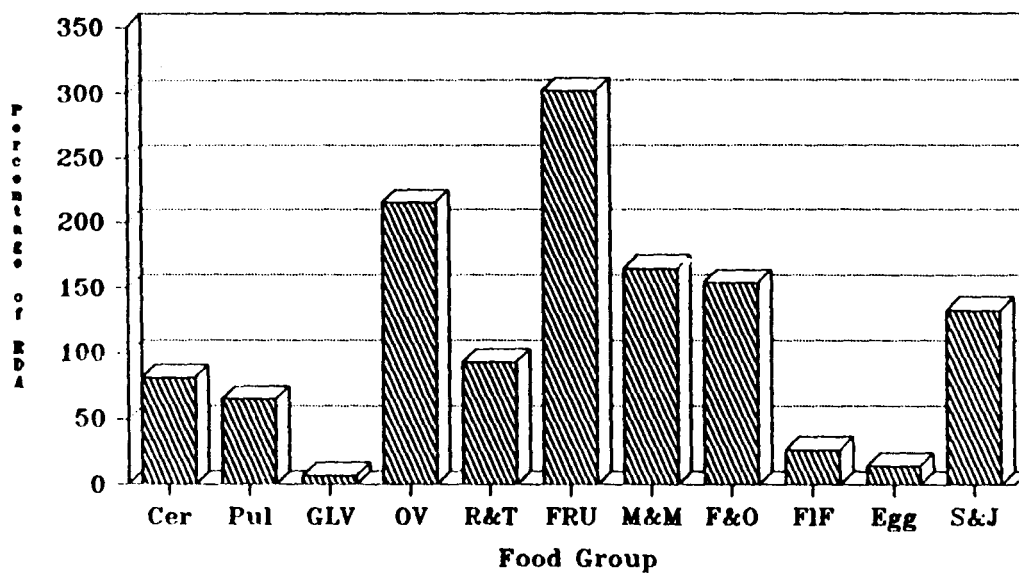
The nutrients present in the diet of farm women were calculated to find out the quality of the foods consumed using the food composition tables (Gopalan *et al.*, 1995). The results were compared with 1989 recommended dietary allowance of nutrients suggested by ICMR (1994) and the results were statistically analysed.

The mean nutrient intake of farm women revealed that the diet was deficient in all other nutrients except calcium, niacin and vitamin C (Table 31). The intake of iron, retinol and riboflavin was insignificantly lower than the RDA. The percentage nutrient intake of farm women in comparison with the RDA is presented in Figure 3.

#### **4.3.5 Biochemical estimation of blood**

The blood haemoglobin was estimated among 12 farm women (Appendix IX) and the haemoglobin values were compared with the standard values suggested by WHO as given by Gopaldas and Seshadri (1987) and the results are given in Table 32.

**Fig.2. Food intake of farm women as percentage of RDA**



**Cer** - Cereals

**Pul** - Pulses

**GLV** - Green Leafy Vegetables

**OV** - Other Vegetables

**R&T** - Roots and Tubers

**FRU** - Fruits

**M&M** - Milk & milk products

**F&O** - Fats and Oils

**FIF** - Flesh Foods

**S & J** - Sugar and Jaggery

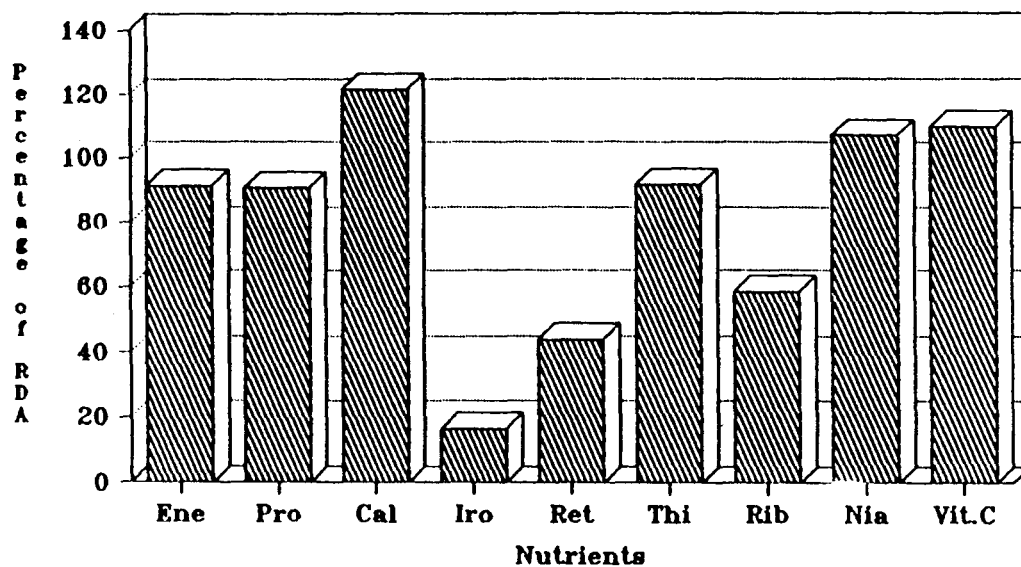
Table 31 Mean nutrient intake of the respondents in comparison with recommended dietary allowance (RDA)

Nutrients	Mean $\pm$ SE	RDA	% RDA	t value compared with RDA
Energy (Kcal)	2034 $\pm$ 351.25	2225	91.42	1.81 <sup>NS</sup>
Protein (g)	45.4 $\pm$ 9.181	50	90.80	1.66 <sup>NS</sup>
Calcium (mg)	486 $\pm$ 279.203	400	121.50	1.02 <sup>NS</sup>
Iron (mg)	4.95 $\pm$ 2.197	30	16.50	37.95 <sup>**</sup>
Retinol ( $\mu$ g)	264 $\pm$ 348.018	600	44.00	3.21 <sup>**</sup>
Thiamine (mg)	1.01 $\pm$ 0.352	1.1	91.82	0.82 <sup>NS</sup>
Riboflavin (mg)	0.76 $\pm$ 0.315	1.3	58.46	6.00 <sup>**</sup>
Niacin (mg)	15.0 $\pm$ 3.522	14	107.14	0.94 <sup>NS</sup>
Vitamin C (mg)	44.0 $\pm$ 28.179	40	110.00	0.47 <sup>NS</sup>

\*\* Significant at 1% level      NS - Non Significant



**Fig.3. Nutrient intake of farm women as percentage of RDA**



Ene - Energy

Ret - Retinol

Pro - Protein

Thi - Thiamine

Cal - Calcium

Rib - Riboflavin

Iro - Iron

Nia - Niacin

Vit. C - Vitamin C

Table 32 Details regarding the haemoglobin level of the subsample

Hb level g/dl	No. of respondents	Percentage
< 8	-	-
8 - 10	1	8.33
10 - 12	7	58.33
> 12	4	33.33
Total	12	100.00

It was revealed that only 33.33 per cent of the farm women had a normal haemoglobin level and 66.67 per cent of the women had values lower than the standard . The deviations ranged from 9.1g/100 ml to 12.9 g/100 ml. There was no significant difference of the observed values from the standard as evident from the 't' value of 1.71.

The comparison of the haemoglobin values of farm women with the standard value are illustrated in Fig. 4.

To interpret the iron status of farm women they were grouped according to the criteria suggested by Gopaldas and Seshadri (1987) with reference to haemoglobin values and the details are given in Table 33.

The results indicated that majority (58.33%) of the respondents had 'low' iron status on the basis of haemoglobin values and 33.33 per cent had 'acceptable' iron status. The iron status of farm women on the basis of haemoglobin level is presented in Figure 5.

#### **4.3.6 Clinical assessment**

Incidence of clinical signs and symptoms observed among 12 farm women are presented in Table 34. It was found that in majority (91.67%) of the respondents, xerosis of conjunctiva of eyes, mild angular stomatitis, pale tongue, carries in the teeth, and abnormalities in face, perineum and gums were absent. Only 33.33% of the respondents had good appearance.

Fig.4. Comparison of haemoglobin level of farm women with the standard

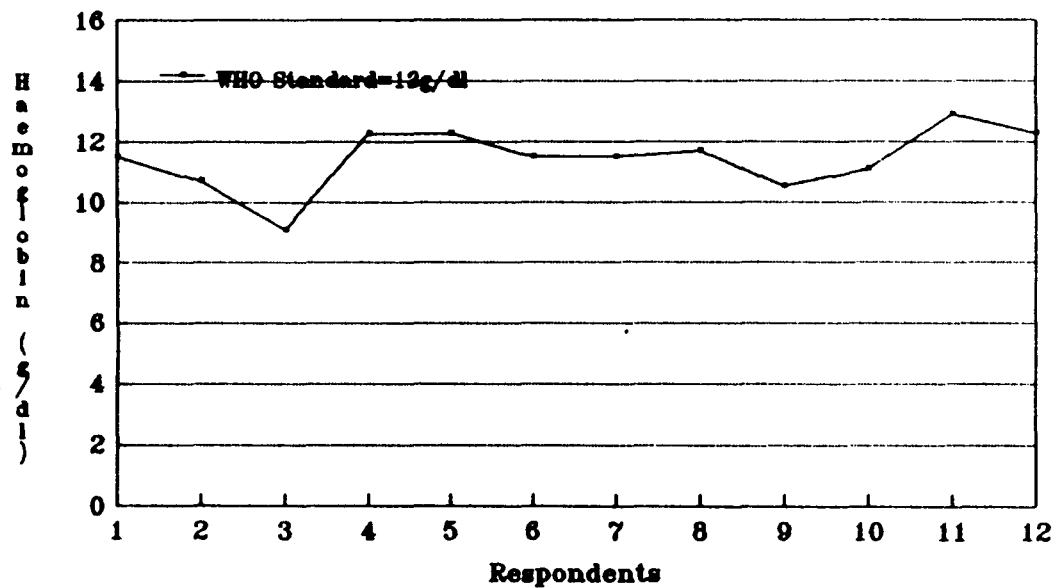


Table 33 Distribution of respondents based on iron status

Particulars	Age in years	
	18-45 years	Percentage
Deficient	1	8.33
Low	7	58.33
Acceptable	4	33.33
Total	12	100.00

Age	Deficient	Low	Acceptable
>16	<10g/100ml	10 - 11.9g/100ml	>12.0g/100ml

Fig.5. Iron Status of farm women on the basis of haemoglobin level

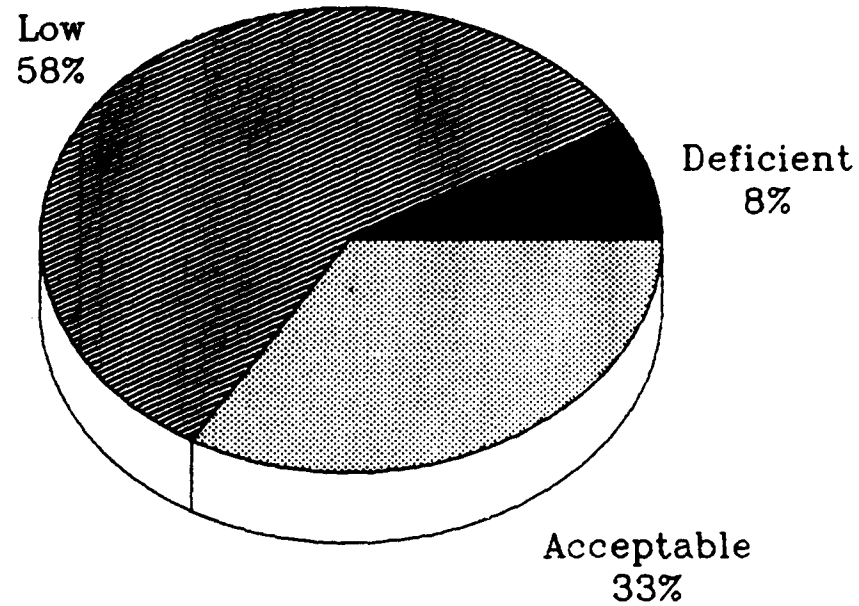


Table 34 Details regarding clinical signs present in the subsample

Clinical details	Present
Good appearance	4 (33.33)
Xerosis of the conjunctiva of eyes	1 (8.33)
Pigmentation of conjunctiva	6 (50)
Mild angular stomatitis	1 (8.33)
Pale tongue	1 (8.33)
Gums condition (Normal)	1 (8.33)
Carries in the teeth	1 (8.33)
Face	1 (8.33)
Perineum - Scrotal or pudendal	1 (8.33)

Numbers in parentheses are percentages

## *Discussion*

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## **DISCUSSION**

The present study was carried out to assess the food consumption pattern and nutritional status of farm women in Thrissur district. This chapter presents a critical discussion on the major findings and the details are presented under the following broad sections:

- 5.1 Socio-economic profile of the farm families
- 5.2 Food consumption and dietary pattern of the farm families
- 5.3 Nutritional status of farm women

### **5.1 Socio-economic profile of the farm families**

Joint family system is disintegrating fast in all communities and Saxena (1986) found that nuclear families were better than the joint families in health and development. It was found that majority of the farm families in this study were of the nuclear type. Similar type of families were observed not only among the different socio-economic strata of Kerala state (Thomas, 1989a; Varghese, 1989; Seshadrinath, 1993) but also among various tribal communities of Kerala (Thomas, 1989b and Indira, 1993).

Family size is a major factor influencing the nutritional status of family members. Majority of the families in this study were medium sized with 3-5 members. Average family size of the farm families was found to be 5.37.

Nagammal (1989), Cherian (1992) and Jayanthakumari (1993) also reported similar findings among the farm families of Trivandrum district. In contrast to this Usha *et al.* (1990) reported that majority of the farm families in Trivandrum district belonged to large families consisting of 5-9 members.

Kerala is a state which represents a different spectrum as far as sex ratio is concerned. Among the different states, Kerala has the highest sex ratio with 1,036 females for 1000 males. The results from the present study was in accordance with this ratio. Cherian (1992) also reported a same trend among the farm families of Trivandrum district.

Education is considered to be a catalyst of change, and its role in the process of national development cannot be overemphasized (Manorama Year Book, 1996). The study revealed that majority of the male and female members of the surveyed families were literate. This result was supported by the Census of India (1991), which ranked Kerala as the most literate state with a highest literacy rate of 89.81 per cent (Manorama Year Book, 1996). Usha *et al.* (1990) and Jayanthakumari (1993) also reported similar findings among the farm families of Trivandrum district. Choudhary (1990) pointed out that in rural areas the female literacy rate is only about 1/3rd of the males. In contrast to this, the results of the present study indicated that the percentage of literate females were more than the males.

Rief and Cochrame (1991) indicated that off-farm employment played an important role in expanding income of households constrained by limited land and water and with large number of residents. The occupational status of the family members in this study revealed that 28.05% of the male members were engaged in off-farm activities. Majority of the female members were not found to be occupied in any income generating occupation. This finding was in accordance with the finding of Jayanthakumari (1993) among the farm families of Trivandrum district. Choudhary (1990) also reported increasing displacement of women from economic activity particularly in rural areas.

Land is one of the chief determinants of the resource position. Majority of the families owned more than 100 cents of land. Saikia (1982) pointed out that small farmers who owned landholdings upto five acres constituted nearly 70 per cent of the total number of farmers in India. In contrary to this the cultivable land area in Kerala is only 0.10 hectares (Farm Guide, 1996).

Agriculture was found to be the major source of income in all the surveyed families. Sixty three per cent of the families had a monthly income ranging from Rs. 1000-4000. Statistical analysis revealed a significant positive correlation between land area and income of the families. Acharya (1982) and Singh and Singh (1991) also reported a direct relationship between the landholdings of the farm families and their income.

All the families were found to cultivate paddy irrespective of the size of landholdings. This result is contrary to the findings of Jayanthakumari (1993) in which it was found that only families with larger landholdings cultivated paddy. It was also found that majority of the families did not have a kitchen garden. The families who had kitchen garden cultivated vegetables like lady's finger, brinjal, cowpea, bittergourd etc. and used the products fully at home. Jayanthakumari (1993) reported that families with larger landholdings utilised the farm produce fully at home.

Results of the housing conditions of the farm families revealed that all the surveyed families had their own pucca houses and majority had better amenities like drinking water, separate kitchen, lavatory facilities, electricity and recreational facilities. These results are partly in contrast to the results revealed by Usha *et al.* (1990) among the farm families of Trivandrum district.

Monthly expenditure pattern of the farm families indicated that about 63 per cent of the families spent 30-80 per cent of their monthly income on food. Usha *et al.* (1990) also revealed a similar finding among the farm families of Trivandrum district where majority spent 51 to 70 per cent of their income on food. Moorthy *et al.* (1983) and, Devadas and Easwaran (1986) also reported that nearly 84.0 per cent and 90 per cent of the monthly income was spent on food by the rural households in Hyderabad and Tamil Nadu respectively. Majority of the families did not spend money for recreation, health, and fuel. Expenditure on

clothing, electricity, personal need and education was substantially low among the families. A similar result was reported by Usha *et al.* (1990) and Jayanthakumari (1993) in a study among the farm families of Trivandrum district. The findings of Jayanthakumari (1993) and KAU (1996) indicated an inverse relationship between landholdings and income spent on food. In addition, majority of the families in this study spent 10-50 per cent of their income for other activities which included mainly agricultural activities.

It was found that only 56 per cent of the families saved money as against that reported by Cherian (1992) and Jayanthakumari (1993) in their study, where all the families saved a portion of their income for future needs.

Regarding the information source utilisation of the farm families, it was found that all the families obtained information through different media which included newspaper, radio, T.V., cinema and meetings. This result was in concurrence with the findings of Jayanthakumari (1993) who observed a high exposure to different communication sources among the farm families.

## **5.2. Food consumption and dietary pattern of farm families**

Food consumption pattern of the families indicated that all the families were habitually non-vegetarians and the staple food consumed was cereals especially rice.

The food expenditure pattern revealed that majority of the families did not spend any money for the purchase of cereals. This finding was contradictory to the results reported by Jayanthakumari (1993) among the farm families where the families spent more money for the purchase of cereals. The availability of farm produce through cultivation could be the reason for not spending any money for the purchase of cereals. Similarly, majority of the households who domesticated animals used a part of the products for their own use and hence did not spend money for milk and milk products. However, most of the families did not spend money for leafy vegetables, roots and tubers and fruits. The lack of allocation of money for the purchase of leafy vegetables, roots and tubers and fruits may be considered as ignorance on their part regarding the nutritive value of these food items. Statistical analysis revealed that there was a significant influence of family size and income over the food expenditure. This finding was in line with the findings of Rao, (1975); Wong *et al.* (1985) and Jayanthakumari (1993).

The frequency scores revealed that the most frequently used food items were cereals, milk and milk products, nuts and oilseeds, spices and condiments, fats and oils, sugar and jaggery. Augustine (1993) also reported a similar finding among the women of non-organised sector in Trivandrum district. Pulses, roots and tubers, other vegetables and fish were the medium frequently used foods. This is in deference to the report of Gopalan (1979) and Lina and Reddy (1989) who reported that the dietary pattern of the Keralites was based upon an excess consumption of tapioca and fish. Devadas and Easwaran (1986) had reported that

food available to a household is dependent on the purchasing power and food available in the region. Earlier studies conducted among rural families in Trivandrum district had also revealed similar observations (Usha *et al.*, 1990).

Three-meal-a-day pattern was followed by all the farm families. George (1987) and Jayashree (1987) reported similar findings among the rural households of Trivandrum district. Usha *et al.* (1990), Cherian (1992), Jayanthakumari (1993) and Augustine (1993) also reported a three-meal-a-day pattern among majority of the rural families of Kerala.

It was observed that majority of the farm families gave preference to the male members while giving meals. Devadas and Easwaran (1986) in a study conducted among the rural households of Coimbatore reported that the female head of the family cooked and distributed the food giving priority to the male adult and preschool children. Usha *et al.* (1990) and Cherian (1992) found that preference was given to the head of the family while serving the food by the farm families of Trivandrum district. Regarding cooking methods followed, majority of the families adopted the boiling method for almost all the food stuffs. This finding is in line with the results published by Thomas (1989a); Cherian (1992) and Jayanthakumari (1993).

Infancy, pregnancy and lactation are three important special conditions where adequate care in food consumption has to be made. Data collected in these

lines indicated that during infancy, foodlike cow's milk, ragi, arrowroot and banana powder were included as supplementary foods by majority of the families. Similar practices were observed and reported by Thomas (1989a), Cherian (1992) and Jayanthakumari (1993) among the farm families.

The food intake of pregnant mothers in our country is reported to be deficient in terms of energy and other nutrients (Devadas and Easwaran, 1986). Easwaran and Goswami (1989) reported that special conditions like pregnancy and lactation did not receive any special attention except for the increased intake of food among the rural households of Meghalaya. In the present study, during pregnancy and lactation in addition to increased intake of the normal adult food, milk was also consumed. Usha *et al.* (1990) and Cherian (1992) observed a normal dietary pattern among pregnant and lactating women of Trivandrum district without the inclusion of any special foods.

Majority of preschool children in India received only ordinary homediets and those diets were deficient in many nutrients especially in vitamins and minerals (Bhat and Dahiya, 1985). In this study, it was found that in addition to the normal diet, preschool children were given milk and biscuits. This is in contrast to the findings of Usha *et al.* (1990); Cherian (1992) and Jayanthakumari (1993) who reported that preschool children received only family diet without any special foods. The school going children and adolescents did not get any special food.



Modification of the normal diet is essential during disease condition. Easwaran and Goswami (1989) opined that bland diets were given during fever, diarrhoea and chickenpox. In this study, it was found that rice gruel was preferred during illness by majority of the families. Cherian (1992) also reported that most of the farm families in Trivandrum district preferred gruel and bread during illness.

Infant feeding practices observed by a community will throw light on their nutritional awareness and knowledge. Majority of the mothers started feeding the baby with breast milk during the first day itself and gave colostrum to the baby which is highly nutritious and the most suitable first food for a new born. The rest who did not give colostrum may be unaware of its nutritive value.

Scientific schedule of infant feeding practices insist on fixed time for feeding and regular interval between feeds. Such dietary regimen were not observed among the low income strata of Kerala (George, 1987). In the present study, also, it was found that the mothers breast fed their children as and when they cry.

The daily meal pattern of the farm families was obtained by a three day recall method. Breakfast is expected to be a meal supplying 1/3rd of the day's nutrients including energy and the major ingredients to be included are cereals, pulses, fruits along with milk and sugar. From the results obtained it was found that all the families included cereals like rice and wheat for breakfast and a little

milk in the form of tea. The finding was in conformity with the results of Usha *et al.* (1990), who concluded that the farm families included cereals like rice and wheat for breakfast.

Hui (1983) had reported that food served at lunch should help balance the nutrient intake for the body. Ideal lunch and dinner are expected to contain cereal and pulse preparations, vegetables, milk and milk products, egg and fruits. However, in the present study cereals, vegetables and fish were included for lunch as well as dinner. The inclusion of pulses during lunch or dinner was found to be very rare. Usha *et al.* (1990) also observed a similar finding among the farm families of Trivandrum district. It was evident from this that the frequency of use of green leafy vegetables and fruits which are rich in vitamin and minerals was very low.

### **5.3 Nutritional status of farm women**

In the present study, anthropometry, food intake, biochemical estimations and clinical examinations were reckoned as the major determinants of nutritional status of the farm women.

The mean height and weight of the farm women were 156.3 cm and 48.47 kg respectively. Statistical analysis revealed that there is no significant change in the weight with change in height. This result was in line with the findings of Bimla (1995) who found that the mean height of farm women in the

age group of 25-50 years in Hissar district of Haryana was 154.76 cm and the mean weight was 48.31 kg. Weight for age is the most sensitive index to evaluate the body mass and thereby the current nutritional status. The mean body weight of the women was below the reference body weight suggested by ICMR (1994). Cherian (1992) also reported in a study that all the women were undernourished when compared with the standard weight for age. In contrast to this, Jayanthakumari (1993) reported a higher weight-for-age value among the farm women of Trivandrum district.

The body mass index of the farm women revealed that 38.33 per cent were in the normal group and 40 per cent in the low weight group. An almost similar result was reported by Cherian (1992) among the farm families of Trivandrum district. Severe chronic energy deficiency was found only among 19.17 per cent of the farm women.

The food consumption of rural population was lower than the minimum requirement of physical sustenance of healthy living (Agarwal, 1980). The one day weighment survey conducted among the sub samples to assess their actual food intake revealed that the intake of cereals, pulses, roots and tubers were lower than the RDA. The intake of green leafy vegetables, flesh foods and egg were found to be very low whereas the intake of other vegetables, milk and milk products, fruits, fats and oils were higher than the recommended dietary allowance (RDA) (Jayanthakumari, 1993). A low intake of pulses and green leafy vegetables was

found among the farm families of Trivandrum district (Jayanthakumari, 1993). Cherian (1992) also observed a low intake of pulses and green leafy vegetables in the diets of agricultural labourers. Usha *et al.* (1990) also reported a low intake of all food groups except roots and tubers among the farm families.

The energy intake of the farm women was found to be lower than the RDA suggested by ICMR (1994). Aujla *et al.* (1983); Wadker *et al.* (1988); Pinstруп *et al.* (1991) and ICMR (1994) also observed a reduced energy consumption among the households of southern and Northern India. The intake of other nutrients like iron, vitamin A and vitamin B<sub>2</sub> was significantly lower than the RDA among the farm women. The intake of iron, vitamin A and vitamin B<sub>2</sub> were found to be significantly inadequate in the diet of female agricultural labourers of Trivandrum district (Cherian 1992). Aujla *et al.* (1983); Bhat and Dahiya (1985); Kaur and Sood (1988); and Agarwal (1991) had also observed that majority of the Indian home diets are deficient in vitamins especially vitamin A.

Nutritional anaemia has been defined as a condition in which the haemoglobin content of the blood is lower than the normal as a result of a deficiency of one or more essential nutrients (WHO, 1979). Agarwal (1991) had reported that nutritional anaemia is characterised by inadequate erythropoiesis and reduced haemoglobin concentration which is due to inadequate supply of nutrients like iron, folic acid and vitamin B<sub>12</sub>. The biochemical estimations conducted among the samples to assess the incidence of anaemia indicated a lower

haemoglobin values among majority of the samples. The low haemoglobin values observed in this study may be due to decreased intake of green leafy vegetables which in turn resulted in a very low intake of iron.

Clinical examination is the most effective measure to find out the nutritional deficiencies among individuals. The results of the present study indicated a very mild prevalence of angular stomatitis, bad gums and carries in the teeth (8.33% each) among the samples. The clinical assessment as conducted by Cherian (1992) revealed many nutritional disorders due to the deficiency of minerals and vitamins, whereas, Jayanthakumari (1993) in her study among the farm families reported the absence of clinical manifestations among the farm women of Trivandrum district except in the case of anaemia in females.

*Summary*

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## **SUMMARY**

The present study entitled Food consumption pattern and nutritional status of farm women in Thrissur district was conducted among 120 families.

The study was carried out to throw light on the socio-economic and dietary habits of the families and also the nutritional status of farm women.

Information regarding socio-economic condition of the families indicated that majority of the families were of nuclear type with an average family size of 5.37 and sex ratio in favour of female members.

Educational status of the adults showed that majority of them were literate. Agriculture was found to be the main occupation and most of them domesticated animals which also supplemented their income.

It was found that about 28 per cent of the male members were engaged in off-farm employment.

Majority of the families had a monthly income ranging from Rs.1000-4000/-.

The major expenditure was for food followed by the expenditure incurred for agriculture activities.

Majority of the families had their own pucca house with safe drinking water, electricity and lavatory facilities. Majority of the houses did not have proper drainage facilities.

All the families surveyed were non-vegetarians and their staple food was rice. Three-meal-a-day pattern was followed by majority of the families.

Majority of the families did not spend money for cereals, leafy vegetables, roots and tubers, fruits and milk and milk products. Cereals, milk and milk products, nuts and oil seeds, spices and condiments and fats and oils were the most frequently used foods. Most of the families adopted the boiling method for cooking foods.

It was found that majority of the mothers started feeding their babies on the first day itself and continued for 1-2 years. Early weaning was practised by the farm families with ragi or banana powder as the important weaning food.

Nutritional status of the respondents revealed that majority of them were undernourished when their weight-for-age was compared with the standards. On the basis of body mass index only 38.33 per cent of the farm women was found to be normal.



Food weighment survey indicated that the intake of cereals, pulses, green leafy vegetables and flesh foods were lower than the prescribed levels. Except calcium, niacin and Vitamin C the intake of all the other nutrients was lower than the recommended dietary allowances.

Biochemical investigations revealed that majority of the respondents had a low haemoglobin value but suffered only very mild form of anaemia.

Majority of the respondents were found to be free from any form of clinical symptoms.

**Suggestions to improve the nutritional status of farm families with particular reference to farm women**

1. Encourage the use of locally available foods.
2. Increase the nutritional awareness through nutrition education programmes.

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\* Originals not seen

# Appendices

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13. Composition, education and occupation of the family members

Sl. No.	Name of the members	Relationship with the head of the family	Age	Sex	Occupation	Income	Educational qualification							
							Illiterate	Can read	Can read and write	LP	UP	HS	College	
												UG	PG	

14. Source of income:

- a. Government job
- b. Private job
- c. Agriculture
- d. Cattle
- e. Poultry
- f. Coolie
- g. Business
- h. Others (specify)

15. Do you own land : Yes/No

a. Area under cultivation :

b. Specify how you got this land? :

i. Purchased :

ii. Inherited from parents:

iii. Received from Government :

iv. Others (specify) :

16. Details regarding the cultivation of food crops

Sl. No.	Name of crop	Area under cultivation	Total produce per year	Qty. used at home	Qty. sold	Income

17. Do you have a kitchen garden in your house? : Yes/No

If yes, specify :

Sl. No.	of Items <sub>k</sub> cultivation	Use of produce		
		By the family	Gift	Sale

18. Domestication of animals

i. Do you have any domestic animal? : Yes/No

If yes,

- a. What are they?
- b. From where did you get it?

- i. Purchased
- ii. From Government
- iii. Others (specify)

ii. Details of produce from domestic animals

Sl. No.	Name of product	Quantity produced per month	Use of produce			Income from produce
			By the family	Gift	Sale	

19. Details of housing conditions:

- i. Type of house :
- a. Own/rented
  - b. No. of rooms  
one/two/3-5/6 or more
  - c. Kutcha/pucca
  - d. Tiled/terraced/thatched

ii. Other characteristics

- a. Separate kitchen : Yes/No
- b. Source of drinking water : Own well/tap/public water well/tap/tank/river/nearby house



- c. Lavatory facilities : Yes/No  
 d. Drainage facilities : Yes/No  
 e. Electricity facilities : Yes/No  
 f. Recreational facilities : Yes/No  
 If yes; specify  
 g. Transport facilities : Yes/No  
 If yes; specify

20. Monthly expenditure pattern:

Sl. No.	Items	Amount spent per month	Mode of payment Cash/Credit	Percentage of total income
1.	Food			
2.	Clothing			
3.	Shelter			
4.	Transport			
5.	Water			
6.	Recreation			
7.	Education			
8.	Lighting/ Electricity			
9.	Furniture			
10.	Health			
11.	Fuel			
12.	Luxury items			
13.	Personal expenditure			
14.	Remittance (for debt)			
15.	Savings			

21. Details regarding savings:

Do you have the habit of saving money? : Yes/No

If yes,

Sl. No.	Mode of saving				Frequency of saving	Purpose of saving	Amount saved
	Post Office	Bank	Chitty	Others (specify)			

22. Details regarding loan taken:

Have you taken any loan? : Yes/No

If yes, give details

Sl. No.	Source of debt	Amount of debt	Long term	Short term	Purpose	Mode of payment	Interest rate
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23. Details regarding availability of fuel

i. Type of fuel used in the house

- a. Wood
- b. Agricultural waste
- c. Cow dung
- d. Others (specify)

ii. Source of fuel for the family

- a. Collected from the surroundings of the house
- b. Purchased
- c. Others (specify)

24. i. Epidemics prevalent in the locality during the past one year

- a) Measles
- b) Chicken pox
- c) Whooping cough
- d) Typhoid
- e) Mumps
- f) Others (specify)

ii. Specify whether family was affected by the above epidemics : Yes/No

iii. If yes, specify

- a. Name of the disease :
- b. Name of the individual :

## APPENDIX II

### Interview schedule to elicit information regarding the dietary pattern of farm families

1. Serial No :
2. Name of the respondent :
3. Block : Panchayat : Ward :
4. House No. :
5. Total income of the family :
6. Type of food consumed generally:
  - a. Vegetarian :
  - b. Non-vegetarian :
7. Name of the staple food :
8. Details of food expenditure pattern :

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Sl. No.	Food items	Qty. purchased	Frequency of purchase				Total cost	% of total food expenditure
			Daily	Weekly	Monthly	Occasionally		
1.	Cereals							
2.	Pulses							
3.	Leafy vegetables							
4.	Roots & tubers							
5.	Other vegetables							
6.	Fruits							
7.	Milk and milk products							
8.	Egg							
9.	Meat							
10.	Fish							
11.	Nuts and oil seeds							
12.	Spices and condiments							
13.	Fats and oils							
14.	Sugar & jaggery							
15.	Others							

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9. Frequency of using various foods

Sl. No.	Food items	Frequency of use						
		Daily	Weekly four times	Weekly thrice	Weekly twice	Weekly once	Occasionally	Never
1.	Cereals							
2.	Pulses							
3.	Leafy veg.							
4.	Roots & tubers							
5.	Other veg.							
6.	Fruits							
7.	Milk and milk products							
8.	Egg							
9.	Meat							
10.	Fish							
11.	Nuts & oil seeds							
12.	Spices & condiments							
13.	Fats & oils							
14.	Sugar & jaggery							
15.	others (specify)							

10. Do you maintain accounts for food expenditure? : Yes/No

If yes,

- i. In what form?
  - a. Written
  - b. Memory
- ii. Period
  - a. Daily
  - b. Weekly
  - c. Monthly

11. Details regarding meal planning

- i. Do you plan your meals in advance? : Yes/No
- ii. If yes, what is the basis for planning?
  - a. Total family requirement
  - b. Money available
  - c. Likes and dislikes of family members
  - d. Food availability
  - e. Others (specify)

12. i. How many times do you or your family members take food daily?
- Once
  - Twice
  - Thrice
  - More than 3 times
  - As and when they like
  - Others (specify)

ii. (a) Do you maintain specific time : Yes/No  
schedule for taking food?

(b) Specify the reasons

iii. Do you use boiled water or water  
without boiling for drinking?

iv. (a) Have you changed your food  
pattern because of any : Yes/No  
religious reasons?

(b) If yes, specify

13. Methods of preparing various food articles prior to cooking

- i. Dry food articles (like cereals)
- Washing and drying soon after purchase
  - Washing just before cooking
  - Cleaning/Winnowing and then washing
  - Others, specify

- ii. Washing - Specify the number of times
- Once
  - Twice
  - Thrice
  - More than 3 times
  - Washing till the water is clear

iii. Perishable foods

Sl. No.	Food item	Washing before cutting	Washing after cutting	Cutting size		Reasons
				Large	Small	
1.	Vegetables					
2.	Roots and tubers					
3.	Leafy vegetables					
4.	Fruits					
5.	Fish					
6.	Meat					

19. In feeding whom do you consider the most important person

Individual	Reasons
1st	
2nd	
3rd	

20. Use of left over foods : Yes/No  
Do you use left over foods?

Sl. No.	Items left over and reused	How it is reused

21. Foods given/avoided during special conditions

Sl. No.	Conditions	Foods given	Reasons	Foods avoided	Reasons
1.	Infancy				
2.	Pre-school children				
3.	School children				
4.	Adolescence				
5.	Pregnancy				
6.	Lactation				
7.	Old age				

22. Foods prepared for special occasions

Sl. No.	Occasion	Foods prepared	Reasons
1.	Birthday		
2.	Death		
3.	Marriage		
4.	Feast		
5.	Others (specify)		

### 23. Diet during illness

Sl. No.	Illness	Foods given	Reasons	Foods avoided	Reasons
1.	Cold				
2.	Fever				
3.	Diarrhoea				
4.	Chickenpox				
5.	Measles				
6.	Others (specify)				

### 24. Infant feeding practices

i. When do you start breast feeding the new born baby?

First day				2nd day	3rd day	After 3rd day	Reasons
Soon after birth	6 hrs after birth	7-12 hrs after birth	After 12 hrs				

ii. a. What is the first item of food given to the baby?

b. When it is given?

c. Reasons

iii. Do you give colostrum to your baby? : Yes/No

iv. Do you consider colostrum important for the health of the baby?

v. Specify reasons

vi. How long do you breast feed the infants?

a. Until next pregnancy

b. Less than 6 months

c. One year

d. Two years

e. More than two years (Specify)

vii. What is the interval between feeds?

a. Every two hours

b. Whenever the child cries

c. When the mother feels that the child is hungry

d. Others

viii. Details regarding weaning

a. What is the age of weaning the infant?

b. What are the foods included during weaning?

Foods included	Quantity
----------------	----------

25. Methods of storage of foods

- i. Do you store any food in your home? Yes/No
- ii. If yes, specify

Sl. No.	Name of foods	Method of storage	Period of storage
1.	Cereals		
2.	Pulses		
3.	Vegetables		
4.	Fruits		
5.	Meat		
6.	Fish		
7.	Others (specify)		

- iii. Do you employ and specific treatment before storing the food items? : Yes/No

If yes, specify

26. Details of food preservations

- i. Do you preserve any foods in your home? Yes/No
- ii. If yes, specify

Sl. No.	Foods preserved	Methods used	Period over which preserved	Problems encountered
1.	Cereals			
2.	Pulses			
3.	Vegetables			
4.	Fruits			
5.	Milk			
6.	Meat			
7.	Fish			
8.	Others (specify)			

27. Do you purchase any preserved food from outside : Yes/No

If yes, specify



## 28. Daily meal pattern

Sl. No.	Meal time	Menu 1st day	Menu 2nd day	Menu 3rd day
1.	Early morning			
2.	Breakfast			
3.	Lunch			
4.	Evening tea			
5.	Dinner			
6.	Any other			

## **APPENDIX III**

### **Procedure adopted for anthropometric measurements**

#### **Weight-for-age**

For weighing, platform weighing balance was used, as it is portable and convenient to use in the field. The weighing scale was checked periodically for accuracy. The scale was adjusted to zero before each measurement. The subject was having minimum clothing and was asked to stand on the platform of the scale, without touching anything and looking straight ahead. The weight was recorded to the nearest 0.25 kg. Each reading was taken twice to ensure correctness of the measurement.

#### **Height-for-age**

To determine height, a measuring tape was used. The tape was fixed vertically on a smooth wall perpendicular to the ground.

The subject was asked to remove the slippers, stand with centre of the back touching the scale, with the feet parallel and heels, buttocks, shoulders and back of the head touching the scale. The head was held comfortably erect, the arms hanging loosely by the side. The ruler was held on the top of the head in the centre, crushing the hair at right angle to the scale and the height read-off from the lower edge of the ruler to the nearest 0.5 cm. Each reading was taken twice to ensure correctness of the measurement.

## APPENDIX IV

### Schedule for individual food consumption survey - weighment method

Date: .....

Name of the head of the family :

Address :

Name of subject :

Age of subject :

Name of the meal	Menu	Food consumption		
		Weight of total raw ingredients used by family	Weight of total cooked ingredients used by family	Weight of total cooked ingredients used by the individual
Breakfast				
Lunch				
Evening tea				
Dinner				
Others				

## APPENDIX V

### Schedule for clinical assessment (N.A.C.I.C.M.R.)

1. Sex :
2. Age :
3. Height :
4. Weight :
5. General appearance

0. Good
1. Fair
2. Poor
3. Very poor

#### 6. Eyes

##### (a) Conjunctiva

##### i) Xerosis

0. Absent, glistening and moist
1. Slightly dry on exposure for a minute, lack of lustre
2. Conjunctiva dry and wrinkled
3. Conjunctiva very dry and Bitot's spots present

##### ii) Pigmentation

0. Normal colour
1. Slight discolouration
2. Moderate browning in patches
3. Severe earthy discolouration

##### iii) Discharge

0. Absent
1. Watery, excessive, lachrymation
2. Mucopurulent
3. Purulent

(b) Cornea

i) Xerosis

- 0. Absent
- 1. Slight dryness and diminished sensibility
- 2. Haziness and diminished transparency
- 3. Ulceration

ii) Vascularization

- 0. Absent
- 1. Circumcorneal infection
- 2. Vascularization of cornea

(c) Lids

i) Excoriation

- 0. Absent
- 1. Slight excoriation
- 2. Blepharitis

ii) Folliculosis

- 0. Absent
- 1. A few granules
- 2. Lids covered with extensive granules
- 3. Hypertrophy

iii) Angular conjunctivitis

- 0. Absent
- 1. Present

(d) Functional

i) Night Blindness

- 0. Absent
- 1. Present

NB: Exclude other eye diseases not associated with nutritional defects

## 7. Mouth

### (a) Lips

#### i) Condition

0. Normal
1. Angular stomatitis, mild
2. Angular stomatitis, marked

### (b) Tongue

#### i) Colour

0. Normal
1. Pale but coated
2. Red
3. Red and Raw

#### ii) Surface

0. Normal
1. Fissured
2. Ulcered
3. Glazed and atrophic

### (c) Buccal mucosa

#### (i) Condition

0. Normal
1. Bleeding and/or gingivitis
2. Pyorrhoea
3. Retracted

### (d) Gums

#### i) Condition

0. Normal

### (e) Teeth

#### i) Fluorosis

0. Absent
1. Chalky teeth
2. Pitting of teeth
3. Mottled and discoloured teeth

ii) Carries

0. Absent
1. Slight
2. Marked

8. Hair

i) Condition

0. Normal
1. Loss of lustre
2. Discoloured and dry
3. Sparse and brittle

9. Skin

(a) General

i) Appearance

0. Normal
1. Loss of lustre
2. Dry and rough or crazy pavements
3. Hyperkeratosis, phrynoderma

ii) Elasticity

0. Normal
1. Diminished
2. Wrinkled skin

(b) Regional

i) Trunk

0. Normal
1. Collar-like pigmentation and dermatitis around the neck
2. Moon face

ii) Face

0. Normal
1. Nasolabial seborrhoea
2. Symmetrical suborbit pigmentation
3. Moon face

iii) Perineum

0. Normal
1. Scrotal or pudendal dermatitis

iv) Extremities

0. Normal
1. Symmetrical dermatitis with pigmentation of glove or stocking type

10. Adipose tissue (to be judged by the examination of the arm over the biceps)

i) Quantity

- 0. Normal
- 1. Deficient

11. Oedema

i) Distribution

- 0. Absent
- 1. Oedema on dependent parts
- 2. Oedema on face and dependent parts
- 3. General anasarca

12. Bones

i) Condition

- 0. Normal
- 1. Stigmata of past rickets

13. Heart

i) Size

- 0. Normal
- 1. Apex outside the nipple line
- 2. Enlarged

14. Alimentary system

i) Appetite

- 0. Normal
- 1. Anorexia

ii) Stools

- 0. Normal evacuation
- 1. Diarrhoea

iii) Liver

- 0. Not palpable
- 1. Palpable

iv) Spleen

- 0. Not palpable
- 1. Palpable

15. Nervous system

i) Calf tenderness

- 0. Absent
- 1. Present

ii) Paresis

- 0. Absent
- 1. Present



## APPENDIX VI

### Procedure adopted for biochemical estimation of haemoglobin (Cyanmethaemoglobin method)

#### Principle

Haemoglobin is converted into cyanmethaemoglobin by the addition of KCN and ferricyanide. The colour of cyanmethaemoglobin is read in a photoelectric colorimeter at 540 nm against a standard solution. Since cyanides has the maximum affinity for haemoglobin, this method estimates the total haemoglobin.

#### Reagent

Drabkin's solution - Dissolve 0.05 g of KCN, 0.20 g of potassium ferricyanide and 1.00 g of sodium bicarbonate in 1 litre of distilled water.

#### Procedure

20 ml of blood is transferred with the help of a haemoglobin pipette and delivered on to a Whatman No.1 filter paper disc. The filter paper is air dried, labelled and can be stored upto one week. The portion of filter paper containing the blood is cut and dipped in 5 ml of Drabkin's solution taken in a test tube. Wait for 30 minutes and mix the contents in the tubes, take the reading in a photoelectric colorimeter. The reagent blank (Drabkin's diluent) is adjusted to zero.

#### Construction of standard curve

If the blood drawn from the subject contains haemoglobin 15 g/dl after estimation then the three reference standards prepared are as follows:

##### 1. Reference standard A

4 ml of blood in 1000 ml Drabkin's reagent contains haemoglobin 15 g/dl.

## 2. Reference standard B

300 ml of reference standard A+200 ml Drabkin's reagent contains haemoglobin concentration of 10 g/dl.

## 3. Reference standard C

200 ml of reference standard A+300 ml Drabkin's reagent contains haemoglobin concentration of 7.5 g/dl.

Thus we have three reference standards at three levels of haemoglobin concentration. Use 5 ml from each standard whenever haemoglobin estimations are done.

## APPENDIX VII

### Formula for calculation of food use frequency

Based on the frequency of use of different food groups in the daily diet of the surveyed families, food use frequency scores were calculated as suggested by Reaburn *et al.* (1979). The formula used for the calculation is given below:

$$\text{Percentage of total score} = \frac{R_1S_1 + R_2S_2 + \dots + R_nS_n}{n}$$

$S_n$  = Scale of rating

$R_n$  = Percentage of respondents selecting a rating

$n$  = Maximum scale rating

## APPENDIX VIII

Body Mass Index (BMI) of 120 respondents

Sl. No.	Height (cm)	Weight (Kg)	BMI
1	157	55	22.35
2	160	50	19.53
3	156	50	20.57
4	158	47	18.87
5	155	45	18.75
6	158	50	20.08
7	156	48	19.75
8	153	43	18.37
9	158	49	19.68
10	156	48	19.75
11	152	48	20.77
12	162	60	22.90
13	154	50	21.09
14	154	45	18.98
15	156	45	18.51
16	155	47	19.58
17	158	50	20.08
18	150	48	21.33
19	159	48	19.20
20	157	50	20.32
21	152	48	20.77
22	150	43	19.11
23	154	48	20.25
24	154	46	19.40
25	159	49	19.44

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Sl. No.	Height (cm)	Weight (kg)	BMI
26	153	45	19.23
27	153	46	19.55
28	156	48	19.75
29	158	50	20.08
30	158	45	18.07
31	151	47	18.65
32	160	50	19.53
33	150	49	21.77
34	155	45	18.75
35	157	56	23.30
36	155	47	19.58
37	156	56	23.04
38	152	43	18.61
39	158	50	20.08
40	150	60	26.66
41	153	42	17.94
42	156	43	17.69
43	158	43	17.26
44	158	50	20.08
45	156	59	24.27
46	159	38	15.07
47	153	49	20.94
48	160	48	18.75
49	163	49	18.42
50	159	45	17.79
51	161	46	17.76
52	158	48	19.27

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Sl. No.	Height (cm)	Weight (Kg)	BMI
53	155	55	22.91
54	153	43	18.37
55	156	56	23.04
56	158	50	10.08
57	160	50	19.53
58	150	45	20.00
59	155	47	19.58
60	159	48	19.04
61	161	48	18.53
62	150	48	21.33
63	156	55	22.63
64	156	49	20.16
65	154	45	18.98
66	158	47	18.87
67	160	48	18.75
68	155	48	20.00
69	154	50	21.09
70	158	59	20.08
71	158	49	19.67
72	155	43	17.92
73	160	50	19.53
74	160	45	17.58
75	157	47	19.10
76	159	52	20.55
77	152	48	20.78
78	159	47	18.58
79	160	48	18.75
80	155	43	17.92

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Sl. No.	Height (C m)	Weight (Kg)	BMI
81	157	40	16.26
82	158	55	22.08
83	155	55	22.91
84	165	55	20.22
85	157	45	18.29
86	158	50	20.08
87	158	48	19.27
88	157	50	20.32
89	157	40	16.26
90	157	47	19.10
91	156	49	20.16
92	149	50	22.52
93	158	45	18.07
94	153	45	19.23
95	155	43	17.92
96	161	52	20.08
97	159	51	20.16
98	154	48	20.25
99	150	50	22.22
100	163	49	18.42
101	156	48	19.75
102	159	52	20.55
103	150	48	21.33
104	156	56	23.04
105	156	50	20.57
106	158	49	19.68
107	159	47	18.65
108	160	49	19.14

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Sl. No.	Height (cm)	Weight (Kg)	BMI
109	153	46	19.66
110	156	56	23.04
111	155	42	17.50
112	152	43	18.61
113	158	37	14.86
114	150	65	28.88
115	153	43	18.37
116	156	45	18.52
117	157	63	25.61
118	158	49	19.68
119	155	45	18.75
120	158	55	22.08

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$r = 0.107^{NS}$



## APPENDIX IX

Haemoglobin values of respondents ( sub-sample)

No. of respondents	Hb values g/dl
1	11.5
2	10.7
3	9.1
4	12.3
5	12.3
6	11.5
7	11.5
8	11.9
9	10.5
10	11.1
11	12.9
12	12.3

t' value - 1.71

25. Social participation

a. Are you a member of any organization/institution : Yes/No

- b. If yes, specify
- i. Co-operative society
  - ii. Trade union
  - iii. Mahila Samajam
  - iv. Youth club
  - v. Others (specify)

c. How frequently you attend the meeting

- Always  
Mostly  
Sometimes  
Never

26. Information source utilization

a. Which are the resources from which you get information on family life, society, health aspects etc.

**General**

- a. Friends
- b. Other family members
- c. Neighbours
- d. Relatives

**Media**

- a. Newspaper
- b. Radio
- c. Cinema
- d. Television
- e. Meetings
- f. Exhibition

**Official**

- a. Agricultural Officer
- b. University officials
- c. Panchayat officials
- d. Block officials
- e. Bank officials
- f. Any others (specify)

**FOOD CONSUMPTION PATTERN AND NUTRITIONAL  
STATUS OF FARM WOMEN IN  
THRISSUR DISTRICT**

By

**P. K. UDAYA**

**ABSTRACT OF THE THESIS**

Submitted in partial fulfilment of the  
requirement for the degree of

**Master of Science in Home Science**

(FOOD SCIENCE & NUTRITION)

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## **ABSTRACT**

A study on the food consumption pattern and nutritional status of farm women in Thrissur district was carried out among 120 families.

The results of the study indicated that majority of the families were of nuclear type and were Hindus. Majority of the adults were literate and agriculture was found to be their main occupation. It was observed that majority of the respondents were engaged in house work. Majority of the families had a monthly income ranging from Rs.1000 to 4000/-.

The most frequently used food items were cereals, milk and milk products, nuts and oil seeds, spices and condiments.

Majority of the families did not plan their meal pattern in advance and they consumed food three times a day giving preference to the male members of the family.

Nutritional status of the farm women revealed that majority of them were undernourished.

Food weightment survey revealed a deficient intake of cereals, pulses, green leafy vegetables and flesh foods. The intake of most of the nutrients was low. Nutritional status of farm women on the basis of body mass index indicated that only 38.33 per cent had normal nutritional status.

Majority of the respondents suffered from very mild form of anaemia and clinical symptoms were observed only in very few respondents.