

FOOD CONSUMPTION PATTERN OF SELECTED FARM FAMILIES IN THIRUVANANTHAPURAM DISTRICT

By

JAYANTHA KUMARI S

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I hereby declare that this thesis, entitled "Food consumption pattern of selected farm families in Thiruvananthapuram 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.

Vellayani,



JAYANTHAKUMARI. S.

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Vellayani,

Mrs. Mary Ukkuru,
Chairman,
Associate Professor,
Department of Home Science.

APPROVED BY

CHAIRMAN

Mrs. MARY UKKURU

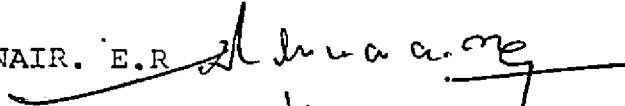


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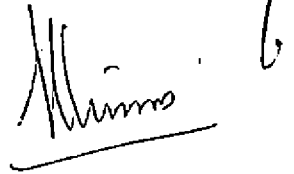
1. Dr. (Mrs) L. PREMA



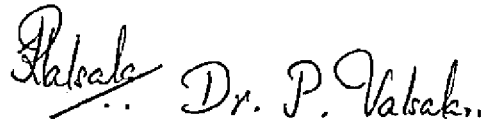
2. Sri. NARAYANAN NAIR. E.R



3. Smt. SOFFI CHERIYAN



EXTERNAL EXAMINER



Dr. P. Vabak.

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INTRODUCTION

INTRODUCTION

Agriculture over centuries continues to be the backbone of India's national economy. Agricultural labourers constitute a major group of workers and in Kerala, they constitute 19.7 lakhs accounting 28.23 percent of total workers in the State. According to Mahajan (1990), our country is characterised by small farms with 77 percent of the people (527 million person) living in rural areas and depending on agriculture directly or indirectly for their livelihood. Hence progress of our country depends on the progress of the agricultural sector.

Though most programmes of agricultural and rural development are intended for the upliftment of the rural poor, the goal is not often accomplished and many live under poor health and environment. Dewey (1979) opined that agricultural development of the third world countries had led to worsening the quality of rural people with economic, social, ecological and dietary changes often leading to poorer health and nutritional status. Jeemolunni (1992) has also pointed out that the household of agricultural labourer forms the lowest rungs of the rural hierarchy and constitute a very vulnerable section of the population.

Kerala is a state that has experienced revolutionary changes in land reforms. These reforms along with alterations in the socio economic environment within the state has brought in considerable variations in the lives of the farmers. The judicious use of land, adoption of multiple cropping system and reallocation of a major portion of the produce for home consumption, were found to have a positive influence on the nutritional status of the members of the farm families. However the available data pertaining to the food consumption pattern of the population of the lower strata of the State, indicate an ill-balance in the intake of various nutrients resulting in poor nutritional status. The present study is an attempt to provide an insight into the food habits and food consumption pattern, prevailing in the farm families and to analyse the nutritional status of the members of the farm families belonging to different size of land holding.

Objectives of the study

- 1) To study the food habits of selected farm families.
- 2) To assess their food consumption pattern.
- 3) To assess their nutritional status in relation to food consumption pattern and socio economic background.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Agricultural Situation and nature of farming community

Sekar and Subramaniam (1986) opined that, agriculture is the back bone of the Indian economy. They also pointed out that about 2/3 of the population directly depends on agriculture, and it contributes over 30 percent of the gross national product.

Venkitaraman (1985) stated that 70 percent of the Indian Population directly depend on agriculture and there is a need for indirect participation and involvement of farmers at all levels in food production. Singh and Indregit (1988) reported that many households in South Asia rely ^{on farming} for their livelihood.

In Kerala, according to 1981 census, out of total main workers (6742967), the agricultural labourers, constitute a major portion (1900904). Agriculture in Kerala is different in labour use pattern when compared to other parts of India. (Government of India, 1981) According to Ravindran Nair (1990) as much as 79.40

percent of women workers are engaged in agricultural activities mainly as agricultural labourers.

Richard Grabowsky (1987) reported that, economic activities of the farmers may vary as a result of difference in the size of land holdings, since land is one of the chief determinants of the resource position and risk bearing, biochemical and technological innovative capacities of the farmers. Sekar and Subramaniam (1986) have the opinion that resource use is an important issue in deciding the existing opportunities in agriculture for economic growth and also for the welfare of farm families.

All India Rural Credit Review Committee (1969) classified the farmers into three categories like 'Medium to Large' 'small to Medium' and 'very small to small' on the basis of land holdings. Khan and Sharma (1971) classified the farmers into three categories viz small groups (upto 2 hectores) Medium (2-4 hectores) and big farmers (above 4 hectores). Melhotra and Krishnan (1972) also followed the same classification. According to Agricultural Census in India (1980-81) by Pandey (1989) the small and marginal farmers with holdings to less

than 2 hectares represent about 74.6 percent of the total land holdings. Rekha Batt and Koshy (1984) opined that marginal farmers and agricultural labourers are the poorest section of farming community. Though they are the poorest, they are in the largest number. (Rekha Batt and Koshy, 1984).

Hota (1984) observed that poor constitutes 75 percent of the total household of the Village with 50 percent living below the poverty line and they are mainly agriculturists owning 1 acre or less of land. Saikia (1982) pointed out that small farmers who own land holdings upto 5 acres constitute nearly 70 percent of the total number of the farmers in this country.

Khusro (1964) viewed that less than 5 acres of land holdings is too small and uneconomic because it does not generate surplus over and above the family's requirement. According to Seetaram (1974) most of the small farmers were found to work with bigger holdings. According to Richard (1981) small farmers are involved only peripherally in the market economy.

Richard (1981) has the opinion that small farmers produce mainly for their home consumption. Morgon (1988)

Colin and Falk (1979) viewed that the productivity of different kinds of land varies substantially. Arora (1990) suggested that the size of the holdings, ie. large, small, medium, marginal and landless labour, exercised a commanding influence on work participation of rural women.

Socio economic Conditions of farming community

Pandy (1989) viewed that, in a country like India, where most of the cultivators (about 74 percent) are small and marginal farmers, the rural development is designed to improve the economic and social life of these poors.

Pinstrup et al (1991) opined that, technological break through had resulted in increased production of staple food in South Asia, which ~~was~~ enabled to raise the income of farmers considerably over the last 25 years.

According to Singh and Singh (1991) a higher inequality is observed in the distribution of income in relation to the farm size and employment. Inequality

was seen higher among marginal farmers followed by large, small, and medium sized farmers. Achaya (1982) pointed out that marginal farmers have varying levels of income depending on the nature of land.

Alanberg (1973) had reported that higher wages and more working days had increased the income and nutritional status of land less labourers who were usually at the bottom of the income ladder in India. Seetaram (1984) opined that most of the small farmers suffer from semi starvation. Rekha Batt and Koshy (1984) stated that quality of life of marginal farmers and that of agricultural labourers are poor.

Studies conducted among Tamil Nadu Agricultural labourers by Ratnam Nadar (1981) and Venk¹ata Swami (1975) revealed that they were living under conditions of poverty and unemployment. Alauddin and Tisdell (1989) observed, an increasing dependence on wage employment for subsistence by the rural poor, the majority of whom are agricultural labourers.

Lalitha and Sarada (1988) examined, the various socio economic factors which reflect the living condi-

tions of agricultural labourer families in Andhra Pradesh and suggested that those families not entirely dependent on wages will have lower standard of living.

Satnam kaur (1991) found that the maximum days that a female can get work is about 5 months out of which only for 3 months they get full day employment.

Rief and Cochrame (1991) indicated that off farm employment plays an important role in expanding income for households constrained by limited land and water, and with larger number of residents.

Epstin (1975) was of the opinion that, when rural wages lag considerably behind and the price rises, agricultural labourers are bound to suffer, while land owners take the advantage.

Greer (1985) had found that, insufficient farm land or farm implements, lack of full time off farm employment and large household size were the major cause of poverty among kenyan small holders. Omidayi (1988) studied the family size and productivity of

rural households in Nigeria and reported that low farm productivity combined with large family size has resulted in lowering of household income and saving and to greater poverty.

Harsan Nazmul and Kamaluddin Ahmad (1986) opined that, the socio economic factors such as land holdings, income and expenditure of food have a positive influence on healthy living of farmers.

According to Natarajan (1978) agricultural labourers in Punjab and Himachal Pradesh are in better economic status than Tamil Nadu, Madhya Pradesh, Orissa and Kerala. Panicker (1979) in his study on agricultural labourers in Kuttanadu found that open unemployment rates accounts to be 33 percent of the total labour force. Ingle and Khai (1987) from their study conducted among Maharashtra agricultural labour families found that, majority of female children of families were illiterate and bears heavy work load. They had also reported that Maharashtra agricultural labour families were found to be satisfied with their life style. Devadas et al (1990) found that women's load in agri-

culture was very much higher than that of men's load in the household.

Dietary and food Consumption Pattern of the farm families.

Rajalekshmi (1981) opined that every culture has its own dietary pattern. According to Devadas and Easwaran (1980) religion, injunctions, superstitions and ignorance were found to influence the food habits significantly. On the other hand Rao et al (1986) found that, age and sex were not the determinants of food habits. Devadas and Easwaran (1986) had opined that food habits of the people^{were} dependent on availability of food. Kusin et al (1984) pointed out that low food availability is one of the causal factors of low consumption.

Panicker (1979) reported ~~that~~ adverse circumstances such as unemployment, economic distress, natural calamities affect the level of food intake.

Agarwall (1980) had reported that, food consumption of rural population was lower than the minimum requirements of physical sustenance of healthy living.

Sarma and Roy (1974) has the opinion that aggregate consumption of food grains were decreased in India due to increase in the price of food commodities. Study conducted among the farmers by Silva et al (1981) indicated that well being as measured by the quantity of food consumed by the farmers were far from a satisfactory living. Devadas and Easwaran (1986) found that the food intake of poor household families in Tamil Nadu was found to be influenced by the wages received for the day and the food materials available in the market.

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 produce considerable variations in food consumption pattern and also on the nutrition and health status of the people.

Devadas and Easwaran (1986) ~~were of~~ opinion that food availability is influenced by the climate. Niedzialek (1983) stated that seasonal nature of consumption is one of the causes of poor nutrition among the agricultural labourers. Hassan et al (1985) noted

the seasonal pattern of food intake among the Bangladesh farmers. Intake of almost all food were found to be the lowest in late October, early November and May-June period, because it was the preharvest period. Niedzialek (1983) found that the food consumption pattern in Poland is subjected to considerable seasonal nature of production.

Abdulla (1989) revealed that, the share of household resources allocated to young girls was found to be greater during the preharvest season (hungry season) than during the post harvest season. Abdulla (1988) revealed that seasonal patterns of food intake in two traditional subsistence farming in Bangladesh Villages.

Teokul et al (1986) observed that in agricultural societies, where there is one main crop a year, food is freely available after the harvest, but with the storage losses and use of food grains, these may be very little left in the growing season prior to the next harvest.

Mathai (1988) had pointed out that, in Kerala, the food habits changes from region to region. Food consumption studies conducted by Devadas and Easwaran

(1986) found that staple food items mainly rice and other millets dominated the food expenditure pattern. Earlier studies indicated that excess consumption of fish and tapioca is common in the dietary pattern of the Keralites (Gopalan, 1979).

Mohanram (1978) stated that there had been a significant under reporting regarding the consumption of items like banana, tapioca and fish among the farm families. Sharma (1989) conducted food consumption studies in rural areas of earlier Uttarpradesh and found that the consumption of sugar, jaggery, oilseeds and vegetable were low in the diets of villagers. Laisamma (1992) in her study found that, rice, tapioca, fish, coconut, locally cultivated vegetables, milk, cooking oils and sugar were the main item in the daily diet of agricultural labourers in Vellayani, Thiruvananthapuram.

Nutrient intake of the farm families

Applied Nutrition Institute (1966-67) reported that the land owners had higher nutrient intake levels than the landless labourers. A case study done by

Gulati (1974) in a typical agricultural labourer household in Kerala, revealed that on working days, calorie intake of males fall short of the ICMR recommendations by 11 percent and that of female by 20 percent. Where as on an unemployed day the calorie intake was 26 percent less in males and 50 percent less in females. Pin Strip et al (1991) had concluded that most of the farm households in South India were found to consume 80 percent of the recommended calorie intake.

A comparative study conducted by Aujla et al (1983) among the different income and occupation groups belonging to the rural areas of Punjab indicated that calorie consumption was below the recommended allowances in the labour class group. Leonard (1989) investigated energy intake among small scale farmers of Peru and found that the average daily energy intakes was lowest during the last few months before harvest. They also observed that seasonal energy reduction was not found to affect all sectors of the population equally.

A nutritional survey conducted among the agricultural labourers by Schofield (1974) in 25 African

Villages ~~revealed~~ that the calorie intake is reduced in the wet season than in the dry season.

Abdulla and wheeler (1985) found that energy (K cal/kg/day) and protein (gm/kg/day) showed significant seasonal differences for adults and young children. Nicol and Phillips (1976) revealed that, Nigerian farmers were habituated to diets relatively low in protein. Ishigeo et al (1970) observed variation in the protein intake with season among the Japanese farmers.

Nutritional Status and extent of malnutrition among the farming community

According to Pacey and Payne (1985) nutritional status is the out come of the process of acquiring consuming and utilising food. Jelliffee (1979) and Simopoulos (1982) expressed nutritional status is the State of nutriture of an individual or a specific group. Suitar and Hunder (1980) stated that the nutritional status of an individual is influenced by factors such as psychological, socio cultural and physiological influences and also by thoughts beliefs and emotions.

Banik (1977) was of the opinion that nutritional status depends largely on the feeding practices, which in turn are influenced by social customs, beliefs, superstitions, religion, cultural values and socio economic status. Melville (1988) indicated that the nutritional status appears to be positively related to ownership of land among the farming population.

Mohanram and Ramadas moorthy (1978) had opined that it is difficult to generalise the health and nutritional status of all population of country like India, which has diverse agroclimatic social cultural and dietary pattern. Pacey and Payne (1985) had opined that information dealing with households belonging to different categories of population and their nutritional welfare is of vital importance in National Agricultural Planning. Mukaram (1978) reported that increased food production is necessary to improve the nutritional status of farmers.

Sukhathme (1979) stated that the studies relating to nutritional status of the members of the farm families of Kerala in relation to their land holdings are scarce.

Leowenson (1986) compared the health status of children belonging to the different occupational groups including farm labourers, mine workers and peri-urban workers in Mashno land and Zimbabew and found that the health status of children of the farm labourers was the poorest.

According to Thimmayamma (1983) large family size result in improper food distribution among family members of agricultural labourers mainly due to low purchasing power and faulty food habits. Kumar et al (1976) Sreenath et al (1978) Aujla et al (1983) and Comideyi (1988) also supported the same view.

Rohmat and Qureshi (1982) was of the opinion that the incidence of malnutrition exist when the food supply falls shorter of the demand. Gosh (1977) had pointed out that, the main factors responsible for malnutrition, are poor socio economic conditions, large families, ignorance of parents about the nutritional requirement of children and prejudices against certain foods. Edgar Mohs (1976) believed that the lack of food was a major cause of illness and malnutrition. Economic political and social factors

contribute to malnutrition (Bernardo et al 1989). Mary Alice (1986) found that highest incidence of malnutrition was usually found among the household with lowest purchasing power.

Butt et al (1987) indicated that the severe limitation on the purchasing power of the poor is the main cause of malnutrition. One of the important causes of malnutrition among agricultural workers was low purchasing power (Swaminathan, 1986).

Swaminathan (1979) stated that majority of population suffering from the ill effects of under nutrition belong to landless labour households. Levinson and Monada (1974) found that morbidity was considerably higher among landless labourers group. Tanner (1987) stated that ~~the~~ relationship exist between land holdings and prevalence of malnutrition. Pacey and payne (1985) suggested that, to avoid malnutrition, members of a farming family must be able to do physical work on their land and crop.

MATERIALS AND METHODS

MATERIALS AND METHODS

A study was undertaken to assess the food habits and consumption pattern of the selected farm families in Thiruvananthapuram District. The study also ascertained the nutritional status of these families.

I. Area of Study: Venganoor Panchayath in Athiyanoor Block was purposively selected for the study.

II. Selection of Samples

A total number of 100 families were selected at random for the present study. These families were divided into 4 different groups viz., upto 25 cents (Group I), 26-50 cents (Group II) 51 to 100 cents (Group III) and more than 100 cents (Group IV). A sub sample of ten families each, from different land holdings were selected for detailed study.

III. Plan of action

The study envisaged the following plan of action.

1. Selection of families having four different size of land holdings ranging from one cent to more than two

acres of land. A subsample of 40 families were also selected on the basis of multistage random sampling for detailed study.

2. Collection of data pertaining to socio-economic background and agricultural practices of families, using suitably structured and pretested questionnaires.
3. Collection of details pertaining, to food consumption pattern of families through a food consumption survey.
4. Ascertaining the nutritional status of the families through anthropometric, actual food intake, clinical and biochemical investigation.
5. Correlating the nutritional status of selected families with land holding, food habits and socio-economic background.

IV. Method Selected for Study

Data was collected by interview method by house to house visits. It was adopted because this method consists of face to face verbal inter-change in which the interviewer attempts to elicit information or expression of opinion or belief from another person

(Lindzey 1954). Devadas and Kulandaivel (1975) pointed out that interview method is a systematic approach by which a person enters more or less imaginatively into an inner life of comparative ranges. Bingham and Moore (1924) stated that during the interview, the investigator presented each topic by means of specific questions and care was taken to continue the dialogue until information had satisfied the research objectives.

Data pertaining to socio-economic background, agricultural practices and food consumption pattern of the selected families were collected through interview method.

Nutritional Status of the families were assessed through (i) anthropometric (ii) actual food intake (iii) Clinical and (iv) bio-chemical methods.

Anthropometry has been accepted as an important tool for assessment of nutritional status (Vijayaraghavan 1987). Tanner (1976) and Frisancho (1974) pointed out that the body measurements taken are used to assess either physical growth or body composition. Vandnasen et al (1980) pointed out that weight/Height^2 gives a

fair estimate of the magnitude of the protein calorie malnutrition. Weighing is considered as the key to anthropometric measurements (Jelliff 1966).

Food weighing method was used to assess the actual food intake of the family members. Marr (1971) opined that the actual food intake of the individual can be estimated by household consumption surveys. According to Visweswara Rao (1975) any single day or two day weighing methods would be as efficient a tool as that of 7 days. Gore et al (1977) had suggested that weighing method can give accurate values of dietary intakes than recall method.

According to Swaminathan (1986) Clinical examination is the most important part of nutritional assessment as we get direct information of signs and symptoms of dietary deficiencies prevalent among people. Most signs of malnutrition are not specific due to lack of one nutrient and can often be produced by various non-nutritional factors, since they have complex aetiology, with the nature of some of the underlying factors and interrelationship still unknown (Beaton 1969).

Daphne (1979) pointed out that, bio-chemical tests are of utmost importance in the assessment of vitamin nutriture.

V. Conduct of the Study

i) Assessing the socio economic status of farm families

In the present study, the socio-economic characters of the farm families were collected using a suitably developed pretested questionnaire. The questionnaire is presented in Appendix I. Socio economic characters such as religion, caste, type of the family, family size, number of adults and children, educational and employment status of male and female members of the family, economic status of the family including total monthly income, number of earning members, sources of income, monthly expenditure pattern and exposure to mass media were collected. According to Sirshi (1985), to ascertain the socio economic status, type of family, family size, monthly income and caste are to be assessed.

ii) Assessing the agricultural practices of the farm families

Agricultural practices of the farm families were collected through a suitably prepared and pretested

questionnaire. Questionnaire is presented in Appendix II. Data pertaining to cultivation practice of crops viz paddy, coconut, arecanut, vegetables, roots & tubers and fruits as well as their utilization pattern was assessed.

iii) Assessing the food consumption pattern of the farm families

Under the food consumption survey, details regarding purchasing habits, frequency of consumption of various food items, cooking methods commonly followed, the preservation practices, meal frequency, daily meal pattern and special foods prepared and served during different stages of life cycle were collected. Schedule used for the survey is presented in Appendix III.

iv) Assessing the nutritional status of the farm families.

a. Anthropometric measurements

In the present study anthropometric measurements viz weight and height of all the members of the 40 selected families were recorded.

The family members were weighed wearing very light clothing. The weight was measured using a beam

balance. Beam balance scales were used for measuring weight as they are less likely to be inaccurate if carefully looked after. This was checked frequently at least twice daily during the conduct of the survey. The person was made to stand on the centre of the platform without touching where else. Care was taken to use the balance on a flat surface and it was checked before use. The measurements were done made to an accuracy of upto 0.1 kg.

The height of the family members were measured using a stadiometer. The children were made to stand on a flat floor by the scale with feet parallel and with heels, buttocks, shoulders and back of the head touching the upright. The head was held comfortably erect with the lower border of the orbit in the same horizontal plane as the external auditory meatus. The arms were hanging at the sides in a natural manner. A wooden block was used as head piece which was gently lowered crushing the hair and making contact with the top of the head. The measurements were done to 0.5cm accuracy.

b. Actual food intake

In the present study a three day food weighment was conducted in 40 families (drawing 10 families in each group). The investigator weighed all the raw foods included for the meals in each day. Cooked weight of each preparation was also recorded. The amount of food consumed, by each family member~~s~~ for each meal was also weighed. From the above, raw equivalent of the foods consumed were computed. From the *raw* equivalent quantities of foods consumed by an individual from each food group was computed. Using food composition table (ICMR - 1987), the nutrients available from the food intake was computed. Schedule used is presented in ~~table~~ Appendix. IV.

c. Clinical examination

The presence or absence of clinical deficiency symptoms attributable to malnutrition was assessed by a qualified physician. Clinical symptoms of malnutrition was looked in each family member of the selected 40 families. The clinical form is presented in Appendix. V.

d. Bio Chemical Investigation

Haemoglobin estimation was conducted among all the members of 40 families. Cyanmethmoglobin method was used in the present study. Procedure is given in Appendix. VI.

RESULTS

RESULTS

A study to assess the "Food consumption pattern of selected farm families in Thiruvananthapuram District" was conducted. The data collected were analysed and the results^{are} presented under the following heads.

1. Socio economic status of the families
2. Agricultural practices of the families
3. Food habits and dietary pattern of the families.
4. Nutritional status of the families.

I. Socio economic status of the families

Informations collected pertaining to the socio economic background of the families include features such as religion, caste, type of family, size of the family, number of adults and children in the family, educational and economic status, sources of income, monthly expenditure pattern and their exposure to different mass media.

Table 1 Distribution of the farm families by religion
(in percentage)

Religion	Group I	Group II	Group III	Group IV	Total
Hindu	76(19)	84(21)	92(23)	88(22)	85
Christian	24 (6)	16 (4)	8 (2)	12 (3)	15
Total	100(25)	100(25)	100(25)	100(25)	100(25)

Figures in parenthesis denote\$ number

- Group I - Land holding size upto 25 cents
 Group II - Land holding size (26-50 cents)
 Group III - Land holding size (51-100 cents)
 Group IV - Land holding size more than 100 cents

Religion of the farm families surveyed are presented in Table 1 . Among the 100 families surveyed, 76, 84, 92, 88 percent respectively in Group I, Group II, Group III and Group IV were Hindus. While 24, 16, 8 and 12 percent respectively in Group I, Group II, Group III and Group IV were Christians. None of the families belonged to Muslim community.

Table 2 Distribution of the farm families by caste
(in percentage)

Caste	Group I	Group II	Group III	Group IV	Total
Forward	20 (5)	64 (16)	48 (12)	84 (21)	54
Backward	36 (9)	28 (7)	40 (10)	16 (4)	30
SC and ST	44 (11)	8 (2)	12 (3)	-	16
Total	100 (15)	100 (25)	100 (25)	100 (25)	100

Figures in parenthesis denote number

Caste of the families surveyed indicated that, 84 percent of the families in Group IV, 64 percent in Group II and 48 and 20 percent respectively in Group III and Group I belonged to forward community. While 80, 36, 52 and 16 percent respectively in Group I to Group IV belonged to under privileged sections of the community.

Table 4 Distribution of farm families according
to the family size (in percentage)

Family size	Group I	Group II	Group III	Group IV	Total
Small sized (having members upto 4)	76(19)	60(15)	44(11)	52(13)	58
Medium sized (5-7 members)	24 (6)	36 (9)	56(14)	44(11)	40
Large sized (>7 members)	-	4 (1)	-	4 (1)	2
Total	100(25)	100(25)	100(25)	100(25)	100

Figures in parenthesis denote number

Size of the farm families surveyed are presented in Table 4. Majority of the families in Group I and Group II (76 percent and 60 percent respectively) were small sized with members upto 4. While 44 percent families in Group III and 52 percent families in Group IV were also found to be small in structure. Medium sized families having 5 to 7 members were located in 24, 36, 56 and 44 percentages respectively in Groups I, II, III and IV. Large sized families were observed only in negligible number in Groups II and IV and none in Groups I and III.

Table 5 Distribution of farm families according to
the number of adults in the families
(in percentage)

Number of adults	Group I	Group II	Group III	Group IV	Total
1-2	56 (14)	28 (7)	24 (6)	36 (9)	36
3-4	28 (7)	40 (10)	40 (10)	36 (9)	36
>4	16 (4)	32 (8)	36 (9)	28 (7)	28
Total	100 (25)	100 (25)	100 (25)	100 (25)	100

Figures in parenthesis denote number

As shown in Table 5, 56, 28, 24 and 36 percent families of Group I to Group IV were found to have 1-2 adult members. While 3-6 adult members were observed in 28 percent families in Group I, 40 percent each in Group II and Group III and 36 percent in Group IV. Above 4 adult members were seen only in 16, 32, 36 and 28 percent respectively of Group I to Group IV.

Table 6 Number of Children in the farm families
(in percentage)

Number of children	Group I	Group II	Group III	Group IV	Total
Dependent children (0-14)					
1-2	28 (7)	20 (5)	12 (3)	20 (5)	20
Adolescent children (15-18 years)					
1-2	40 (10)	28 (7)	32 (8)	36 (9)	34
Nil	32 (8)	52 (13)	56 (14)	44 (11)	46
Total	100 (25)	100 (25)	100 (25)	100 (25)	100

Figures in parenthesis denote number

Table 6 reveals the number of children in the farm families surveyed. 28,20,12 and 20 percent of the families in Groups I,II,III and IV respectively were found to have dependent children (below 14 years of age) upto 2 numbers.

Adolescents and preadolescents upto 2 numbers were located in 40,28,32 and 36 percent families respectively in Groups I,II,III and IV. While 32,52 and 56 and 44 percent of the families in Groups I,II,III and IV respectively were found have only adult members.

Table 7 Educational status attained by the male and female members in the farm families
(in percent)

Educa- tional status of male member	Pri- mary	Upper pri- mary	High Sch- ool	Coll- ege	Educa- tional status of fe- male member	Pri- mary	Upper Pri- mary	High Sch- ool	Coll- eges
Group I	60 (15)	16 (4)	24 (6)	-	Group I	56 (14)	16 (4)	24 (6)	4 (1)
Group II	8 (2)	24 (6)	40 (10)	28 (7)	Group II	28 (7)	12 (3)	44 (11)	16 (4)
Group III	-	4 (1)	32 (8)	64 (16)	Group III	-	8 (2)	48 (12)	44 (11)
Group IV	-	12 (3)	28 (7)	60 (15)	Group IV	-	16 (4)	40 (10)	44 (11)
Total	17	14	31	38	Total	21	13	39	27

Figures in parenthesis denote number

Educational status attained by the families are presented in Table 7. 64 percent male members in Group III and 60 percent in Group IV, were found to have education upto College level. While 28 percent in Group II and none in Group I had education upto College level.

Upper primary to High School level education was found to be attained by 40 percent male members each in Groups I and IV and 36 percent in Group III and 64 percent in Group II. Majority of the male members in Group I (60 percent) and 8 percent in Group II had education only upto primary school level.

Educational status attained by the female members in the farm families indicated that education upto College level was attained by 44 percent female members each in Groups III and IV, 4 and 16 percent respectively in Groups I and II. Upper primary to High School level education was attained by 56 percent female members each, in Groups II, III and IV and 40 percent in Group I. Many of the female members in Groups I (56 percent) and 28 percent in Group II were found to obtain education only upto primary School level.

Table 8 Employment status of the male and female members in the farm families (in percentage)

Employment status of male members	Un-emplo- yed	Casual labou- rer	Govt job	Pri- vate job	Employment status of fe- male members	Un- emplo- yed	Cas- ual labo- urer	Govt job	Pri- vate job
Group I	12 (3)	80 (20)	4 (1)	4 (1)	Group I	88 (22)	12 (3)	-	-
Group II	28 (7)	24 (6)	28 (7)	20 (5)	Group II	76 (19)	8 (2)	12 (3)	4 (1)
Group III	12 (3)	-	52 (13)	36 (9)	Group III	80 (20)	-	12 (3)	8 (2)
Group IV	32 (8)	-	56 (14)	12 (3)	Group IV	84 (21)	-	12 (3)	4 (1)
Total	21	26	35	18	Total	82	5	9	4

Figures in parenthesis denote number

Employment status of the male and female members in the farm families are presented in Table 8. Eighty percent male members belonging to Group I were casual labourers, while none of the male members in Group III and Group IV were found to be casual labourers. Male members engaged in Government jobs were found to be in 4, 28, 52 and 56 percent respectively in Groups I, II, III and IV. While members of 4, 20, 36 and 12 percent families in Groups I, II, III and IV were found to be engaged in

private job respectively. Unemployed male members observed were 12 percent each in Group I and Group III, 28 percent and 32 percent respectively in Group II and Group IV.

Employment status of the female members in the farm families indicated that in all the 4 categories, majority of the members were unemployed (88, 76, 80 and 84 respectively in Groups I, II, III and IV). In 12 and 8 percent families in Group I and Group II, the female members were found to be casual labourers. While none of them in Groups III and IV were casual labourers. 12 percent each in Groups II, III and IV, the female members were found to be engaged in government job. Only negligible number of female members in the surveyed families were found to be engaged in private jobs. (4 percent each in Group I and III and 8 percent in Group II)

Table 9 Distribution of the farm families according to the monthly income. (in percentage)

Monthly income in rupees	Group I	Group II	Group III	Group IV	Total
500-1000	52 (13)	8 (2)	-	-	15
1001-2000	48 (12)	56 (14)	24 (6)	12 (3)	35
Above 2000	-	36 (9)	76 (19)	88 (22)	50
Total	100 (25)	100 (25)	100 (25)	100 (25)	100

Figures in parenthesis denote number

As indicated in Table 9, 52 percent families in Group I and 8 percent families in Group II were in the monthly income range of Rs.500/- to Rs.1000/-. 48, 56, 24 and 12 percent families respectively in Groups I,II,III and IV were found to have a monthly income ranging from Rs.1001/- to Rs.2000/-. In Group I category, none of the families had monthly income above Rs.2000/- while 36, 76 and 88 percent families respectively in Groups II, III and IV had monthly income above Rs.2000/-.

Table 10 Distribution of farm families according to the number of earning members in the families (in percentage)

Earning members	Group I	Group II	Group III	Group IV	Total
1 Number	68 (17)	60 (15)	60 (15)	72 (18)	65
2 Numbers	24 (6)	20 (5)	36 (9)	20 (5)	25
Above 2	8 (2)	20 (5)	4 (1)	8 (2)	10
Total	100 (25)	100 (25)	100 (25)	100 (25)	100

Figures in parenthesis denote number

Table 10 reveals that, majority of the families (68,60,60 and 72 percent respectively in Groups I,II, III and IV) were found to have only one earning member. While 20 percent each, in Groups II and IV and 24 percent and 36 percent respectively in Groups I and III, were found to have two earning members. More than two earning members were found in 8 percent families each, in Groups I and IV and 20 percent and 4 percent respectively in Groups II and III.

Percentage of income contributed from agriculture, is depicted in Table 11.

Table 11 Percentage of income contributed from agriculture in the families surveyed.
(in percentage)

Contribution from agriculture	Group I	Group II	Group III	Group IV	Total
1 - 25%	24 (6)	52 (13)	64 (16)	44 (11)	46
26 - 50%	-	12 (3)	12 (3)	36 (9)	15
51 - 75%	-	4 (1)	4 (1)	4 (1)	3
76 -100%	-	-	-	16 (4)	4
Nil	76 (19)	32 (8)	20 (5)	-	32
Total	100 (25)	100 (25)	100 (15)	100 (25)	100

Figures in parenthesis denote number

The percentage of income contributed from agriculture was found to be 1-25 percent in 24,52,64 and 44 percent families respectively in Groups I,II,III and IV. While 26 to 50 percent income was obtained from agriculture in 12 percent families each in Group II and Group III and 36 percent in Group IV. Above 50 percent income was obtained from agriculture in 20 percent families in Group IV and 4 percent families each in Groups II & III.

Table: 12 Monthly expenditure pattern of the families (in percentage)

Items	Group I							Group II						Group III						Group IV											
	Nil	1	1-10	11-25	26-50	51-75	76-100	Nil	1	1-10	11-25	26-50	51-75	76-100	Nil	1	1-10	11-25	26-50	51-75	76-100	Nil	1	1-10	11-25	26-50	51-75	76-100			
Food	-	-	-	-	20 (5)	80 (20)	-	-	-	-	-	56 (14)	44 (11)	-	-	-	-	12 (3)	64 (16)	24 (6)	-	-	-	-	-	16 (4)	84 (21)	-	-		
Clothing	-	-	100 (25)	-	-	-	-	-	-	100 (25)	-	-	-	-	-	-	100 (25)	-	-	-	-	-	-	-	100 (25)	-	-	-	-	-	
Shelter	-	-	100 (25)	-	-	-	-	-	12 (3)	88 (22)	-	-	-	-	-	16 (4)	84 (21)	-	-	-	-	-	-	8 (2)	92 (23)	-	-	-	-	-	
Transportation	-	8 (2)	92 (23)	-	-	-	-	-	32 (8)	68 (17)	-	-	-	-	-	8 (2)	92 (23)	-	-	-	-	-	-	12 (3)	88 (22)	-	-	-	-	-	
Education	24 (6)	-	76 (19)	-	-	-	-	36 (9)	-	64 (16)	-	-	-	-	20 (5)	-	80 (20)	-	-	-	-	-	36 (9)	-	64 (16)	-	-	-	-	-	
Recreation	-	28 (7)	72 (18)	-	-	-	-	-	80 (20)	20 (5)	-	-	-	-	-	88 (22)	12 (3)	-	-	-	-	-	-	88 (22)	12 (3)	-	-	-	-	-	
Health	-	-	100 (25)	-	-	-	-	-	68 (17)	32 (8)	-	-	-	-	-	76 (19)	24 (6)	-	-	-	-	-	-	80 (20)	20 (5)	-	-	-	-	-	
Fuel	-	-	100 (25)	-	-	-	-	-	36 (9)	64 (16)	-	-	-	-	-	28 (7)	72 (18)	-	-	-	-	-	-	40 (10)	60 (15)	-	-	-	-	-	
Luxury item	88 (22)	4 (1)	8 (2)	-	-	-	-	52 (13)	32 (8)	16 (4)	-	-	-	-	16 (4)	76 (19)	8 (2)	-	-	-	-	-	-	56 (14)	44 (11)	-	-	-	-	-	
Savings	-	-	32 (8)	44 (11)	20 (5)	4 (1)	-	-	-	16 (4)	8 (2)	64 (16)	12 (3)	-	-	-	4 (1)	12 (3)	72 (18)	12 (3)	-	-	-	-	-	-	40 (10)	60 (15)	-	-	
Debt	92 (23)	-	-	-	-	-	8 (2)	72 (18)	-	-	8 (2)	4 (1)	-	16 (4)	88 (22)	-	-	8 (2)	4 (1)	-	-	-	100 (25)	-	-	-	-	-	-	-	-

Figures in parenthesis denote number.

Monthly expenditure pattern of the families surveyed is given in Table 12. In Group I, 80 percent families were found to spend 51 to 75 percent of their income for food, where as in Group II and III, the percentage of the families spending 51 to 75 percent of income for food was 44 percent and 24 percent respectively. In Group IV none of the families were found to spent 51 to 75 percent of their income for food items. The families spending 26 to 50 percent of the income for food items was found to be 20,56,64 and 84 percent respectively in Groups I,II,III and IV. All the families irrespective of their land holdings were found to spent 1 to 10 percent of their income for clothing. Similarly all the families in Group I and majority in Groups II,III and IV (88,84 and 92 percent respectively) were found to spend 1 to 10 percent of their income for shelter. 1 to 10 percent of the income was found to be incurred on transportation by 92,68,92 and 88 percent respectively in Groups I,II,III and IV, for education 76,64,80 and 64 percent respectively in Group I to Group IV and for fuel 100,64,72 and 60 percent respectively in Groups I,II,III and IV. For health purpose, all the families were found to spend 1 to 10 percent of their income in Group I, where as in Group II to Group IV majority of the families (68,76,80 percent respectively), spent less than 1 percent of their monthly income for health.

Expenditure on luxury items revealed that majority of the families in Groups I and II were not found to incur any expenses on this. While majority of the families in other groups viz Group III and Group IV spent less than one percent for luxury items. All the families were found to have savings according to their economic condition. In Group I, 32 percent families saved 1 to 10 percent of their monthly income. While 64 percent families in Group II and 72 percent families in Group III saved 26 to 50 percent of their income. In Group IV, 51 to 75 percent of their income was found to be saved by 60 percent families. All the families in Group IV and majority of the families in Groups I, II and III (92, 72 and 88 percent respectively) were not found to have any debts.

Exposure to different sources of media by the farm families were assessed by assigning scores ranging from 1 to 3 depending on their regularity in availing four different sources of communications viz newspaper, magazine, radio and television.

Table 13 Frequency distribution of families
according to exposure to mass media.

Exposure to mass media	Group I	Group II	Group III	Group IV	Total
Highly exposed group (Scores 9-12)	20(5)	20(5)	60(15)	64(16)	41
Medium exposed group (Scores 6-8)	64(16)	72(18)	40(10)	36(9)	53
Less exposed group (Score below 6)	16(4)	8(2)	-	-	6
Total	100(25)	100(25)	100(25)	100(25)	100

Figures in parenthesis denote number

(Based on the score obtained, the families were classified into Highly exposed group (score between 9-12), medium exposed group (score between 6-8) and less exposed group (score below 6)).

As shown in Table 13, families highly exposed to mass communication media were 20 percent in Group I and Group II and 60 and 64 percent respectively in Group III and Group IV. Medium exposed families were located as 64 percent and 72 percent respectively in Groups I and II

and 40 and 36 percent respectively in Groups III and IV. None of the families in Groups III and IV belonged to low exposure groups. However 16 and 8 percent families in Groups I and II respectively were in the low exposure group.

2. Agricultural practices of the families

Cultivation practices among the farm families

Table 14 Cultivation of paddy, coconut and arecanut among the farm families (in percentage)

Cultivated crops	Group I		Group II		Group III		Group IV		Total	
	cultivated	not cultivated	cultivated	not cultivated	cultivated	not cultivated	cultivated	not cultivated	cultivated	not cultivated
Paddy	-	100 (25)	-	100 (25)	8 (2)	92 (23)	56 (14)	44 (11)	16	84
Coconut	100 (25)	-	100 (25)	-	100 (25)	-	100 (25)	-	100	-
Arecanut	-	100 (25)	4 (1)	96 (24)	12 (3)	88 (22)	8 (2)	92 (23)	6	94

Figures in parenthesis denote number

Cultivation practices with regard to paddy, coconut and arecanut among the four groups of the farm families are presented in Table 14. None of the families in Groups I and II were found to cultivate paddy. 56 percent families in Group IV and a negligible percent of families in Group III were in the habit of cultivating paddy. All the families irrespective of their land holdings were found to cultivate coconut. Cultivation practices of arecanut indicated that only negligible percent families in Groups II, III and IV (4,12 and 8 percent respectively) cultivated arecanut, while none of the families in Group I cultivated the same.

Utilization of the above crops for meeting their food needs indicated that, among those who cultivated paddy, majority were found to utilize the produce fully at home. While 21 percent in Group IV consumed only partially at home. 64 percent families each in Groups II and III and all the families in Group IV were found to utilize coconut produced partially at home. Whereas in Group I, 96 percent families utilized the produce fully at home.

Table 15 Cultivation practices of vegetables, roots and tubers and fruits among the families (in percentage)

Cultivation of crops	Group I		Group II		Group III		Group IV		Total	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Vegetables	12 (3)	88 (22)	36 (9)	64 (16)	32 (8)	68 (17)	24 (6)	76 (19)	26	74
Roots and tubers	16 (4)	84 (21)	72 (18)	28 (7)	92 (23)	8 (2)	76 (19)	24 (6)	64	36
Green leafy vegetables	40 (10)	60 (15)	56 (14)	44 (11)	44 (11)	56 (14)	52 (13)	48 (12)	48	52
Fruits other than plantain	24 (6)	76 (19)	64 (16)	36 (9)	72 (18)	28 (7)	80 (20)	20 (5)	60	40
Plantain	52 (13)	48 (12)	68 (17)	32 (8)	80 (20)	20 (5)	92 (23)	8 (2)	73	27

Figures in parenthesis denote number

Cultivation practices of the farm families with regard to vegetables, roots and tubers, green leafy vegetables and fruits are presented in Table 15. Vegetable cultivation was observed in 12 percent families in Group I, 36 percent in Group II, 32 percent in Group III and 24 percent in Group IV. The major vegetables culti-

vated by these farm families were found to be bitter-gourd, ladies finger, peas, snake gourd, brinjal and cucumbers.

Roots and tubers were found to be cultivated by 72, 92 and 76 percent families respectively in Groups II, III and IV. Whereas only 16 percent of the families in Group I cultivated roots and tubers. The major roots and tubers cultivated by these families were found to be tapioca, sweet potato, elephant foot yam and colocasia.

Green leafy vegetables mainly Amaranth^{US} was found to be cultivated by 40,56,44 and 52 percent families respectively in Group I to Group IV.

Fruits were found to be cultivated by majority of the families except in Group I. (24,64,72,80 percent respectively in Groups I,II,III and IV). Plantain was the major crop cultivated by them. (52,68,80,92 percent respectively) Apart from plantain, jack fruit, mango, pineapple were also found to be grown by these families.

Utilization of vegetable crops and fruits among the families revealed that vegetables and green leafy

vegetables were utilized fully at home by the families in Groups II, III and IV. In Group I only 33 percent families were found to utilize vegetables cultivated at home. The utilization of green leafy vegetables by the families of Group I was 90 percent. With regard to roots and tubers 25 percent of the families in Group I, 56 percent in Group II, 52 percent in Group III and 16 percent in Group IV were found to utilize roots and tubers fully at home. While 52 percent in Group I, 22 percent in Group II, 30 percent in Group III and 42 percent in Group IV were not found to fully utilize roots and tubers at home.

Majority of the families in all the 4 groups (76 percent each in Groups I and II, 90 percent in Group III and 82 percent Group IV) were in the habit of utilizing plantain grown at the homestead. Similarly other fruits such as jack fruit, mango and pineapple produced at home were found to be fully utilized by majority of the families in all of the four groups.

3. Food habits and dietary pattern of the families

Food habits of the families were assessed with regard to the expenditure pattern of the families, frequency of use of foods, meal frequency, daily meal pattern, cooking methods followed, preservation practices, ^{and} practice of providing special food at different stages of life cycle etc.

Non vegetarian diet was habituated by all the families surveyed.

Details of expenditure pattern of the families on different food items are presented in Table 16.

11 to 25 percent of income was found to be spent for the purchase of cereals by 56,76,88 and 72 percent respectively by Groups I,II,III and IV. However, 26 to 50 percent of the income was spent for cereals by 14 percent families in Group I, 12 percent each, in groups II and III and none in Group IV.

Only 1 to 5 percent of the income was found to be spent for pulses and fats and oil by all the families irrespective of their land holding.

Table: 16 Food expenditure pattern of the families (in percentage)

Item	Group I					Group II					Group III					Group IV				
	1	1-5	6-10	11-25	26-50	1	1-5	6-10	11-25	26-50	1	1-5	6-10	11-25	26-50	1	1-5	6-10	11-25	26-50
Cereals	-	-	-	56 (14)	44 (11)	-	-	12 (3)	76 (19)	12 (3)	-	-	-	88 (22)	12 (3)	-	8 (2)	20 (5)	72 (18)	-
Pulses	-	100 (25)	-	-	-	-	100 (25)	-	-	-	-	100 (25)	-	-	-	-	100 (25)	-	-	-
Vegetables	-	100 (25)	-	-	-	12 (3)	88 (22)	-	-	-	8 (2)	92 (23)	-	-	-	-	24 (6)	76 (19)	-	-
Green leafy vegetables	48 (12)	52 (3)	-	-	-	80 (20)	20 (5)	-	-	-	100 (25)	-	-	-	-	100 (25)	-	-	-	-
Roots and tubers	-	80 (20)	20 (5)	-	-	12 (3)	88 (22)	-	-	-	24 (6)	86 (19)	-	-	-	-	68 (17)	32 (8)	-	-
Fruits	68 (17)	32 (8)	-	-	-	56 (14)	44 (11)	-	-	-	80 (20)	20 (5)	-	-	-	56 (14)	44 (11)	-	-	-
Egg	58 (11)	42 (8)	-	-	-	85 (17)	15 (3)	-	-	-	100 (23)	-	-	-	-	100 (21)	-	-	-	-
Meat	60 (15)	40 (10)	-	-	-	64 (10)	36 (9)	-	-	-	52 (13)	48 (12)	-	-	-	72 (18)	28 (7)	-	-	-
Fish	-	20 (5)	48 (12)	32 (8)	-	-	36 (9)	64 (16)	-	-	-	36 (9)	64 (16)	-	-	-	68 (17)	32 (8)	-	-
Fats & oil	-	100 (25)	-	-	-	-	100 (25)	-	-	-	-	100 (25)	-	-	-	-	100 (25)	-	-	-
Nuts & oil seed	-	66 (14)	44 (11)	-	-	20 (5)	80 (20)	-	-	-	20 (5)	80 (20)	-	-	-	48 (12)	52 (13)	-	-	-
Species	-	100 (25)	-	-	-	8 (2)	92 (23)	-	-	-	8 (2)	92 (23)	-	-	-	32 (8)	68 (17)	-	-	-
Sugar & jaggery	-	100 (25)	-	-	-	12 (3)	88 (22)	-	-	-	16 (4)	84 (21)	-	-	-	28 (7)	72 (18)	-	-	-
Beverages	8 (2)	92 (23)	-	-	-	28 (7)	72 (18)	-	-	-	12 (3)	88 (22)	-	-	-	36 (9)	64 (16)	-	-	-

All the families in Group I and majority of the families in Groups II and III (88 and 92 percent respectively) spent 1 to 5 percent of their monthly income for vegetables. While 76 percent in Group IV spent 6 to 10 percent of their income for vegetables.

All the families in Groups III and IV and majority of the families (80 percent) in Group II spent less than one percent of their income for green leafy vegetables.

Similarly in all the four groups, majority of the families (80,88,86 and 68 percent respectively) were found to spend 1 to 5 percent of their monthly income for roots and tubers. Sixty eight percent in Group I, 56 percent each in Groups II and IV and 80 percent in Group III were found to spend less than one percent of their income for fruits. The income spent for the purchase of egg and meat was found to be less than 1 percent in majority of the families of all the groups.

With regard to the expenditure on fish it was found that 48 percent in Group I, 64 percent families each in Groups II and III were found to spend 6 to 10 percent of their income for buying fish. Whereas in Group IV majority of the families (68 percent) incur 1 to 5 percent of the income for the purchase of fish.

In all the 4 categories of families, majority of them spent 1 to 5 percent of their monthly income for nuts and oil seeds (66,80,80 and 52 percent respectively in Groups I, II, III and IV), spices, (100, 92, 92 and 68 percent respectively in Groups I,II,III and IV), sugar and jaggery (100, 88, 84 and 72 percent respectively in Groups I,II,III and IV) and for beverages (92, 72, 88 and 64 percent respectively in Groups I,II,III and IV).

Frequency of use of various food items among the farm families were assessed by assigning scores ranging from 1 to 8 depending upon frequency of use viz (daily, once in a week, twice in a week, thrice in a week, now and then and never). Based on these scores, frequency score of each food group was determined by the formula suggested by Reaburn et al (1979) appended Appendix (VIII).

Table 17 Frequency score obtained by the families for different food groups. (According to the score level)

Food items	Group I	Group II	Group III	Group IV
Cereals	100	100	100	100
Pulses	28	43	46	50
Roots and tubers	52	51	46	40
Vegetables	100	100	100	100
Green leafy vegetables	38	35	37	38
Fruits	40	50	60	57
Milk	100	100	100	100
Egg	38	41	46	55
Fish	96	99	91	95
Meat	16	15	17	19
Sugar	100	100	100	100
Bakery items	6	5	12	10

$$\text{Score} = \frac{R_1 S_1 + R_2 S_2 + R_3 S_3 + \dots + R_n S_n}{n}$$

n

Frequency score obtained by each food groups is presented in Table 17. From this table it is clear that the maximum score of 100 was obtained for the food groups viz cereals, vegetables, milk, fish and sugar by all the 4 groups. The score obtained for roots and tubers was 52 and 51 for Group I and Group II and 46 and 40 respectively for Groups III and IV. The score obtained for green leafy vegetables by the Groups I, II, III and IV were 38, 35, 37, 38 respectively. Group I secured a score of 28 for pulses while Group II, Group III and Group IV secured a scores ^{ranging from} ~~24~~ 43 to 50. Lowest score was obtained for meat for all the 4 groups of families.

Table 18 Food use frequency score obtained by the families.

Frequency	Group I	Group II	Group III	Group IV
Most frequently used foods (score 90-100)	cereals vegetables fish milk sugar	cereals vegetables fish milk sugar	cereals vegetables fish milk sugar	cereals vegetables fish milk sugar
Medium frequently used foods (score 50-75)	roots & tubers	roots & tubers fruits	fruits	fruits pulses egg
Less frequently used foods (below 50)	pulses green leafy vegetables fruits egg meat bakery items	pulses green leafy vegetables egg meat bakery items	pulses roots & tubers green leafy vegetables meat egg meat bakery items	roots & tubers green leafy vegetables meat bakery items

Based on the scores obtained by the families for different food groups, the foods were classified in to three groups viz most frequently used food, medium frequently used food and less frequently used food.

items were cereals, vegetables, fish, milk, sugar. Medium frequently used food items were roots and tubers in Group I, roots and tubers and fruits in Group II, fruits in Group III and pulses, fruits and egg in Group IV. Less frequently used food items were pulses, green leafy vegetables, fruits, egg, meat and bakery items in Group I. In Group II and Group III, the less frequently used foods were pulses green leafy vegetables, egg, meat and bakery items, in addition of roots and tubers in Group III. In Group IV less frequently used food items were roots and tubers green leafy vegetables, meat and bakery items.

Table 19 Meal frequency among the farm families surveyed (in percentage)

Frequency	Group I	Group II	Group III	Group IV	Total
4 items	12 (3)	24 (6)	44 (11)	36 (9)	29
3 items	88 (22)	76 (19)	56 (14)	64 (16)	71
Total	100 (25)	100 (25)	100 (25)	100 (25)	100

Figures in parenthesis denote number

Meal frequency among the farm families indicated (Table 19) that, majority of the families belonging to Groups I, II, III and IV (88, 76, 56 and 64 percent respectively) followed 'three meals a day' pattern, while 4 meals a day was followed by 12, 24, 44 and 36 percent families respectively in Groups I, II, III and IV).

Table 20 Food included in the daily meal pattern
(in percentage)

Type of meal	Group I	Group II	Group III	Group IV	Total
Break fast					
cereal + tea/ coffee	64(16)	52(13)	12(3)	36(9)	41
cereal +pulse+ tea/coffee	12(3)	39(9)	48(12)	44(11)	35
cereal+fruits+ tea/coffee	24(6)	12(3)	40(10)	20(8)	24
Lunch					
cereal+vege- tables+fish	32(8)	44(11)	8(2)	16(4)	25
cereal+pulse+ vegetables+ fish	12(3)	20(5)	28(7)	20(5)	20
cereal+vege- tables+meat/ egg	28(7)	36(9)	32(8)	40(10)	34

cereal+green leafy vege- table+fish	-	-	12(3)	16(4)	7
cereal+roots& tubers. +fish+ vegetables	8(2)	-	12(3)	-	5
cereal+fish	20(5)	-	8(2)	8(2)	9
Dinner					
cereal grual	12(3)	24(6)	8(2)	16(4)	15
cereal+fish	40(10)	16(4)	8(2)	-	16
cereal+fish+ vegetables	24(6)	32(8)	48(12)	44(11)	37
cereal+pulse+ vegetables+ fish	24(6)	28(7)	36(9)	40(11)	32

Figures in parenthesis denote number

Table 20 pictures the different foods included in the daily meal pattern of the families. In Group I and Group II majority of the families (64 percent and 52 percent) were in the habit of taking any cereals preparation along with tea or coffee for breakfast. Including cereal pulses combinations along with tea or coffee for breakfast was the practice among 36, 48 and 44 percent families in Groups II, III and IV respectively. Cereal fruit combination along with tea or

coffee was followed by 24,12,40 and 20 percent families respectively in Groups I,II,III and IV. For the main meal of the day, ie, for lunch 32,44,8 and 16 percent families (in Groups I,II,III and IV respectively included cereal,vegetable and fish. Whereas cereal, pulses, vegetables and fish combination was found^{to be} followed by 12,20,28 and 20 percent families respectively in Groups I,II,III and IV. Cereal and vegetables along with meat or egg^{of} was another combination followed by 28,36,32&40 percent families in Group I,II,III and IV. Cereal and fish combination was followed by 20 percent families in Group I.

For dinner 40 percent families in Group I, followed cereal and fish combination. Whereas 32, 48 and 44 percent of the families in Groups II,III and IV were in the habit of taking cereal, fish and vegetables combination for dinner respectively. Only 24 percent families were found to follow^{combination} cereals, fish, vegetables^{combination} in Group I and cereals, pulses, vegetables and fish combination was followed^{followed} by 24,28,36 and 40 percent families in Groups I,II,III and IV.

Table 21 Cooking methods followed for various food items

Methods of cooking	Cereal				Pulses				Roots & tubers				Vegetables			
	Group I	Group II	Group III	Group IV	Group I	Group II	Group III	Group IV	Group I	Group II	Group III	Group IV	Group I	Group II	Group III	Group IV
Boiling	100 (25)	80 (20)	80 (20)	72 (18)	72 (18)	36 (9)	32 (8)	20 (5)	100 (25)	80 (20)	80 (20)	72 (18)	60 (15)	60 (15)	44 (11)	20 (5)
Absorption	-	-	-	-	28 (7)	44 (11)	48 (12)	52 (13)	-	-	-	-	40 (10)	20 (5)	36 (9)	52 (13)
Pressure cooking		20 (5)	20 (5)	28 (7)	-	20 (5)	20 (5)	28 (7)	-	20 (5)	20 (5)	28 (7)	-	20 (5)	20 (5)	28 (7)
Total	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)
Methods of cooking	Green leafy vegetables				Fish				Meat				Egg			
	Group I	Group II	Group III	Group IV	Group I	Group II	Group III	Group IV	Group I	Group II	Group III	Group IV	Group I	Group II	Group III	Group IV
Boiling	40 (10)	36 (9)	28 (7)	20 (5)	72 (18)	60 (15)	44 (11)	24 (6)	100 (25)	56 (14)	36 (9)	20 (5)	72 (18)	60 (15)	32 (8)	24 (6)
Absorption	40 (10)	36 (9)	24 (6)	20 (5)	28 (7)	40 (10)	36 (9)	28 (7)	-	-	-	-	-	-	-	-
Deepfrying	-	-	-	-	-	-	-	20 (5)	-	-	24 (6)	24 (6)	-	-	20 (5)	28 (7)
Shallow frying	20 (5)	28 (7)	48 (12)	60 (15)	-	-	20 (5)	28 (7)	-	24 (6)	20 (5)	28 (7)	28 (7)	40 (10)	48 (12)	48 (12)
Pressure cooking	-	-	-	-	-	-	-	-	-	20 (5)	20 (5)	28 (7)	-	-	-	-
Total	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)	100 (25)

Figures in parenthesis denote number

Cooking methods generally followed in these farm families was ascertained and the details are presented in Table 21.

Boiling was found to be the commonly adopted method of cooking for cereals in Groups I, II, III and IV by 100, 80, 80 and 72 percent ^{families} respectively. Apart from boiling, 20 percent families each in Group II and Group III and 28 percent in Group IV were found to use pressure cooking method for cereals. Majority of the families (72 percent) adopted boiling for cooking pulses while absorption method was practiced by 44, 48, and 52 percent of families in Groups II, III and IV respectively. All the families in Group I and majority in Groups II, III and IV (80, 80 and 72 percent respectively) followed boiling method for cooking roots and tubers. For vegetables, boiling was commonly practiced by 60 percent families each, in Groups I and II and 44 percent families in Group III. Absorption method was followed for vegetables by 52 percent families in Group IV. Boiling and absorption method was followed by 40 and 36 percent families each in Groups I and II and shallow frying was adopted by 48 and 60 percent families respectively in Groups III and IV,

for green leafy vegetables. In the case fish, meat and egg, majority of the families in Group I and II were found to practice boiling method. (72,100 and 72 percent respectively for fish, meat and egg in Group I and 60,56 and 60 percent respectively in Group II). For fish and egg absorption method was adopted by 36 and 28 percent families deep frying method was adopted by 20,48 percent families and shallow frying was adopted by 68 and 76 percent families respectively in Group III and Group IV. For meat, 20 percent each in Groups II and III and 28 percent of the families in Group IV had adopted pressure cooking.

Table 22 Food preservation practices followed in the families surveyed (in percentage)

Preservation method	Group I	Group II	Group III	Group IV	Total
Cereals					
Drying and storing in the tight containers	20(5)	84(21)	88(22)	92(23)	71
Not preserved	80(20)	16(4)	12(3)	8(2)	29
Pulses					
Drying and storing in the tight containers	12(3)	80(20)	84(21)	92(23)	67
Not preserved	88(22)	20(5)	16(4)	8(2)	33
Vegetables					
Refrigeration	-	16(4)	32(8)	44(11)	23
Pickling	8(2)	12(3)	12(3)	20(5)	13
Not preserved	92(23)	72(18)	56(14)	36(9)	64
Fruits					
Refrigeration	-	16(4)	32(8)	44(11)	23
Not preserved	100(25)	84(21)	68(17)	56(14)	77
Meat					
Refrigeration	-	-	-	12(3)	3
Not preserved	100(25)	100(25)	100(25)	88(22)	97
Fish					
Refrigeration	-	-	24(6)	12(3)	9
Not preserved	100(25)	100(25)	76(19)	88(22)	91

Figures in paranthesis denote number

Table 22 pictures the common preservation methods adopted among the families surveyed. It was observed that families belonging to Group I were not in the habit of storing foods such as cereals, pulses, vegetables, fruits, meat and fish.

Cereals and pulses were found to be stored after drying in Group II, (84 and 80 percent) Group III (88 and 84 percent) and Group IV (92 percent each).

The vegetables were preserved in refrigerator by 16,32 and 44 percent families respectively in Groups II, III and IV.

All the families in Group I, ^{and} majority of the families in Groups II, III and IV were not found to preserve fruits. (84,68 and 56 percent respectively). However 16,32 and 44 percent respectively in Groups II, III and IV were found to preserve fruits in refrigerator. Meat and fish were not found to be preserved by majority of the families surveyed. However a negligible percent families in Groups III and IV preserved fish by refrigeration. Preservation of fruits and vegetables, by different processing methods were not practiced by the families surveyed.

Table 23 ~~Practice~~ Details regarding special foods given at different stages of life cycle among the families (in percentage)

Stages	Group I		Group II		Group III		Group IV	
	Yes	No	Yes	No	Yes	No	Yes	No
Infancy	100 (25)	-	100 (25)	-	100 (25)	-	100 (25)	-
Preschool children	24 (6)	76 (19)	24 (6)	76 (19)	48 (12)	52 (13)	52 (13)	48 (12)
School children	-	100 (25)	8 (2)	92 (23)	20 (5)	80 (20)	24 (6)	76 (19)
Pregnant women	16 (4)	84 (21)	36 (9)	64 (16)	68 (17)	32 (8)	20 (20)	20 (5)
Lactating mother	16 (4)	84 (21)	36 (9)	64 (16)	68 (17)	32 (8)	20 (20)	20 (5)

Figures in paranthesis denote number

Practice of providing special foods, by the families during different stages of life cycle revealed (Table 23) that, during infancy all the families irrespective of land size were found to provide special foods to infants. Twentyfour percent families each in Groups I and II and 48 and 52 percent

families in Groups III and IV provided special foods to preschool children. All the families in Group I and majority of the families in Groups II, III and IV (92,80 and 76 percent respectively) were not found to give special foods for school going children. Similarly majority of the families in Groups I and II (84 and 64 percent each) were not found to give special foods during pregnancy and lactation. However in Groups III and IV, 68 percent and 80 percent families respectively were found to give special foods for pregnant and lactating women.

Table 24a. Correlation coefficient determined for socio economic ^{variables} size of land holdings, and expenditure pattern.

Group I	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆
		**		**	**	**
X ₁	1.000	0.6276	0.3853	0.6849	0.7458	0.7456
				**	**	**
X ₂		1.000	0.2891	0.5154	0.5300	0.6189
				**		
X ₃			1.000	0.5922	0.2921	0.2139
					**	**
X ₄				1.000	0.7683	0.6661
						**
X ₅					1.000	0.8996
						**
X ₆						1.000

** 1% significant.

* 5% significant

X₁. Family size

X₂. Number of earning members

X₃. Size of land holdings

X₄. Monthly income

X₅. Expenditure on food

X₆. Expenditure on staples

Table 24 b. Correlation coefficient determined for socio economic ^{variables} size of land holdings, and expenditure pattern.

Group II	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆
	*	-		**	**	**
X ₁	1.000	0.4376	0.2591	0.5465	0.6565	0.6489
			-	*		
X ₂		1.000	0.1041	0.4828	0.3543	0.3741
X ₃			1.000	0.1194	0.0877	0.0586
					**	**
X ₄				1.000	0.8046	0.5550
						**
X ₅					1.000	0.7194
						**
X ₆						1.000

** 1% significant

* 5% significant

X₁. Family size

X₄. Monthly income

X₂. Number of earning members

X₅. Expenditure on food

X₃. Size of land holdings

X₆. Expenditure on staples

Table 24 c. Correlation coefficient determined for socio economic ^{variables} size of land holdings, and expenditure pattern.

Group III	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆
X ₁	1.000	0.2538	0.0489	0.1288	0.7727	0.8225
X ₂		1.000	0.3848	0.0943	0.1828	0.2055
X ₃			1.000	1.788	0.0833	0.2222
X ₄				1.000	0.2126	0.2084
X ₅					1.000	0.8961
X ₆						1.000

** 1% significant

* 5% significant

X₁. Family size

X₂. Number of earning members

X₃. Size of land holdings

X₄. Monthly income

X₅. Expenditure on food

X₆. Expenditure on staples

Table 24 d. Correlation coefficient determined for socio economic variables size of land holdings, and expenditure pattern.

Group IV	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆
X ₁	1.000	0.0824	0.4133	0.0721	0.7075**	0.7194**
X ₂		1.000	0.0489	0.4521*	0.1897	0.3578
X ₃			1.000	0.0796	0.5260	0.4922
X ₄				1.000	0.1648	0.1284
X ₅					1.000	0.8967**
X ₆						1.000

** 1% significant

* 5% significant

X₁. Family size

X₂. Number of earning members

X₃. Size of land holdings

X₄. Monthly income

X₅. Expenditure on food

X₆. Expenditure on staples

Table 24 (a to d) describes the correlation coefficient worked out for socio economic characters, size of land holdings and expenditure pattern of the 100 farm families surveyed. Family size of the surveyed families was found to be significantly correlated with the earning members in Groups I and II. (0.6276 and 0.4376) ^{**} ^{*} Whereas it was not significantly correlated in Groups III and IV. However family size was not significantly correlated with size of the land holdings. Significant correlation was found between family size and monthly income in Groups I and II. Whereas it was not correlated in bigger land holdings. In all the four categories of land holdings, the family size was highly correlated with expenditure pattern on foods and also on the expenditure on staple food article viz cereals.

No significant correlation was observed between the number of earning members and size of the holdings. Number of earning members and monthly income was significantly correlated in all the four groups except in Group III. Number of earning members and expenditure on food as well as on staple food articles were found to be significantly correlated in Groups I. Whereas in all other groups, it was not significantly correlated.

Size of land holdings and monthly income was significantly correlated in Group I. Whereas it was not significantly correlated in other groups. No significant correlation was observed between the expenditure on foods and expenditure on staples.

Monthly income was highly correlated with the expenditure pattern on food and expenditure pattern on staple foods (cereals) in Groups I and II. However it was not correlated in Groups III and IV.

In all the four groups expenditure on food and expenditure on staples were significantly correlated.

4. Nutritional status of the families

Nutritional status of the farm families under study were assessed through anthropometry, actual food intake, clinical and bio chemical investigations.

a) Assessing the anthropometric measurements of the family members

Under the anthropometric assessment, body weight and height of all the members in 40 families were recorded. Among these 40 families, 98 adult members (49 males and 49 females) and 34 adolescent children (21 adolescent boys and 13 adolescent girls) were found.

Table 25 Weight for age profile of the adult members of the farm families.

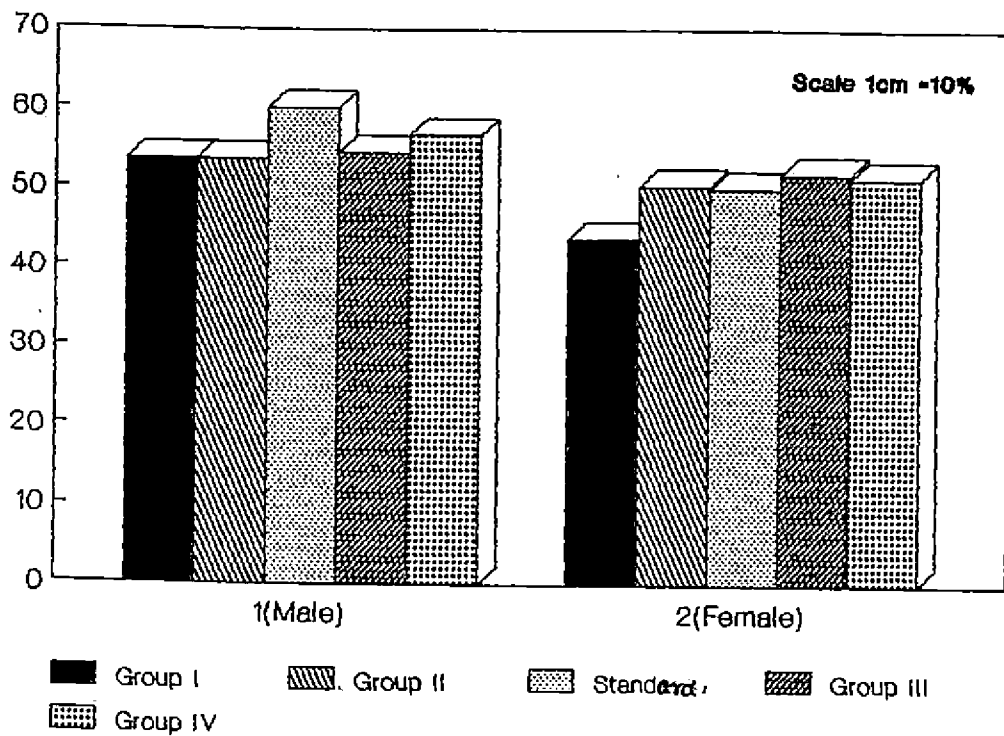
Land holdings	Average weight in Kilograms	
	Adult male	Adult female
Group I	53.5 (10)	43.6 (12)
Group II	53.5 (15)	50.3 (11)
Group III	54.3 (12)	51.7 (13)
Group IV	56.6 (12)	51.29(13)
Total	49	49

Figures in parenthesis denote number

Standard weight for male 60 Kg. λ ICMR (1989)
 Standard weight for female 50 Kg λ

As shown in Table 25, the average weight for age profile of the adult males belonging to Groups I and II was 53.5 Kg each. Whereas in Groups III and IV, the average weight for age was 54.3 Kg and 56.6 Kg respectively. In all the four groups of land holdings, weight for age profile was found to be below the standard, suggested by ICMR (1989).

Average weight of Adults in the farm families



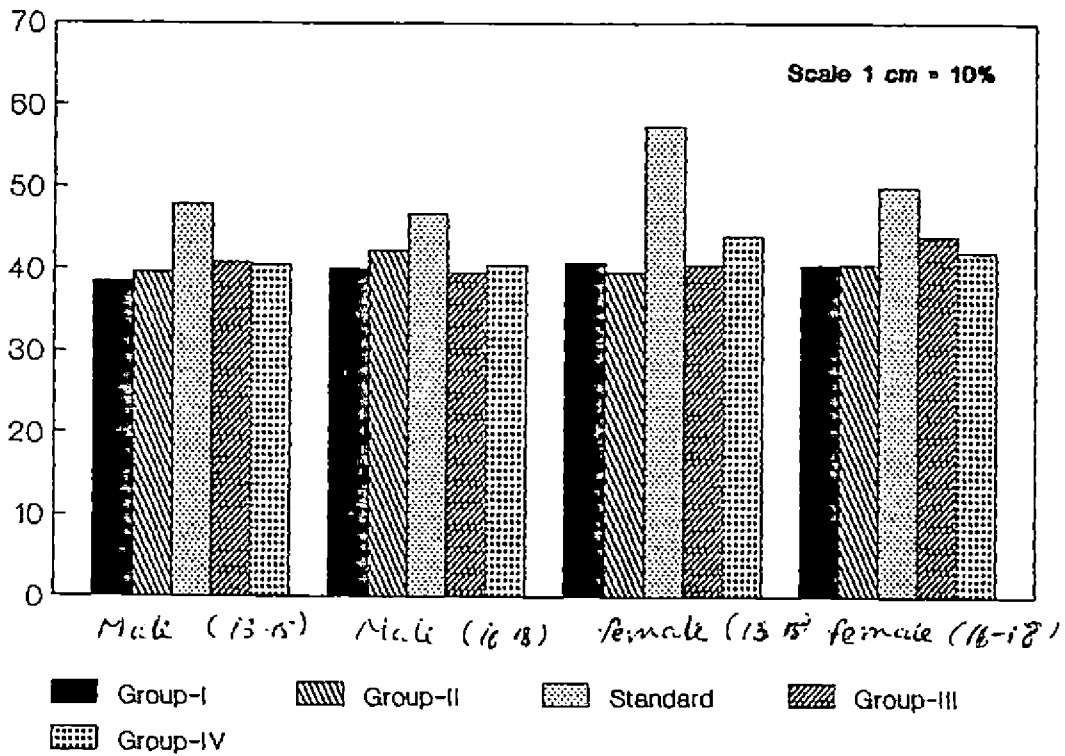
Weight for age of adult female, belonging to Groups I,II,III and IV, was 48.6, 50.3, 51.7 and 51.2 Kg respectively. It is seen that weight for age of adult females belonging to Group I was below ICMR standard, whereas in all other three groups, average weight was above the ICMR standard.

Table 26 Weight for age profile of the adolescent children in the farm families.

Age groups	Sex	Average weight in Kilograms				ICMR standard (1989)
		Group I	Group II	Group III	Group IV	
13-15	Male	38.4 (4)	40.0 (1)	40.8 (4)	40.4 (5)	47.88
13-15	Female	39.5 (1)	42.2 (2)	39.5 (1)	40.5 (1)	46.66
16-18	Male	43.5 (2)	45.5 (2)	40.5 (1)	44.0 (2)	57.28
16-18	Female	44.6 (3)	41.2 (2)	44.0 (2)	42.0 (1)	49.92
Total	Male	6	3	5	7	21
	Female	4	4	3	2	13

Figures in parenthesis denote number

Average weight of Adolescents (Male & Female) in the farm families



As depicted in Table 26, the average weight for age of the pre-adolescents (13-15 years) belonging to Group I,II,III and IV, was observed to be 38.4, 40.0,40.8 and 40.4 Kg respectively in males and 39.5, 42.2, 39.5 and 40.5 Kg respectively in females. In both males and females belonging to 4 categories, observed weight for age was below the standard suggested by ICMR (1989).

Average weight for age of the adolescents in the age group of (16-18 years) was 43.5, 45.5, 40.5 and 44.0 Kg in males and 44.6,41.2,44.0,42.0 Kg in female adolescents in the Groups I,II,III and IV respectively. In both male and female adolescents observed weight by age was found to be below the standard suggested by ICMR (1989).

On the basis of weight deficit as suggested by Gomez (1987) adult members and adolescent members of the farm families were grouped into different grades of malnutrition.

Table 27 Distribution of adult members according to the Grades of malnutrition.

Land holdings	Group I		Group II		Group III		Group IV		Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Normal (>90% weight for age)	40.0 (4)	58.3 (7)	46.6 (7)	63.6 (7)	50.0 (6)	69.2 (9)	66.2 (8)	69.2 (9)	51.0 (25)	65.3 (32)
Grade I malnutrition (76-90% weight for age)	50.0 (5)	41.6 (5)	40.0 (6)	36.4 (4)	33.3 (4)	30.8 (4)	16.6 (2)	30.8 (4)	34.6 (17)	34.6 (17)
Grade II malnutrition (61-75% weight for age)	10.0 (1)	-	13.3 (2)	-	16.6 (2)	-	16.6 (2)	-	14.2 (7)	-
Total	10	12	15	11	12	13	12	13	49	49

Figures in parenthesis denote number

As indicated in Table 27, the percentage of adult males coming in the normal group was found to be 40.0, 46.6, 50.0 and 66.6 percent respectively in Groups I,II,III and IV, whereas the percent of adult females in the normal group was 58.3 and 63.6 percent in Groups I and II and 69.2 percent each in Groups III and IV. 50.0, 40.0, 33.3 and 16.6 percent of the adult males belonging to Groups I,II,III and IV were observed to be in Grade I malnutrition.

Adult female coming in Grade I malnutrition was found to be 41.6 and 36.4 percent in Groups I and II and 30.8 percent each in Groups III and IV. Grade II malnutrition was not observed among the female members in any groups. However in male members, 10.0 and 13.3 percent of Groups I and II and 16.6 percent each, in Groups III and IV were found to be in Grade II malnutrition.

Table 28 Distribution of the adolescent members according to the Grades of malnutrition.

Land holdings	Group I		Group II		Group III		Group IV		Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Normal (>90% weight for age)	16.6 (1)	50.0 (2)	-	25.0 (1)	20.0 (1)	33.3 (1)	-	-	9.5 (2)	30.7 (4)
Grade I malnutrition (76-90% weight for age)	66.6 (4)	50.0 (2)	100.0 (3)	75.0 (3)	60.0 (3)	66.6 (2)	85.7 (6)	100.0 (2)	76.1 (16)	69.2 (9)
Grade II malnutrition (61-75% weight for age)	16.6 (1)	-	-	-	20.0 (1)	-	14.2 (1)	-	14.2 (3)	-
Total	6	4	3	4	5	3	7	2	21	13

Figures in parenthesis denote number

As revealed in Table 28, the percentage of adolescent male and female children found in the normal group was observed as 16.6 percent in Group I, 20.0 percent in Group III and none in Group II and IV. However 50.0, 25.0 and 33.3 percent female adolescents, belonging to Groups I, II and III were observed to be in the normal group while none was identified under Group IV. Majority of the male and female adolescents found in Grade I malnutrition were 66.6, 100.0, 60.0, 85.7 percent respectively in male and 50.0, 75.0, 66.6 and 100.0 percent respectively in female children belonging to Groups I, II, III and IV. 16.6, 20.0 and 14.2 percent male adolescents belonging to Groups I, III and IV respectively suffered from Grade II malnutrition.

Height profile of adult members of the farm families are presented in Table 29.

Table 29 Height profile of adult members of the farm families.

Land holdings	Average Height in cm	
	Adult male	Adult female
Group I	164.0 (10)	154.2 (12)
Group II	164.7 (15)	154.3 (11)
Group III	165.2 (12)	154.5 (13)
Group IV	165.3 (12)	155.8 (13)
Total	49	49

Figures in parenthesis denote number

As revealed in Table 29, the average height profile of the adult males belonging to Groups I, II, III and IV was 164.0, 164.7, 165.2 and 165.3 respectively as against 154.2, 154.3, 154.5 and 155.8 in females.

Table 30 Height for age profile of adolescents
of the farm families.

Age group	Sex	Average height in centimeters				NCHS standard (1977)
		Group I	Group II	Group III	Group IV	
13-15	M	149.6 (4)	151.5 (1)	153.7 (4)	152.1 (5)	159.66
13-15	F	150.0 (1)	147.0 (2)	147.0 (1)	145.0 (1)	158.33
16-18	M	158.7 (2)	159.5 (2)	158.0 (1)	153.5 (2)	174.30
16-18	F	150.6 (3)	151.7 (2)	149.5 (2)	153.0 (1)	163.00
Total	M	28.5 (6)	14.2 (3)	23.8 (5)	33.3 (7)	21.
	F	30.7 (4)	30.7 (4)	23.0 (3)	15.3 (2)	13

Figures in parenthesis denote number

M - Male

F - Female

Table 30 shows the height for age profile of the adolescent children of farm families. Height for age profile of the pre-adolescent male children in the age group 13 to 15 years is 149.6, 151.5, 153.7 and 152.1. Whereas the height for age profile of female adolescents (13-15 years) were 150.0, 147.0, 147.0 and 145.0 respectively in Groups I, II, III and IV. In both male and

female pre-adolescents, height profile were below the standard suggested by NCHS (1977)

Height for age profile of adolescent male children in the age of 16 to 18 years were 158.7, 159.5, 158.0 and 153.5. Whereas the height for age profile of female adolescents were 150.6, 151.7, 149.5 and 153.0 respectively in Groups I, II, III and IV. Height profile of male and female ^{adolescent} children were also found to be below the standard suggested by NCHS (1977)

Table 31 Distribution of adult members of the farm families as per the BMI classification.

BMI classification	Group I		Group II		Group III		Group IV		Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
18.6-25 (Normal)	40.0 (4)	50.0 (6)	66.6 (10)	45.4 (5)	41.7 (5)	84.6 (11)	75.0 (9)	61.5 (8)	57.1 (28)	61.2 (30)
16-18.5 (Mild to moderate)	40.0 (4)	16.6 (2)	13.3 (2)	27.0 (3)	16.6 (2)	7.7 (1)	-	23.0 (3)	16.3 (8)	18.3 (9)
<16 (Severe)	10.0 (1)	16.6 (2)	13.3 (2)	9.0 (1)	16.6 (2)	-	16.6 (2)	7.7 (1)	14.2 (7)	8.1 (4)
>25 (Obese)	10.0 (1)	16.6 (2)	6.7 (1)	18.2 (2)	25.0 (3)	7.7 (1)	8.3 (1)	7.7 (1)	12.2 (6)	12.2 (6)
Total	10	12	15	11	12	13	12	13	49	49

Figures in parenthesis denote number

As per the Body Mass Index (BMI), 40.0, 66.6, 41.7 and 75.0 percent adult male belonging to Groups I, II, III and IV were found to be in the normal group, as against 50.0, 45.5, 84.6 and 61.5 percent adult female respectively in Groups I, II, III and IV. (Table 31)

Mild to moderate level chronic energy deficiency was located among 40.0, 13.3 and 16.6 percent males in Groups I, II and III and none in Group IV, as against 16.6, 27.0, 7.7 and 23.0 percent respectively in the adult females belonging to Groups I, II, III and IV.

Severe energy deficiency located among female adults belonging to Groups I, II and IV were 16.6, 9.0, 7.7 and none in Group III, as against 10.0, 13.3 percent male members in Groups I and II and 16.6 percent each in Groups III and IV.

The percent of obese members among the adult members of farm families belonging to Groups I, II, III and IV as per the BMI classification were 10.0, 6.7, 25.0 and 8.3 in males and 16.6 and 18.2 percent in females belonging to Groups I and II and 7.7 percent each in Groups III and IV.

Table 32 Distribution of adolescents as per the BMI classification.

Land holdings	Group I		Group II		Group III		Group IV		Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
18.6-25 (Normal)	16.6 (1)	50.0 (2)	33.3 (1)	25.0 (1)	20.0 (1)	33.3 (1)	57.1 (4)	50.0 (1)	33.3 (7)	38.4 (5)
16-18.5 (Mild to moderate)	66.6 (4)	50.0 (2)	66.7 (2)	75.0 (3)	60.0 (3)	66.7 (2)	14.2 (1)	50.0 (1)	47.6 (10)	61.5 (8)
<16 (Severe)	16.6 (1)	-	-	-	20.0 (1)	-	28.5 (2)	-	19.0 (4)	-
Total	6	4	3	4	5	3	7	2	21	13

Figures in parenthesis denote number

As revealed in Table 32, 50.0; 25.0, 33.3 and 50.0 percent female adolescents and 16.6,33.3, 20.0 and 57.1 percent male adolescent respectively in Groups I,II,III and IV were in the normal low weight groups as per the BMI classification. Majority of selected male and female adolescents were found in mild to moderate energy deficient group except the male children in Group IV. (66.6, 66.7, 60.0 and 14.2 percent respectively in Groups I,II,III and IV for males). For females 50.0 percent each in Group I and Group IV, 75.0 and 66.7 in Groups II and III. 16.6 adult males in Group I, 20.0 percent in Group III and 28.5 percent in Group IV were found to be in severe energy deficiency, as against none in female adolescents.

b. Assessing the actual food intake of the family members.

Assessing of the actual food intake clearly gives an idea about the quantity and quality of the foods they consume.

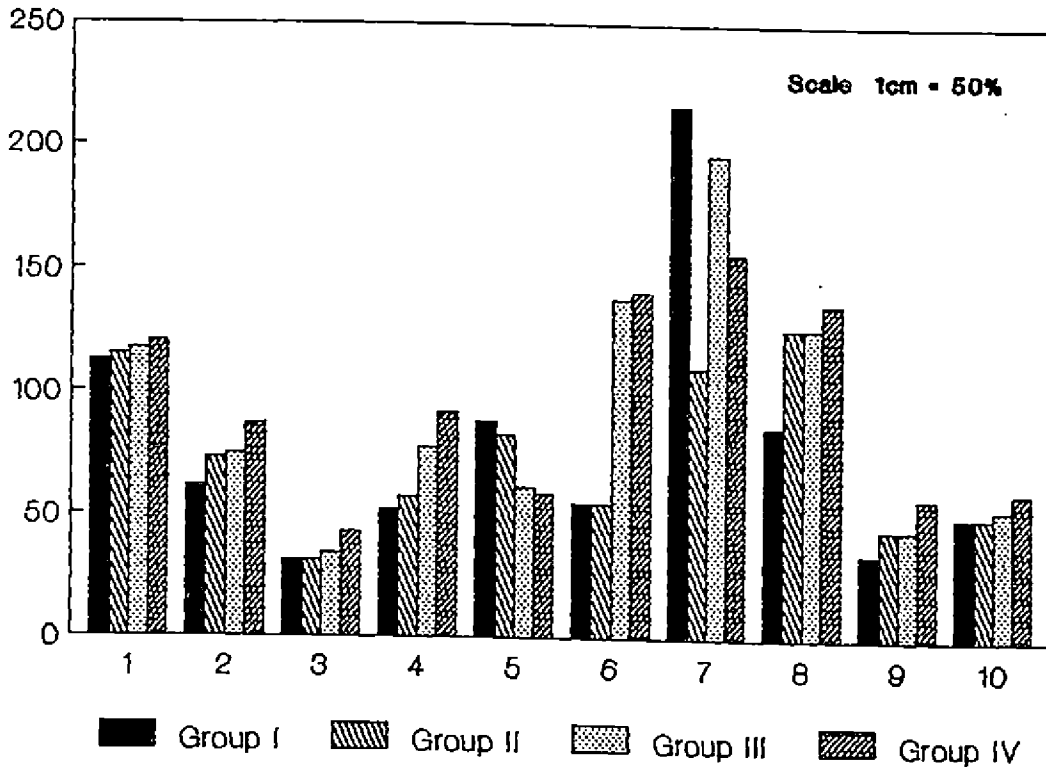
The actual food intake of the adult male and female members in the farm families determined by the

Table 33 Food consumption of adult males in the farm families by weighment method
(ICMR - 1989)

Food stuffs	RDA	Group I	Group II	Group III	Group IV	Average consumption
Cereals	400	451 (112.7)	461 (115.2)	470 (117.5)	482 (120.5)	466.0 (116.5)
Pulses	55	34 (61.8)	40 (72.7)	41 (74.5)	48 (87.2)	40.7 (74.0)
Green leafy vegetables	100	31 (31.0)	31 (31.0)	34 (34.0)	43 (43.0)	34.7 (34.7)
Other vegetables	75	39 (52.0)	43 (57.3)	58 (77.3)	69 (92.0)	52.2 (69.6)
Roots and tubers	75	66 (88.0)	62 (82.6)	46 (61.3)	44 (58.6)	54.5 (72.6)
Milk	100	55 (55.0)	55 (55.0)	138 (138.0)	141 (141.0)	97.2 (97.2)
Fish	30	65 (216.6)	33 (110.0)	59 (196.6)	47 (156.6)	47.2 (157.3)
Fruits	30	26 (86.6)	38 (126.6)	38 (126.6)	41 (136.6)	35.7 (119.1)
Fats and oil	40	14 (35.0)	18 (45.0)	18 (45.0)	23 (57.5)	18.2 (45.5)
Sugar and jaggery	30	15 (50.0)	15 (50.0)	16 (53.3)	18 (60.0)	16.0 (53.3)

Figures in parenthesis denote percentage of RDA met

Composition of the diet of Adult Male members in the farm families



1. Cereals

2. Pulses

3. Green Leafy vegetables

4. Other vegetables

5. Roots & tubers

6. Milk

7. Fish

8. Fruits

9. Fats & Oils

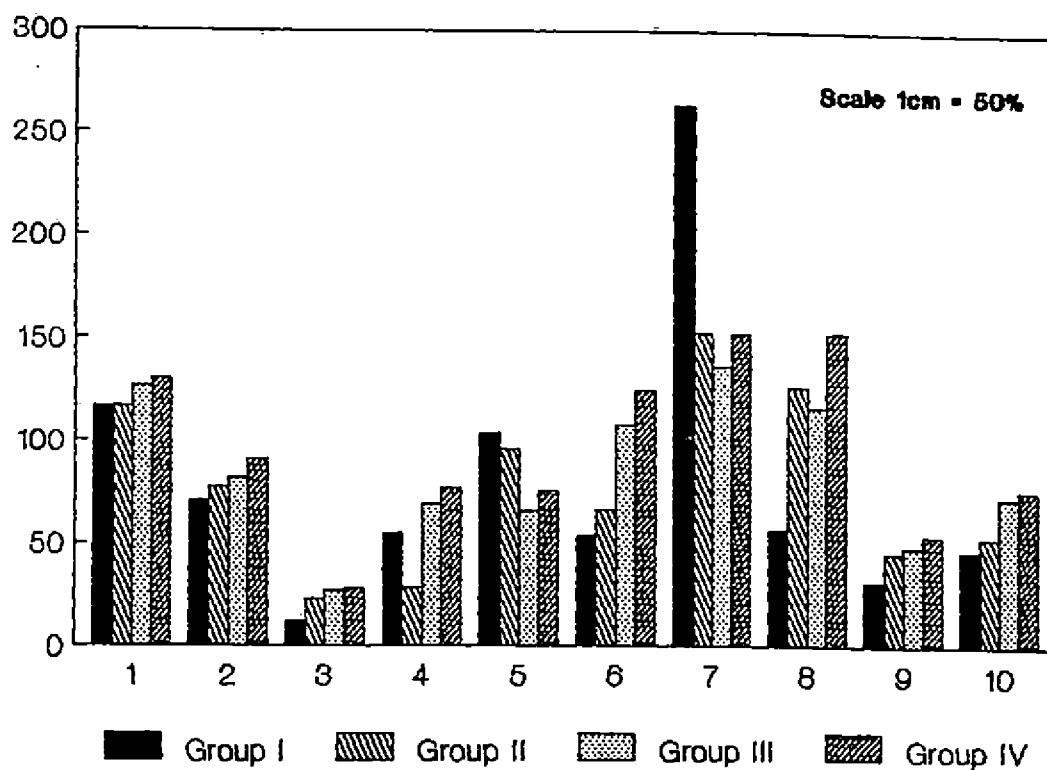
10. Sugar & Jaggery

Table 34 Food consumption of adult females in the farm families by weighment method
(ICMR - 1989)

Food stuffs	RDA	Group I	Group II	Group III	Group IV	Average consumption
Cereals	300	349 (116.3)	351 (117.0)	368 (122.6)	391 (130.3)	364.7 (121.5)
Pulses	45	32 (71.1)	35 (77.7)	37 (82.2)	41 (91.1)	36.2 (80.4)
Green leafy vegetables	125	15 (12.0)	29 (23.2)	34 (27.2)	35 (28.0)	28.2 (22.5)
Other vegetables	75	41 (54.6)	44 (58.6)	52 (69.3)	58 (77.3)	48.7 (64.9)
Roots and tubers	50	52 (104.0)	48 (96.0)	33 (66.0)	38 (76.0)	42.7 (85.4)
Milk	100	54 (54.0)	67 (67.0)	108 (108.0)	125 (125.0)	88.5 (85.5)
Fish	30	79 (263.0)	46 (153.3)	41 (136.6)	46 (153.3)	53.0 (176.6)
Fruits	30	17 (56.6)	38 (126.6)	35 (116.6)	46 (153.3)	34.0 (113.3)
Fats and oil	35	11 (31.4)	16 (45.7)	17 (48.5)	19 (54.2)	15.7 (52.3)
Sugar and jaggery	30	14 (46.6)	16 (53.3)	22 (73.3)	23 (76.6)	18.7 (62.3)

Figures in parenthesis denote percentage of RDA met.

Composition of the diet of Adult Female members in the farm families



1. Cereals

2. Pulses

3. Green Leafy vegetables

4. Other vegetables

5. Roots & tubers

6. Milk

7. Fish

8. Fruits

9. Fats & Oils

10. Sugar & Jaggery

weight method is given in Tables 33 and 34. It revealed that, the consumption of cereal was higher than the recommended allowances in both male and female adult members. (112.7, 115.2, 117.5, 120.5 percentage of RDA for males and 116.3, 117.0, 122.6, 130.3 percentage of RDA for females in Groups I, II, III and IV). The consumption of pulses was met above 70.0 percent in adult male and female, except in the case of adult males belonging to Group I (61.8 percent). The consumption of green leafy vegetables were met above 30.0 percent in adult male members, whereas it was below 30.0 percent in adult females, it was alarmingly low in females of Group I (12.0 percent). Consumption of other vegetable was above 50.0 percent of the recommended allowances in both male and female members and same trend was also observed in the consumption pattern of roots and tubers. Roots and tubers were consumed by the adult members in a better way as it was met above 80.0 percent in the male and female members belonging to Groups I and II. Consumption level was higher in females than in males.

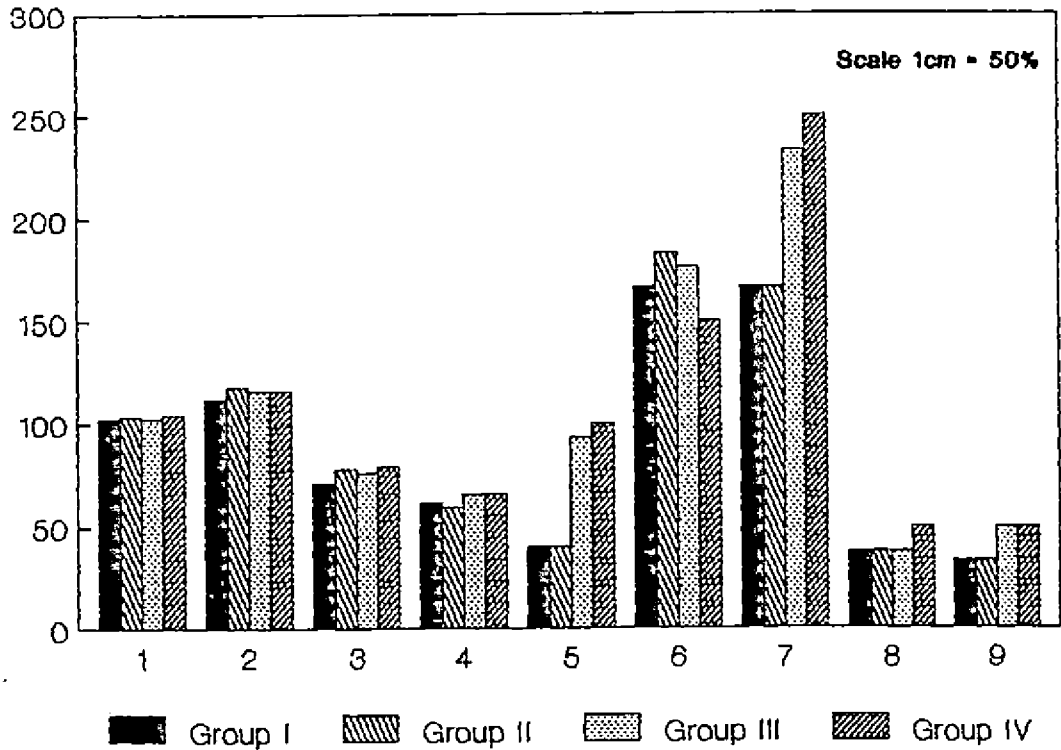
Milk consumption was met sufficiently for both male and female adult members in Groups III and IV, whereas it was met meagrely in the first two groups for both males and females. In all the adult members, (male and female) the consumption of fish was found to very high. Consumption of fruits were also found to be met adequately in all the groups except adult males and females of Group I. Consumption of fats and oil and sugar and jaggery were met ~~insufficiently~~ ^{sufficiently} in both male and female adult members belonging to Groups I, II, III and IV.

Table 35 Food consumption of adolescent males in the farm families by weightment method
(ICMR - 1981)

Food stuffs	RDA		Group I		Group II		Group III		Group IV		Average consumption	
	13-15	16-18	13-15	16-18	13-15	16-18	13-15	16-18	13-15	16-18	13-15	16-18
Cereal	430	450	439 (102.0)	453 (100.6)	445 (103.4)	458 (101.7)	442 (102.7)	455 (101.1)	450 (104.6)	458 (101.7)	440.0 (103.2)	456.0 (101.3)
Pulses	50	50	56 (112.0)	56 (112.0)	59 (118.0)	60 (120.0)	58 (116.0)	56 (112.0)	58 (116.0)	58 (116.0)	57.7 (115.4)	57.5 (115.0)
Green leafy vegetables	100	100	71 (71.0)	44 (44.0)	78 (78.0)	87 (87.0)	76 (76.0)	97 (97.0)	79 (79.0)	95 (95.0)	76.0 (76.0)	80.7 (80.0)
Other vegetables	150	175	92 (61.3)	91 (52.0)	89 (59.0)	100 (57.1)	98 (65.3)	103 (58.0)	99 (66.0)	99 (56.5)	94.5 (63.0)	98.2 (56.1)
Milk	150	150	60 (40.0)	60 (40.0)	60 (40.0)	60 (40.0)	140 (93.3)	140 (93.3)	150 (100.0)	150 (100.0)	102.5 (68.3)	102.5 (68.3)
Fish	30	30	50 (166.6)	50 (166.6)	55 (183.3)	68 (226.6)	53 (176.6)	54 (180.0)	45 (150.0)	55 (183.3)	50.7 (169.0)	56.7 (189.0)
Fruits	30	30	50 (166.6)	50 (166.6)	50 (166.6)	50 (166.6)	70 (233.3)	70 (233.3)	75 (250.0)	75 (250.0)	61.2 (204.0)	61.2 (204.0)
Fats and oil	40	50	15 (37.5)	15 (30.0)	15 (37.5)	15 (30.0)	15 (37.5)	15 (30.0)	20 (50.0)	20 (40.0)	16.2 (40.5)	16.2 (32.4)
Sugar and jaggery	30	40	10 (33.3)	10 (25.0)	10 (33.0)	10 (25.0)	15 (50.0)	15 (37.5)	15 (50.0)	15 (37.5)	12.5 (41.6)	12.5 (31.2)

Figures in parenthesis denote percentage of RDA met

Diet of
**Composition of the Pre Adolescent Male
 children in the farm families (13-15Yrs)**



1. Cereals

2. Pulses

3. Green Leafy vegetables

4. Other vegetables

5. Milk

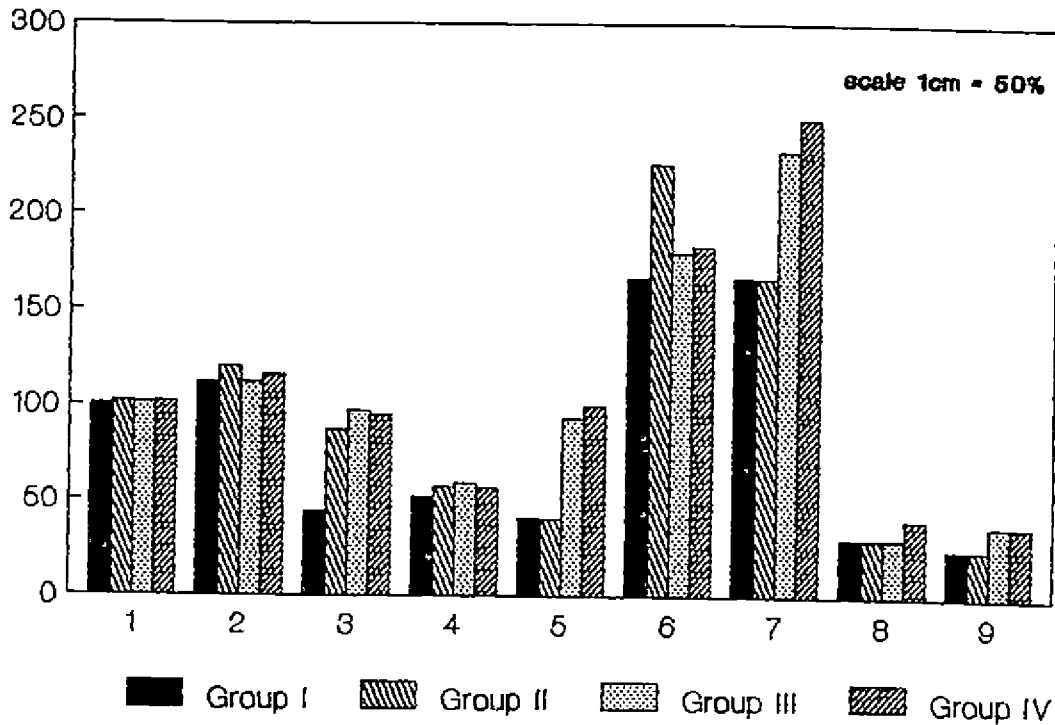
6. Fish

7. Fruits

8. Fats & Oils

9. Sugar & Jaggery

**Composition of the Diet of Adolescent
Male children in the farm families
(16 - 18 Years)**



1. Cereals

2. Pulses

3. Green Leafy vegetables

4. Other vegetables

5. Milk

6. Fish

7. Fruits

8. Fats & Oils

9. Sugar & Jaggery

Table 35 describes the average consumption of food stuffs among the adolescent male of the farm families. The cereal consumption was found to be sufficiently met in the adolescent male, (13 to 15 years) and 16 to 18 years belonging to all the four groups of land holdings. The average consumption for cereals being 103.4 percent in the 13 to 15 years age groups, and 101.3 percent in the age groups of 16 to 18 years. Similarly the consumption of pulses was also met above the prescribed recommended allowances. 115.4 percent each in the age groups of 13 to 15 and 16 to 18 years. Consumption of green leafy vegetables was found to be above 70.0 percent in the adolescents of 13 to 15 years, whereas the percentage consumption was above 80.0 percent in the age group of 16 to 18 in Groups II, III and IV. The consumption of other vegetables met above 50.0 percent in both the age groups of adolescents belonging to the four groups of land holdings, whereas the consumption of milk was found to be 40.0 percent in the first two groups. It was sufficiently met in Groups III and IV. The consumption pattern of fish and fruits indicated that in all the adolescent male members irrespective of the land holdings, met above the prescribed standards. Fats and oil and sugar and jaggery were found to be less in all the male adolescents belonging to different land holdings.

Table 36 Food consumption of adolescent females in the farm families by
weightment method (ICMR -1981)

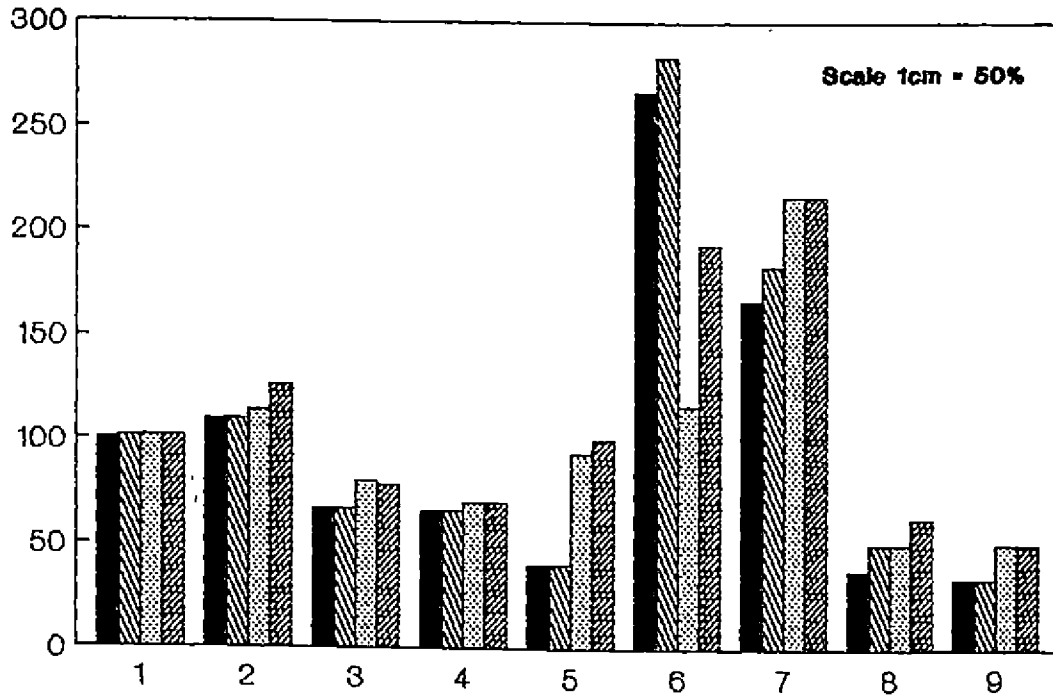
Food stuffs	RDA	Group I	Group II	Group III	Group IV	Average consumption
	13-18	13-18	13-18	13-18	13-18	13-18
Cereals	350	352 (100.5)	355 (101.4)	356 (101.7)	357 (102.0)	355.0 (101.4)
Pulses	50	55 (110.0)	55 (110.0)	57 (114.0)	63 (126.0)	57.5 (115.0)
Green leafy vegetables	150	100 (66.6)	100 (66.6)	120 (80.0)	117 (78.0)	109.2 (72.8)
Other vegetables	150	99 (66.0)	99 (66.0)	105 (70.0)	105 (70.0)	102.0 (68.0)
Milk	150	60 (40.0)	60 (40.0)	140 (93.3)	150 (100.0)	102.5 (68.3)
Fish	30	80 (266.6)	85 (283.3)	50 (116.6)	58 (193.3)	68.2 (227.3)
Fruits	30	50 (166.6)	55 (183.3)	65 (216.6)	65 (216.6)	58.7 (195.6)
Fats and oil	40	15 (37.5)	20 (50.0)	20 (50.0)	25 (62.5)	20.0 (50.0)
Sugar and jaggery	30	10 (33.0)	10 (33.3)	15 (50.0)	15 (50.0)	12.5 (41.6)

Figures in parenthesis denote percentage of RDA met



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**Composition of the Diet of Adolescent
Female children in the farm families
(13 - 18 Years)**



1. Cereals

2. Pulses

3. Green Leafy vegetables

4. Other vegetables

5. Milk

6. Fish

7. Fruits

8. Fats & Oils

9. Sugar & Jaggery

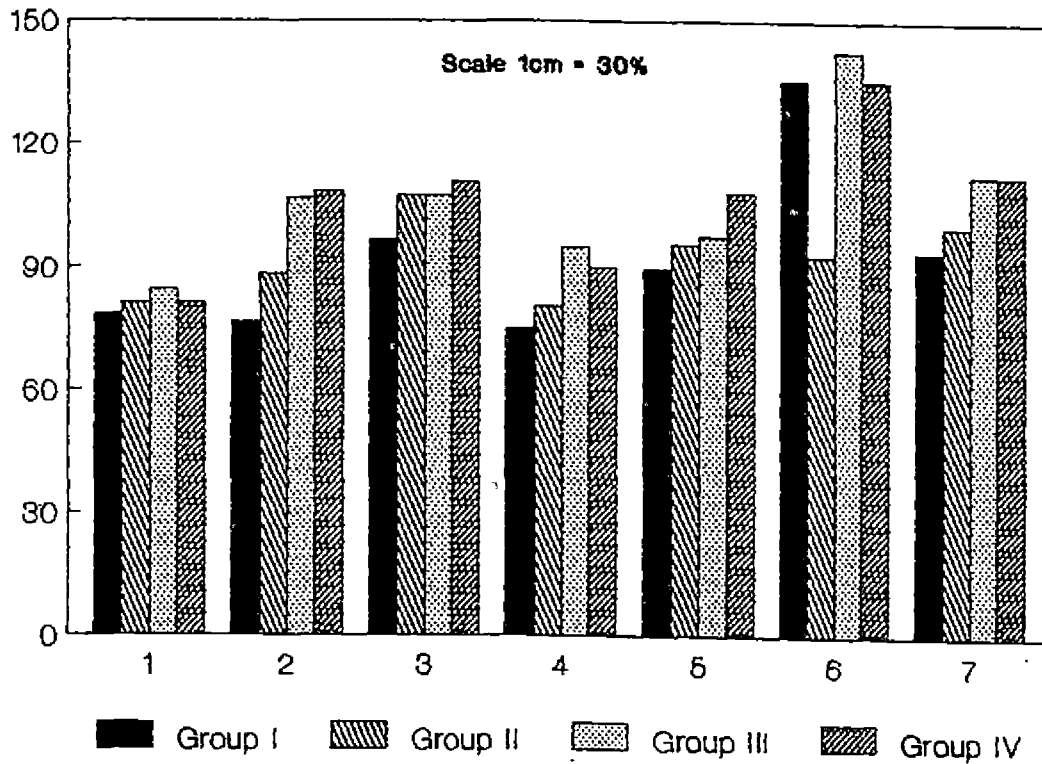
The actual food consumption pattern of the adolescent female children of 13 to 18 years in the farm families determined by weighment method is given in Table 36. The consumption of cereals, pulses, fruits and fish were found to be met above the limit prescribed in all the different groups of land holdings. The consumption of green leafy vegetables was met above 66.0 percent in the first two groups, whereas it was above 75.0 percent in Groups III and IV. Consumption of other vegetables including roots and tubers was 66.0 percent each, in Groups I and II and 70.0 percent each in Groups III and IV. Milk consumption was sufficiently met in Groups III and IV. (93.34 and 100.0 percent) whereas it was met meagrely in Groups I and II (40.0 percent each). Consumption of fats and oils and sugar and jaggery was found to be very low. (For fats and oils, 37.5, 50.0, 50.0 and 62.5 percent respectively in Groups I, II, III and IV and for sugar and jaggery, 33.3, 33.3, 50.0 and 50.0 percent respectively in Groups I, II, III and IV.)

Table 37 Nutrient intake of the adult males in the farm families.

Nutrients	RDA	Group I	Group II	Group III	Group IV	Average intake of nutrients
Energy (Kcal)	2875	2263 (78.7)	2333 (81.2)	2425 (84.3)	2336 (81.2)	2339.2 (81.3)
Protein (gm)	60	46 (76.6)	53 (88.3)	64 (106.6)	65 (108.3)	57.0 (95.0)
Iron (mg)	28	27 (96.4)	30 (107.1)	30 (107.1)	31 (110.7)	29.5 (105.3)
Retinol (μ g)	600	450 (75.0)	482 (80.3)	569 (94.8)	539 (89.9)	570.0 (85.0)
Calcium (mg)	400	359 (89.7)	382 (95.5)	390 (97.5)	433 (108.2)	391.0 (97.7)
Thiamin (mg)	1.4	1.9 (135.7)	1.3 (92.8)	2.0 (142.8)	1.9 (135.7)	1.7 (121.4)
Riboflavin (mg)	1.6	1.5 (93.7)	1.6 (100.0)	1.8 (112.5)	1.8 (112.5)	1.6 (100.0)

Figures in parenthesis denote percentage of RDA met

Nutritional composition of the diet of Adult Male members in the farm families



1. Energy

2. Protein

3. Iron

4. Retinol

5. Calcium

6. Thiamin

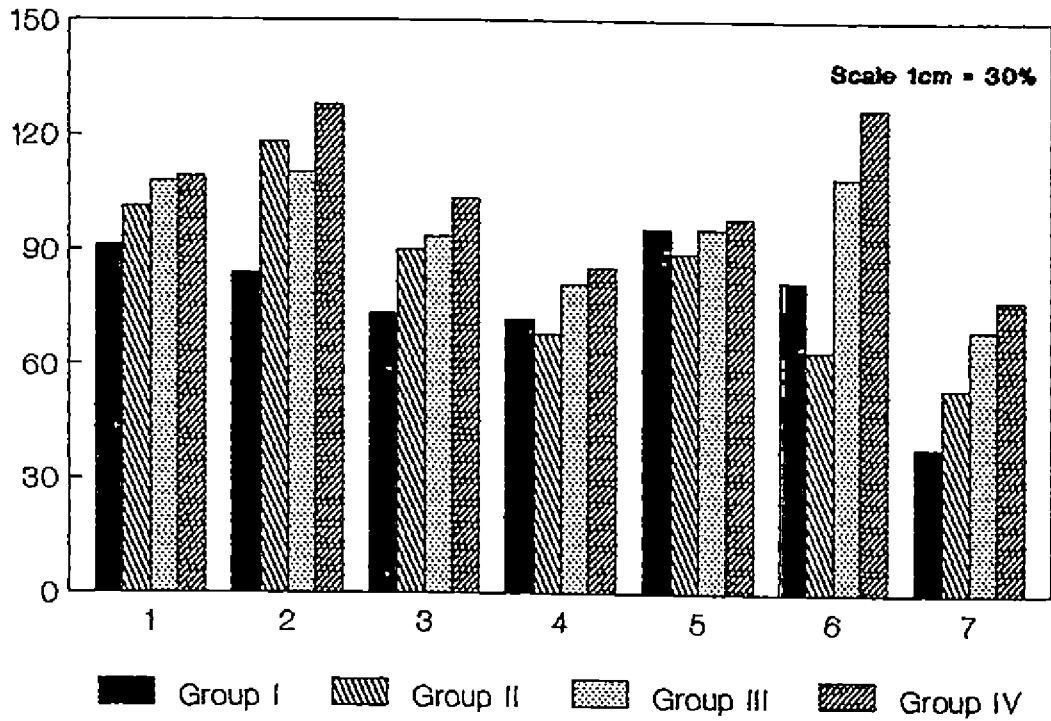
7. Riboflavin

Table 38 Nutrient intake of the adult females in the farm families.

Nutrients	RDA	Group I	Group II	Group III	Group IV	Average intake of nutrients
Energy (Kcal)	2225	2026 (91.0)	2251 (101.1)	2401 (107.9)	2429 (109.1)	2276.7 (102.3)
Protein (gm)	50	42 (84.0)	59 (118.0)	55 (110.0)	64 (128.0)	55.0 (110.0)
Iron (mg)	30	22 (73.3)	27 (90.0)	28 (93.3)	31 (103.3)	27.0 (90.0)
Retinol (μ g)	600	430 (71.6)	408 (68.0)	487 (81.1)	512 (85.3)	459.2 (76.5)
Calcium (mg)	400	382 (95.5)	356 (89.0)	382 (95.5)	393 (98.2)	378.2 (94.5)
Thiamin (mg)	1.1	0.9 (81.8)	0.7 (63.6)	1.2 (109.0)	1.4 (127.2)	1.0 (90.9)
Riboflavin (mg)	1.3	0.5 (38.4)	0.7 (53.8)	0.9 (69.2)	1.0 (76.9)	0.7 (53.8)

Figures in parenthesis denote percentage of RDA met

Nutritional composition of the diet of Adult Female members in the farm families



1. Energy

2. Protein

3. Iron

4. Retinol

5. Calcium

6. Thiamin

7. Riboflavin

Nutrient intake of the adult male and female members computed according to the quantity they consumed. The data is presented in Table 37 and 38.

As given in Table 37, 38, the average intake of nutrients of the adult members depicted that, the average energy intake was 78.7, 81.1, 84.3 and 81.2 percent for adult males in Groups I,II,III and IV respectively. Whereas in the females, except in Group I energy intake was sufficiently met. The intake of protein in adult male members were below the recommended allowances in Groups I and II (76.6 and 88.3 percent). Whereas in Groups III and IV, protein intake was above the recommended allowances (106.6 and 108.3 percent). In the adult female members , similar to energy intake, protein intake was also sufficiently met in all groups except in Group I, whereas 84.0 percent of RDA was met. Iron intake was found to be above the prescribed amounts of recommended allowed in the adult males except in Group I. (96.4, 107.1, 107.1, 110.7 respectively in Groups I,II,III and IV.) Whereas it was nearly met in adult females except in Group I,(73.3, 90.0, 93.3 and 103.3 percent respec-

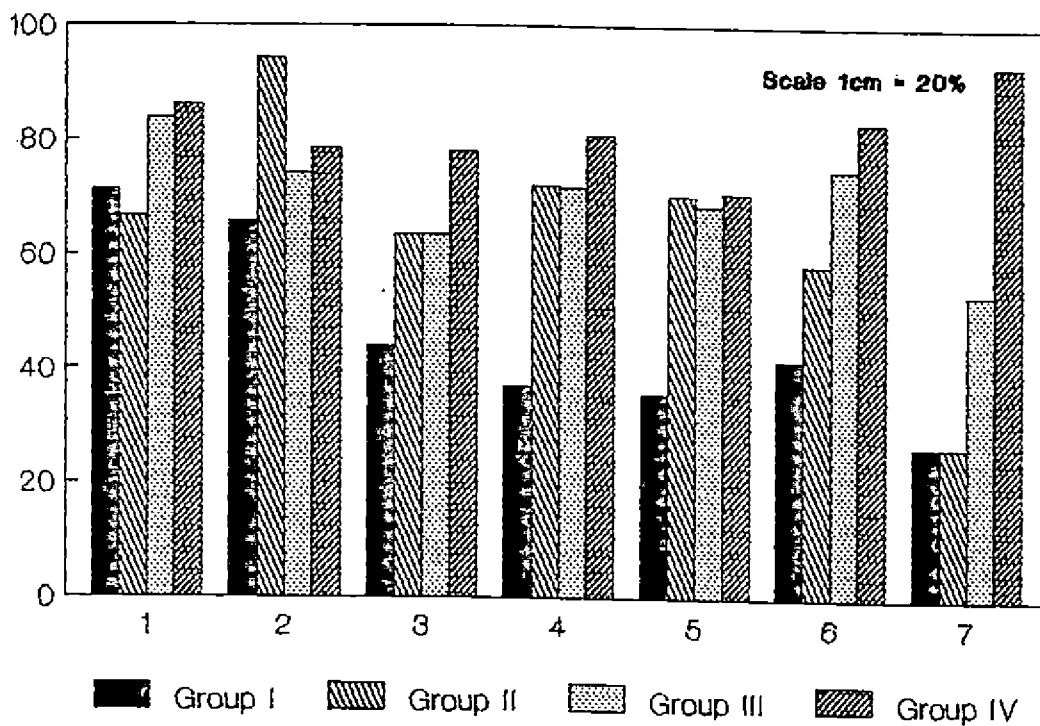
tively in Groups I,II,III and IV.) The percentage of retinol met was 75.0, 80.3, 94.8 and 89.9 percent respectively in Groups I,II,III and IV for adult males, as against 71.6, 68.0,81.1 and 85.3 percent respectively in Groups I,II,III and IV for adult females. Except in Group IV (108.2 percent) in all the other three groups calcium intake was below the recommended allowances among adult male members. (89.7, 95.5 and 97.5 percent of RDA respectively in Groups I,II and III. Whereas in adult female members, calcium intake was met upto 95.5, 89.0, 95.5 and 98.2 percent of the requirement respectively in Groups I,II,III and IV. Thiamin and riboflavin were met sufficiently in adult males (135.7, 92.8, 142.8 and 135.7 percent respectively in Groups I,II,III and IV for thiamin and 93.7, 100.0, 112.5 and 112.5 percent respectively in Groups I,II, III and IV for riboflavin). Whereas in adult females, the percentage of RDA met for thiamin was 81.8, 63.6, 109.0 and 127.2 percent respectively in Groups I,II, III and IV and for riboflavin was 38.4, 53.8, 69.2 and 76.9 percent respectively in Groups I,II,III and IV.

Table 39 Nutrient intake of the adolescent males in the farm families.

Nutrients	RDA		Group I		Group II		Group III		Group IV		Average intake of nutrients	
	13-15	16-18	13-15	16-18	13-15	16-18	13-15	16-18	13-15	16-18	13-15	16-18
	Energy (K cal)	2450	2640	1748 (71.3)	1968 (74.5)	1635 (66.7)	1753 (66.4)	2055 (83.8)	2213 (83.8)	2111 (86.1)	2225 (84.2)	1887.2 (77.0)
Protein (gm)	70	78	46 (65.7)	64 (82.0)	66 (94.2)	71 (91.0)	52 (74.2)	46 (58.9)	55 (78.5)	64 (82.0)	54.7 (78.1)	61.2 (78.4)
Iron (mg)	41	50	18 (43.9)	18 (36.0)	26 (63.4)	28 (56.0)	26 (63.4)	28 (56.0)	32 (78.0)	36 (72.0)	25.8 (62.1)	27.5 (55.0)
Retinol (μ g)	600	600	222 (37.0)	140 (23.3)	433 (72.1)	452 (75.3)	431 (71.8)	439 (73.1)	486 (81.0)	489 (81.5)	393 (65.5)	380.0 (63.3)
Calcium (mg)	600	500	213 (35.5)	226 (45.2)	422 (70.3)	440 (88.0)	412 (68.6)	465 (93.0)	455 (75.8)	466 (93.2)	375.5 (62.5)	399.2 (79.8)
Thiamin (mg)	1.2	1.3	0.5 (41.6)	1.0 (76.9)	0.7 (58.3)	1.1 (84.6)	0.9 (75.0)	1.0 (76.9)	1.0 (83.3)	1.1 (84.6)	0.7 (58.3)	1.0 (76.9)
Riboflavin (mg)	1.5	1.6	0.4 (26.6)	0.9 (56.2)	0.4 (26.6)	0.7 (43.7)	0.8 (53.3)	1.1 (68.7)	1.4 (93.3)	1.4 (87.5)	0.7 (46.6)	1.0 (62.5)

Figures in parenthesis denote percentage of RDA met

**Nutritional composition of the diet of
Pre Adolescent Male in the farm families
(13 - 15 Years)**



1. Energy

2. Protein

3. Iron

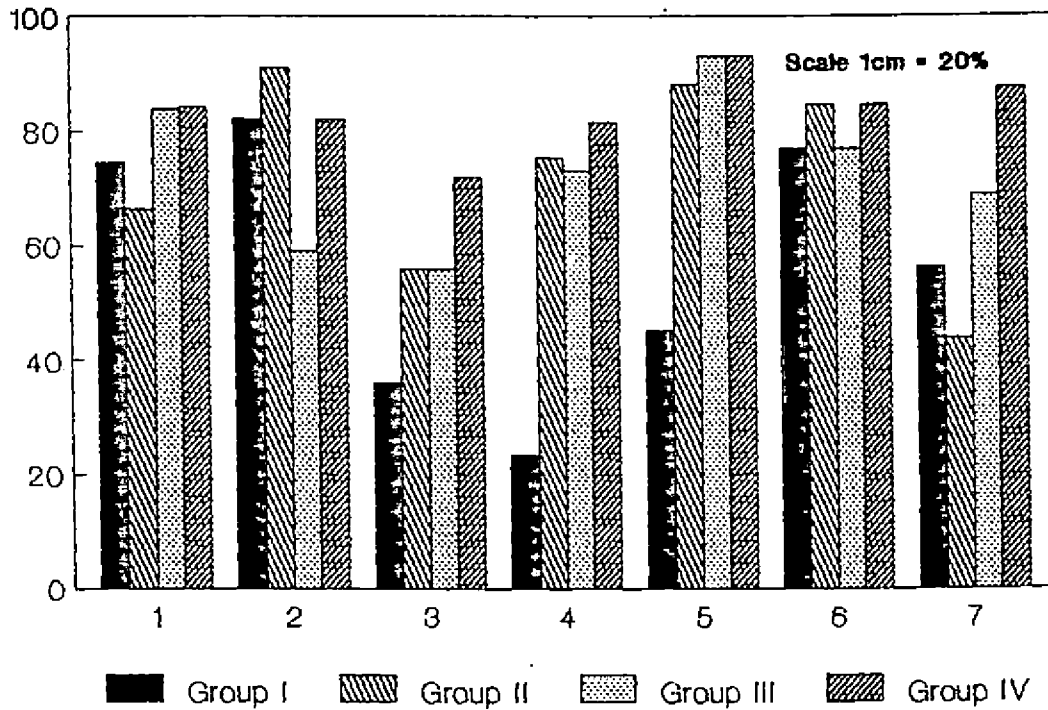
4. Retinol

5. Calcium

6. Thiamin

7. Riboflavin

**Nutritional composition of the diet of
Adolescent Male in the farm families
(16 - 18 Years)**



1. Energy
2. Protein
3. Iron
4. Retinol

5. Calcium
6. Thiamin
7. Riboflavin

As given in Table 39, the average intake of nutrients in pre-adolescent and adolescent male children of farm families depicted that intake of all the nutrients were below the recommended allowances, irrespective of the land holdings. Energy intake was 71.3, 66.7, 83.8 and 86.1 percent ^{of the R.D.A.} respectively in Group I, II, III and IV for male adolescents in the age group of 13½-15 years and 74.5, 66.4, 83.8 and 84.2 percent respectively in Groups I, II, III and IV for 16½-18 years old adolescents. Protein intake was 65.7, 94.2, 74.2 and 78.5 percent for 13½-15 years old adolescent and 82.0, 91.0, 58.9 and 82.0 percent for 16½-18 years old adolescent. The percentage of iron met was 43.9, 63.4, 63.4 and 78.0 percent respectively in Groups I, II, III and IV belonging to 13½-15 years, as against 36.0, 56.0, 56.0 and 72.0 percent respectively in Groups I, II, III and IV for 16½-18 years adolescents. Retinol intake was also found to be lesser than recommended allowances for adolescents in Group I (37.0 for 13½-15 years and 23.3 for 16½-18 years). Whereas for adolescents in Group II and Group III it was met 70-80 percent in

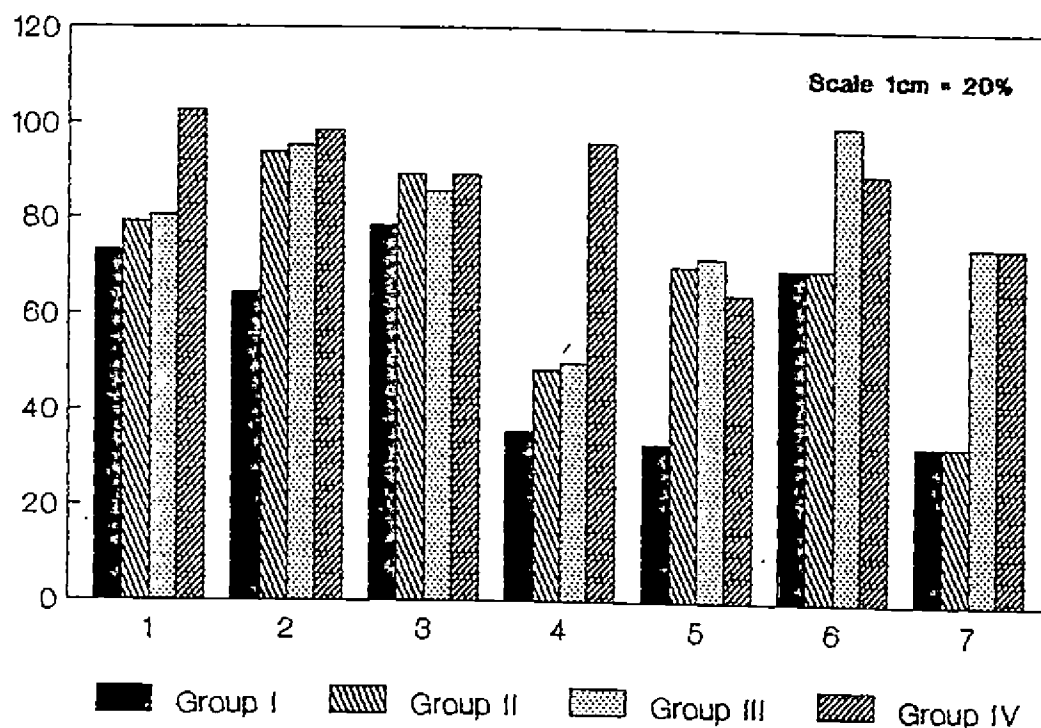
both the age groups. The calcium intake was very low in the adolescents of Group I (35.5 percent for 13-15 years and 45.2 percent for 16-18 years). However adolescents (13-15 years) were found to consume 60-80 percent calcium in Groups II, III and IV. Whereas the intake was 85-95 percent in the age group of 16-18 years. 41.6, 58.3, 75.0 and 83.3 percent thiamin intake in comparison with RDA was observed in the pre-adolescent males belonging to Groups I, II, III and IV respectively, as against 76.9, 84.6, 76.9 and 84.6 percent in adolescents of 16-18 years from the four groups. The riboflavin intake was very low in the pre-adolescents belonging to Groups I and II (26.6 percent each). Whereas it was 53.3 and 93.8 percent respectively in Groups III and IV. The percent of riboflavin met in adolescents were found to be 56.2, 43.7, 68.7 and 87.5 respectively for the adolescents belonging to Groups I, II, III and IV.

Table 40 Nutrient intake of the adolescent females in the farm families.

Nutrients	RDA		Group I		Group II		Group III		Group IV		Average intake of nutrients	
	13-15	16-18	13-15	16-18	13-15	16-18	13-15	16-18	13-15	16-18	13-15	16-18
Energy (Kcal)	2060	2060	1510 (73.3)	1549 (75.1)	1635 (79.3)	1753 (85.0)	1662 (80.6)	1882 (91.3)	2119 (102.8)	2360 (114.5)	1731.5 (84.0)	1886.0 (91.5)
Protein (gm)	65	63	42 (64.6)	45 (71.5)	61 (93.8)	66 (104.7)	62 (95.3)	67 (106.3)	64 (98.4)	68 (107.9)	57.2 (88.0)	61.5 (97.6)
Iron (mg)	28	30	22 (78.5)	23 (76.6)	25 (89.2)	28 (93.3)	24 (85.7)	29 (96.6)	25 (89.2)	28 (93.3)	24.0 (85.7)	27.0 (90.0)
Retinol (μ g)	600	600	213 (35.5)	240 (40.0)	291 (48.5)	332 (58.3)	300 (50.0)	324 (54.0)	577 (96.1)	739 (123.1)	948.2 (158.0)	408.7 (68.1)
Calcium (mg)	600	500	198 (33.0)	232 (46.4)	422 (70.3)	440 (88.0)	433 (72.1)	439 (87.8)	388 (64.6)	444 (88.8)	360.2 (60.0)	388.7 (77.7)
Thiamin (mg)	1.0	1.0	0.7 (70.0)	0.9 (90.0)	0.7 (70.0)	1.1 (110.0)	1.0 (100.0)	1.0 (100.0)	0.9 (90.0)	1.5 (15.0)	0.8 (80.0)	1.1 (110.0)
Riboflavin (mg)	1.2	1.2	0.4 (33.3)	0.6 (50.0)	0.4 (33.3)	0.7 (58.3)	0.9 (75.0)	1.0 (83.3)	0.9 (75.0)	1.1 (91.6)	0.6 (50.0)	0.8 (66.6)

Figures in parenthesis denote percentage of RDA met

**Nutritional composition of the diet of
Pre Adolescent Female in the farm
families (13 - 15 Years)**



1. Energy

2. Protein

3. Iron

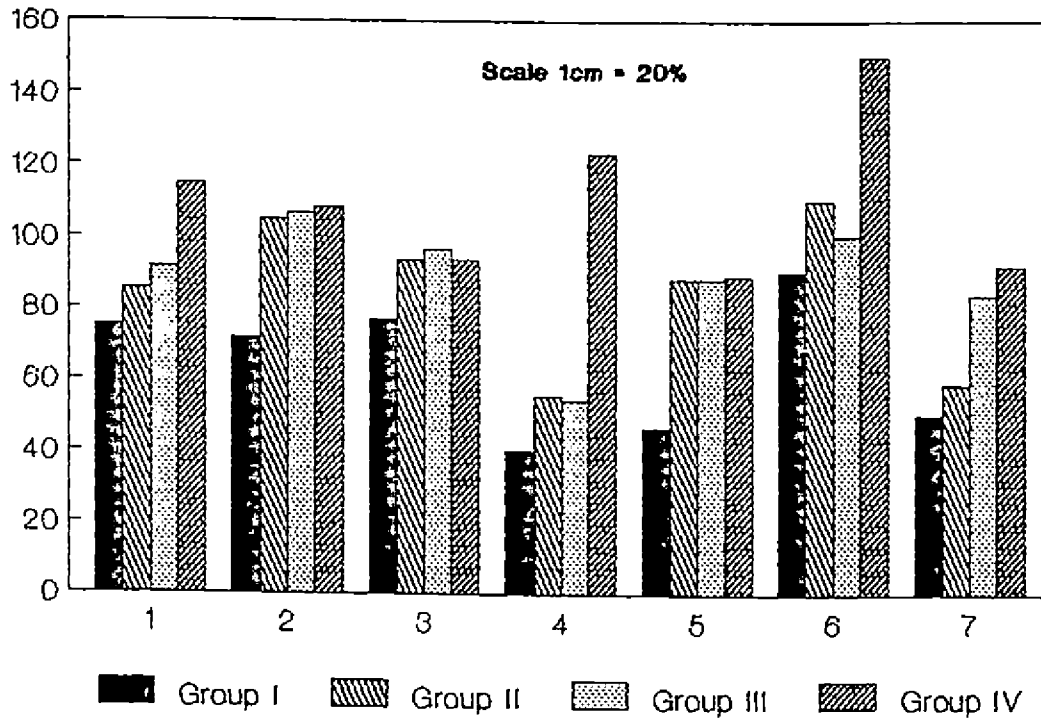
4. Retinol

5. Calcium

6. Thiamin

7. Riboflavin

Nutritional composition of the diet of Adolescent Female in the farm families (16 - 18 Years)



1. Energy

2. Protein

3. Iron

4. Retinol

5. Calcium

6. Thiamin

7. Riboflavin

Table 40 shows the average intake of nutrients in the female adolescent children of the farm families. The energy intake was below the recommended allowances in all groups of land holdings except in Group IV. 73.3, 79.3 and 80.6 percent respectively in Groups I, II and III for 13 to 15 years and 75.1, 85.0 and 91.3 percent respectively in Groups I, II and III for 16 to 18 years. The protein intake of the adolescents (16 to 18 years) met above the recommended allowances in Groups II, III and IV, whereas it was 71.5 percent in Group I. The protein intake of adolescent female of 13 to 15 years was met almost sufficiently except in Group I. Iron intake was found to be 78.5, 89.2, 85.7 and 89.2 percent for 13 to 15 years old adolescents, whereas it was 76.6, 93.3, 96.6 and 93.3 percent for 16 to 18 years in Groups I, II, III and IV respectively. Retinol intake was found to be very low in Groups I, II and III belonging to both the age groups. In Group IV the retinol intake was sufficient in both the age groups. Calcium intake was far below the recommended allowances in Group I. Whereas it was 60 to 70 percent in pre-adolescents belonging to Groups II, III

and IV. It was inadequate in 16 to 18 years old adolescents in Group I, ~~whereas~~ it was above 80.0 percent in other groups. Thiamin intake was found to be 70.0 percent in the pre-adolescent females belonging to Group I and Group II. Whereas in the adolescents of all the other groups, thiamin intake was sufficiently met. With regard to the riboflavin intake in the first two groups, it was insufficiently (33.3 percent each) met. Whereas in Groups III and IV, the percentage of RDA met was around 70.0 percent. Similarly in the adolescents of (16 to 18 years) belonging to Groups I and II, the percentage of riboflavin was above 50.0 percent, as against above 80.0 percent in Groups III and IV.

c. Clinical assessment of the farm families

Table 41 Percent score obtained by the farm families for clinical assessment.

Percent score obtained by adults		Group I	Group II	Group III	Group IV	Total
100	Male	70.0(7)	93.3(14)	83.3(10)	75.0(9)	81.6(40)
	Female	33.3(4)	45.4(5)	61.5(8)	69.2(9)	53.0(26)
95-99	Male	30.0(3)	6.6(1)	16.6(2)	8.3(1)	14.2(7)
	Female	58.3(7)	54.5(6)	38.4(5)	23.0(3)	42.8(21)
90-94	Male	-	-	-	16.6(2)	4.0(2)
	Female	8.3(1)	-	-	7.6(1)	4.0(2)
Total	Male	10	15	12	12	49
	Female	12	11	13	13	49
Percent score obtained by adolescents		Group I	Group II	Group III	Group IV	Total
100	Male	33.3(2)	66.6(2)	40.0(2)	71.4(5)	52.3(11)
	Female	50.0(2)	25.0(1)	33.3(1)	50.0(1)	38.4(5)
95-99	Male	50.0(3)	33.3(1)	60.0(3)	28.5(2)	42.8(9)
	Female	50.0(2)	50.0(2)	66.6(2)	50.0(1)	53.8(7)
90-94	Male	16.6(1)	-	-	-	4.76(1)
	Female	-	25.0(1)	-	-	7.76(1)
Total	Male	6	3	5	7	21
	Female	4	4	3	2	13

Figures in parenthesis denote number

Clinical signs and symptoms found in the family members were assessed.

Table 41 shows the percent score obtained by the adult and adolescent members of the farm families for clinical assessment. The maximum score that can be obtained by an individual for the clinical assessment ~~will is~~ hundred. 70.0, 93.3, 83.3 and 75.0 percent in the adult male members and 33.3, 45.4, 61.5 and 69.2 percent in the adult females belonging to Groups I, II, III and IV respectively were not found to manifest any clinical symptoms for deficiency diseases. ~~secured~~, 30.0, 6.6, 16.6 and 8.3 percent in adult male members and 58.3, 54.5, 58.4, 23.0 percent in adult females respectively in Groups I, II, III and IV, were coming under the score range of 95 to 99. 16.6 percent adult males in Group IV, 8.3 percent in Group I and 7.6 percent in Group IV, adult females obtained a score between 90 to 94.

In the case of adolescents 33.3, 66.6, 40.0 and 71.4 percent adolescent males respectively in Groups I, II, III and IV and 50.0, 25.0, 33.3 and 50.0

percent, ^{adolescent females} respectively in Groups I, II, III and IV for ~~adolescent females~~ secured maximum score for clinical assessment. 50.5, 33.3, 60.0 and 28.5 percent adolescent males and 50.0 percent each in Groups I, II and IV and 66.6 percent in Group III adolescent females were found to come under the score range of 95 to 99. 16.6 percent adolescent males in Group I and 25.0 percent adolescent females in Group II obtained a score between 90 to 94.

Table 42 Clinical symptoms observed in the adults of the farm families.

Clinical symptoms	Group I		Group II		Group III		Group IV		Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Vitamin B ₁	20.0 (2)	16.6 (2)	6.6 (1)	9.0 (1)	16.6 (2)	-	16.6 (2)	-	14.2 (7)	6.1 (3)
Vitamin C	-	-	-	-	-	-	8.3 (1)	-	2.0 (1)	-
Anaemia	-	16.6 (2)	-	27.3 (3)	-	15.3 (2)	-	15.3 (2)	-	18.3 (9)
Thyroid enlargement	-	16.6 (2)	-	-	-	-	-	-	-	4.0 (2)
Dental carries	10.0 (1)	8.3 (1)	-	9.0 (1)	-	7.6 (1)	-	7.6 (1)	2.0 (1)	8.1 (4)
Mottled enamel	-	16.6 (2)	-	9.0 (1)	-	15.3 (2)	-	7.6 (1)	-	12.2 (6)
Nil	76.0 (7)	25.0 (3)	93.3 (14)	45.4 (5)	83.3 (10)	61.5 (8)	75.0 (9)	69.2 (9)	81.6 (40)	51.0 (25)
Total	10	12	15	11	12	13	12	13	49	49

Figures in parenthesis denote number

Table 42 depicts the clinical symptoms ^{observed} among the adult male and female members of the farm families. Vitamin B deficiency was ~~observed~~ in 20.0 percent adult males in Group I, 6.6 percent in Group II, 16.6 percent each in Groups III and IV. Whereas in adult females, it was observed 16.6 percent ^{in Group I} and 9.0 percent in Groups II and III. Vitamin C deficiency symptoms was found only in Group IV adult males (8.3 percent). The percent of adult females suffering from anaemia was found to be 16.6 and 27.3 percent in Groups I and II and 15.3 percent each in Groups III and IV. None of the adult male members were found to suffer from anaemia. Thyroid enlargement was observed in 16.6 percent females in Group I. Dental caries was seen in adult females of all the groups, the percentage being 8.3, and 9.0 in Groups I and II and 7.6 percent each in Groups III and IV. Dental carries was observed among 10.0 percent adult male members in Group I and ^{the occurrence of} mottled enamel in adult females was 16.6, 9.0, 15.3 and 7.6 percent respectively in Groups I, II, III and IV.

Table 43 Clinical symptoms observed in the adolescents of the farm families.

Clinical symptoms	Group I		Group II		Group III		Group IV		Total	
	Male	Female	Male	Female	Male	Female	Male	Femal	Male	Female
Vitamin A	33.3(2)	-	-	-	40.0(2)	-	14.2(1)	-	23.8(5)	-
Vitamin B	16.6(1)	-	-	-	-	-	-	-	4.7(1)	
Vitamin C	-	-	33.3(1)	-	-	33.3(1)	14.2(1)	-	9.5(2)	7.6(1)
Anaemia	16.6(1)	50.0(2)	-	25.0(1)	-	-	-	-	4.7(1)	23.0(3)
Dental caries	-	-	-	50.0(2)	20.0(1)	33.3(1)	-	50.0(1)	4.7(1)	30.7(4)
Nil	33.3(2)	50.0(2)	66.6(2)	25.0(1)	40.0(2)	33.3(1)	71.4(5)	50.0(1)	52.3(11)	38.4(5)
Total	6	4	3	4	5	3	7	2	21	13

Figures in parenthesis denote number

Clinical symptoms found in the male and female adolescents are indicated in Table 43. Vitamin A deficiency symptoms were depicted by 33.3 percent adolescent males in Group I, 40.0 percent in Group III and 14.2 percent in Group IV, whereas none of the female adolescents depicted vitamin A deficiency symptoms. Vitamin B deficiency was found only among the male adolescents in Groups I (16.6 percent), II (33.3 percent) and IV (14.2 percent). While vitamin C deficiency was found among 33.3 percent adolescent females in Group III. Anaemia was detected among 16.6 percent adolescent males belonging to Group I, as against 50.0 percent and 25.0 percent in female adolescents of Groups I and II. Dental caries was ~~observed~~ among 50.0 percent each in Groups II and IV, 33.3 percent of female adolescents and 20.0 percent of male adolescent belonging to Group III.

d. Biochemical investigation of the farm families

Table 44 Haemoglobin level of adults and adolescents of the farm families

Haemoglobin level of adult members	Sex	Group I	Group II	Group III	Group IV	Total

Anaemic (< 12)	Male	-	-	-	-	-
	Female	16.6(2)	27.3(3)	15.3(2)	16.6(2)	18.3(9)
Non anaemic (12.1-16)	Male	100.(10)	100(15)	100(12)	100(12)	100(10)
	Female	83.3(10)	72.7(8)	84.6(11)	84.6(11)	81.6(40)

Total	Male	10	15	12	12	49
	Female	12	11	13	13	49

Haemoglobin level of adolescent members	Sex	Group I	Group II	Group II	Group IV	Total

(< 12)	Male	16.6(1)	-	-	-	4.7(1)
	Female	50.0(2)	25.0(1)	-	-	23.0(3)
Non anaemic (12.1-16)	Male	83.3(5)	100.0(3)	100.0(5)	100.0(7)	95.2(20)
	Female	50.0(2)	75.0(3)	100.0(3)	100.0(2)	76.9(10)

Total	Male	6	3	5	7	21
	Female	4	4	3	2	13

Figures in parenthesis denote number

Haemoglobin levels of the members of the farm families belonging to different land holdings are presented in Table 44. As revealed in the table, none of the adult male members were found to be anaemic. Whereas 16.6, 27.3, 15.3 and 16.6 percent female adults in Groups I, II, III and IV respectively were found to be anaemic. Anaemia was prevalent among 16.6 percent adolescent males in Group I and 50.0 and 25.0 percent adolescent females in Groups I and II respectively.

Table 45 Nutritional Status Index of the members
(adult and adolescent) of the farm families

Land holdings	Adult members		Adolescent members	
	Male	Female	Male	Female
Group I	18.5(10)	37.2(12)	39.6(6)	52.2(4)
Group II	17.5(15)	24.1(11)	52.3(3)	71.1(4)
Group III	28.1(12)	21.1(13)	28.5(5)	61.4(3)
Group IV	16.3(12)	41.4(13)	19.4(7)	72.0(2)
Total	49	49	21	13

Nutritional Status Index of the adult and adolescent members of the farm families were computed using the data on Weight, Height Body Mass Index, Haemoglobin level, Calorie and Protein intake. The average nutritional status index obtained for the adult and adolescent members were depicted in Table 45. As indicated in Table 45 the average nutritional status index of adult male members was 18.5, 17.5, 28.1 and 16.3 respectively from Groups I, II, III and IV, and 37.2, 24.1, 21.1 and 41.4 respectively from Groups I, II, III and IV for adult females.

The nutritional status index was 39.6, 52.3, 28.4, 19.4 respectively for adolescent males belonging to Groups I,II,III and IV and 52.2, 71.1, 61.4 and 72.0 respectively for adolescent females in Groups I, II,III and IV. The nutritional status index worked out for each individual is shown in Appendix VII.

DISCUSSION

DISCUSSION

The present study was carried out to assess the food habits, food consumption pattern and nutritional status of the members of the farm families. The socio economic status, agricultural practices, food habits and dietary pattern and nutritional status of these farm families were also ascertained.

Socio economic status of the families

Majority of the families (35.0 percent) surveyed were Hindus and nearly half of them belonged to the under privileged communities. Irrespective of the land holdings, the nuclear family system predominated in the families surveyed. Kumar (1982) in his study also observed that joint family system was not prevalent among the agricultural labourers. Sexena (1986) found that nuclear type families were better than the joint type families in health and development. Thus in the present study, majority of the families are in an advantageous position.

Family size is an important factor which greatly influences the development of children in all respects. (Devadas et al 1980). Another observation reported by Kumar et al (1976) was that family size has been shown to influence the nutrient intake of families of low socio economic group. Families with three or less children were observed to have better intake of calorie and protein than families with one or more children. On analysing the size of these farm families it was found that majority of the families were found to adopt small family norms. Families belonging to the smaller land holdings were comparatively small sized than the families belonging to ~~the~~ bigger land holdings. However very large sized families were not found ⁱⁿ any of the studied families of different land holdings. It is assumed that economic constraints, might have influenced the families in restricting the size of the families belonging to smaller land holdings. In majority of the families, 1 to 4 adult members were found with children of pre-adolescent and adolescent age groups.

Bhatia (1972) pointed out that the educational level of the parents, is a major factor which influences the growth and development of children. In the present study it is indicated that, the parents of larger land holdings were found to have better education than the parents of smaller land holdings, as many of them had undergone education upto college level. However majority of the parents, irrespective of the size of the land holdings had medium level of education. It is encouraging to note that none of the parents belonging to any groups were found to be illiterate.

Employment status of male and female members of the surveyed farm families indicated that majority of the male members belonging to the group of smallest land holdings were casual labourers, while majority in largest land holdings were found to have better employment status since they were employed in the government sector or in private sector. However majority of the female members, irrespective of their land holdings were found to be unemployed.

Monthly income of the farm families indicated that, more than 50.0 percent of the families belonging to the lowest land holdings, was found to have very meagre income of Rs.500 to 1000/- month. Whereas majority of the families in the larger land holding were found to have comparatively better monthly income above Rs.2000. It can be inferred that, farm families with larger land holdings were in an economically better position than the families of smaller land holdings as evidenced in this study. Laisamma (1992) had found in her study that family income was directly proportional to the number of persons employed in the family. However in majority of families belonging to all the categories, only one member was found to be employed. The study conducted among the farm families by Laisamma (1992) found two earning members in majority of the families.

On analysing the sources of income of these farm families it was observed as the size of the land holdings increased, contribution of the total income from agriculture was also found to be increased. Since the percent of income contributed from agriculture was 1 to 50 percent in 24,64,76 and 80 percent families respectively in Groups I,II,III and IV.

Expenditure pattern of the families studied indicated that in the group of smallest land holdings, more than 50 percent of the income was spent on food by majority of the families and as the size of the land holdings increased, the percent of income spent on food decreased. Quiogue (1970) supported this observation stating that lower the income, the higher was the percentage of income spent on food. Kasper and Hoppe (1981) had similar finding in their studies. They observed that poorest peasant farm families in Poland spent more on food stuffs. According to Ramadas moorthy et al (1983) nearly 84.0 percent of the family income was spent on food by rural house-holds in Hyderabad. According to Devadas and Easwaran (1986) the rural households in Tamil Nadu spent over 90.0 percent of their income on food.

Puhazhendi (1980) in his study on the standards of living of agricultural labourers in Nilgiri's district had found that expenditure on food was 67.45 percent of total expenditure followed by clothing and expenditure on social and religious functions ranked third. Irrespective of the land holdings,

majority of the families was found to spend upto 10 percent of their income for clothing, shelter, transportation, education and for fuel. However the families of smallest land holdings were found to spend higher percentage of income, for health than the families of bigger land holdings, which indirectly reflect the poor health status among the families of smaller land holdings.

A positive trend was observed among the families, with regard to savings. All the families irrespective of the land holdings saved a portion of their income, for future use and none of them were in debts. Laisamma (1992) in her study of agricultural labourers had also reported similar findings. In the present study, the families of larger land holdings were found to save more than the families of smaller land holdings. This could be attributed to their higher income and due to reduced expenditure on other necessities.

Exposure of the studied farm families to the various sources of communication indicated that families of larger land holdings were found to be highly

exposed to various communication sources compared to the families of the lower land holdings. However it was also observed that only negligible families were found in the very low exposure group, which could be attributed to the high literary rate of Keralites.

Agricultural practices of the families

Rajendran (1978) found a positive and significant relationship between size of land holdings and adoption of selected agricultural practices by farmers. Among the four categories of land holdings, paddy cultivation was observed only in the families belonging to the larger land holdings. However all the families irrespective of the land holdings were found to cultivate coconut. Arecanut cultivation was not found to be popular among the surveyed families. Since only negligible families were found to take up arecanut cultivation. Among the cultivators of paddy, majority of the farmers were found to utilize the produce fully at home. With regard to the coconut utilisation, families belonging to the larger land holdings, utilized coconut at partially at home, whereas families in the lowest land holdings utilized coconut fully at home.

This could be attributed to the fact that the production potential are less due to the smaller size of the holdings.

Menon and Prema (1976) reported that size of the holding has positive influence on creating a favourable attitude towards kitchen gardening. Cultivation practices of vegetables indicated that only few families were found to be interested in the cultivation of vegetables. Vegetables commonly cultivated were bittergourd, ladiesfinger, peas, brinjal and cucumber. Majority of the families belonging to the different categories of land holdings were found to cultivate roots and tubers, with exception of in Group I. Similarly the positive trend was noted among the different categories of the families with regard to fruit cultivation. This could be attributed to the fact that cultivation of fruit crop does not require much care. Among the four categories of land holdings, cultivation of green leafy vegetables was found to be appreciable.

Utilisation of farm produce by the farm families revealed that majority of the families belonging to

higher land holdings utilize the produce such as vegetables and green leafy vegetables fully at home. Whereas in Group I, utilisation of farm produce was less. It was noted that the utilisation of roots and tubers produced at home was found to be less in Group I and IV, whereas it was found to be above 50 percent in Groups II and III. It is encouraging to note that the fruit produced are fully utilized by majority of the families irrespective of the land holdings.

Food habits and dietary pattern of the families

Food habits differ from group to group because each group has its own evolution which was set up ^{by} a complex pattern of standardised behaviour. Individuals within a culture responds to the approved behaviour pressure by selecting, consuming and using those foods which are available.

On assessing the food habits of farm families indicated that, all of them were non-vegetarian.

Expenditure pattern of the farm families surveyed indicated that, families spent more money for

the purchase of cereals, being higher in the families of smaller land holdings than in the bigger land holdings. The percentage of income spent for the purchase of pulses by the families ^{was found} to be 1 to 5 percent. Similarly the income spent for the purchase of vegetables, nuts and oil seeds, spices, sugar and jaggery and beverages were found to be 1 to 5 percent in the families of smaller land holdings. Whereas families belonging to higher land holding spent more amount for the purchase of vegetables. Green leafy vegetables are inexpensive source of many nutrients essential for growth and maintenance of normal health.

(ICMR - 1987) The deficiency of vitamin A, vitamin B₁, vitamin B₂ and vitamin C is reported to be uprooted by the inclusion of green leafy vegetables in the daily diet (Sadasivan et al 1980). Majority of the families were found to incur less than one percent for green leafy vegetables, and for egg and meat. The expenditure incurred for the purchase of fish was found to be 6 to 10 percent in the families of smaller holdings, whereas families of bigger land holdings were found to spend comparatively lesser

~~income~~ for the purchase of fish (1 to 5 percent). Alanberg (1973) found that, the higher the income, larger the percentage of income spent on fruits, vegetables and other variety of food items.

Earlier studies conducted by Lina and Reddy (1984) revealed that a typical rural Kerala dietary pattern, would be based on rice, fish, tapioca and coconut. With regard to the frequency of consumption of foods among the four groups of land holdings indicated that maximum frequency score was obtained for cereals, vegetables, milk, fish and sugar in the four groups. Thus most frequently used food items were found to be cereal, vegetables, fish, milk and sugar among the 4 categories of land holdings. Medium frequently used foods were roots and tubers in Group I. Whereas roots and tubers and fruits were in this category in Group II, fruits alone in Group III and pulses, fruits and egg in Group IV. Less frequently used food items were found to be green leafy vegetables, meat, and bakery items in all the 4 groups apart from fruits, pulses and egg in Group I and pulses and egg in Group II and III and roots and tubers in Group IV.

Meal frequency of the farm families indicated that majority of the families followed three meal pattern. George (1987) and Jayasree (1987) who had found a three meal-a-day system in the rural households in Thiruvananthapuram.

Foods included in the daily menu indicated that, families of larger land holdings included better combination for breakfast than in the families of smaller holdings. For lunch, families of smaller holdings, included fish along with cereals and pulses. Whereas families of large holdings included other non vegetarian items such as meat or egg instead of fish. Mathias (1971) 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. Hai (1983) had reported that food served at lunch should help to balance the nutrient intake for the body. Ideal lunch and dinner are expected to contain cereal and pulse preparation along with vegetables, milk, egg and fruits. On the contrary for dinner, irrespective of the land holdings, majority of the families included cereal fish combination.

Common cooking methods adopted by the farm families, were the ones that helped to increase the acceptability of the particular food among the family. Among the different cooking methods, boiling was the common method adopted among families of smaller land holdings. Whereas modern methods of pressure cooking was found to be popular among the families of larger land holdings. Suja (1989) in her study revealed that, the common cooking methods adopted among the agricultural labourers was boiling. Laisamma (1992) found that unscientific cooking methods were found to be followed among the agricultural labourers.

Most common preservation method adopted among these farm families were found to be drying and storing in tight container for cereals and pulses among the families studied. However families belonging to the smaller land holdings were not found to preserve cereals and pulses. Preservation by refrigeration was observed among the families of larger land holdings for fruits and vegetables. However the percent was less. Majority of the families were not found to preserve meat and fish. Suja (1989) and Laisamma (1992)

in their study also revealed that majority of the agricultural labourers did not preserve foods as they are purchasing the same daily.

Foods provided in the different stages of life cycle, it was seen that, special foods were found to ^{be} include_o in the diet of the infants belonging to the families of different land holdings. However majority of the families irrespective of the land holdings were not found to provide special foods for preschool and school going children. Bhat and Dahin (1985) had indicated that majority of the Indian children received only ordinary home diets and these diets were deficient in many nutrients like vitamin A and iron. Families belonging to the smaller land holdings were not found to provide special foods to pregnant and lactating mothers, whereas majority of the families of larger land holdings were found to provide special foods to pregnant and lactating mothers. 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.

The correlation co-efficient for socio economic variables, size of land holdings, and expenditure pattern indicated that, the family size was found to be a determining factor in the expenditure pattern on foods as well as that on staple food viz cereals in all the groups of land holdings.

Nutritional status of the families

Nutritional status of the members of the farm families were assessed by collecting information on anthropometric measurements, actual food intake, clinical examination and biochemical investigation.

The results of anthropometric observations indicated that weight for age profile of all the adult males irrespective of land holdings were below the ICMR standard. However the average weight for age of the male members were found to be higher in the families of larger holdings as in land holding. In contrast to the weight for age of the adult males, weight for age of the adult females were found to be above ICMR standard in all the three groups except in the group of lowest land holdings.

The average weight for age profile of pre-adolescents (both male and female) and adolescents (both male and female) belonging to all the four categories of land holdings were found to be below the standard suggested by ICMR (1989). It was also observed that weight for age profile of the adolescent children of both male and female does not vary much with size of the land holding. Morley (1968) found that in Nigerian farm families, more children with standard weight for age measurements came from the families with larger land holdings.

Based on the grades of malnutrition more than fifty percent of the male and female adult members observed to be in the normal group. A major observation in the present study is that, the percentage of respondents coming in the normal group was higher in the families of larger land holdings and compared to the male members, female members were found to be healthier. Severe forms of malnutrition was not observed in any of the adult members of different land holdings. Compared to the adult members, less number of adolescents were found in the normal group of malnutrition. Majority of the male and female adolescents

were found to be in Grade I malnutrition. However severe forms of malnutrition was not observed both in male and female adolescents also. Mony (1993) in her study revealed that ^{more} adolescent boys ~~were~~ ^{from} Grade I and Grade II malnutrition were more when compared to the adolescent girls.

Average height for age profile of the adult male was 164.8 cm and ^{that of} adult female was 154.7 cm. Height for age profile of the pre-adolescents as well as the adolescents belonging to all the four groups of land holdings were below standard suggested by NCHS (1977). Size of land holdings was not found to influence the height for age profile as indicated in the present study. According to Seaoane and Latham (1971) height is primarily a reflection of cumulative or past nutritional status, and thus in the present study it can be inferred that members of these farm families do not have malnutrition in the early period.

According to the Body Mass Index which is a measure of Chronic Energy Deficiency, 57.0 percent

of adult males and 61.0 percent of adult females were found in the normal group which again confirmed that female adult members were healthier. Mild to moderate chronic energy was observed 16 and 18 percent respectively in adult male and female belonging in all the four groups of land holdings. The percentage of adolescents coming in the normal group of chronic energy was found to be less when compared to the adult members in the surveyed families. Majority of the families belonged to moderate type of Chronic Energy Deficiency.

From the above findings it can be concluded that adult members of the farm families were found to be better in anthropometric measurements than the adolescent members and many of the anthropometric measurements of adult members were higher among the members of the larger land holdings, but this difference was not noted in the adolescent children.

Actual food intakes of the farm families revealed that, cereal, fish and fruit consumption of the male and female adult members belonging to

different groups of land holdings were found to be higher than the suggested RDA. It was also seen that the percentage of RDA met for cereals and fish was higher in females than in males in all the four groups. An increasing trend ^{in the consumption of cereals} was observed among adult male and female members with larger land holdings. Even though the consumption of pulses by the adult members of all the four categories was below the prescribed recommended allowances, pulse consumption was also observed higher in the families of larger land holdings. Consumption pattern of adolescents indicated that cereals, pulses, fish and fruits consumption was appreciable.

The consumption of green leafy vegetable was found to be least in both male and female adult members irrespective of the land holdings. Here also comparatively better consumption of green leafy vegetables was observed among the families of the larger land holdings. Better consumption of green leafy vegetables were observed in adolescents (both male and female) when compared to the adult members, though it was below the RDA.

Consumption of other vegetables were below the RDA in adults as well asⁱⁿ adolescents. The percentage of RDA met was found to be higher with larger land holdings.

A notable feature in the consumption trend in roots and tubers among the adult members of surveyed families^{was} that, families belonging to the smaller land holdings included more roots and tubers in their dietaries than the families of the larger holdings.

Among the adult members (male and female) the consumption of milk was below the prescribed standard in the first two groups of land holdings as against appreciable consumption in the families of larger land holdings. Similarly among the adolescents (male and female) too the milk consumption was very meagre in the first two groups. Whereas it was almost met in other two groups. Fats and oil, and sugar and jaggery were met in all the groups irrespective of land holdings in adult male members and adolescents. 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.

Nutrient intake of the family members indicated that energy intake of the adult male members were below the RDA in all the four groups of land holdings, whereas it was sufficiently met in the adult females except in Group I. However in both male and female adolescents energy intake was below the RDA in all the groups except in the adolescent females of Group IV. Aujla et al (1983) reported that, calories were consumed below the body requirements in low income labour class categories in Punjab. Protein intake was insufficiently met in adult male members belonging to Group I and Group II and adult females belonging to Group I only. In the case of adolescents, average protein intake was met insufficiently in the male children and almost sufficiently in female children. Wong (1985) observed that, a tendency for including more protein foods, in the dietaries as the family income increases.

Iron intake was also found to be sufficient in adult male members whereas it was insufficient in adult

females. Vitamin A (retinol) and calcium was insufficiently met in both male and female members in all groups of land holdings. Thiamin and riboflavin intake was appreciable in adult male members whereas it was insufficient in female members.

The average nutrient intake of the pre-adolescent as well as adolescents were found to be below the recommended allowances in all the four groups of land holdings. Intake of all the nutrients were met in a better way in the female adolescents when compared to male adolescents. Laisamma (1992) in her study revealed that, the consumption of nutrients were better in the case of female agricultural labourers than the male agricultural labourers.

Clinical examination of people forms an important practical method for the assessment of the state of nutriture of a community. Clinical examination of the members of the farm families revealed that, compared to the adult and adolescent female members, adult and adolescent male members were found to be free from the clinical manifestation of deficiency disease. Results

also indicated that the land holding does not found to have any impact on the occurrence of deficiency diseases.

Major clinical symptoms observed among the members of the farm families were B complex deficiency, anaemia, dental caries, and mottled enamel. Occurrence of B complex deficiency was more in adult males. However 18.3 percent of the adult females were found to be anaemic. Likewise, occurrence of thyroid enlargement, dental caries and mottled enamel were more in adult females.

Among the adolescents clinical manifestation observed were vitamin A, vitamin B, vitamin C and anaemia and dental caries. Gupta and Sexena (1977) reported that vitamin A deficiencies were noted among the adolescents. In the present study anaemia and dental caries were more in adolescent females. High incidence of dental caries was reported from Kerala. (NNMB - 1984) vitamin C deficiency was more in adolescent males than the adolescent females.

Haemoglobin level of the adult and adolescent members indicated that, majority of them have normal haemoglobin level ranging from 12.1 to 16 g/100 ml. (non anaemic). Compared to male members, more female members were low haemoglobin levels (anaemic) Laisamma (1992) in her study also revealed that, haemoglobin level was better among the male labourers than the female labourers.

Nutritional Status Index does not vary much with land holding. The present study clearly indicated that, size of land holding does not have much effect on the Nutritional Status Index of the members of the farm families.

SUMMARY

SUMMARY

The study entitled "Food consumption pattern of selected farm families in Thiruvananthapuram District" was conducted among the families in Venganoor Panchayath, Thiruvananthapuram. The study undertaken threw light on the socio-economic status, agricultural practices, food consumption and dietary habits and nutritional status of the farm families.

Majority of the families belonged to Hindus community predominated by forward class with nuclear type small sized families. Majority of the families were found to have pre-adolescent and adolescent aged children. Majority of the members of families irrespective of the land holdings were found to have medium level of education. Many of them were employed as casual labourers in the families of smaller land holdings, whereas in bigger land holding, many of them were found to^{be} government employees or employed in private sector.

Higher monthly income was ~~observed~~ among the families of larger holdings, compared to the families of smaller land holdings. As the size of the land holding increased, the contribution^{of} income from the agriculture was also found to be increased.

Expenditure pattern of the families indicated that, in the families of smallest land holdings, more than 50 percent of the income was spent on food, and as the size of the land holdings increased, the percent of income spent on food decreased. Irrespective of the size of the ^{land} holding, ^{families} were found to incur around 10 percent of their income for clothing, shelter transportation, education and fuel. However families belonging to smaller holdings were found to spend more on health, indicating their poor health status. It is encouraging to note that, all the families of irrespective of the land holdings were found to save a portion of their income for future use.

Exposure of the studied farm families to various sources of communications media indicated that, families of larger holding were found to be highly exposed for various means communications.

On assessing the agricultural practices of these families indicated that, paddy cultivation was observed only in farm families of larger holdings and majority of the produce were found to be utilized at home. All the families irrespective of the land holdings were found to cultivate coconut and larger holdings found

to produced the surplus which is used as a source of income. The arecanut cultivation was not found to be popular among the surveyed families.

Only few families were found to take up vegetable^{cultivation}. The commonly cultivated vegetables are bitter-gourd, ladiesfinger, peas, brinjal and cucumber. Except in Group I all other groups were found to cultivate roots and tubers. Positive trend was noted among the different categories of families with regard to fruit cultivation. Majority of the families belonging to higher land holdings were found to utilize the vegetables including green leafy vegetables, cultivated, at home. Fruit produced were also found to be utilized at home.

Expenditure pattern of the farm families on various food articles indicated that, families of small land holdings were^{found to} spend more money on staples. The purchase of pulses by the families^{was found} to be 1 to 5 percent. The income spent for the purchase of vegetables, nuts and oil seeds, spices, sugar and jaggery and beverages were found to 1 to 5 percent and fish was found to 6 to 10 percent ~~in~~ the families of smaller holdings. Expenditure^{on} food items like bakery, egg

and meat found to negligible in the diet of among the surveyed farm families.

Most frequently used food items were found to be cereals, vegetables, fish, milk and sugar in all the four categories of families.

Majority of the families followed three meal pattern.

Foods included in the daily meal pattern indicated that families of larger holdings included better food combination for daily meals.

Simple cooking method was adopted in the surveyed farm families and majority of the families were not found to preserve foods when there is a surplus.

Food provided during different stages of life cycles indicated that, special foods were provided for the infants by the families of all the four categories of land holdings however, families of larger holdings were found to provide special foods for pregnant and lactating mothers.

The correlation co-efficient for socio-economic variables size of land holdings and expenditure pattern indicated

that, the family size was found to be^a determining factor in the expenditure pattern on foods as well as that^g staple foods viz cereals, in all the groups of land holdings.

Weight for age profile indicated that adult female in group I, adult male in all^{the} groups, and adolescents (male and female) were below the standard prescribed.

Based on the grades of malnutrition more than fifty percent of the male and female adult members observed to be in the normal group. However compared to the male members, female members were found to be healthier. Majority of the male and female adolescents were found to be in Grade I malnutrition and compared to the adult members, less member of adolescents were found to beⁱⁿ normal group.

Average height for age profile of the adult male was 164.8 and that for female was 154.7 cm. Height for age profile of adolescents belonging to all the four groups of land holdings were below the NCHS standards.

According to Body Mass Index majority of the male and female members were found to be in the normal group of chronic deficiency. The percentage of adolescents coming in the normal group of Chronic Energy Deficiency was found to be less when compared to the adult members in the surveyed families and majority belonged to moderate type of Chronic Energy Deficiency group.

Actual food intake of the members of the farm families revealed that cereals, fish and fruit consumption was appreciable in adult members of the farm families. In addition to the above food articles, consumption of pulses were also satisfactory in adolescents.

Better consumption of green leafy vegetable was observed in adolescents when compared to the adult members, though it was below the RDA. The consumption of other vegetables was below the RDA both in adults and adolescents. However compared to the families of larger holdings, families of smaller holdings were found to include more amount of roots and tubers in the average *daily diet*

Nutrient intake revealed that, energy intake of the adult male members were below the RDA and in females it was met sufficiently except in adult females in Group I.

Protein intake was insufficiently met in the adults belonging to smaller land holdings and also in male adolescents.

Nutrients such as iron, B-complex were met satisfactory in adults, where as it was insufficiently met in adult females. Average nutrient ^{intake} of the pre-adolescent as well as adolescents were found to be below the recommended ^{allowance} in all the four groups of land holdings.

Clinical examination of the farm families revealed that, both adult and adolescents were found to be free from the clinical manifestation of deficiency disease except in the case of anaemia in females.

B-complex deficiencies, vitamin A deficiencies were some of the clinical manifestations observed in adults and adolescents of the farm families apart from dental caries and thyroid enlargement.

Majority of the adult and adolescents were found to have normal haemoglobin level. Compared to male members, female members were found to have low haemoglobin levels.

Nutritional Status Index indicated that, size of land holding does not have much affect on the Nutritional Status Index of the members of the farm families.

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APPENDICES

APPENDIX I

Kerala Agricultural University

College of Agriculture

Department of Home Science, Vellayani

Name of the investigator : JAYANTHAKUMARI. S

"Food consumption pattern of selected farm families
in Thiruvananthapuram District".

Socio-economic status of the families

1. Name of the respondent
2. Name of the head of the family
3. Full address
4. Religion
5. Caste
6. Type of the family
7. Family size
8. Number of adults in the family
9. Number of children in the family
10. Educational status of male and female members in the family

11. Employment status of male and female members in the family.
12. Total monthly income in the family.
13. Number of earning members in the family
14. Income from Agriculture
15. Monthly expenditure pattern in the family.
 - (i) Food
 - (ii) Clothing
 - (iii) Shelter
 - (iv) Transportation
 - (v) Education
 - (vi) Recreation
 - (vii) Health
 - (viii) Fuel
 - (ix) Luxury items
 - (x) Savings
 - (xi) Debt
16. Exposure to Mass media

APPENDIX II

Kerala Agricultural University

College of Agriculture

Department of Home Science, Vellayani

Name of the investigator : JAYANTHAKUMARI. S

"Food consumption pattern of selected farm families
in Thiruvananthapuram District".

Agricultural practices of the families

1. Details of land holding
2. Details of paddy cultivated
3. Utilisation of paddy produced
4. Income from paddy sold
5. Details of coconut cultivated
6. Utilisation of coconut harvested
7. Income from the sale of coconut
8. Details of arecanut cultivated
9. Income from the sale of arecanut
10. Details of roots and tubers cultivated

11. Details of roots and tubers utilized at home
12. Income from the sale of roots and tubers
13. Details of vegetable cultivated
14. Vegetable grown
15. Vegetable utilized at home
16. Income from the sale of vegetables
17. Details of green leafy vegetables cultivated
18. Green leafy vegetables utilized at home
19. Income from the sale of green leafy vegetables
20. Details of plantain cultivated
21. Plantain utilized at home
22. Details of fruits cultivated
23. Fruits cultivated at home
24. Fruits utilized at home
25. Income from the sale of fruits.

APPENDIX III

Kerala Agricultural University

College of Agriculture

Department of Home Science, Vellayani

Name of the investigator : JAYANTHAKUMARI. S

"Food consumption pattern of selected farm families
in Thiruvananthapuram District".

Food habits and dietary pattern of the families

1. Food expenditure pattern of the families

- (i) Cereals
- (ii) Pulses
- (iii) Vegetables
- (iv) Green leafy vegetables
- (v) Roots and tubers
- (vi) Fruits
- (vii) Egg
- (viii) Meat
- (ix) Fish
- (x) Fats and oils

- (xi) Nuts and oil seed
- (xii) Spices
- (xiii) Sugar and jaggery
- (xiv) Beverages

2. Frequency of using different food items

- (i) Cereals
- (ii) Pulses
- (iii) Roots and tubers
- (iv) Vegetables
- (v) Green leafy vegetables
- (vi) Fruits
- (vii) Milk and milk products
- (viii) Egg
- (ix) Fish
- (x) Meat
- (xi) Sugar
- (xii) Jaggery
- (xiii) Bakery items

3. Meal frequency among the families

- (i) 4 items
- (ii) 3 items

4. Family diet for one day

- (i) Break fast
- (ii) Lunch
- (iii) Evening tea
- (iv) Dinner

5. Cooking methods followed for various food items

- (i) Cereals
- (ii) Pulses
- (iii) Roots and tubers
- (iv) Vegetables
- (v) Green leafy vegetables
- (vi) Egg
- (vii) Meat
- (viii) Fish
- (ix) Milk
- (x) Nuts and oil seeds

6. Preservation methods used for the various food items.

- (i) Cereals
- (ii) Pulses
- (iii) Vegetables

(iv) Fruits

(v) Meat

(vi) Fish

7. Foods given to different stages of life cycle.

(i) Special foods given to infancy

(ii) Special foods given to preschool children

(iii) Special foods given to school children

(iv) Special foods given to pregnant women

(v) Special foods given to lactating mother.

APPENDIX IV

Family and Individual food consumption survey weighment method

Name of the investigator : Serial No :
 Name of the respondent : Address :
 Age of the respondent : Date :

Food Consumption

Name of the meal	Menu	Weight of the total raw ingredients used by the family (g)	Weight of the total cooked food consumed by the family (g)	Amount of cooked food consumed by the respondent(g)	Raw equivalents used by the individuals (g)
1	2	3	4	5	6
Breakfast					
Lunch					
Evening Snack					
Dinner					

APPENDIX V

Kerala Agricultural University

College of Agriculture

Department of Home Science, Vellayani.

"Food consumption pattern of selected farm families
in Thiruvananthapuram District".

Nutritional Assessment Schedule

Serial No

Name of respondent

Age

Anthropometry

1. Weight
2. Height

Clinical examination

1. Parotid enlargement
2. Oedema
3. Emaciation
4. Marasmus

5. Conjunctival xerosis
6. Bitot's spots
7. Corneal xerosis/Keratomalacia
8. Night blindness
9. Photophobia
10. Anaemia
11. Naso-labial dyssebacea
12. Angular stomatitis
13. Cheilosis
14. Tongu-red and raw
15. Atrophic lingual papillae
16. Pellagra
17. Craz pavement dermatosis
18. Pigmentation of knuckles/fingers/toes
19. Phrynderma
20. Koilonychia
21. Gums-spongy bleeding
22. Knock-knees or bow legs
23. Frontal and parietal bossing
24. Teeth caries
25. Mottled enamel
26. Enlargement of spleen
27. Enlargement of liver

Soft

Firm

Hard

28. Thyroid enlargement

APPENDIX VI

Haemoglobin - Cyanmethaemoglobin method

Principle

Haemoglobin is converted into cyanmethaemoglobin by the addition of potassium cyanide and ferricyanide. The colour of the cyanmethaemoglobin is read in a photoelectric calorimeter at 540 nm against a standard solution. Since cyanide has the maximum affinity for haemoglobin. This method estimates the total haemoglobin.

reagent

Drabkin's solution : Dissolve 0.05g of potassium cyanide, 0.20g of potassium ferricyanide and 1.0g of sodium bicarbonate in 1 litre of distilled water.

Procedure

20 μ l 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 tubes and take the readings in a photoelectric calorimeter. The reagent blank (Drabkin's diluent) is adjusted to zero.

Construction of standard curve

If the blood drawn from the subject contain haemoglobin 15g/dl after estimation then prepare three reference standards as follows:-

1. Reference standard A.

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

2. Reference standard B.

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

3. Reference standard C.

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

Individual Nutritional Status Index

Sl. No.	<u>Group I</u>			<u>Adult Male</u>			
	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
1.	50.0	168.0	17.73	14.8	2056.71	51.34	17.50
2.	54.5	161.0	20.84	13.9	2494.16	81.94	19.28
3.	48.1	156.0	19.79	14.2	1952.96	75.38	19.00
4.	65.0	165.0	23.89	14.6	2611.40	86.88	17.91
5.	61.2	164.3	22.85	13.2	2456.54	74.25	18.25
6.	52.0	168.0	18.43	13.1	2532.70	58.18	18.97
7.	68.0	163.0	25.66	15.11	2126.43	60.38	20.14
8.	40.0	172.1	13.55	14.1	2048.32	55.74	17.52
9.	50.0	166.0	18.18	15.0	2216.08	53.93	18.05
0.	47.0	167.0	16.9	13.3	2130.41	61.77	18.68

Adult Female

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
1.	38.5	160.0	15.03	12.4	1851.95	47.45	38.19
2.	54.5	142.0	27.11	14.2	2032.81	64.13	36.76
3.	42.3	148.20	19.31	12.9	1743.69	67.02	36.76
4.	42.0	155.0	17.5	13.2	2355.98	74.17	38.67
5.	52.1	152.1	22.5	13.0	2170.36	63.37	35.94

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
6.	55.0	165.5	20.2	14.0	1928.43	60.78	37.2
7.	66.0	159.0	26.19	14.8	2080.54	58.74	39.95
8.	38.0	144.3	18.35	12.0	1842.88	49.33	36.72
9.	46.2	147.0	21.4	13.5	2085.11	53.76	38.48
10.	40.0	163.0	15.09	14.2	2280.13	69.46	35.46
11.	60.0	161.0	23.16	14.7	2136.14	61.74	37.2
12.	48.0	158.0	19.27	15.8	2049.61	70.36	35.35

Adolescent Male

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
1.	43.2	152.0	18.70	12.4	1207.94	35.25	41.68
2.	39.5	155.5	16.40	11.5	2140.71	69.78	38.60
3.	36.0	146.5	16.90	10.5	2216.43	51.37	37.02
4.	37.0	154.0	15.61	12.6	2240.41	47.74	38.87
5.	37.5	146.0	17.6	11.2	2208.11	49.27	38.65
6.	47.5	162.0	18.2	13.0	1354.58	57.94	42.72

Adolescent Female

Sl. No.	Weight	Height	Body Mass Index	Haemo-globin	Energy	Protein	Nutritional status
1.	46.0	145.5	21.9	12.7	1448.42	39.02	54.12
2.	43.0	154.5	18.14	12.0	1365.12	50.56	52.45
3.	45.0	152.0	19.48	12.5	1832.47	45.67	53.69
4.	39.5	150.0	17.55	10.8	1510.37	42.11	48.61

Group II

Adult Male

Sl. No.	Weight	Height	Body Mass Index	Haemo-globin	Energy	Protein	Nutritional status
1.	47.0	172.0	15.93	14.1	2261.52	54.50	17.57
2.	43.5	170.5	15.05	15.8	1984.36	49.68	15.81
3.	51.0	165.0	18.81	13.2	2711.15	85.50	16.28
4.	49.5	161.0	19.11	14.7	2076.78	69.43	17.84
5.	52.0	165.0	19.11	13.3	2452.93	86.54	16.72
6.	54.0	159.0	21.42	13.0	2780.32	53.03	18.46
7.	51.0	173.0	17.05	15.0	2645.34	58.94	18.41
8.	65.0	169.0	22.80	13.1	2432.04	67.42	18.14
9.	58.1	162.5	22.17	15.6	1924.38	50.46	17.99
10.	55.0	167.0	19.78	14.5	2040.18	48.76	17.31
11.	71.2	161.0	27.5	15.0	2121.76	56.00	18.20

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
12.	55.2	160.0	21.58	13.8	1832.00	52.17	17.50
13.	59.0	170.5	20.41	16.0	1848.48	89.43	16.00
14.	42.0	158.0	46.86	15.4	2142.78	81.14	19.00
15.	49.0	157.0	19.91	15.2	2325.43	72.43	17.01

Adult Female

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
1.	47.2	152.0	20.45	13.7	1984.90	48.47	23.40
2.	40.0	159.5	15.87	11.0	2384.17	72.32	24.86
3.	42.0	162.0	16.03	11.4	2302.45	81.35	22.78
4.	62.0	145.0	29.52	13.5	2379.88	46.77	24.06
5.	39.0	150.5	17.33	13.0	2223.95	44.25	22.94
6.	46.5	155.0	19.37	14.8	1734.08	58.34	22.55
7.	56.0	158.0	22.48	14.2	2432.18	51.38	24.56
8.	60.0	148.0	27.39	13.7	2328.18	73.42	23.43
9.	45.0	157.0	18.29	14.2	2239.42	49.79	25.66
10.	64.0	159.0	25.39	12.1	2432.76	62.43	25.15
11.	51.0	151.0	22.36	14.3	2321.01	59.79	25.61

Adolescent Male

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
1.	40.0	151.5	17.54	12.3	1635.10	81.43	49.75
2.	43.5	162.0	16.6	14.1	1704.71	58.92	52.91
3.	47.5	157.0	19.30	13.5	1800.40	72.12	54.32

Adolescent Female

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
1.	38.5	148.0	17.57	12.5	1842.08	39.05	71.13
2.	44.0	155.5	18.33	12.1	1317.16	49.08	70.62
3.	47.0	145.0	22.38	13.0	1811.74	59.60	75.08
4.	37.5	149.0	16.89	11.7	1345.67	47.81	67.69

Group III

Adult Male

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
1.	55.0	168.0	19.5	14.2	1963.26	40.02	27.28
2.	58.5	166.0	21.27	14.6	1948.12	39.72	28.57
3.	65.5	159.0	25.99	13.1	2337.60	83.98	27.56
4.	41.5	168.0	14.71	15.51	2201.39	75.97	28.93

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
5.	60.0	146.50	28.16	14.2	2202.60	47.73	26.83
6.	47.0	163.0	17.7	13.4	2205.86	28.39	29.81
7.	69.0	158.0	27.71	16.1	2712.96	71.28	27.87
8.	52.5	160.0	20.5	14.3	2150.18	35.18	29.50
9.	48.5	158.0	19.47	13.7	2500.00	41.93	27.37
10.	52.5	174.0	17.21	15.0	2705.98	39.57	31.29
11.	61.0	170.0	21.10	16.3	2832.00	64.32	29.05
12.	41.5	168.0	14.71	14.8	1935.86	52.92	26.26

Adult Female

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
1.	41.5	144.0	20.07	13.4	1915.81	39.20	20.69
2.	57.0	160.0	22.26	13.6	1922.01	64.02	21.22
3.	42.0	149.0	18.91	13.5	1908.50	62.70	19.93
4.	48.0	150.5	21.33	14.2	2037.67	42.21	21.77
5.	40.5	152.0	17.533	13.1	1781.07	60.18	20.81
6.	63.5	144.0	30.67	14.0	2121.76	82.33	19.66
7.	58.5	159.0	23.21	13.1	2374.32	59.76	23.27
8.	55.0	157.0	22.35	14.2	2810.80	84.40	20.64

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
9.	51.5	162.0	19.55	13.0	2150.80	71.98	19.86
10.	62.5	159.0	24.8	15.1	2400.00	79.94	21.52
11.	60.0	163.0	22.64	13.8	2501.00	65.42	21.10
12.	48.0	156.0	19.75	12.5	2150.00	39.11	20.94
13.	45.0	148.0	20.4	11.8	2112.80	45.25	23.25

Adolescent Male

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
1.	38.0	146.0	17.84	12.3	1960.98	41.76	26.50
2.	37.0	161.0	14.28	13.8	1816.90	39.87	27.00
3.	40.5	158.0	16.26	14.9	2212.80	45.94	29.03
4.	42.0	150.0	18.66	15.2	2100.00	37.19	30.05
5.	46.2	158.0	18.55	14.4	2342.00	89.11	30.04

Adolescent Female

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
1.	42.0	154.0	17.72	13.4	1920.75	49.84	63.86
2.	46.0	145.0	21.90	12.1	2235.00	35.12	60.66
3.	39.5	147.0	18.28	12.3	2001.00	41.14	59.60

Group IV

Adult Male

Sl. No.	Weight	Height	Body Mass Index	Haemo-globin	Energy	Protein	Nutritional status
1.	54.5	161.0	21.04	15.2	1939.36	52.47	16.03
2.	40.5	170.0	14.01	13.2	1719.57	46.76	13.94
3.	72.0	169.0	25.26	14.8	2822.98	66.46	16.33
4.	65.0	164.0	24.25	15.0	2612.67	67.64	15.11
5.	62.0	167.0	22.3	13.7	2369.32	59.01	15.98
6.	57.0	171.0	19.52	14.8	2791.74	69.54	16.39
7.	68.0	159.0	23.01	14.1	2306.03	63.66	16.55
8.	52.5	165.0	19.30	15.1	2811.00	74.92	18.21
9.	50.0	157.0	20.32	14.9	2435.80	59.42	14.96
10.	63.0	165.0	23.16	15.6	2150.86	65.48	16.78
11.	45.0	169.0	15.78	13.5	2412.08	62.18	16.93
12.	60.0	167.0	21.58	14.5	1935.80	49.01	17.87

Adult Female

Sl. No.	Weight	Height	Body Mass Index	Haemo-globin	Energy	Protein	Nutritional status
1.	60.0	155.0	25.00	12.9	1711.49	44.96	42.36
2.	39.50	166.0	15.42	11.1	2481.29	59.56	37.95
3.	42.0	162.0	16.03	14.5	2430.13	58.66	42.90
4.	43.0	150.0	17.06	12.7	2260.92	59.36	42.83

Sl. No.	Weight	Height	Body Mass Index	Haemo-globin	Energy	Protein	Nutritional status
5.	50.5	145.5	24.04	13.3	2379.61	63.48	40.08
6.	62.5	162.0	23.85	13.1	2430.31	61.65	42.28
7.	50.0	154.0	21.09	14.3	1871.77	54.27	40.51
8.	58.5	157.5	23.78	15.7	2236.43	84.12	42.53
9.	45.0	143.0	22.05	12.4	2818.47	52.94	41.52
10.	49.5	151.0	21.71	14.5	2939.40	68.98	43.76
11.	56.5	149.5	25.45	14.1	2851.48	72.54	38.96
12.	61.0	158.0	24.49	15.0	2426.96	90.25	41.40
13.	47.5	163.0	17.92	14.3	2741.08	65.19	40.10

Adolescent Male

Sl. No.	Weight	Height	Body Mass Index	Haemo-globin	Energy	Protein	Nutritional status
1.	38.0	152.2	14.5	12.7	1971.28	39.01	19.40
2.	47.5	155.0	19.79	13.7	1962.06	52.00	17.51
3.	40.5	152.0	17.53	11.5	1716.29	48.07	18.08
4.	42.3	148.0	19.31	12.2	1814.32	58.12	19.25
5.	36.5	150.5	14.65	14.5	2010.42	60.92	22.50
6.	43.0	143.1	21.07	14.4	2125.00	35.11	20.50
7.	42.0	149.0	18.91	15.6	2110.80	43.83	18.76

Adolescent Female

Sl. No.	Weight	Height	Body Mass Index	Haemoglobin	Energy	Protein	Nutritional status
1.	42.0	153.0	17.94	11.7	2118.53	54.22	71.5
2.	40.5	145.0	19.28	12.1	2360.00	58.25	72.0

APPENDIX VIII

Formula for making food use frequency table

$$\text{Score} = \frac{R_1 S_1 + R_2 S_2 + \dots + R_n S_n}{n}$$

Sn = Scale of rating

Rn = Percentage of respondents selecting a rating.

n = Maximum scale rating.

FOOD CONSUMPTION PATTERN OF SELECTED FARM FAMILIES IN THIRUVANANTHAPURAM DISTRICT

By

JAYANTHA KUMARI S

ABSTRACT OF A THESIS

**SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE DEGREE**

**MASTER OF SCIENCE IN HOME SCIENCE
(FOOD SCIENCE AND NUTRITION)
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**DEPARTMENT OF HOME SCIENCE
COLLEGE OF AGRICULTURE
VELLAYANI, TRIVANDRUM**

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ABSTRACT

The study entitled "Food consumption pattern of selected farm families in Thiruvananthapuram District" was conducted among the farm families in Venganoor Panchayath, Thiruvananthapuram.

It was found that majority of the families were Hindus and belonged to fore ward community. Nuclear type small sized families characterised these farm families. Majority of the families were found to have pre-adolescent and adolescent aged children and majority of the family members, irrespective of the land holdings had medium level of education. Majority of the members of the smaller holdings were employed as casual labourers and in bigger holdings, many of them were found to be government employees or private employees.

Higher monthly income was observed among the families of larger holdings so also increased the contribute of total income.

Expenditure pattern of the families revealed that, the major expenditure for food, and the percentage of income spend on food decreased in the families

of larger holdings. All the families irrespective of the land holdings were found to save a portion of their income for future use.

Agricultural practices of the farm families indicated that, coconut, fruits, and some vegetables are grown in their farms. In addition, the families of larger holdings were found to cultivate paddy. Many the farm produce were ^{found to be} utilized in these families.

Major share of the food budget goes for the staple food articles in the families of smaller holdings. The money incurred for the purchase of pulses, vegetables, roots & tubers was found to be comparatively less. Fish was found to be a delicacy for all the groups of families.

Most frequently used food items were cereals, vegetables, fish, milk and sugar in all the four categories of surveyed families and majority of them followed three meal pattern families of larger holdings were found to include better food combinations for daily meal pattern.

Simple cooking methods were adopted in the surveyed farm families and majority of the families were not found to preserve foods when there is a surplus.

Foods provided during different stages of life cycle indicated that, for infants, all the categories of families were ^{found to} provide special foods. Where as ~~any~~ families of larger holdings provide special foods for pregnant and lactating mothers.

Family size was found to be correlated in the expenditure pattern on foods viz cereals in all the groups of land holdings.

Weight for age profile of the members of the farm families indicated that, majority of the adults and adolescents were below the prescribed standard.

Based on the grades of malnutrition, majority of the adult members belonged to normal groups where as majority of the male and female adolescents were ⁱⁿ Grade I malnutrition. Compared to male members, female members were found to be healthier.

Average height for age profile of the adult male was 164.8 and that for female was 154.7 cm and adolescents belonging to all the four groups of land holdings were below the prescribed standards.

According to Body Mass Index, majority of the male and female members were also found to be in the normal group of chronic deficiency and majority of the adolescents belonging to surveyed families were moderate type of Chronic Energy Deficiency group.

Actual food intake of the members of the farm families revealed that, cereals, pulses, fish and fruit consumption was appreciable in adolescents and in adult members, cereals, fish and fruit consumption was satisfactory. Intake of all the other food groups viz vegetables, green leafy vegetables, milk roots & tubers were below the standard prescribed.

Energy intake of the adult male members were below the RDA and except in Group I adult female, all energy intake ^{was} sufficiently met

Protein intake was insufficiently met in the adults belonging smaller land holdings and also in male adolescents.

Nutrients such as iron, B-complex were met satisfactorily in adult ^{males} where as it was insufficiently met in adult females. Average nutrient intake of adolescents were found to be below the recommended ^{allowances} in all the four groups of land holdings.

Clinical examination of the farm families revealed that, both adult and adolescent females were found to be free from the clinical manifestation of deficiency disease except in the case of anaemia in females.

Vitamin A, B-complex deficiencies dental caries, thyroid enlargement were some of the clinical symptoms of adults and adolescents of the farm families.

Majority of the female members were found to have low haemoglobin levels than male members.

Nutritional Status Index indicated that size of land holding does not have much affect on the Nutritional Status Index of the members of the farm families.