FOOD SECURITY AT HOUSEHOLD LEVEL IN PARBHANI

By

MANTHALKAR MANJU MURLIDHARRAO

B.Sc.(Home Science)

DISSERTATION

Submitted to the Marathwada Agricultural University,

In Partial fulfillment of the requirement

for the degree of

MASTER OF SCIENCE

(HOME SCIENCE)

IN

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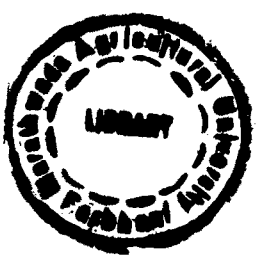

DEPARTMENT OF FOODS AND NUTRITION
COLLEGE OF HOME SCIENCE
MARATHWADA AGRICULTURAL UNIVERSITY,
PARBHANI - 431 402 (M.S.) INDIA

2001

CANDIDATE'S DECLARATION

I hereby, declare that the dissertation or part thereof has not been previously submitted by me to any other University or Institute for a Degree or Diploma.

Parbhani

Date : 25-6-2001

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Parbhani

Date : 25-6-2001

(Manthalkar Manju Murlidharrao)

CERTIFICATE - I

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Parbhani

Date : 25-6-2001

(Prof. Asha Arya)
Guide
Associate Professor
Dept. of Foods and Nutrition
College of Home Science
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College of Home Science
M.A.U., Parbhani.

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(External member)

(Prof. Asha Arya)
Guide
Associate Professor
Department of Foods and Nutrition
College of Home Science

(Advisory committee members)

(Dr (Mrs.) N. S. Reddy)
Associate Dean and Principal
College of Home Science

Head
Department of Foods and Nutrition

(Dr (Mrs.) Nalwade V.M.)
Associate Professor
Department of Foods and Nutrition
College of Home Science.

Associate Dean and Principal
College of Home Science
M.A.U., Parbhani

(Dr. H.S. Acharya)
Asso. Professor and Head
Department of BSCT,
College of Agril. Engineering

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Introduction

Chapter 1

INTRODUCTION

Food intake of an individual varies by social, economic, demographic status and seasons. The food consumption in terms of quality and quantity is one of the key indicators of existing health and nutritional status of an individual or household. If the food intake is insufficient it will lead to hunger and malnutrition. On the other hand if food security is there the better nutritional and health status is achieved. Food security can be defined as "absence of hunger and malnutrition or ability of food deficit countries or regions or households to meet target level of consumption on a yearly basis" (Siamwalla and Valdes, 1980). Another commonly accepted definition of food security is "when all people at all times have both physical and economic access to sufficient food to meet their dietary needs" (USAID, 1992).

Though food security is a global problem still globally there is enough food for all. However, it has been asserted that global or national food security does not necessarily ensure household or individual food security. Food security thus becomes a basic social objective and sensitive policy issue. This issue however has in recent years became emotional and politicized (Donaldson, 1986).

The food security is determined by agrophysical, socio-economic and biological factors (Campbell, 1991; Braun *et al.*, 1992). The food availability, food access and food utilization by the people can be used as the indicators of food security. Apart from these, other generic indicators of food security include the resources possessed by the households, levels of farm and non-farm production, household income, household and individual consumption and individual nutrition. As both production and consumption take place at household level, food security also begins and ends with the households.

Household is defined as "a group of individuals who share a domestic unit that pools it's resources, especially for the purpose of sharing food ". Hence household food security is characterized as an access to food adequate in quality and quantity and safety to ensure healthy and active lives for all household members (Gillespie, *et al.*, 1991). On the other hand, the food insecures are those who have lost or are at risk of losing availability and access to food or the ability to utilize it. Food insecurity thus is characterized by a continuos enability to attain food access, over the long term. In addition to this, insufficient food availability may be the direct cause of low food intake in the food insecure households. The nature of diet, particularly it's quality and quantity may actually be the cause of low food intake.

Chronic food insecurity is characterized by a continuos enability to attain food access over the long term. While, acute food insecurity is decline in food security status over a relatively short period of time. This short term decline in food security status may occur regularly due to seasonal changes in food access in particular or given area.

Agricultural development and food production are central to national food security however, nation's food situation is summation of prosperity of individual household. It is household's capacity or ability to obtain food that is critical in ensuring household food security. In addition there are several other factors that influence the household food security. These include food prices, food availability, employment and purchasing power, Government subsidies and rationing system. The individual food security depends on the amount of food each household member receives. The amount of food reach to each household member depends on the ability of household to acquire food and allotment of acquired food. This inturn depends on the nature of distribution system, variation in pattern of distribution, role and function of person involved in distribution of food, seasonal variations, food preferences, and the influence of special events. These factors can influence individual's health and well being.

Food security though has long been used as macro level indicator of agricultural and economic researches still little work is done to operationalise it at household level. In order to study food security at

household level nutrition surveys can be used as reliable tool. It is well known fact that within the same income level and household structure some households have malnourished members while others do not. The nutrition surveys play an important role in identifying the factors related to food security such as the quality and quantity of food consumed by an individual household and also by each member in the individual household. Nutrition survey provides the information whether the household's or individual's intake is matching with or less or more than Recommended Dietary Allowances. In addition to this these surveys can also provide knowledge about the intrahousehold food practices which will provide assistance in planning better food programmes at national level and to provide food security at household level in the country. Hence, an investigation is taken up to collect the information regarding food security at household level from the selected households of Parbhani. Besides, as the Govt. of India has declared the year 2001 as "Women's Empowerment Year", an effort is made to find out food security status of women from selected households. The study is carried out in light of the following objectives

General objective

To identify food security at household level in Parbhani city

Specific objectives

1. To study the food expenditure pattern of the selected households
2. To find out the access and storage of foods and utilization of food wastes by the selected households

3. To assess the food and nutrient intake of the selected households as affected by socio-economic parameters

4. To study the intrafamily distribution of foods in the selected households

Review of Literature

Chapter 2

REVIEW OF LITERATURE

Household food security is the ability of the household to achieve sustained access in adequate quantity and quality food for all household members. Food security is also influenced by household's purchasing power, availability of food at reasonable prices, land holding, agricultural production, employment status during all seasons and availability of public distribution system and certain other factors. Studies on these aspects are conducted in India and abroad. Such documented studies are reviewed and presented in this chapter under following heads

2.1 Intrafamily food distribution and food and nutrient intake by households and individuals

2.2 Food expenditure pattern, sources, access, availability and utilization of food in households

2.3 Factors influencing food security at household level

2.1 Intrafamily food distribution and food and nutrient intake by households and individuals

Khan and Patel (1989) carried out a study on women's health as a determinant of intrahousehold distribution of food. The study

showed that the women were doubly burdened with paid as well as domestic work. Their longer working hours were causing extra metabolic strain. The clinical, anthropometric and dietary data showed that most of them were malnourished and their caloric intake along with other nutrients was less than RDA (Recommended Dietary Allowances). The study showed the distribution of food in favour of males.

A study conducted by Nagamalleswari (1989) on the women and preschool children in the drought affected villages of Rangareddy district, Andhra Pradesh, revealed that the cereal intake by the respondents was more than the recommended allowances. While, consumption of pulses, green leafy vegetables, milk, fats and sugar were far below the Recommended Daily Allowances. Fish, meat, egg and fresh fruits were not included in their diets. The diets were deficient in all nutrients except protein and B-complex vitamins. Colorie intake was also not meeting the RDI which was attributed to low intake of fats and oils.

Oguntona *et al.* (1989) carried out a study to investigate the nutritional adequacy of the diet of 186 adults and 103 adolscent Kanuris of Borno state of Nigeria. Data was obtained by the 24 hours recall technique. The nutrient intakes were calculated using food composition tables and other records of analysis. It was noticed that cereals and other

plant foods provided high proportion of nutrients. Intake of calories by subjects was at par with FAO/WHO recommendation levels. Protein intake ranged between 89.2 g to 101 g per day. Iron intake was marginal for the children. The results of survey further indicated that the Kanuri's traditional diet provided ample supplies of nutrients to meet FAO/WHO recommendations.

Pathak and Goswami (1989) conducted a study on food consumption pattern in rural areas of Assam. The study illustrated that the food consumption of the people was not very low in terms of quality and quantity. Because of inequality of income/ poorer section did not possess the economic abilities to obtain food for nutritional adequacy. The study emphasised the need for formulation of structural changes for improving food and nutrient situation in rural areas of Assam.

Agarwal (1990) studied the strategies of Indian rural people to cope with food insecurity associated with calamities such as drought and famine. The study indicated that the effective coping and the appropriate state and non-state interventions which would strengthen the survival mechanism were adopted by the families themselves. Gender and age both formed intrafamily inequality. The burden of coping fallen disproportionately on female members within poorer households.

A study was carried out by Kumari and Khader (1990) to find out the impact of supplementary income of women on food and nutrient intake. Under the study 60 families with supplementary income of women (experimental group) and 60 without supplementary income (control group) from 4 villages of Rangareddy district of Andhra Pradesh. The results of the study pointed out that the expenditure on all food items except cereals and millets was significantly higher in experimental families. In general the dietaries of both families failed to meet the RDA in the food groups except cereals. Caloric intake was adequate in the experimental group, whereas it was nearer to RDA in control group. The intake of calcium, β-carotene, riboflavin and vitamin C was far below the RDA in both the family groups.

Walker and James (1990) studied the village and households economics in India's semi-arid tropics and reported that the primary deficiencies of diets were vitamin C, vitamin A, calcium, riboflavin and energy. Across the six study villages severe cases of malnutrition among preschool children ranged from 2 to 7 per cent. Intake of thiamine, ascorbic acid, proteins, calories were subjected to the greatest extent of seasonal variability while consumption of β-carotene fluctuated the least. Vegetable production, the main source of ascorbic acid intake was both

inadequate and subjected to substantial seasonal variation in all the villages.

NNMB (1990-92) conducted a study on the diet and nutritional status of representative segment of different population groups in different states of India. The average intake of food and nutrients showed that cereals and millets formed the bulk of dietaries and its average consumption ranged from 372 to 598g per consumption unit in all states of India.

A diet survey was conducted (Arora, 1992) to study the food and nutrient intake of 120 families belonging to different income groups in Gwallior city. Results of the study explored that the mean intake of all the food groups by the selected families was more than RDA except cereals (81%) and green leafy vegetables (45%). Intake of fruits, milk and sugar and juggery was very high. The mean nutrient intake was also higher as compared to RDA except vitamin-A and C which were 86 per cent and 55 per cent of Recommended Dietary Allowances respectively.

Study conducted by Braun *et al.* (1992) revealed that the income differences resulted in a large difference in the prevalence of food energy deficiency in many remote rural areas. However, household income differences did not make much of a difference to the levels of

malnutrition of children in the short run. Calorie deficiency was reduced as household's income increased.

Webb *et al.* (1992) conducted a study in Ethiopian households. The results of the study showed that in Ethiopian households, income distribution affected consumption which resulted in decrease in one meal or ate less per day among 63 per cent of the poorest households, compared with only 43 per cent of the wealthier group.

A study on food and nutrition situation of rural families in seven Agro-climatic zones of Andhra Pradesh (1992-93) conducted under All India Co-ordinated Research Project pointed out that in scarce rainfall zones of A. P. (500-700 mm) the millets were consumed by all families. Consumption of green leafy vegetables, fruits and oils was very low as well as below the Recommended Dietary Intake (RDI). The intake of milk was very low in landless families but their intake of fleshy foods was more. All families were using nuts and oilseeds upto some extent. The energy intake was lower than the RDI. Height and weights of adult women and children were normal, 25 per cent of girls in small farm families were found to be suffering from grade-II malnutrition.

A study was conducted by Begin (1993) in local areas of the Sahelian zone of Chad to assess the relationship between household food consumption and individual nutritional status in two different seasons.

During the harvest and non-harvest seasons 80 households were surveyed. Household food consumption was measured by weighing food items over two consecutive days. The findings indicated that the intake of energy, protein, and iron was adequate. Seasonal differences were detected only for vitamin A and iron. The study also showed the weak relationship between household dietary intake and individual nutritional status changed with seasons.

Engle and Nieves (1993) explored the mother's views in Guatemala on the appropriate distribution of food within the household and the relation of these views to actual food distribution. The subjects were 45 mothers with one child enrolled in a health centre's food supplementation programmes. Most of the mothers did not report believing that more food should be given to targeted child. Four distribution rules were mentioned. These were giving preferences to adults or workers, giving preferences to children, giving preferences to males and equality. Mothers who stated a male preference were giving more food to males and mothers stated a preference for equality gave relatively higher proportion of food to children.

The National Council for Applied Economic Research (NCAER) and National Nutrition Monitoring Bureau (NNMB) undertook a survey of "Human development profile of India" in 1994. For this

purpose 264 villages were surveyed covering 4453 households from the different states of India. Data was collected on intake of 5746 individuals belonging to different age, sex, and physiological status by using 24 hour recall method of diet survey. Weighment method was carried out on about 1200 rural households. The results revealed that the diets were predominantly cereal and millet based but the intake of green leafy vegetables was very low. The diets of Kerala appeared quantitatively superior to those of other states. Cereal consumption decreased with increase in family income while, consumption of pulses, milk, fat and vegetables increased with increase in family income status. The energy intake on an average was about 90 per cent of the ICMR Recommended Dietary Intake (RDI) while intake of other nutrients fell short of the RDI.

A survey was conducted by the Government of Orissa with support of UNICEF (NIN, 1995-96) in the backward areas of Orissa to assess the nutritional status, dietary status, the perceptions of the community about their household food security status and to identify the contributory factors for food insecurity in selected villages. Insufficiency of cereals was reported in 12 per cent households while in 73 per cent households the consumption of pulses was inadequate. About 12 per cent of households belonged to 'High food insecurity group". It was also noticed that 30 per cent of households had inadequate energy intake (less

than 75% RDA) while in 4.5 per cent households energy intake was highly inadequate (less than 50% RDA).

The study conducted by Haijang and Popkin (1995) revealed that the nutrition transition in China was proceeded to the extent that the food consumption behaviour of low income and high income families had great propensity to increase or decrease fat and calorie intake.

Armar et al (1995) carried out survey of 20 households in a rural northern Ghanna community to ascertain evidence of seasonality and the relationship between household food security status on the food and nutrient intake of preschool children. All foods consumed by households were weighed for three consecutive days and nutrient intake was calculated from appropriate food composition tables. Mean daily intake of food items reflected an over dependence on cereals and minimal consumption of animal products. The consumption of vegetables was low during pre harvest season and increased during post harvest season. Nutrient intake which was lower than the Recommended Dietary Allowances increased during the post harvest seasons for calories, protein and iron. There was a significant association between household food security status and intake of calories and protein but not of micro nutrients. In addition, household food security did not necessarily ensure

the quality of children's diets in an area where food consumption pattern was monotonous.

Haddad and Kanbur (1995) conducted a study for understanding the value of intra household survey data for age based food targeting. The study showed that optimum age eligible, cut off depended on the availability of intra household data on food intake. Age proved to be a good indicator of individual calorie deficit. However this was not the case with the household level calorie adequacy. The study concluded that the age was apparently less useful as targeting instrument. Food sharing on the other hand rendered age impotent as a targeting instrument because of intrahousehold food distribution.

Qualitative and quantitative dietary patterns were studied (Liere *et al.*, 1995) as indicators of seasonal changes in household food security in north western Benin. These studies were carried out at both the individual level and the intra household level. Dietary changes between the intermediate period (April) and the preharvest period (August) included increased consumption of pulses and tubers which compensated for a decrease in cereal consumption and increased consumption of gifted foods, purchased foods and child foods. The adequacy of children's energy and protein intake increased in the pre harvest season while those of parents decreased. Children and adult had

same pattern with regard to the contribution of different food groups except that children ate more than their parents in the pre harvest season.

Vijayraghavan *et al.* (1998) studied household food security, it's duration and nutrition in South Western Orissa. The results of the study revealed that the percentages of households which considered that their consumption of cereals, millets and pulses was sufficient were 88, 51 and 27 respectively. Only few households felt that the intake of animal foods and fats and oils was sufficient. About 8 per cent households felt that they were completely food secure and 12 per cent felt that they were severely food insecure.

Mujeeb and Rao (2000) carried out a survey to study variation in dietary pattern and nutrient intake by economic status at Hyderabad. The food consumption of 450 families for seven consecutive days was estimated by weighment method. The families were classified according to their monthly per-caput income of rupees less than 500, 500-1500, 1500-2500 and 2500 and above as low middle, upper middle and high income groups respectively. The pattern of food consumption was different between families with low, middle, upper middle and high income groups. The intake of almost all food items except cereals, leafy vegetables and roots and tubers was below the requirements in low income families, while in upper middle income and high income families,

the intake was better and higher than suggested allowances. The mean intake of foods such as cereals and millets decreased with per capita income. The intake of nutrients was lower than requirements in low income group families. In upper middle and high income group families, the intake was more than the suggested allowances.

It can be concluded from the findings of the above studies that the distribution of foods within the family was in favour of males followed by children. Gender formed intrafamily inequality in distribution of foods. Women received least share of food in the family. They shouldered maximum burden of coping mechanisms. Age of household members was the important factor considered during food sharing in the households.

Cereals were the major foods consumed by the households. The major factor placing its impact on the consumption of foods in households was income. As the family income increased, there was an increase in consumption of food especially milk, fruits, vegetables and pulses. However, on the contrast, the consumption of cereals decreased with size in household income. Upliftment in income status of family helped in bringing down the energy deficiency in household. Apart from income season plays an important role in food and nutrient intake by the individuals. Hence in general the food and nutrient intake could be used

as good indicators in order to recognize the food security of households as well as individuals.

2.2 Food expenditure pattern, sources, access, availability and utilization of food in households

Pramila (1989) compared the food expenditure pattern, food and nutrient intake, anthropometry and clinical signs of 100 each of DWCRA beneficiary families and Non-DWCRA beneficiary families in Srikakulam district of Andhra Pradesh. Non-DWCRA families were having more per capita income as compared to DWCRA families. Non-DWCRA families had per capita expenditure more on all food items except cereals, pulses and fleshy foods as compared to DWCRA families. Among DWCRA families the intake of cereals, pulses, green leafy vegetables, animal foods and milk was more. The data on nutrient intake indicated that the intake of calories, protein, calcium and thiamin was more among DWCRA families than Non-DWCRA families.

Bindiger *et al.* (1990) conducted a study in a drought prone village Dokur, in the semi-arid Telangana region of Andhra Pradesh. The findings revealed that the villages were maintaining their consumption pattern as it was before the drought due to food grain price stability and wide spread availability of consumption credit.

Walker and James (1990) studied the village and household economics in India's semi-arid tropics (SAT) and reported that intake of thiamine, ascorbic acid, protein and calories was subjected to the greatest extent of seasonal variability while consumption of beta carotene and lysine fluctuated the least. Vegetables were the main source of ascorbic acid intake and it was inadequate and subjected to substantial seasonal variation in all the villages. The proportional increase in the quantity of food consumed was noticed when the household expenditure on food increased.

Immink and Alarcon (1992) carried out a study of household food security and crop diversification among small families in Guatemala. The study revealed that two interrelated approaches were required for food security. Productivity of basic food crops should be raised and the risk involved in production and marketing of cash crops should be lowest. Maize and bean yield increase contributed little to household dietary energy food availability.

Alternative cropping, tapping forest grasses, increasing the area of fodder under irrigation, storage of adequate buffer food grains to meet the peak demands in drought periods, income generation schemes, self employment schemes and special health care programmes specially

for children, expectant and nursing mothers were the strategies suggested by Venkateshwarlu (1992) for management of drought.

Payne and Lipton (1993) stated that coping responses for food security were behavioural rather than biological at the household level. They included redistribution of food among household members and redistribution of work over time to avoid mismatches between food needs and food availability.

A study by (Neela and Amitabh 1994) on rural women in Krishna Rakshit Chak in Midnapore district of West Bengal, revealed that raw food, fruits, leaves, snails and fishes were collected by women for meeting food deficit in households. The women tried to hedge against low food availability and tended to switch sources depending on the seasons. Rice, Potatoes, and pulses were grown by the people which provided the primary food security while existing natural resources such as produce from forest served as the secondary food security to the people.

Kendall *et al.* (1996) studied the relationship of hunger and food insecurity to food availability and consumption by administering questionnaire. The results showed a significant decrease in frequency of consumption of fruits and vegetables and the amount of food in the household. A significant decrease in sources which indicated the

disordered eating patterns were associated with severe food insecurity status.

From the finding of the above studies it can be concluded that the expenditure on food increased as income of the family increased which ultimately resulted in proportionate increase in food consumption by the individuals. Own field products were the sources of foods, contributing major part in the diet. The storage of foods, increasing the area under irrigation increasing in income generation and self employment schemes, price stability and availability of consumption credit helped to sustain food security at household level during natural calamities. The behavioural changes were needed in order to have equal distribution of food and to avoid the mismatches between food needs and food availability. The sources utilized to cope up with low food availability were growing of crop and forest foods.

2.3 Factors influencing food security at household level

Neuman *et al.* (1989) carried out a survey to find out the impact of drought on 247 households in Kenyan district of sub-saharan African countries. The study indicated that there was immediate response to hunger by adopting coping mechanism. The primary coping mechanisms adopted by household during the drought was to purchase

food and curtailment of purchasing goods and scarifying of assets and lands to survive.

Muranjan (1991) studied the impact of 1987-88 drought on the economic condition of Rural people in Maharashtra and reported that there was reduction in cereal production which was compensated by supplies through the public distribution system. The poverty alleviation programmes were being implemented since 1978, which resulted in rising of per capita income. Since the mid 1970s the food production had been fairly stable at the household level, calorie and other nutrient composition of diet had remained more or less unchanged.

A report (Richards, 1991) on Syrian food security focussed on domestic production, foreign trade and aid in Syria from 1970 to the late 1980s. The report exhibited a marked contrast between two decades. In the 1970, per capita income expanded rapidly due to regional oil boom. Demand for food was increased rapidly. Irrespective of enough supply, food imports were increased as a percentage of consumption. During 1980s per capita income stagnated and demand growth slowed. At the same time a series of poor rainfall years reduced domestic production and supply significantly. However, there was no change in food imports.

Kachondham (1991) focussed food security issues associated with development in Thailand. It was reported that though Thailand had

sustained economic growth and generated an increase in national and per capita income, still income distribution and poverty profiles remained major concerns. It was suggested that for meeting the food security and dietary needs of people improvement in every link of the food chain was necessary. It included research, training and technology development in the area of food production food storage, food distribution, nutrition, public health, income distribution, education and food and nutrition policy.

Kalla and Purohit (1992) conducted a case study on the coping strategies of households for food security in high risk environment in Rajasthan. The findings reported that the coping mechanisms adopted by population were substitution of superior consumer goods with lower quality goods, postponement of acquisition of consumer durable and curtailment in expenditure on entertainment and social expenditure.

A longitudinal study was conducted by Alderman and Garcia (1993) for a three years period in Pakistan. They assessed the fluctuations in income, consumption, savings and nutrition and health seeking behaviour of 800 rural households in five districts. The study revealed that fluctuations in income were not associated with the fluctuations in calorie intake. Households coped with seasonal stress and higher food prices through savings including storage of grains. A fairly

constant expenditure on food was maintained throughout by credit from informal sector. The study also indicated that as household income increased the quality of diet was improved rather than quantity.

Braun's *et al* (1993) study in Africa revealed that the labour intensive public work addressed three central problems which were food security, growing unemployment and poor infrastructure. Malnourished rural poor African depended on non-agricultural sources for 40 to 60 per cent of their income.

Gittelsohn *et al.* (1998) tried to operationalise food security and linked it to the household food consumption pattern in rural Nepal. The results showed that in general, caste status and socio-economic status were more associated with frequency of consumption of the different food groups than the food security scale. Brahmins or to lesser degree Chhetri were found to have frequent consumption of green leafy vegetables, tubers and dairy products and less frequent consumption of meat. Households in the upper terciles of socio-economic status consumed more green leafy vegetables and tubers.

From the above studies it can be concluded that the natural calamities like drought and famine lead to curtailment in purchase of goods and sacrifying of assets and land for purchasing of foods. Poverty alleviation programmes helped to maintain food and nutrient intake by

people at household level and thus food security even during drought. Increase in income helped to elevate the food security status of the households. Also increase in national and per capita income improved food security chain. The large scale employment also helped to raise the food security status at household level. Seasonal stress and higher food prices were the responsible factors for the food insecurity. Storage of food grains helped in sustaining food security during seasonal stress and higher food prices.

Materials and Methods

Chapter 3

MATERIALS AND METHODS

The food security at household level was studied at Parbhani. For the purpose of study, various households from different localities of city were selected. The food security was assessed based on the food expenditure pattern, intrafamily distribution of foods, access, storage and utilization pattern of food in the selected households. Apart from this the food and nutrient intake by the selected households was studied.

3.1 Selection of sample

A pilot survey was conducted on 150 households belonging to various socio-economic stratas which were randomly selected from Parbhani city. All households were interviewed personally by administering a survey schedule in order to find out their socio-economic background (Appendix I). Based on the collected data, the households were classified in four groups according to their monthly income such as Rs. $\leq$ 5000 (low income group), Rs. 5001-10,000 (middle income group), Rs.10,001-20,000 (upper middle income group) and > 20,000 (high

income group). From each income group category 15 families were selected purposefully for further detailed study.

3.2 Collection of data

The pretested survey schedule was used to collect the demographic data of the selected households, including information about composition of the family, type of family and total monthly income of the family (Appendix II). The selected households were grouped into 3 categories according to family size viz. small family ($\leq$ 4 members), medium family (5-6 members) and large family ($\geq$ 7 members). According to educational status of housewives, the selected households were classified into three groups such as illiterate, school educated and college educated. Besides this the selected households were also categorised into two classes such as nuclear and joint, depending on type of family.

3.3 Determination of expenditure on food

Through a structured personal interview, information on the expenditure pattern of the selected households on different food groups viz. cereals, pulses, fruits etc. was collected. From the collected data the monthly expenditure on individual food groups was calculated (Appendix III).

3.4 Access and storage of foods and utilization of food wastes

Information on access to food, household food storage and utilization of food wastes by the selected households was gathered (Appendix III).

3.5 Intrafamily distribution of foods

From the selected 60 households food intake of all 302 individuals was assessed. The intake of different foods was assessed by one day weighment method (Marr, 1971). For each meal, all the raw foods and prepared foods were measured and weights were recorded on the day of assessment. The weights of leftover foods, plate leftovers and foods given to others were also recorded (Appendix IV). From the recorded weights, the equivalent weights of raw foods to that of cooked foods were calculated. Weights of the foods which were consumed as such were also recorded. From the data the family's total intake of different food items on the assessment day was determined. In order to know the intake of foods by each family member, all the items of each meal were weighed before being served to each family member (Appendix V). The daily intake of nutrients by the family and by each family member was calculated by using food composition tables (Gopalan, *et al.* 1996). Per capita consumption of different foods and nutrients was calculated. The average per capita consumption of different

foods and nutrients by the selected households were compared with the Recommended Dietary Allowances (RDA) (ICMR, 1990). The per capita consumption of foods and nutrients as influenced by monthly family income, educational status of homemakers, family size and type of family was determined.

3.6 Food and nutrient intake of women

The average intake of foods and nutrients on the day of assessment by all the women between age group of 18 to 60 years from the selected households was calculated. The association between the activity pattern of women and their food and nutrient intake was tested.

3.7 Statistical analysis

The data was computed and analysed statistically. The means and standard errors of the food and nutrient intake were calculated. Mean per capita consumption of different food groups and nutrients was compared with Recommended Dietary Allowances, ICMR (1990), by using 'Z' test. Analysis of variance was done to compare the differences of means of food and nutrient intake as influenced by socio-economic parameters such as monthly family income, educational status of homemakers, family size and type of family.

Results and Discussion

Chapter 4

RESULTS AND DISCUSSION

An investigation was carried out to study the food security at household level in Parbhani city. In order to carry out research work, the parameters used were food expenditure pattern, intrafamily food distribution and food and nutrient intake of the selected households. Apart from this the information on access and storage of foods and utilization of food wastes by the selected households was also gathered.

The collected data was consolidated, analysed statistically and interpreted under the following heads.

4.1 Socio-economic backgrounds of the selected households

The data presented in Table 1 depicts the socio-economic background of experimental sample. The households having $\leqslant 4$ members categorized as small family were 38.3 per cent, 48.3 per cent families were medium sized with 5-6 members in it while only 13.4 per cent families were large constituting $\geqslant 7$ members.

There were only 25 per cent joint families, while remaining all 75 per cent families were nuclear.

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Table 1. Socio-economic background of the selected households

Sr. No	Socio-economic factor	Selected households	
		Number	Per cent
1	**Family size**		
	⩽ 4 family members	23	38.3
	5-6 family members	29	48.3
	⩾ 7 family members	08	13.4
2	**Type of family**		
	Nuclear	45	75.0
	Joint	15	25.0
3	**Educational status of Homemakers**		
	Illiterate	18	30
	School educated	28	46.6
	College educated	14	23.4
4	**Educational level of the head of the family**		
	Illiterate	07	11.6
	School educated	19	31.6
	College educated	34	56.8
5	**Occupation of the head of the family**		
	Labour	06	1.0
	Farmer	02	3.4
	Service	36	60.0
	Business	16	26.6
6	**Occupation of homemakers**		
	House wives	48	80
	Labour	03	5.0
	Service	05	8.4
	Business	04	6.6
7	**Total monthly income of households**		
	Rs. ⩽ 5000	15	25
	Rs. 5001 - 10,000	15	25
	Rs.1001 - 20,000	15	25
	Rs. > 20,000	15	25

The records of educational status of homemakers revealed that majority of them (46.60 %) were school educated while 30, per cent and 23.4 per cent homemakers were illiterate and college educated, respectively. The data on educational status of the heads of the family indicated that a meagre per cent (11.6 %) heads were illiterate and 31.6 per cent heads were school educated while majority (56.8 %) of the heads of the families were received higher education. Majority (80%) of the women from the selected household were housewives. Maximum number (60 %) of selected heads of the families and 8.4 per cent selected home makers were holding the job either in private or government sector. A sizable number of heads of the families (26.6%) and 6.6 per cent homemakers were engaged in business. However, 10 per cent heads of the families and 5 per cent homemakers were labourers, only 3.4 per cent heads of the families were farmers.

As the households were selected purposively on income basis, there was equal distribution of 15 households in each category of income viz. low income group (Rs. $\leqslant$ 5000), middle income group (Rs. 5001–10,000), upper middle income group (Rs. 10,001–20,000) and high income group (Rs. >20,000).

The findings indicated that majority of the studied families were medium sized (48.3 %) and nuclear (75 %). School educated

homemakers and highly educated heads from the selected households were maximum. Further it was noticed that majority of men were engaged in job while most of the homemakers were performing only household activities.

4.2 Average monthly expenditure on different foods by the selected households as affected by monthly family income

The average monthly expenditure on foods by the selected households as influenced by monthly family income is given in Table 2 and depicted in Figure 1. The maximum monthly expenditure by the house holds belonging to income groups Rs ⩽ 5000 and Rs 5001-10,000 was on cereals (Rs 338 and 285, respectively), followed by on milk and milk products (Rs 165 and 254, respectively). The minimum monthly expenditure of households from above two income groups was on roots and tubers and meat, fish and egg (Rs 20 and 12, respectively).

The expenditure of households from another two income groups viz. Rs 10,001-20,000 (upper middle income group) and Rs > 20,000 high income group was maximum on milk and milk products (Rs 500 and 890, respectively) followed by cereals (Rs 301 and 452, respectively).

The next food group on which the more money was spent by upper middle class households was fats and oils (Rs 205 per month),

Table 2 Average monthly expenditure on different foods by the selected households as affected by monthly family income (n = 60)

Sr. No.	Food groups	Monthly Family Income (Rs)				SE	CD
		⩽ 5000 (Low income group) (n=15)	5001-10,000 (Middle income group) (n=15)	10,001-20,000 (Upper Middle income group) (n=15)	>20,000 (High income group) (n=15)		
1	Cereals	338	285	301	452	46.7	129.3 NS
2	Pulses	121	148	169	215	24.8	68.8 NS
3	Leafy vegetables	46	48	63	48	6.3	17.5 NS
4	Other vegetables	31	43	63	74	8.1	22.6**
5	Roots & tubers	20	18	36	77	6.8	18.8 NS
6	Fruits	29	49	117	196	21.5	59.6 NS
7	Nuts & oilseeds	72	67	80	150	14.7	40.8 **
8	Milk & milk product	165	254	500	890	55.4	153.2*
9	Fats & oils	156	189	205	283	21.1	58.1**
10	Sugar & Jaggery	118	151	129	178	14.8	41.1*
11	Meat,fish,egg	137	12	20	64	25.4	70.5 NS
12	Other foods	82	99	114	414	34.1	94.6 NS

NS – Non significant
* - Significant at 5 % level
** - Significant at 1 % level

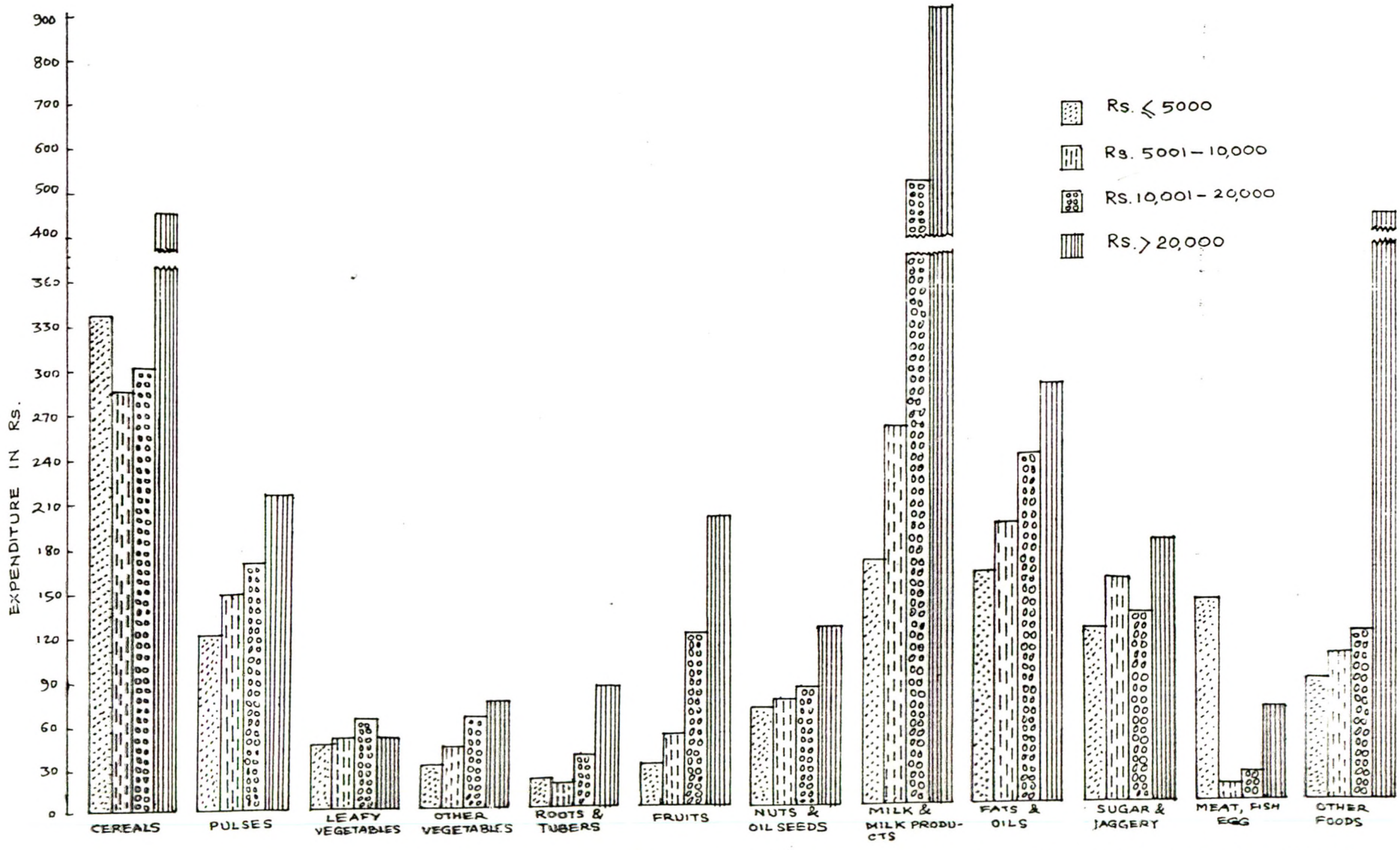

Fig. 1: AVERAGE MONTHLY EXPENDITURE ON DIFFERENT FOODS BY THE SELECTED HOUSEHOLDS AS AFFECTED BY FAMILY INCOME ($n = 60$)

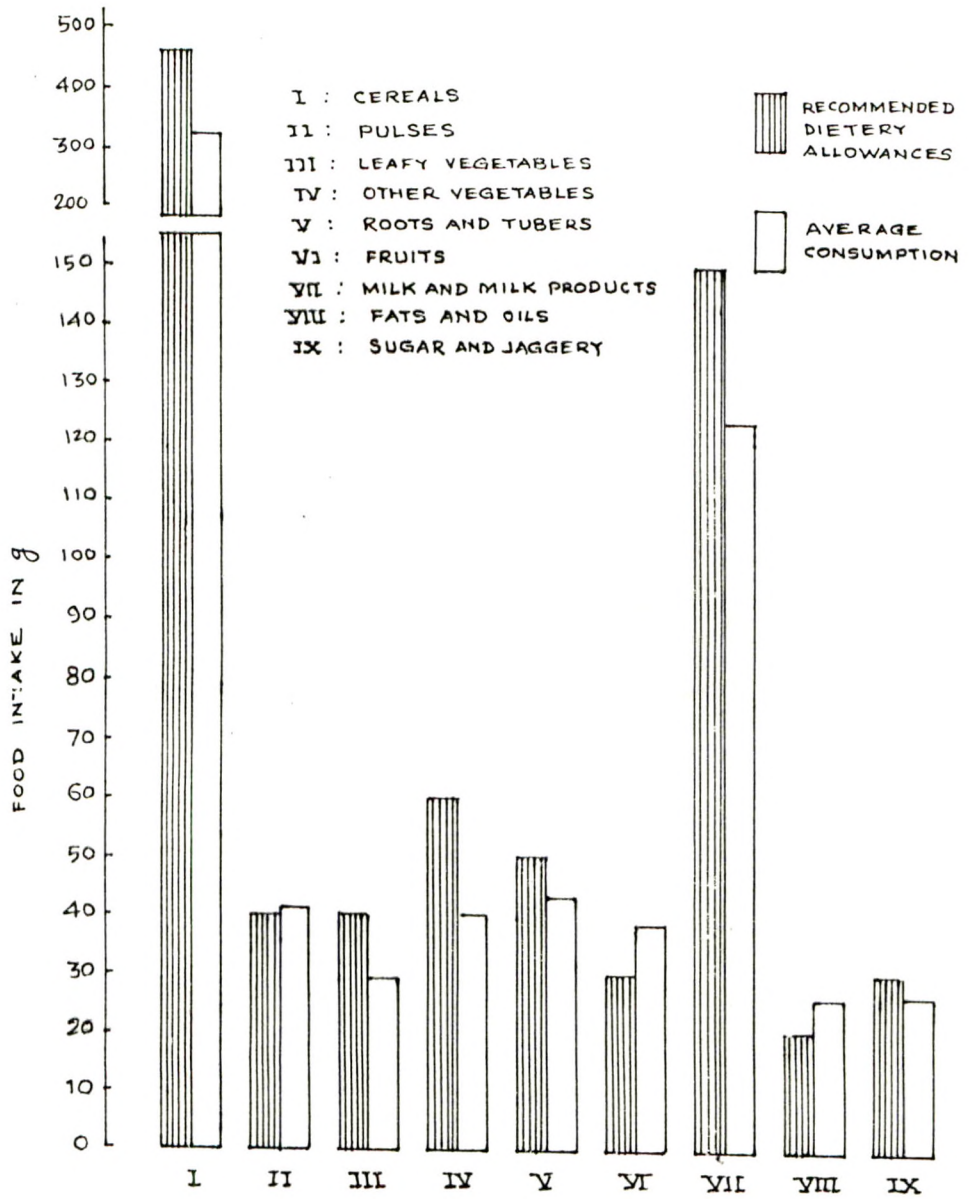

Fig. 2. AVERAGE VALUES OF CONSUMPTION OF DIFFERENT FOODS BY THE SELECTED HOUSEHOLDS (n=60)

while it was other foods like spices, processed foods, health foods etc. (Rs 414 per month) in high income group.

The statistical analysis of the data depicted that there was significant difference in the amount of money spent by various income groups on other foods, nuts and oilseeds, milk and milk products, fats and oils and sugar and jaggery. There was significant difference in the expenditure on other vegetables by low income group, middle income and high income group. The expenditure by high income group on nuts and oilseeds was significantly high as compared to the expenditure by low income group and middle income group, whereas the money expenditure on milk and milk products and fats and oils was significantly more by high income and upper middle income families than middle income and low income groups.

The results showed that monthly expenditure by the households increased on various food groups except for leafy vegetables, sugar and jaggery and meat fish and egg as the monthly income of the households increased.

Study conducted by Walker and James (1990) revealed that a proportional change in household expenditure was accompanied by similar proportional increase in the quantity of food consumed.

4.3 Sources of access to foods for the selected households

The percentages of households using different sources in order to have access to foods were recorded and tabulated (Table 3).

The table shows that all 100 per cent of the selected households were using market as an access for cereals, pulses, vegetables, fruits and other foods like biscuits, snacks, papad etc. While, only two to four per cent households were not dependent on market for milk, nuts and oilseeds respectively from their relatives. The public distribution system (ration shop) was advantageous as an access to 8.3 per cent households for cereals and fats and oils, while pulses and sugar and jaggery was procured only by 11.6 per cent households from ration shops. Cereals (11.6%), pulses and vegetables (3.3% each) were available to households in the form of donations.

It was evident from the results that the market was the only access which was available for more than 90 per cent of the households for majority of the foods. Most of the households were dependent on their own field for accessing cereals and pulses. The public distribution system was not used as a measure of food access by majority of the households. Rice distributed in the schools as a part of applied nutrition programme to elementary school children was observed to be very good access to food for households. Besides this some households received food from employers.

Table 3 Different sources of food access for the selected households (n =60)

Sr. No.	Sources of access	Percentage of selected households having access to different food groups								
		Cereals	Pulses	Vegetables	Fruits	Milk	Nuts and oilseeds	Fats and oils	Sugar and jaggery	Other foods
1	Own field or house	31.6	20.0	5.0	3.3	3.3	Nil	Nil	Nil	Nil
2	Own shop	6.6	6.6	Nil	Nil	Nil	6.6	6.6	6.6	6.6
3	Market	100	100	100	100	96.6	93.3	93.3	93.3	100
4	Relatives	Nil	5.0	Nil	Nil	Nil	6.6	Nil	Nil	Nil
5	PDS	8.3	11.6	Nil	Nil	Nil	Nil	8.3	11.2	Nil
6	Other sources	11.6	3.3	3.3	Nil	Nil	Nil	Nil	Nil	Nil

Gittlesohn (1998) stated that the flow of food the households is from own production, purchase of foods and wild foods.

4.4 Storage of food by the selected households

The data regarding storage period of various foods is presented in Table 4. Cereals were stored by 81.6 per cent households while pulses were stored by 4.3 per cent households for a year. None of the households stored all other foods for a year.

However for a period of six months only pulses were stored by 15 per cent of the selected households for a period of three months majority (48 %) of the selected households stored pulses. While, 33.3 per cent of the selected households stored nuts and oilseeds for three months period. Sugar and jaggery and fats and oils were stored by 15.8 per cent of households (6.8 %) for three months. Monthly storage was followed by majority (90 %) of the selected families for nuts and oilseeds, fats and oils and sugars and jaggery. The per cent households storing pulses, roots and tubers and cereals and cereal products for a month was 47.0, 15.7 and 8.4 per cent, respectively.

From the selected households a significant number of households (84.60 %) were noticed to be storing roots and tubers for one week period. However all other foods were stored for a week only by 10.0 per cent of households. It was observed that 48.4 per cent of the

Table 4 Storage of food by the selected households (n=60)

Sr. No.	Food Groups	Per cent households storing foods for various period						
		One Day	2-3 days	One week	One month	Three months	Six months	One year
1	Cereals and cereal products	10	Nil	10	8.4	6.8	Nil	81.6
2	Pulses	Nil	Nil	10	47	48	15	43
3	Vegetables	56	44	Nil	Nil	Nil	Nil	Nil
4	Roots & tubers	Nil	Nil	84.6	15.7	Nil	Nil	Nil
5	Milk and milk products	100	48.4	Nil	Nil	Nil	Nil	Nil
6	Nuts & Oilseeds	Nil	Nil	10	90	33.3	Nil	Nil
7	Fats & oils	Nil	6.6	10	90	13.2	Nil	Nil
8	Sugar & Jaggery	Nil	11.2	10	90	15.8	Nil	Nil

selected households were storing milk and milk products for two-three days period. Storage of vegetable for two - three days was practiced by 44.0 per cent households while sugar and jaggery were stored by 11.3 per cent of the selected households for two to three days.

It was noticed that all of the selected households (100 %) were storing milk and milk products for one day. Whereas, 56 per cent of the selected households were found to be storing vegetables for one day. A small number of the selected households (10 %) stored cereals and cereal products for one day only.

It is evidenced from the results that only cereals and pulses were stored for longer period by majority of the selected households, may be because they are non-perishables as used and a staple food in the diet. Only pulses were stored for six months by the selected households. Food groups such as nuts and oilseeds; fats and oils and sugar and jaggery were found to be stored for shorter period. Results further indicated that milk and milk products and vegetables were mostly stored for a short period of two to three days or one day may be as these foods are perishable in nature, hence storing period was less. Gittlesohn (1998) et al observed that the household food storage was a good predictor of food security at household level.

4.5 Per cent of households utilizing food wastes

The per cent households utilizing food wastes is presented in Table 5. The data indicated that cereal brokens and bran were always utilized by maximum number of households (66.6 %), while it was found to be sometimes utilized by 27 per cent households. It was not at all used by 6.4 per cent households. The utilization pattern of pulse brokens was noticed to be more or less same like cereal brokens. The per cent households utilizing, sometimes utilizing and not utilizing pulse brokens were 69.8, 23.8 and 6.4 per cent respectively. Majority of the households (80 %) were not utilizing fruit and vegetable edible wastes. Only 8.4 and 11.6 per cent households were utilizing it always and sometimes, respectively. On the contrast, maximum households (70 %) were always utilizing leftover foods and 21.6 per cent households were utilizing it sometimes. Only 8.4 per cent households were not at all utilizing the leftover foods.

From the findings it can be said that except for fruit and vegetable edible wastes all other food wastes were used by most of the studied population. As reported by the homemakers during interview, the food waste were used for preparation of various recipes by them.

Table 5 Per cent of households utilizing food wastes (n=60)

Sr. No.	Food waste	Utilization by per cent households		
		Utilized always	Not utilized	Sometimes utilized
1	Cereal Brokens and bran	66.6	27.0	6.4
2	Pulse brokens	69.8	23.8	6.4
3	Fruit and vegetable edible waste	8.4	11.6	80.0
4	Leftover foods	70.0	21.6	8.4

4.6 Average values of consumption of foods by the selected households

The per capita consumption of foods of the selected households was calculated and averages were compared with Recommended Dietary Intake (RDI) ICMR (1990) as shown in Table 6 and Figure 2.

The average per capita values of daily intake of cereals, pulses, leafy vegetables, other vegetables, roots and tubers, milk and milk products, fats and oils and sugar and jaggery were 320 g, 41g, 34g, 40g, 123g, 26g and 26 g, respectively. The households consuming various foods more than RDI ranged from 5.0 to 63.3 per cent, while households consuming different foods less than RDI ranged from 37.7 to 95.0 per cent.

The average per capita consumption of cereals, other vegetables, milk and milk products and sugar and jaggery was noticed significantly lower than the RDI per day. However, the average consumption of fats and oils was significantly more than the RDI per day. Even though the average values of per capita consumption of leafy vegetables, other vegetables, fruits and pulses statistically varied from Recommended Dietary Intake. The differences were found to be not significant ($P > 0.05$).

Table 6 Average values of consumption of different foods by the selected households (n=60)

Sr . No.	Food groups	RDA g/c.u./day	Average consumption g/c.u./day	'Z' values	Households consuming more than RDI (%)	Households consuming less than RDI (%)
1	Cereals	460	320	13.49**	5.0	95.0
2	Pulses	40	41	0.26 NS	60.0	40.0
3	Leafy vegetables	40	34	1.26 NS	40.0	60.0
4	Other vegetables	60	40	3.92**	38.3	61.7
5	Roots and tubers	50	43	1.34 NS	31.6	68.4
6	Fruits	30	39	1.16 NS	40.0	60.0
7	Milk and milk products	150	123	2.88**	28.3	71.7
8	Fats and oils	20	26	4.23**	63.3	36.7
9	Sugar and Jaggery	30	26	2.17*	28.3	71.7

NS – Non significant
* - Significant at 5 % level
** - Significant at 1 % level

The food sufficiency status of selected households is presented in Table 7. The data indicated that only five per cent households consumed cereals more than RDI, while the remaining 95 per cent households were consuming it less than RDI. On the other hand, more than 60 per cent of the households were observed to be consuming all the other foods less than RDI. In contrast, it was noticed that more than 60 per cent of the selected families were consuming pulses and fats and oils above the level of recommendation. This may be related to the prevailing traditional pattern of food consumption. The habit of consuming regularly almost everyday one or the other preparation like *jowar roti* or *chapati* or cooked rice served with some kind of pulse preparation. Besides, the consumption of fats and oils was found to be higher due to frequent use of groundnuts, pure ghee and hydrogenated oils in the diets. Increased intake of fruits may be to the suitability of land for growing horticultural crops and easy availability of the fruits at lower price.

It can be said from the above results that the households under study were food secure only with regard to pulses, fruits and fats and oils, while they were food insecure with respect to the remaining other food groups. A study conducted by Government of Orissa and

Table 7 Food sufficiency status of the selected households

Sr. No.	Food groups	Per cent of households
1	All food groups sufficient	Nil
2	$C^+ P^+ V^+ M^+$	Nil
3	$C^+ P^+ V^+$	3.3
4	$C^+ P^+ M^+$	Nil
5	$C^+ P^+$	3.3
6	C^+	5.0
7	P^+	60
8	V^+	21.6
9	M^+	28.3
10	All food groups insufficient	31.6

C - Cereals

P - Pulses

V - Vegetables

M - Milk and milk products

\+ - Sufficiency.

UNICEF (NIN, 1995-96) also pointed out that the households under study were food insecure with regard to cereals, pulses and vegetables.

4.7 Averages values of food consumption of the selected households (c. u./day) as affected by the monthly family income

The average per capita intake of different foods by the selected households per day belonging to different income groups is presented in Table 8 and depicted in fig. 3. The average values of per capita per day consumption of different food stuffs namely cereals, pulses, leafy vegetables, other vegetables, roots and tubers, fruits, milk and milk products, nuts and oilseeds, fats and oils, sugar and jaggery and meat, fish, egg were 304 g, 27g, 17g, 15g, 34g, 18g, 67g, 2g, 20g, 32g and 8g in the households of families having Rs $\leq$ 5000 monthly income and 301g, 43g, 38g, 46g, 61g, 25g, 127g, 6g, 25g, 25g and nil in the families of monthly income Rs 5001-10,000, respectively. The respective values were 360g, 43g, 42g, 26g, 29g, 31g, 130g, 9g, 26g, 22g and nil in families of monthly income Rs 10,001-20,000 and 331g, 50g, 38g, 74g, 49g, 82g, 165g, 12g, 32g, 26g and nil in families of monthly income Rs > 20,000 for the corresponding foods.

The food security status for cereals and pulses of the households belonging to different income groups (Table 9) revealed that

Table 8 Average values of food consumption by the selected households (c.u. /day) as affected by monthly family income

Sr. No.	Food groups (g)	Food consumption of the selected households belonging to different income groups (Monthly income in Rs)				SE	CD
		⩽ 5000 (Low income group) (n=15)	5001-10,000 (Middle income group) (n=15)	10,001-20,000 (Upper middle income group) (n=15)	>20,000 (High income group) (n=15)		
1	Cereals	304	301	360	331	19.9	55.2*
2	Pulses	27	43	43	50	4.2	11.7*
3	Leafy vegetables	17	38	42	38	9.1	25.2NS
4	Other vegetables	15	46	26	74	8.8	24.4**
5	Roots & tubers	34	61	29	49	9.9	27.6NS
6	Fruits	18	25	31	82	14.4	40.0*
7	Milk & milk product	67	127	130	165	17.1	47.4**
8	Nuts and oilseeds	2	6	9	12	7.8	79.0NS
9	Fats & oils	20	25	26	32	7.0	19.5NS
10	Sugar & Jaggery	32	25	22	26	3.3	9.3NS
11	Meat,fish,egg	8	Nil	Nil	Nil	3.5	9.9NS

NS – Non significant
* - Significant at 5 % level
** - Significant at 1 % level

Table 9 Distribution of households according to food security for cereals and pulses as affected by monthly family income

Sr. No.	Monthly income (Rs)	Household (%) food security status			
		$C^+ P^+$	$C^+ P^-$	$C^- P^+$	$C^- P^-$
1	Rs ⩽ 5000 (Low income group)	Nil	6.6	26.6	66.8
2	Rs 5001 –10,000 (Middle income group)	13.3	Nil	60.0	26.7
3	Rs 10,001 – 20,000 (Upper middle income group)	Nil	Nil	60.0	40.0
4	Rs > 20,000 (High income group)	Nil	Nil	80.0	20.0

C – Cereals

P – Pulses

+ – Sufficiency

– – Insufficiency.

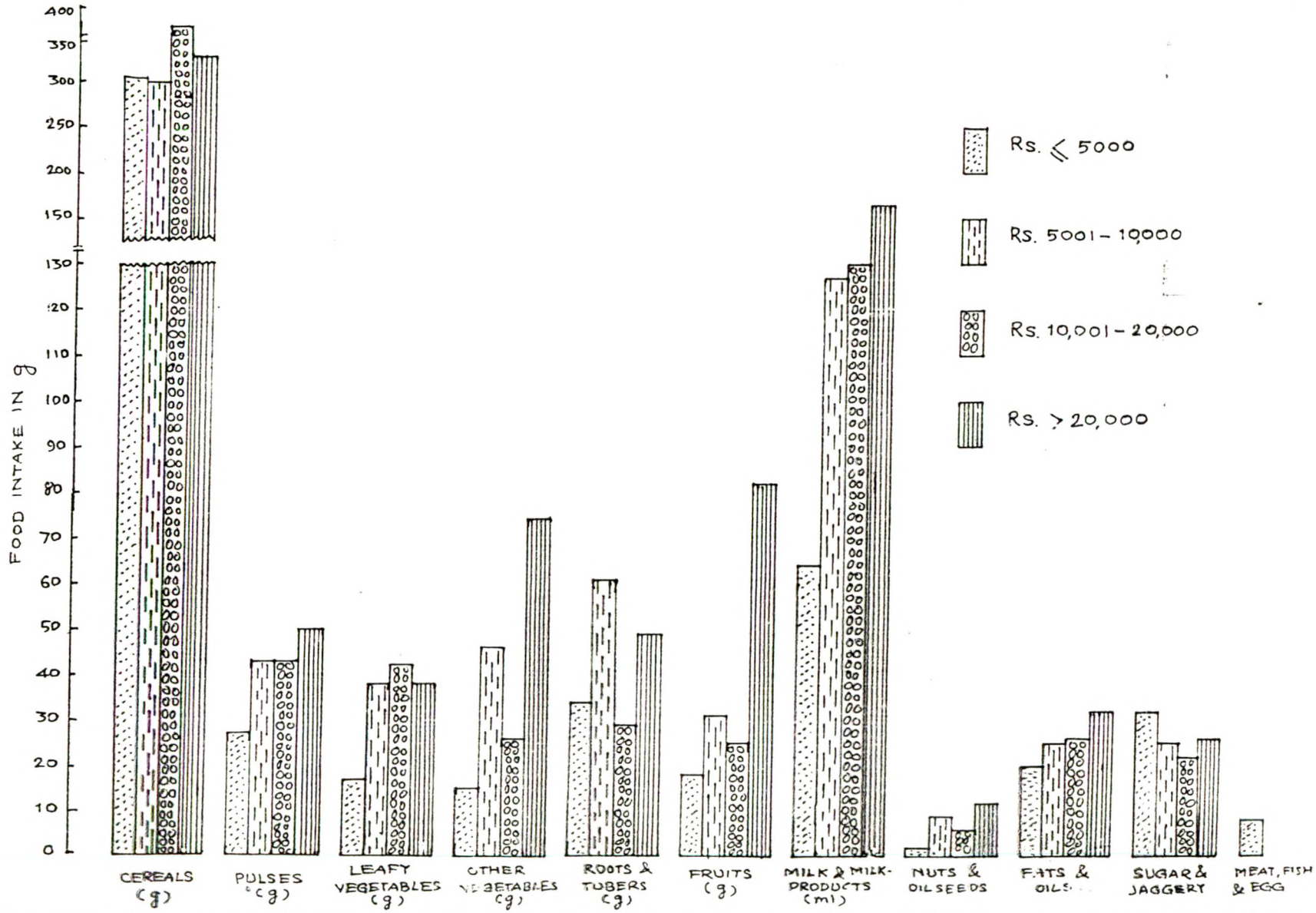

Fig. 3. AVERAGE VALUES OF FOOD CONSUMPTION OF THE SELECTED HOUSEHOLDS (PER C.U./DAY) AS AFFECTED BY THE FAMILY INCOME

the highest per cent of the households (66.8 %) from the low income group had insufficiency of both cereals and pulses, while the lowest insufficiency of cereals and pulses was found in the high income group. The sufficiency of intake of only pulses was found to be the highest in households with Rs > 20,000 as monthly income. On the contrary, the per cent of families having sufficiency in pulses was the lowest in low income group. Whereas, 60 per cent of middle and upper middle income families had sufficiency of pulses, 6.6 per cent of the households were cereal secure from the low income group and only 13.3 per cent of the households were cereal and pulse secure from middle income group. No households of all the income groups except the low income group was cereal secure. None of the households of any income group had both cereal and pulses security except 13.3 per cent of the middle income group households. In general cereal and pulses insecurity was noted in the selected households of middle and low income groups. Cereal insecurity was found to be at a higher level than pulse insecurity in the selected households of the present study.

It is evident from the results that there was a significant difference in the levels of consumption of cereals, pulses, other vegetables, fruits and milk and milk products by the households belonging to various income groups. There was no specific trend

observed with regard to the consumption of cereals, pulses, all types of vegetables, nuts and oilseeds and sugar and jaggery, whereas increase in the levels of intake of fruits, milk and milk products and fats and oils was observed as the income of households increased. Thus from the results it can be concluded that the intake of different foods varied with various levels of income of the selected households.

The results of the present study are in line with the findings of Arora (1992) and Mujeeb and Rao, (2000) who reported that food intake varied with an increase in the income of the households.

4.8 Averages values of food consumption of the selected households (c.u. /day) as affected by educational status of homemakers

The average per capita consumption of different foods by the selected households per day belonging to various groups according to educational status of homemakers is given in Table 10. The average values of intake (g/c.u./day) of the different food groups namely cereals, pulses, leafy vegetables, other vegetables, roots and tubers, fruits, milk and milk products, nuts and oilseeds, fats and oils, sugar and jaggery and meat, fish, egg were 335g, 29g, 20g, 31g, 54g, 13g, 89g, 3g, 20g, 29g and 6g by the families belonging to illiterate group and 310g, 43g, 33g, 40g, 42g, 43g, 132g, 8g, 25g, 26g and 0.5g in the families having school

Table 10 Average values of food consumption of the selected households (c.u. / day) as affected by educational status of home makers

Sr. No.	Food groups (g)	Food consumption by the selected households belonging to various categories of homemakers educational status			SE			CD		
		I Illiterate (n = 18)	II School educated (n = 28)	III College educated (n = 14)	I Vs II	II Vs III	I Vs III	I Vs II	II Vs III	I Vs III
1	Cereals	335	310	314	24.3	28.8	26.4	47.6NS	36.4 NS	51.7 NS
2	Pulses	29	43	53	4.9	5.3	5.8	13.7*	16.2 NS	14.8*
3	Leafy vegetables	20	33	54	10.5	12.5	11.4	29.3 NS	34.7 NS	31.8*
4	Other vegetables	31	40	52	12.0	14.2	13.1	23.0 NS	27.8 NS	25.6 NS
5	Roots and tubers	54	42	44	12.0	14.2	13.0	33.2 NS	39.3 NS	36.1 NS
6	Fruits	13	43	65	17.4	20.6	18.9	48.3 NS	57.2 NS	52.4*
7	Milk and milk products	89	132	151	20.9	22.7	24.7	58.0*	62.9 NS	68.6*
8	Nuts and oilseeds	3	8	17	3.2	3.8	3.5	9.1 NS	10.7 NS	9.8*
9	Fats and oils	20	25	33	2.7	3.2	2.9	7.6 NS	9.0 NS	8.2*
10	Sugar and jaggery	29	26	29	5.3	6.3	5.7	10.3 NS	12.3 NS	11.1 NS
11	Meat, fish and egg	6	0.5	Nil	4.2	Nil	5.2	6.5*	Nil	6.9*

NS – Non significant

* - Significant at 5 % level

educated housewives, respectively. The corresponding values for the respective food groups were 314g, 53g, 54g, 52g, 44g, 65g, 151g, 17g, 33g, 29g and nil in the households having college educated homemakers.

The food security status for cereals and pulses of the selected households categorised according to educational status of homemakers (Table 11) indicated that the highest per cent households (55.7%) from illiterate group had insufficiency of both cereals and pulses, however lowest insufficiency was found in the households with college educated homemakers. Pulses sufficiency was observed to be highest in the households with college educated homemakers. On the other hand, pulse sufficiency was found to be lowest (33.3%) in illiterate group. Only 5.5 per cent households from illiterate group were having the sufficiency of pulses. However, security of both cereals and pulses was observed in 5.5 per cent and 7.1 per cent households with illiterate and college educated homemakers, respectively. Both cereals and pulses insecurity was observed to be at higher level in households with illiterate women than the other two groups, on the contrary, pulses security was found to be higher in the households with the college educated homemakers.

The results reported that there was significant difference in the consumption of pulses, leafy vegetables, fruits, milk and milk products, nuts and oilseeds, fats and oils, and meat, fish, egg by the

Table 11 Distribution of households according to food security for cereals and pulses as affected by educational status of homemakers

Sr. No.	Educational status	Household (%) by food security status			
		$C^+ P^+$	$C^+ P^-$	$C^- P^+$	$C^- P^-$
1	Illiterate (n=18)	5.5	5.5	33.3	55.7
2	School educated (n=28)	Nil	Nil	57.1	42.9
3	College educated (n=14)	7.1	Nil	85.8	7.1

C – Cereals

P – Pulses

+ – Sufficiency

– – Insufficiency

households having homemakers with different educational status. Statistically significant difference was observed in the consumption of pulses, milk and milk products and meat, fish, egg by illiterate and school educated groups. The intake of all the food groups except for cereals, other vegetables, roots and tubers and sugar and jaggery was significantly less in the households with illiterate homemakers than that of the households with college educated homemakers. There was no significant difference observed with regard to the consumption of all the foods by the households with school and college educated households. Thus it can be inferred from the findings that the consumption of the protein rich foods such as pulses, milk and nuts and oilseeds, meat, fish, egg and [illegible] of protective foods like fruits and leafy vegetables was increased with increase in educational status of homemakers.

The study conducted by Vijayraghavan *et al* (1998) revealed that the percentage of food insecure households decreased with increase in educational status. Similar results were obtained during the present study.

4.9 Averages values of food consumption of the selected households (c.u./day) as affected by the family size

The average per capita intake of different foods by the selected households per day belonging to the different family size groups is shown in Table 12. The average values of per capita per day intake of different foods viz. cereals, pulses, leafy vegetables, roots and tubers, fruits, milk and milk products, nuts and oilseeds, fats and oils, sugar and jaggery and meat, fish, egg were 329, 46, 43, 43, 44, 34, 133, 7, 27, 26 and 4 g by the families having 4 or less members and 303, 37, 27, 41, 41, 36, 120, 6, 21, 28 g and nil by the households having 5-6 members, respectively. The respective values were 361, 48, 24, 39, 54, 65, 115, 13, 32 and 25 g /c.u./day in the households with $\geqslant 7$ family members for the corresponding food groups except for meat, fish, egg.

The food security status for cereals and pulses of the households having different family sizes is given in Table 13 which indicated that the highest per cent of households from the medium size families (5-6 members) had both cereal and pulses insecurity, while the lowest insecurity was noticed in large families. The sufficient intake of only pulses was highest in large families and lowest security for only pulses was found in households having 5-6 members. Only 3.5 per cent households from medium size families were having cereal sufficiency.

Table 12 Average values of food consumption by the selected households (c.u. / day) as affected by family size

Sr. No.	Food groups (g)	Food consumption by the selected households belonging to various family size categories			SE			CD		
		I ⩽ 4 members (Small family) (n = 23)	II 5-6 members (Medium family) (n = 29)	III ⩾7 members (Large family) (n = 8)	I Vs II	II Vs III	I Vs III	I Vs II	II Vs III	I Vs III
1	Cereals	329	303	361	21.6	33.3	34.7	60.1NS	92.3 NS	93.6 NS
2	Pulses	46	37	48	5.2	8.0	8.1	14.4 NS	22.2 NS	22.5 NS
3	Leafy vegetables	43	27	24	8.7	6.0	7.3	41.8 NS	32.8 NS	20.7 NS
4	Other vegetables	43	41	39	11.2	17.2	17.4	31.1 NS	47.7 NS	48.4 NS
5	Roots and tubers	44	41	54	11.1	17.0	17.3	30.8 NS	47.3 NS	47.9 NS
6	Fruits	34	36	65	16.5	25.4	25.8	45.9 NS	70.5 NS	71.5 NS
7	Milk and milk products	133	120	115	20.4	31.3	31.8	56.6 NS	86.9 NS	88.2 NS
8	Nuts and oilseeds	7	6	13	3.1	4.7	4.8	8.6 NS	13.2 NS	13.4 NS
9	Fats and oils	27	21	32	2.4	3.7	3.8	6.8 NS	10.4*	10.6 NS
10	Sugar and jaggery	26	28	25	3.9	6.0	6.1	10.8 NS	16.7 NS	16.9 NS
11	Meat, fish and egg	4	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

NS – Non significant
* - Significant at 5 % level

Table 13 Distribution of households according to food security for cereals and pulses as affected by family size

Sr. No.	Family size	Households (%) by Food security status			
		$C^+ P^+$	$C^+ P^-$	$C^- P^+$	$C^- P^-$
1	≤ 4 Family members (n=25)	4.4	Nil	60.8	34.8
2	5-6 Family members (n=28)	6.9	3.5	41.3	48.3
3	≥ 7 Family members (n=7)	Nil	Nil	87.5	12.5

C – Cereals

P – Pulses

+ – Sufficiency

– – Insufficiency

However, none of the household from other two groups of family size were found to be cereal secured. Both cereals and pulses sufficiency was noticed in 4.4 and 6.9 per cent of the households belonging to small and medium size families.

The results indicated that there was significant difference in the consumption of only fats and oils in medium and small sized families. Whereas, the consumption level of all other food groups was statistically at par ($P > 0.05$) by households from various family sizes. However, the data regarding the food security that the food security revealed with special reference to the pulses increased as the size of the family increased.

A study conducted by Vijayraghavan et al (1998) also reported that the percentage of food secure households increased with increase in family size.

4.10 Averages values of food consumption of the selected households (c.u./day) as affected by type of family

The average intake of various foods by the households grouped depending upon the type of family are given in Table 14. The average intake of cereals, pulses, leafy vegetables, other vegetables, roots and tubers, fruits, milk and milk products, nuts and oilseeds fats and oils,

Table 14 Average values of food consumption of the selected households (c.u. / day) as affected by the type of family (mean ± SD)

Sr. No.	Food group (g)	Food consumption by the selected households belonging to various type of family		
		Nuclear (n=45)	Joint (n=15)	'Z' values
1	Cereals	311±82.8	346±70.1	1.58NS
2	Pulses	41±19.9	41±12.3	0.02NS
3	Leafy vegetables	37±38.1	24±26.5	1.52NS
4	Other vegetables	39±41.1	44±39.1	0.49NS
5	Roots & tubers	39±55.9	36±50.3	1.20NS
6	Fruits	33±49.6	57±84.3	1.06NS
7	Milk & milk products	118±80.3	138±45.0	1.20NS
8	Nuts and Oilseeds	7±10.0	10±14.5	0.95NS
9	Fats & oils	25±10.6	27±9.1	0.71NS
10	Sugar & Jaggery	25±13.3	30±12.7	1.15NS
11	Meat, fish, egg	3±0.0	Nil	Nil

NS- Non significant

sugar and jaggery and meat, fish, egg by the nuclear family was 311, 41, 37, 39, 33, 118, 7, 25, 25 and 3 g per day respectively. However, the corresponding values of consumption of foods by the households from joint families except for meat, fish, egg group were 346, 41, 24, 44, 36, 57, 138, 27,10 and 30 g/c.u./day, respectively.

The security status of cereals and pulses of the families grouped as nuclear and joint (Table 15) indicated that both cereal and pulses insecurity was highest (35.6%) in nuclear families than the joint families. Only pulses secured households were 60 per cent in both the family types. While only 6.6 per cent of the household from the joint families were found to have cereal sufficiency. On the other hand, 4.4 per cent of the households from nuclear families were found to be both cereals and pulses secured. The results revealed that pulse security was found to be affected by the type of family, while the households from joint families had better security level for both cereals and pulses than households from nuclear families.

From the results it may be concluded that the cereal and pulses security in joint families is more than the nuclear families. This may be due to the more number of earning members in joint families.

Table 15 Distribution of food security for cereals and pulses as affected by type of family

Sr. No.	Type of family	Households (%) by food security status			
		$C^+ P^+$	$C^+ P^-$	$C^- P^+$	$C^- P^-$
1	Nuclear (n=45)	4.4	Nil	60.0	35.6
2	Joint (n=15)	Nil	6.5	60.0	33.4

C – Cereals

P – Pulses

+ – Sufficiency

– – Insufficiency

4.11 Average intake of energy and protein by the selected households

The average values of intake of energy and protein by the selected households and RDA (Recommended Dietary Allowances) values are presented in Table 16 and illustrated in fig. 4. The average values of intake of energy and protein by the selected households were 1851 kcal and 52 g/c.u./day, respectively.

The findings of the study also pointed out that the mean values of intake of energy and protein by the households under study were significantly less than those of the Recommended Dietary Allowances. It is also evident from the results that very high per cent of the households could not reach to the level of recommendation with regard to energy (90%) and protein (76%) intake. This deficit with respect to both the nutrients may be attributed to the inadequacy in the consumption of cereals, milk and other food groups noticed in the present study.

Hence, it can be said from the above results that the studied households could not secure adequate amount of energy and protein. A study conducted by AICRP, Andra Pradesh (1995-96) also reported that the energy intake of the studied households was far below the RDAS.

Table 16 Average values of energy and protein intake by the selected households (n = 60)

Sr. No	Nutrient	RDA (c.u./day)	Average consumption (c.u./day)	'Z' values	Households consuming more than RDA (%)	Households consuming less than RDA (%)
1	Energy (Kcal)	2425	1851	11.30**	10.0	90.0
2	Protein (g)	60	52	5.85*	23.3	76.7

* - Significant at 5 % level
** - Significant at 1 % level

4.12 Average intake of energy and protein by the selected households as affected by monthly family income

The average intake of energy and protein (c.u./day) by the households from different economic stratas is given in Table 17 and presented in fig. 5. The average intake of energy by the selected households belonging to low income group, middle income group, upper middle income group and high income group was 1587, 1697, 1982 and 2138 kcal per consumption unit per day, respectively. However, the intake of protein by the households from low income group, middle income group, upper middle income group and high income group was 44, 47, 57 and 59 g c.u./day, respectively.

The findings pointed out that there was significant increase in the amount of protein intake of households associated with increase in family income. Even the calorie intake of the households also increased as income increased.

It can be inferred from above results that the income influenced the nutrient intake. As the household income increased, there was an increase in the intake of calories and protein. Braun, *et al.* (1992) and Mujeeb and Rao (2000) also reported the increase in nutrient intake along with the increase in family income.

Table 17 Average values of energy and protein intake of the selected households (c.u. / day) as affected by monthly family income (n = 60)

Sr. No.	Nutrients	Nutrient intake by the selected households belonging to various income groups				SE	CD
		≤ 5000 (Low income group) (n=15)	5001-10,000 (Middle income group) (n=15)	10,001-20,000 (Upper middle income group) (n=15)	>20,000 (High income group) (n=15)		
1	Energy (kcal)	1587	1687	1982	2138	141.6	501.6 NS
2	Protein (g)	44	47	57	57	2.4	6.6**

NS – Non significant
** - Significant at 1 % level

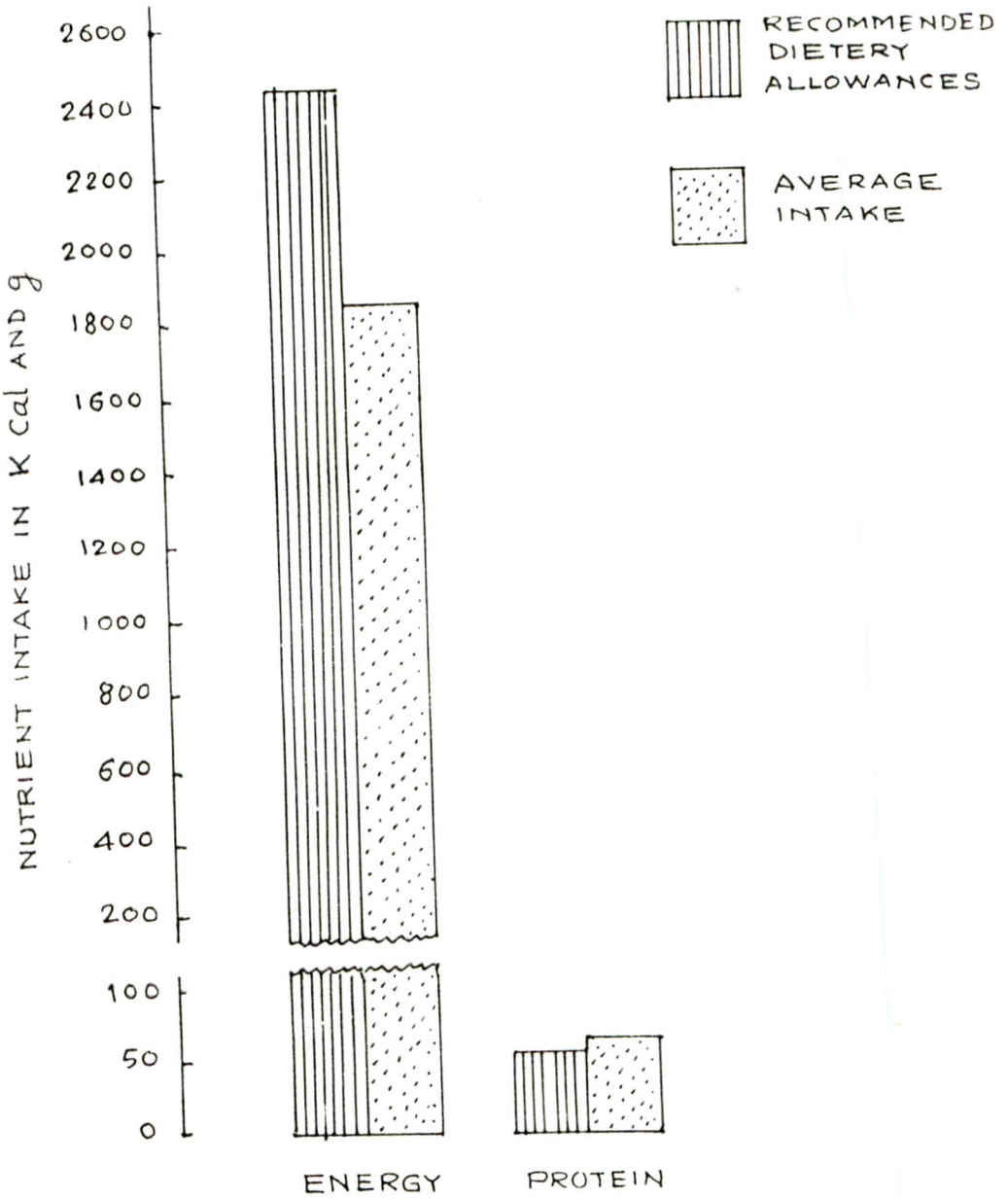

Fig.4 : AVERAGE VALUES OF ENERGY AND PROTEIN INTAKE BY THE SELECTED HOUSEHOLDS (n=60)

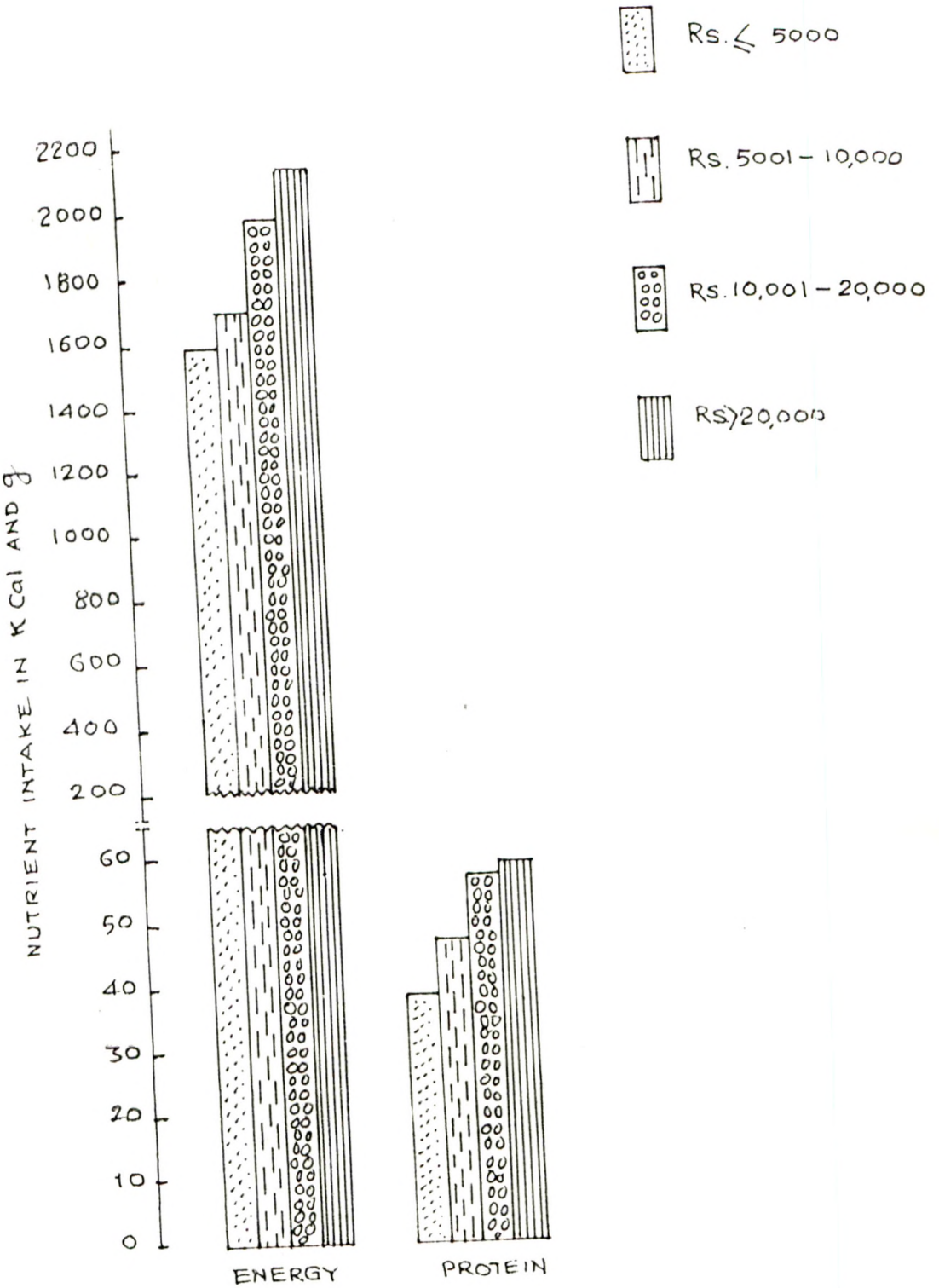

Fig. 5: AVERAGE VALUES OF ENERGY AND PROTEIN INTAKE OF THE SELECTED HOUSEHOLDS (PER C.U./DAY) AS AFFECTED BY FAMILY INCOME

4.13 Average values of energy and protein intake of the selected households (c.u./day) as affected by educational status of homemakers

The average intake of energy and protein (c.u./day) by the households as affected by educational status of homemakers is presented in Table 18. The average values of energy intake by households were 1669, 1885 and 2001 kcal per c.u./day having illiterate, school educated and college educated homemakers, respectively. On the other hand, the average values of protein intake by the households with illiterate, school educated and college educational homemakers were 50, 51 and 55 g/c.u./day, respectively.

From the results it was clear that there was significant difference in the intake of energy by the households having college educated homemakers and households having illiterate homemakers. The households from families with college educated homemakers had significantly high intake of calories than the households from the families with illiterate homemakers. The observed differences may be due to the fact that the increase in educational status helps in increasing the awareness regarding health and nutrition. From the results it may be concluded that as educational status of homemakers increased the energy intake of the households also increased.

Table 18 Average values of energy and protein intake of the selected households as affected by education status of homemakers (c.u. / day)

Sr. No.	Nutrient	Nutrient intake of households by various categories of homemakers (Educational status)			SE			CD		
		I Illiterate (n=18)	II School educated (n=28)	III College educated (n=14)	I Vs II	II Vs III	I Vs III	I Vs II	II Vs III	I Vs III
1	Energy (kcal)	1669	1855	2001	117.1	127.1	138.6	324.7NS	352.4NS	384.2*
2	Protein (g)	50	51	55	3.4	3.6	4.0	9.4NS	10.2NS	11.1NS

NS – Non significant
* - Significant at 5 % level

4.14 Average values of energy and protein intake of the selected households as affected by educational status of homemakers (c.u./day)

Average values of energy and protein intake by the selected households belonging to different family size categories are given in Table 19. The average values of intake of energy by small size, medium size and large size families were 1917, 1718 and 2042 kcal/c.u./day, respectively, while the average values of intake of protein by the corresponding family size categories were 53, 49 and 58 g/c.u./day, respectively.

The results showed that there was no significant trend in the intake of energy and protein by the households from various family size categories. The intake of both energy and protein was observed to be lower by the households having 5-6 members than the households having ≤ 4 members and ≥ 7 members. The observed difference in the nutrient intake among the households from different family type categories may be due to the fact observed during investigation that there was single earning member in most of the medium size families.

Table 19 Average values of energy and protein intake by the selected households as affected by family size (c.u. / day)

Sr. No.	Nutrient	Nutrient intake of households by various family size categories			SE			CD		
		I ⩽ 4 members (Small family) (n = 25)	II 5-6 members (Medium family) (n = 28)	III ⩾7 members (Large family) (n = 7)	I Vs II	II Vs III	I Vs III	I Vs II	II Vs III	I Vs III
1	Energy (kcal)	1917	1718	2042	101.0	155.2	157.8	286.8NS	430.3NS	436.3NS
2	Protein (g)	53	49	58	2.8	4.5	4.4	7.9NS	12.1NS	12.4NS

NS – Non significant

4.15 Average values of energy and protein intake of the selected households (per/c.u./day) as affected by type of family

Table 20 gives the information regarding the average energy and protein intake (c.u./day) by the selected households as affected by type of family. The mean per capita daily intake of energy was 1784 ± 384.2 kcal and 2052 ± 351.3 kcal by the households from the nuclear and joint families, respectively. On the other hand, the average protein intake was recorded to be 51 ± 11.3 and 56 ± 10 g/c.u./day by the households from nuclear and joint families, respectively.

The significant increase in the intake of calories and protein was noticed in the households from joint families. As it was noticed in the present study that the food security status of households from joint families was better than that of the households from nuclear families which may be attributed to the above findings.

4.16 Average values of consumption of foods by the selected women of sedentary and moderate activity

The mean intake of different foods by the selected women performing sedentary and moderate activivity was calculated and the averages were compared with Recommended Dietary Allowances ICMR (1990) as shown in Table 21 of cereals, pulses, leafy vegetables, other

Table 20 Average values of energy and protein intake of the selected households (c.u. / day) as affected by the type of family (mean ± SD)

Sr. No.	Nutrient	Nutrient intake of the selected households as affected by the type of family		
		Nuclear (n=45)	Joint (n=15)	'Z' values
1	Energy (kcal)	1784 ± 384.2	2052 ± 351.3	2.34*
2	Protein (g)	51 ± 11.3	56 ±10.0	1.8 NS

* - Significant at 5 % level
NS- Non significant

Table 21 Average values of consumption of different foods by the selected women of sedentary and moderate activity

Sr . No.	Food groups (g)	Food consumption by women					
		Sedentary activity (n=87)	RDI (g/c.u./day)	'Z' values	Moderate activity (n=3)	RDI (g/c.u./day)	'Z' values
1	Cereals	279	300	2.5*	330	350	0.3NS
2	Pulses	39	60	11.8**	53	70	2.0NS
3	Leafy vegetables	35	125	22.0**	Nil	125	Nil
4	Other vegetables	38	75	9.1*8	48	75	2.3NS
5	Roots and tubers	39	50	2.7**	2	75	31.7**
6	Fruits	42	30	1.7NS	35	30	0.4NS
7	Milk and milk products	100	200	13.1**	50	200	46.8**
8	Fats and oils	23	30	6.7**	22	35	2.9NS
9	Sugar and Jaggery	23	30	5.6**	33	30	0.4NS

NS – Non significant
* - Significant at 5 % level
** - Significant at 1 % level

vegetables, roots and tubers, fruits, milk and milk products, fats and oils, sugar and jaggery by the sedentary working women was 279, 39, 35, 38, 39, 42, 100, 23 and 23 g/day where as the intake of all above foods groups by the moderate working women was 330, 53, 18, 2, 35, 50, 22 and 33 g/day, respectively except for leafy vegetables. The average intake of both the groups was compared with respective levels of Recommended Dietary Intake (RDI). The results pointed out that the intake of all the food groups except for fruits was significantly less than RDI by the sedentary working women. While only the intake of roots and tubers and milk and milk products was found to be significantly deficient by the moderate working women when compared with RDA.

The observed food insecurity in the women may be because of the unequal food distribution pattern in the households. Similar observations were made by Khan and Patel (1989) and Kumari and Khader (1990).

4.17 Average values of the intake of energy and protein by the women with sedentary and moderate activity

The average nutrient intake of energy and protein by the sedentary and moderate working women in comparison with RDA for both the groups of activities pattern is given in Table 22. The mean per

Table 22 Average values of intake of energy and protein by the selected women of sedentary and moderate activity

Sr . No.	Nutrients	Nutrient intake by women					
		Sedentary activity (n=87)	RDA (g/c.u./day)	'Z' values	Moderate activity (n=3)	RDA (g/c.u./day)	'Z' values
1	Energy (kcal)	1642	1875	5.9**	1651	2225	2.1NS
2	Protein (g)	46	50	3.4**	48	50	0.2NS

NS – Non significant
** - Significant at 1 % level

day intake of energy of the sedentary and moderate working women was observed to be 1642 and 1651 kcal, respectively. On the other hand, the values of average protein intake by the sedentary and moderate working women were 46 and 48 g/day, respectively.

The findings indicated that the energy and protein intake of only sedentary working women was found to be significantly lower than the RDA. In contrast, there was no significant variation noticed between nutrient intake and RDA values. From the results it can be concluded that sedentary women were deficit in both energy and protein.

The study conducted by Kumari and Khader (1990) also observed calorie sufficiency in the diet of working women.

Summary

Chapter 5

SUMMARY AND CONCLUSIONS

The present investigation was carried out to find out the food security at household level in Parbhani city. A pilot survey of 150 households was conducted and a sample of 60 households was drawn for further detail study. The selection of sample was done on the basis of economic status of the households. The selected sample was further divided in 4 equal groups depending on income levels as low income group (Rs $\leq$ 5000), middle income group (Rs 5001 to 10,000), upper middle income group (Rs 10,001 to 20,000) and high income group (Rs > 20,000).

The food security determinates used were expenditure on food and access, storage and utilization of different foods. Apart from this the food and nutrient intake of the households as well as of women was determined and compared with RDA in view of identifying the food security. The food and nutrient intake of households, as influenced by socio-economic parameters, such as family income, educational status of homemakers and type and size of family was assessed. One day weighment method of diet survey was used for assessing the food intake

of households and intrafamily distribution of foods. Nutrient intake was calculated by using food composition tables.

Socio-economic data of the households revealed that most of the homemakers from the studied households were school educated, maximum families were medium sized (5-6 members) while most of the studied families were nuclear.

The data on food expenditure indicated that the major items of expenditure were cereals and milk and milk products. The expenditure on other vegetables, nuts and oilseeds, milk and milk products and fats and oils was increased significantly with increase in monthly family income.

The major access of food was market for all 100 per cent selected households followed by produce from own field.

The staples like cereals and pulses were stored for a period of six months to one year by the majority of households. Foods like rice flakes, semolina, nuts and oilseeds, fats and oils, sugar and jaggery were found to be stored for one month period while perishables like milk and milk products and vegetables were stored for one to three days. Most of the families used food wastes like broken cereals and pulses and leftover foods.

The data on food sufficiency status indicated that majority of the sample under study (95%) was found to be grossly inseucred for cereals. However, 40 per cent of the selected households were noted to be pulses insecured. The selected households having insecurity for fats and oils was the lowest (36.7%).

Findings with respect to food consumption as influenced by monthly family income evidenced that there was a significant difference observed in the consumption levels of cereals, pulses, other vegetables, fruits and milk and milk products by the households from different categories of income. There was no specific trend observed in the intake of cereals, pulses, all types of vegetables, nuts and oilseeds and sugar and jaggery by the households belonging to various income groups. Whereas, the households from low and upper middle income group found to be facing severe insecurity for cereals and pulses. The educational status of the homemakers in the households significantly influenced the food consumption by family members. The significant increase in the per capita consumption of cereals, other vegetables, roots and tubers and sugar and jaggery was observed in the households with college educated homemakers.

A positively significant association was noticed between the level of consumption of fats and oils and pulse security and joint families.

The consumption of all the foods by the households from joint and nuclear families was at par. However, the cereal and pulse security was more in households from joint families.

The data regarding the energy and protein intake indicated that the intake of energy and protein was significantly less in the studied households in comparison with Recommended Dietary Allowances. The increase in the monthly family income and educational status of homemakers was found to be helpful in increasing intake of protein and energy, respectively. The mean intake of energy and protein (c.u./day) of the selected households was not found to be influenced by the family size. On the other hand, there was significant increase observed with regard to energy intake by the households from joint families.

Food and nutrient intake was grossly deficient than RDA in sedentary working women.

Thus from the results of the present study it can be concluded that families with income less than Rs 10,000 spent more on cereals, while households with income more than Rs 10,000 spent highest amount of money on milk and milk products followed by cereals.

All the selected households attained market as an access to foods.

Maximum households were noticed to be cereals, energy and protein insecured irrespective of having sufficient stores of cereals and pulses at home. Cereal insecurity was found to be at a higher magnitude than pulse insecurity in the selected households in the present study.

In general cereal, pulse, energy and protein security was noticed in the selected households of upper middle and high income group and in families with college educated homemakers.

Type of activities performed by women influenced the food and nutrient intake.

Hence on the basis of findings of the present study it is recommended that there should be an easy access to food, the availability of more amounts of good quality and quantity of food and creation of awareness regarding maximum utilization of available food in order to increase the food security at household level.

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APPENDIX-I

Pilot survey schedule for selection of households to study food security at household level.

Name of the place	:		
District	:		
Name of the Head of the family	:		
Educational status	:	Head :	Housewife :
Occupation	:	Head :	Housewife :
Income	:	Rs	/day / month / year
Land owned	:	Acres	
Total No. of family members	:		
Type of family	:	Nuclear / Joint / Extended.	
Age of family members	:		

1.

2.

3.

4.

5.

Date

Signature and Name of the Investigator

APPENDIX – II

Survey schedule to assess socio-economic background of selected households

Date

1. Name of the homemaker :
2. Address :
3. Name of the Head of the family :
4. Type of family : Nuclear/Joint/Extended
5. Composition of the family :

Sr. No	Sex	Age (Yrs)	Education	Occupation	Income (Rs)

6. Total income of the family : Rs. /month/year
7. Caste :

APPENDIX-III

Expenditure pattern of the selected Households on food.

1. Monthly expenditure on food : Rs

2. **Food purchasing in the family**

Name of the food stuff	Source	Amount purchased (g/kg) yearly/monthly/weekly/daily	Money spent (Rs)
Cereals			
Jawar			
Rice			
Wheat			
Bajra			
Rice flakes			
Rice puffed			
Maida			
Rava			
Bread			
Vermicilli			
Pulses			
Red gram (whole)			
Red gram dhal			
Bengal gram (whole)			
Bengal gram dhal			
Black gram (whole)			
Black gram dhal			
Green gram (whole)			
Green gram dhal			
Lentil			

Cow pea			
Mothbean			
Dry peas			
Soybean			
Vegetables			
Leafy vegetables			
Roots & tubers			
Other vegetables			
Fruits			
Milk and milk products			
Milk			
Curd			
Nuts & oilseeds			
Groundnut			
Gingelly seeds			
Coconut			
Linseed seeds			
Niger seeds			
Almond			
Cashewnut			
Mustard seeds			
Charoli			
Fats and oils			
Ghee			
Vegetable Oil			

Pure Ghee			
Sugar & Sugar Products			
Sugar			
Jaggery			
Spices & condiments			
Chillies			
Garlic			
Ginger			
Meat & fleshy foods			
Meat			
Fish			
Egg			
Ready to eat or processed foods			
Biscuits			
Jam			
Jelly			
Ketch-up			
Fursan (Khara)			
Puffed bengal gram dhal			
Puffed bengal gram whole			
Other foods			
Snacks			
Sweets			
Miscellaneous foods			

Sago			
Rajkeera			
Poppy seeds			
Bhagar			
Corn flakes			
Papad			
Health foods			
Chayanprash			
Bournvita			
Horlicks			
Complan			
Any other			

3. Do you utilize edible wastes in the house ? : Yes/No/ some times used.
4. Do you utilize food left over In the house.? : Yes/No/ sometimes used.

APPENDIX – IV

Food intake of the selected households

Meal Pattern	Name of the Preparation	Ingredients	Weight of raw foods (g)	Source	Weight of cooked foods (g)	Weight of leftover foods (g)
Break Fast						
Midmorning						
Lunch						
Mid afternoon						
Snacks						
Dinner						

APPENDIX-V
Individual Food Intake

Family Members	Age (Years)	Break Fast		Mid Morning		Lunch		Mid Afternoon		Snacks		Dinner		Any other time	
		Name of Preparation	Amount (g)	Name of Preparation	Amount (g)	Name of Preparation	Amount (g)	Name of Preparation	Amount (g)	Name of Preparation	Amount (g)	Name of Preparation	Amount (g)	Name of Preparation	Amount (g)