

**NUTRITIONAL STATUS, KNOWLEDGE, ATTITUDE,
PRACTICES AND FOOD SECURITY PROFILE OF
SELECTED TRIBAL FAMILIES OF PACHAIMALAI**

By

G.MEENA

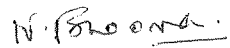
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CERTIFICATE

This is to certify that the dissertation entitled "**NUTRITIONAL STATUS, KNOWLEDGE, ATTITUDE, PRACTICES AND FOOD SECURITY PROFILE OF SELECTED TRIBAL FAMILIES OF PACHAIMALAI**" submitted to the Avinashilingam Institute for Home Science and Higher Education for Women, (Deemed University), Coimbatore, in partial fulfilment of the requirements for the Award of the **DEGREE OF MASTER OF PHILOSOPHY IN FOOD SCIENCE AND NUTRITION** is a record of original research work done by **G. MEENA** during the period of her study in the **DEPARTMENT OF FOOD SCIENCE AND NUTRITION**, Avinashilingam Institute For Home Science and Higher Education For Women, (Deemed University), Coimbatore-641 043, under my supervision and guidance and the dissertation has not formed the basis for the Award of any Degree / Diploma / Associateship / Fellowship or similar title to any candidate of any other University.



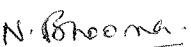
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DECLARATION

I hereby declare that the dissertation entitled **“NUTRITIONAL STATUS, KNOWLEDGE, ATTITUDE, PRACTICES AND FOOD SECURITY PROFILE OF SELECTED TRIBAL FAMILIES OF PACHAIMALAI”** is the result of investigation carried out by me in the Department of Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women, (Deemed University), Coimbatore, under the supervision and guidance of **Dr. (Tmt.) Bhooma Mani**, M.Sc., M.Phil., Ph.D., Reader, Department of Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women, (Deemed University), Coimbatore, and that it has not formed the basis for the award of any Degree / Diploma / Associateship / Fellowship or Similar title to any candidate of any other University.


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INTRODUCTION

I. INTRODUCTION

Over a few hundred or so different tribes spread over India, many of them have suffered the indignity of social discrimination for centuries. It was Mahatma Gandhi who fought hard to recognize them as free citizens of India and called them the Girijans or the Children of the Forest God.

After independence in 1947, the Government of India spent a lot of resources to improve the life of the native Indians or scheduled tribes, as they are known in India today. While much progress has been made in reforming the tribal, the forced change gave rise to numerous unforeseen problems in India, including social conflict, loss of identity and coerced religious conversions (Kamat, 1996).

The Indian tribes constitute eight per cent of India's population, according to 1991 census. This too is misleading, as the last listing of tribal groups was done in 1976. Anthropological survey insisted that there are 635 tribes in India. Yet Government of India recognized only 426 as tribes and 209 tribes still are left out. If the total population of 635 tribes was enumerated the percentage would go up (Devi, 2000)

The tribal population groups of India are known to be the autochthonous people of the land. Tribal are often referred to as **ADIVASI, VANAJATI, VANVASI, PAHARI, ADMJATI, AND ANUSUCHIT, JAN JATI**. The concept of tribe emerged in India with the coming of the British. Gradually, the concept of reservation emerged and through that emerged the idea of scheduled tribe in independent India (Salil, 1990).

The 426 groups recognized as scheduled tribes form approximately eight per cent of the total Indian population. These tribal groups inhabit widely varying ecological and geo-climatic conditions (hilly, forest, desert, etc.,) in different concentration throughout the country with different cultural and socio-economic backgrounds. Due to their remote and isolated living, tribal groups are difficult to reach (Salil, 1994).

There is bewildering variation in population size of the scheduled tribes; the highest number of tribes is represented by the State of Orissa (62) and the lowest in Sikkim (2). The largest tribal population around 15.4 million reside in Madhya Pradesh. Seventy-four primitive tribal communities have been identified by the Government of India in 15 States/ Union Territories for taking up special socio-economic development programmes on the basis of

- a) Pre- agricultural level of technology following a hunting-gathering way of life.
- b) Extremely low level of literacy, and
- c) Small stagnant diminishing population (Report of the working group, 1989).

The scheduled tribes differ considerably from one another in race, language, culture and beliefs. Notwithstanding so much diversity, there are certain broad similarities between the mutually divergent tribal groups. Striking similarities are noticed in their modes of living; each tribe lives in a definite area, has common dialect, cultural homogeneity and unifying social organization. The tribal population of India has been found to speak 105 different languages and 225 subsidiary languages indicating a great deal of variety. Languages spoken by Indian tribes can be classified into four

major families of languages, namely; Austro- Asiatic family, Tibeto - Chinese family, Dravidian family and Indo- European family (Vidyarthi, 1983).

According to AmarKumar (1997) tribal, because of poor economic conditions and lack of facilities, frequently suffer from malnutrition. A combination of factors makes them vulnerable. Most tribal live in sub human physical conditions. An average tribal family has seven people living in only two rooms. Their homes do not have enough ventilation. Their pigs, cattle, and hens live within the same house, to ensure the security of their animals. Generally they do not have electricity, sanitary latrines, etc., They use the same source of waters for themselves as well as for their cattle, to wash their clothes, vessels drinking and other domestic needs. They themselves take bath in that same water, which gets mixed with wells that satisfy the need of drinking water. Moreover, the wells themselves are rarely properly constructed and maintained.

According to Indian Council of Medical Research, which took samples from some of the Communities, (i.e.) Khond, Godaba, Pothey, tribal consume less food than recommended. The mean nutrient intake is low, causing deficiency, which varies from fifteen per cent to seventy five per cent approximately. They do not have correct scientific knowledge of proper health care. Neither do they have proper knowledge for growing the vegetables and consume the maximum from whatever produce they have (Basu, 1993).

Because of malnutrition tribals show

- Higher infant mortality rate compared to the national average
- Higher rates of neo- natal, post-natal, pre-natal mortality
- Lower life expectancy

- Poor body weight and height
- Low haemoglobin levels (Tribal Research Bulletin, 1997).

Location

The Pachaimalai Hill range is at an altitude of around 200 meter above sea level and is a natural water catchment area. Though it has lost much of its dense forest cover, one could easily imagine as what would have been its original appearances from seeing the present shape. The very nomenclature "Pachaimalai" (Green Hills) is apt and proof enough for its fertility. The irrigation needs for the surrounding places of Gangavalli, Venkatachalapuram, Uppiliapuram, Sobanapuram, Veeraganur, Poolambadi and Thuraiyur are served by Pachaimalai for it being the ground water recharging source. This information was hitherto unknown to the World.

In the light of the above said facts let us review the ways to improve the purpose of real Tribal development. 32 villages are located in the Pachaimalai Hills. The Tribal population of this area is about 12,000. The "Malayali Tribes" are the inhabitants of these villages. Though crores of Rupees are allotted and spent under the Integrated Tribal Development programme, carried out by 23 Central and State Government agencies, only marginal developments have taken place in the fronts of education, economy, agriculture and forest wealth.

Even after 56 years of attaining freedom these hapless tribals are still in shackles. They are put at towering height of the Hills but paradoxically the living conditions are not on par with others in the plains.

Regarding the basic needs, Primary Schools are functioning in these areas. The Department of Scheduled Caste and Scheduled Tribes manage these Schools. As far as the roads concerned, the metalled roads connected 16 villages. The 40 km long bitumen roads links Uppliapuram, Top Sengattupatti, Odaikattupudur, Periamangalam and Perianagoor. Bus services, supposed to be operated, everyday is always irregular. The bus plying between these villages is the most poorly maintained one. The eroded roads are in a still more deplorable condition (Plate 1).

Apart from these, there are still many villages that are to be connected by roads. Only the one foot wide footpaths connect most of the places and walking is the only possible mode of transport to these parts.

As far as the drinking water is concerned wells are the only sources of water. This is protected drinking water. At all villages overhead tanks have been constructed. But in reality, the frequent interruption in power supply prevents the benefits of having overhead tanks from reaching the Tribes.

To fulfill the health care needs of Tribal villages, a Primary Health Centre in Top Sengattupatti village (Plate 2) and sub Health Centres are functioning with the staff strength of two qualified Physicians and para-medical personnel. The Tribals inhabiting Pachaimalai Hills are afflicted to the range of communicable and non-communicable diseases like dental problems, skin diseases, sexually transmitted diseases (STD), ringworm and seasonal diseases like Typhoid, Malaria, Jaundice and Pyorrhea etc.



PLATE 1
ROADS IN DEPLORABLE CONDITION



PLATE 2
PRIMARY HEALTH CARE

The above said illnesses are the direct results of environmental pollution, change in food habits, unprotected water and last but not the least, the cultural impacts. Anaemia, white discharge, miscarriages, stillborn babies and maternal mortality are the specific diseases found wide spread among the women in these areas (Rajannan, 1990).

Pachaimalai fall under Thummampatti range of Athoor forests. District and is divided into seven Reserved Forest areas of Vethimbiam, Venamede, Periasolai, Venjarai, Nagoor, Veppudi and Gangavalli. These forests have red and black soil and have tropical trees and a variety of other plant species. The following lists of plants, which provide a multi-utility value, are found in this region.

- i) *Acacianilotica*
- ii) *Acaciaferuginea*
- iii) *Acacialeucophlocia*
- iv) *Acaciaplainfrons*
- v) *Acacia aicanthus excelsa*
- vi) *Ficus glomrata*
- vii) *Ficus sula*
- viii) *Petro carpa santalinus etc.*

A balanced diet, Knowledge of nutrition and good dietary practices are important for food absorption, which in turn substantiates nutrition security. Nutrition security brings an added dimension to the concept of food security by including aspects of consumption and utilization of sufficient macro and micro nutrients required to meet physiologic needs for growth, development

health and well being. Habitual dietary intake patterns, individual food choices, intra-household distributions of food and health status are important to attain nutrition security. In order to achieve lasting food and nutrition security aspects such as clean water, basic health services, female literacy and improved childcare practices also need to be addressed (Tontisirin, 2003).

Micro nutrient deficiencies are prevalent in areas where dietary diversity is poor and illness; particularly malaria and hookworm are also wide spread. Vitamin-A, Iron and Iodine are the three deficiencies of greatest health significance. An estimated two billion persons suffer from anemia, the majority of who are women and children (World Health Organization, 2001).

To break the vicious cycle of malnutrition and get back on track to reach the World Food Summit goal it is crucial to recognize the synergies between nutrition, health, environment, education and social equity. Ultimately there must be improved governance at global, national and local level. The problems of hunger and malnutrition will not be reduced without reducing the underlying impediments mainly poverty and under development. Poverty social inequality, and lack of education are the primary causes of hunger and malnutrition (Lupien, 2002).

Most developing countries need to devote more resources and give higher priority to the development to two of their most valuable resources, the people and agricultural potential. Better agriculture leads to better food supplies more employment and improved incomes to increase access to food. The income generated by improved agriculture can also increase the national income in the form of taxes and thus more funds can be made for improved

health and educational services. Governments need to see individuals and households as principal agents of change and not merely as passive recipients of services (Bage, 2001).

Since many studies have not been conducted so far along the tribals in India the present investigation was attempted to study the “Nutritional Status, Knowledge, Attitude, Practices and Food Security Profile of Selected Tribal Families of Pachaimalai”, with the following specific objectives;

1. Assessment of Nutritional status of the selected tribal families,
2. To evaluate the food security profile of tribes,
3. Evaluation of Nutritional Knowledge, Attitude and Practices of the women of the selected tribal families.

REVIEW OF LITERATURE

II. REVIEW OF LITERATURE

The literature pertaining to the study entitled "**Nutritional Status, Knowledge, Attitude, Practices and Food Security Profile of Selected Tribal Families of Pachaimalai**" is discussed under the followed headings:

- A. Dimension of Food Security
- B. Magnitude of Malnutrition in India
- C. Coping Mechanisms Adopted for Food Security
- D. Knowledge, Attitude and Practice

A. DIMENSION OF FOOD SECURITY

Access to adequate food, which is one of the foremost basic needs of life should be the birthright of every single human being on this earth. On her part, Mother Nature has provided this unique planet of ours with such abundant resources and human beings with such an intelligence that the global production can easily feed the present and future population of this entire World. Yet, the way human society has got organized, One fifth of the population of the developing Countries, (i.e) about 800 million people suffer from chronic under nutrition (FAO 1992).

According to a world bank policy study (1986), the world bank position paper on poverty and hunger added an "activity level" concept to these goals, stating that "food security must assure access by all people at all times to enough food for an active and healthy life". In turn, food insecurity was defined as the lack of access to enough food for a healthy, active lifestyle.

Worldwide, a substantial number of people remain food insecure or hungry. The Food and Agriculture Organization (FAO) indicates that more than 840 million people in the world do not have enough to eat (FAO, 2002). Over half of all child deaths worldwide are associated with malnutrition (Pelletier *et al.*, 1995). Micronutrient deficiencies are especially widespread. In the developing world, nearly 20 per cent of the population suffers from iodine deficiency, about 25 per cent of children have subclinical vitamin A deficiency and more than 40 per cent of women are anaemic (Mason *et al.*, 2001).

Famine – the image many people have of hunger – affects relatively few people, and the amount of food needed to prevent it is relatively small. Whatever the cause, the effects of famine can be devastating. In 1992, some three per cent of the world's population lived in countries affected by famine or severe food shortage, although not everyone in these countries actually suffered from hunger (Ulvin, 1994).

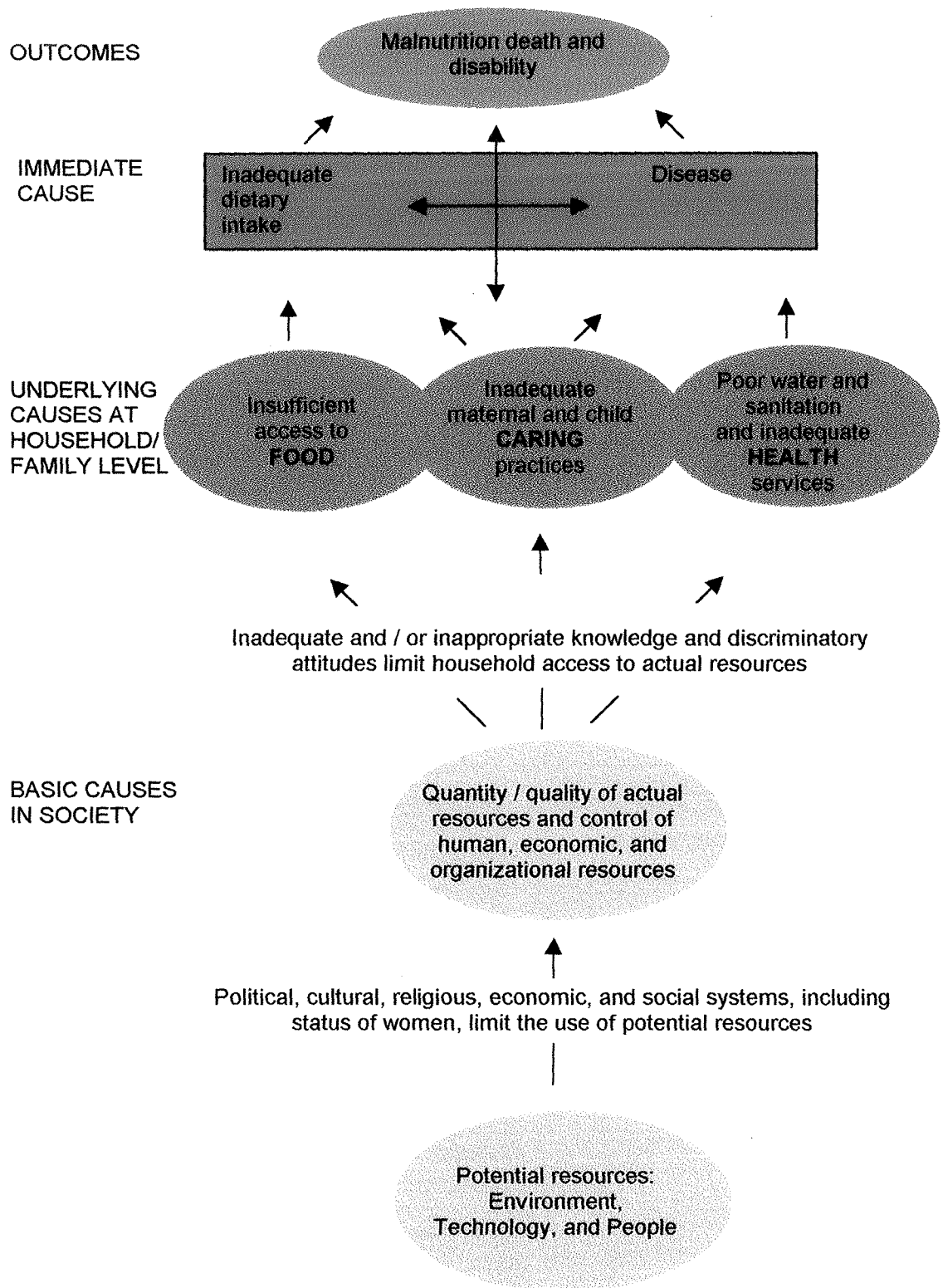
In a report on the World Nutrition situation, (Geneva, 2000) Chronic hunger caused by poverty is much more widespread than acute hunger caused by famine. About 33 per cent of children under five years in developing countries are stunted, malnourished indicating long-term, cumulative effects of inadequate nutrition and/or poor health.

Hunger is intolerable in a world of plenty about 1.2 billion people in developing Countries almost five times the U.S. Population – live on \$1 a day or less. These people often cannot afford to buy all the food they need, although they may spend 50 to 70 percent of their income on food and many do not have access to land to produce food (Daeton, 1997).

In addition to human suffering, hunger and malnutrition have negative effects on cognitive development, growth, and health (Boyle, 2003). Additionally, hunger and malnutrition have negative effects on labor productivity and a nation's development. According to the World Bank, the global loss of social productivity in one year alone, caused by four overlapping types of malnutrition – nutritional stunting and wasting, iodine deficiency disorders and deficiencies of iron and vitamin A – is the equivalent of 46 million years of productive, disability – free life (World Bank Report, 1993). Hence, a concentrated effort to eradicate hunger could yield tremendous benefits for individuals and nations, as well as for the world community itself (Gardner, 2000). Because hunger causes are typically, a combination of individual, household, community, national, and international factors, simplistic solutions such as short-term food aid, limiting population growth, or increasing agricultural productivity are inadequate (Figure 1).

Severe undernourishment is rare in Industrialized Countries, but many low-income group people have difficulty in meeting their food needs. The U.S. Department of Agriculture (USDA) considers 31 million people in the United States - about one in ten – “Food insecure”, (i.e) unable to regularly afford an adequate diet (ref. www.ers.usda, 2000).

The specific term “Food Security” is of recent origin, although in some form or other, adequate availability of food must have been one of the most primary concerns of the human beings since time immemorial. In recent years, most of the experts like to define “Food Security” as access by all people at all times to enough food for a healthy life. It was FAO Committee on World Food Security that in a way formalized the definition in 1983 and incorporated following three specific goals for food security.



CAUSES OF CHILD MALNUTRITION
 (Source: The state of the World's Children, 1998)

FIGURE 1

- ❖ ensuring adequacy of food supplies;
- ❖ maximizing stability of supplies; and
- ❖ securing access to available supplies to all who need them.

The largest number of hungry people is in the Asia- Pacific Region, especially South Asia, (Including the Indian Sub Continent). The other global hunger hot spot in Sub- Saharan Africa, the only region in which the number of hunger people is expected to increase during the next 20 years.

In many countries there are problems of access to food, within households individual food intake is affected by many factors, including gender, control of income, education, age and birth order. For example, women and girls may receive less food than men and boys. In some cultures, women are more likely than men to allocate income to food; thus, to the extent that women control income, they are more likely to use it to ensure household members adequate food consumption. A recent analysis of malnutrition in 63 nations found that improvements in women's education, access to health care, and living environment were responsible for 75 per cent of the total reduction in child malnutrition and underweight that took place from 1970 to 1995 (Smith, 2000).

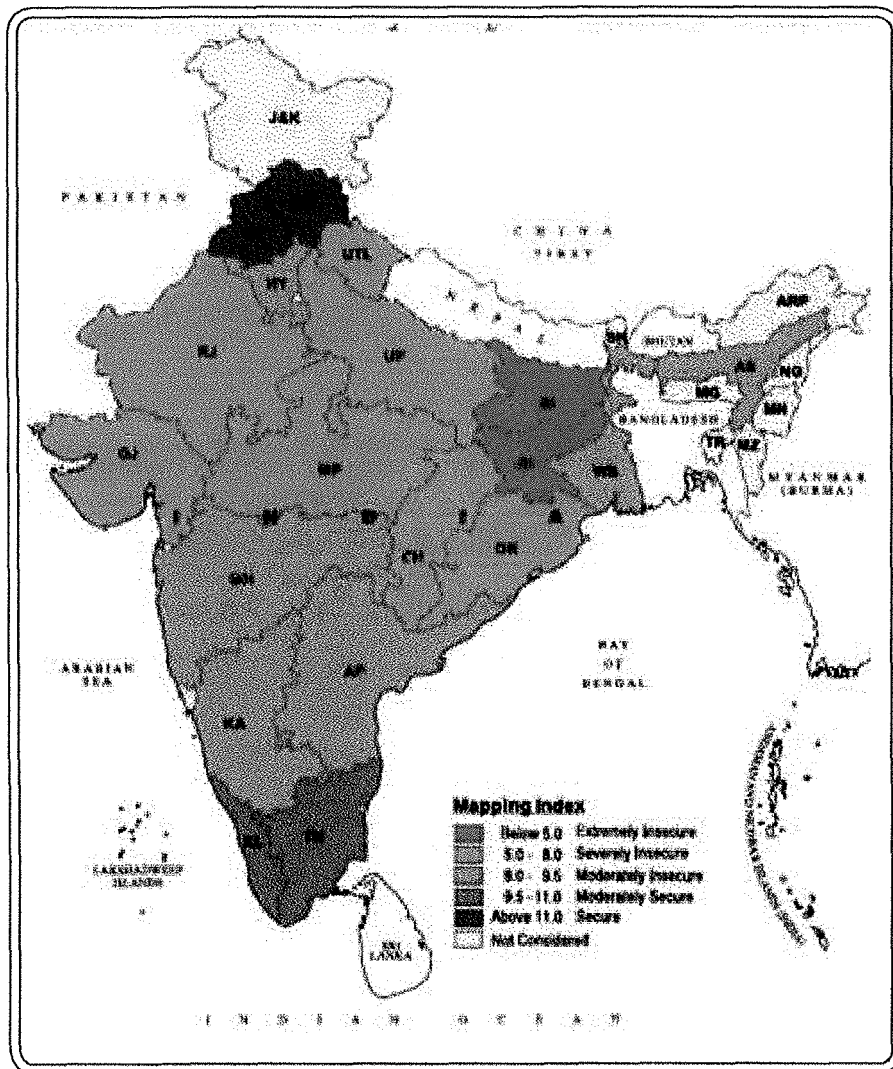
The concept of food security has been undergoing an evolutionary change during the last 50 years. More recently, it is becoming evident that even if availability and access are satisfactory, the biological absorption of food in the body is related to the consumption of clean drinking water as well as to environmental hygiene, primary health care and primary education. Finally, even if physical and economic access to food is assured, ecological factors

will determine the long-term sustainability of food security systems. Based on the above considerations, the M.S. Swaminathan Research Foundation (MSSRF) and the United Nations World Food Program (WFP) have recently brought out a Food Insecurity Atlas of Rural India (Vepa *et al.*, 2001) (Figure 2).

The food insecurity atlas of MSSRF and WFP reveals that every state in the country has its strengths and weaknesses in relation to the five major dimensions considered in the analysis. They are: availability of food, which is a function of production, access to food, which is related to purchasing power, absorption of food in the body, which is determined by the availability of safe drinking water, environmental hygiene, primary health care etc.,

The World Bank (1997) reported that 72 per cent of the world's poor live in rural areas. Most of them live on unproductive, semiarid lands or on steeply sloping lands with high erosion rates. Despite families best efforts to protect their young against food insecurity and hunger, when poverty engulfs a household, the youngest are the most affected and most vulnerable (UNICEF, 2001). If family food is limited, pregnant and lactating women, infants and children are the first to show the signs of under nutrition because of their high nutrient needs for growth. However, most malnourished children live in homes that have access to adequate quantities of food (Goldman, 1998).

The lack of adequate access is due to either production fluctuation or price fluctuation or a combination of both. "These two fluctuations in real income, both direct and indirect, affect the agricultural labourer as well as other members of the society, will ultimately have an impact on household food consumption, that of the poorer households being particularly sensitive" (Valde, 1981).



FOOD INSECURITY MAP - RURAL INDIA
FIGURE 2

1. Household food security

Although national food security is important as providing a foundation, in the ultimate analysis what is more important is food security for each and every household and within it, to every member of the family. Put differently, "at the household level, food security is defined as access to food that is adequate in terms of quality, quantity, safety and cultural acceptability for all household members" (Gillespie and Mason, 1991).

Reference can, at this stage, be also drawn to the concept of household food security adopted recently at the International Conference on Nutrition (ICN) held at Rome during December 1992, "Food security is defined in its most basic form as an access by all people at all times to the food needed for a healthy life".

Achieving food security has thus three dimensions,

- i) It is necessary to ensure a safe and nutritionally adequate food supply both at the national level and at the household level.
- ii) It is necessary to have a reasonable degree of stability in the supply of food both from one year to the other and during the year.
- iii) And most critical, is the need to ensure that each household has physical, social and economic access to enough food to meet its needs (ICN Pub. 1992)

Household security is a function not only of availability of food but also of the procuring power available with each household. It has now been well established that at the global level availability of food is not the problem. Even at our national level availability of food grains is not the real problem, it is prevailing poverty amongst a large number of household that

comes in the way of achieving households food security. There may be abundance of food but it is no help to the poor households if it has no access to that. "There is no assurance of deliverance from hunger unless those charged with the tasks of governing him (the poor) take conscious and deliberate steps to channel that abundance in this direction so that he can absorb the little he needs" (Venugopal, 1992)

The lack of access or lack of purchasing power, has been forcefully brought out by Dr. Amartya Sen (1981), when he describes it as deprivation due to non- entitlement or "the inability of certain people to command food through the legal means available in the society, including the use of production possibilities, trade opportunities, entitlement vis-à-vis the State and other methods of acquiring food".

2) Per Capita Availability of food

In India, the per capita availability of food grains has plummeted during the 1990's. The factors responsible are:

- ❖ decline in out put of coarse cereals
- ❖ stagnation in pulse production
- ❖ rising population
- ❖ rising use of cereals for feed purposes
- ❖ rising stocks in Food Corporation of India (FCI) godowns, because of rising poverty

During 1989-90 to 1991-92, the annual average adjusted per capita food grains availability was 173.5kg. It fell to 159.9kg during the period 1998-99 to 2000-2001. While cereals availability fell by 11.2kg per head and pulses fell by 2.4kg (Swaminathan, 2002).

3. Improving household food security

Food security is frequently defined as access by all people at all times to the food they need for an active and healthy life. A family can secure food in two main ways; food production and food purchase. Both requires adequate resources or income. Other less important, less common ways of obtaining food are through food gifts or charitable or Government food allocations, in free school meals or with food stamps (Gopalan, 1993).

Food security for the individual child (or for the family is one of the three essential ingredients along with adequate health and adequate care) in preventing malnutrition. Individual food security is essential for good nutrition, but it does not ensure good nutritional status, because other factors such as disease, infrequent feeding lack of care and poor appetite may adversely influence nutrition (Latham, 1994).

The main underlying determinant of household food insecurity is poverty. In Asia, Africa and Latin America a large proportion of population in both Urban and rural areas is affected. It has been stated that not all poor people are undernourished, but most undernourished people are poor (Maxwell, 1992).

4. Forms of food insecurity

Household food insecurity takes different forms, which require different responses or actions. The approaches may be different depending on whether food insecurity is chronic (with households almost always short of food) or transitory (resulting from temporary adverse circumstances). Food insecurity may be seasonal, a family may have insufficient food perhaps each year or most years, but only in certain seasons (King and Burgess, 1993).

5. People at risk

Households most likely to be food insecure, or at high risk of food insecurity, are the poorest. In rural areas these may be landless households; those with such small plots of land (sometimes marginal land) in relation to family size as to make adequate agricultural production impossible (Lapp'e and Collins, 1982).

Increasingly the acquired immuno deficiency syndrome (AIDS) epidemic is contributing to food insecurity, sometimes because adults who were breadwinners have become seriously ill or because orphaned children as young as 12 years of age have become household heads caring for younger children (Johnson, 1988).

6. Coping at the household level

Transitory or short-term food insecurity is often the result of a shock that has struck a blow to the household. The coping mechanisms adopted depend partly on the nature of the shock and partly on the household's circumstances. It has been suggested that there are four main types of shocks namely Work shocks, Output shocks, Food shocks and Asset shocks (Maxwell and Frankenberger, 1992).

Sharma (2002) is of the opinion that adoption of transgenic crops must not be delayed once their bio safety issues have been proven. The demand for food in India is rising and therefore all the tools available must be used to produce more.

7. Food security and nutritional security

Improving nutrition of many millions who suffer from hunger and malnutrition and to others, who are at risk of malnutrition in future, is a matter

of prime concern to planners, policy makers and nutrition related professionals. The International conference on Nutrition (ICN) and the World Food Summit (WFS), held respectively in 1992 and 1996 remind us that the most basic of human rights is the right to enough food to support a healthy life.

Nutritional security involves the consumption and physiological use of adequate quantities of safe and nutritious food by every member of the household to support an active, productive and healthy life (Kachondham, 1992). Food and nutritional insecurity result if there is not enough fuel to prepare the food if there is the shortage facilities are insufficient or unsafe, if sanitation hinders food hygiene during food processing, preparation and consumption (FAO 1998).

Achievement of food security has been a major goal of the development since India gained independence. Despite tremendous increase in agricultural production, reaching self-sufficient in food, food security and nutrition at the household level is still a goal to be achieved. Based on the most recent estimate, about 204.4 million people are suffering from malnutrition in India out of approximately 800 million people in the developing World. So, in order to endeavour towards the eradication of malnutrition, the UN Inter-Agency Working Group on Food security and nutrition was established in 1995. In May 2000, the name of the IAWG was changed to "Inter Agency Working Group on Rural Development and food security and Nutrition" (Mishra, 2003).

8. Management of Transient food scarcity due to drought

Though the country has averted large scale severe under-nutrition of famine in the past five decades, droughts do pose a major threat to food

security. Over the years, the country has developed a system for the early recognition and management of transient food scarcity in times of drought. During the Ninth Plan period, Rajasthan, Andhra Pradesh and Gujarat were affected by drought of the various relief measures. Andhra Pradesh benefited only from additional ration through Public Distribution System (PDS). In the other two states, additional measures such as food for work, supply of drinking water, essential medicines and cattle feed were also in operation.

The National Institute of Nutrition (NIN), Hyderabad conducted a survey in the drought –affected districts in these three states to assess the impact of drought and the ongoing intervention Programmes on the diet and nutritional status of the population.

B. MAGNITUDE OF MALNUTRITION

According to (2003) reports of American Dietetic Association (ADA), today, hunger is well recognized as a problem of poverty. Many factors contribute to poverty, including greed, overpopulation, unemployment, political and civil unrest, and the lack of productive resources such as land, tools, and credit. People who are poor are often powerless to change their situation because they have less access to such vital resources as education, training, food, health services, credit, and other vehicles of change. It is possible to provide adequate nutrition for all, but this will be achieved only when the economic, political, and social structures that are creating a widening gap between rich and poor and thereby limiting food - production, food access, and food consumption – become the targets of change.

Poverty - not insufficient global food production - is the root cause of malnutrition. Poor families lack the economic, environmental, or

social resources to purchase or produce enough food. In rural areas, land scarcity and degradation, water salinity due to over irrigation, soil erosion, droughts and floods can all undermine a family's ability to grow enough food.

In urban areas, low wages, lack of work and under employment, and rapid changes in food prices often place food supplies out of reach of poor households (www.fao.org).

Because of increasing rural poverty and scarcity of land to farm, increasing numbers of people are migrating into urban areas in the hope of finding improved economic opportunities. The trend toward increasing urbanization has been a factor in the worldwide decline in breastfeeding, an increased consumption of nutrient – poor foods, and increased contamination of the urban water supply (Brown, 1997). As transition, the decline in food sufficiency continues, and the incidence of chronic diarrhoea from polluted water and food borne contamination remains a major public health problem in urban slumps (Garrett, 1999).

Although overall trends are positive, with the proportion of people with malnutrition declining, many remain at risk, and some regions are hit hard. Between 1990 and 1992, of approximately 841 million people one out of every five people in the developing world did not have access to enough food for healthy living (FAO, 1996).

The health consequences of inadequate nutrition are enormous. According to one estimate, malnutrition contributed to roughly 12 per cent of all deaths in 1990 (Murray 1996). According to the world Development Report (1993), although much of this toll stems from under consumption of protein and energy, deficiencies in key micronutrients such as iodine, vitamin A and iron also undermine health.

When poverty limits an adequate and varied diet, deficiencies of iodine, iron and vitamin A often occur simultaneously with protein-energy malnutrition. Geography and soil characteristics also influence the amount of these nutrients commonly found in food. Mountainous areas are often deficient in iodine the most severely deficient regions are the Himalayas, Andes, European alps, and mountains of China (WHO, 1993).

Malnutrition can result from low birth weight (which may stem from poor nutrition during pregnancy) and formula feeding in circumstances such as the absence of clean water or the lack of income to purchase appropriate complementary feeding.

More than one billion people in developing countries do not have access to safe drinking water, and 2.5 billion lack adequate sanitation. Diarrhoea and infectious disease thrive in poor communities lacking clean water and sanitation, and both impact negatively on nutritional status (UNICEF, 2000).

In developing countries, 40 percent of non-pregnant women and 50 percent of pregnant women are anaemic, and 3.6 billion people suffer from iron deficiencies (WHO, 1997). The problem is most severe in India.

In countries like India, the scourge of malnutrition impedes the developmental process like a double-edged sword, malnutrition in the form of under-nutrition or deficiencies of essential vitamins and minerals continues to cause severe illness or morbidity among millions of people. It is estimated that more than 50 per cent of women are affected by iron deficiency anaemia and about 49 per cent of the population are at risk of iodine deficiency (National Family Health Survey (NFHS) –2), (1998-99) and millions of children are affected by insufficient vitamin A.

Globally, some 42 million children under age six have mild to moderate vitamin A deficiency. In its severe form, vitamin A deficiency can cause blindness indeed, it is the single most important cause of childhood blindness in developing countries. About 250,000 to 300,000 children go blind annually, and 50 to 80 per cent of those die within one year (Henry, 1993). Upto three million more children suffer lesser but still serious effects, such as night blindness. An estimated 254 million children of preschool age are at risk of vitamin A deficiency.

The combination of malnutrition and infectious disease can be particularly pernicious. Protein - energy can impair the immune system, leaving malnourished children less able to battle common diseases such as measles, diarrhoea, respiratory infections, tuberculosis, peritosis, and malaria. Vitamin A deficiencies are worsened by infectious disease; and reciprocally, poor vitamin A status is likely to prolong or exacerbate the course of an illness such as measles (Andrew, 1989).

Similarly Malarial parasites, which require iron in order to multiply in blood, can cause or exacerbate anaemia (Kathryn, 1995). Malnutrition can also heighten the adverse impacts of toxic substances. Deficiencies of protein and some minerals, for example, can significantly influence the absorption of lead and cadmium into the body (Howard, 1995).

Despite all these measures, the National Family Health Survey (NFHS) 1998 and the Diet and Nutritional Status of Rural population, 2001 of the National Nutrition Monitoring Bureau (NNMB) depict a gloomy nutrition picture of the country as: 51.8 per cent of married women in the age group 15 to 49 years and 56 per cent of married adolescent women in the age group 15 to 19 years suffer from anaemia. This profile is the result of

reproductive behaviour of earlier cohort of undernourished mothers resulting in 33 per cent of children with low birth weight.

The United Nations views good nutrition as a basic human right – and one that the United Nations, especially FAO and WHO, are pledged to secure (FAO, 1996). However achieving improved nutritional well-being worldwide requires broad action on many issues, such as ensuring that the poor and malnourished have adequate access to food; preventing and controlling infectious diseases – providing clean water, basic sanitation and effective health care; promoting healthy diets and lifestyles; protecting consumers through improved food quality and safety; preventing micronutrient deficiencies; assessing analyzing, and global monitoring of nutritional status of population at risk; and incorporating nutrition objectives into development policies and programmes (Haddad, 2003).

C. COPING MECHANISMS ADOPTED FOR FOOD SECURITY

Household food security is the ability of the household to achieve sustained access to food of adequate quantity and quality for all household members (Kumar, 1995). Over the years of famine and drought, households have developed some mechanisms and made the decisions out of past experience in coping with food insecurity.

The studies conducted on coping mechanisms of households for food security in drought prone areas were reviewed under the following sub headings

- ❖ Food Production based coping mechanism
- ❖ Agriculture based coping mechanism

- ❖ Livestock based coping mechanism
- ❖ Employment, Economic and income generation based coping mechanisms including food and non – food expenditure pattern
- ❖ Asset (farm/non farm) based coping mechanism
- ❖ Food procurement, storage, preparation, distribution and consumption based coping mechanism

1. Food production based coping mechanisms

i) Agriculture based coping mechanism

Sahay (1990) analyzed the Chakriya Vikas Pranali, a multiplier planted system which was being practiced in the drought- prone barren lands of certain villages of District Palamau in Southern Bihar, which changed the face of these villages from being one of the most barren into that of prospering ones,. The most important feature of the Pranali was that every drop of water gets retained, detained, and used in this Multi-cropping system of cultivation.

A study conducted by Agarwal (1992) in North-West India, revealed that the integrated management of soil and water resources was of considerable importance for improving and stabilizing crop production particularly when rainfall was subnormal during crop season.

Basu (1992) suggested that as droughts develop gradually over months, providing enough time to the people and authorities to make adequate preparations to take

- ❖ Water Harvesting
- ❖ Sprinkler Irrigation

- ❖ Drip Irrigation
- ❖ Use of drought resistant varieties of crops
- ❖ Fodder plants, and
- ❖ Establishment of fodder banks that considerably reduce the hardship of the affected people in drought prone areas.

Research results from the dry land agriculture research project (All India Coordinated Research Project for Dry land Agriculture) showed that through intercrop and double crop systems production of pulses and oilseeds could be increased without unduly affecting the yields of cereals and millets (Singh and Chatty, 1991).

Venkateswarlu (1992) suggested the drought management strategies, such as alternative cropping strategies, 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 generating schemes, self employment schemes and special health care Programmes specially for children, expectant and nursing mothers.

ii) Livestock based coping mechanisms

Arora (1982) reported that keeping in view the erratic precipitation rate in Bundelkhand region of Uttar Pradesh, like other arid areas in the Country, livestock farming, especially sheep farming played an important role as there were risks involved in the crop farming. It provided employment to a sizeable proportion of population through the wool and skin- based industry.

Govindaiah (1986) suggested the farmers in dry land areas in India to take animal husbandry enterprises as a subsidiary occupation, to get more income, that too a stable one.

2. Economic/Employment/Income generation based coping mechanisms

Snehalatha (1988) conducted a study on income, expenditure and saving patterns of rural households and reported that per family land per capita expenditure level for both food and non-food items increased with an increase in farm acreage. The percentage expenditure on food decreased with an increase in farm size.

Bidinger *et al* (1990) studied in Dokur, a drought prone village in the Semi –arid Telangana Region revealed that food grain price stability and the widespread availability of consumption credit permitted villages to maintain their consumption pattern of normal years.

Radhakrishna *et al* (1991) analyzed the rural labour markets in irrigated and dry zones and revealed that the participation rates of males aged 15-29 and 60+ were higher in the irrigated zone and the participation rates of females excluding 60 and children were higher in dry zone. The incidence of unemployment was higher in the irrigated zone. The wage rates were also significantly higher. The low incidence of unemployment and low wage rate in the dry zone could be due to the fact that the poor offer labour at low wages for subsistence, survival and since labour was available at low wage rate, they were employed by well off households for low productive activities like fuel collection, cattle rearing and other menial works.

3. Asset based coping mechanisms

Muranjan (1991) studied the impact of 1987-88 drought on the socio economic conditions of the rural people and revealed that there was a greater reduction in the use of female labour. Drastic decline in the income

from the cultivated land was compensated by the farmers, through other sources of income, viz., employment as labour sale of milk, sale of livestock and sale of other movable assets.

4. Food procurement, storage, preparation distribution and consumption based coping mechanisms

According to Payne (1993) at the household level, coping responses for food security were behavioral rather than biological. They included redistribution of food among household members, redistribution of work over time to avoid mismatched between food needs and food availability.

Patel in 1989 conducted a survey of 12 tribal villages affected by drought reported that the food mainly comprised rice diet and was devoid of pulses, vegetables, oils and fats. In most areas was hardly any grain in the stores in the individual houses. The drop in consumption level of the protected foods highlights the extreme poor quality of diet.

5. Food beliefs and attitudes of the tribals

Beliefs, customs, and traditions influence the general pattern of living in any community. Beliefs inherent and integral as they are in the cultural matrix act as invisible force in translating pre-set ideas into overt acts and customs. Handed down from generation to generation, beliefs lend authority to customs leading one to accept Traditional customs and practices on their face value. The cultural pattern of each community determines the nature and extent of food behaviour found in the area. Some of the traditions followed blindly by the tribal may be good and should be preserved. Knowledge of their

attitudes, traditional food and dietary practices in general and in specific physiological conditions, etc., is essential in planning appropriate nutrition and health education Programmes intended for the tribals (Cherian, 1981).

Superstitions and belief invariably influence the attitudes towards foods. Food habits and beliefs differ among the communities within the tribes. Certain foods are prohibited from consumption by all and in some cases, the food restrictions are determined by age, sex and physiological status and seasonal availability (Onuoha, 1982).

The Indian diet especially in the rural or tribal setting, is greatly influenced by the two established systems of medicine, Ayurvedic and Unani, both of which classify foods as hot or cold or gas producing according to the effect they are believed to create on body mechanisms (Gopaldas *et al*, 1983).

D. KNOWLEDGE, ATTITUDE AND PRACTICE

Traditional knowledge, attitude and practices have been identified as influencing food habits. There has been much argumentation, however, first as to which of these dimensions is the major determinant of food choices and second as to the direction in which these dimensions operate. For a time, the three way process was believed to exist in uni-linear direction, that is knowledge acquisition affects attitude and that ultimately produces the behavioural change (K-A-P).

Recent efforts however challenge this uni-linear relationship. New conceptual schemes suggest that different mechanisms may be operative and that indeed the direction of the association is through other pathways that is either attitude changes always precede behaviour changes

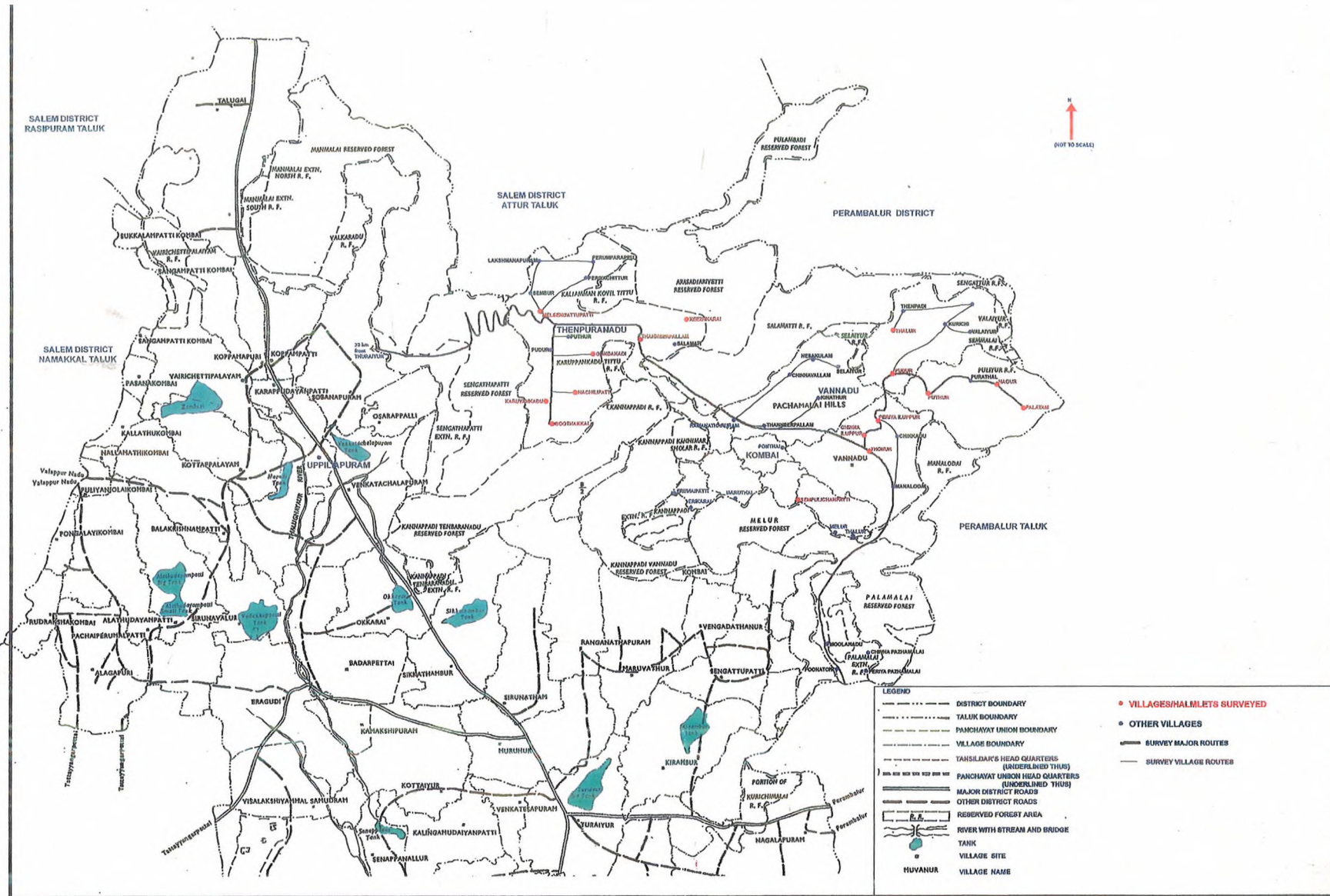
or the effect of nutritional knowledge on practices is through an intermediate effect on attitudes (Sunjur, 1982).

The triad of knowledge, attitude and practice in combination governs all aspects of life in human societies, and all three pillars together make up the dynamic system of life itself (Neil, 1982).

The relationships among knowledge, attitude and behaviour are more intricate. Behaviour typically has multiple causes. The view that nutrition knowledge and attitudes will determine nutrition behaviour simplifies the complexity involved in food selection, preparation and consumption. Behaviour is mostly determined by many motivations operating at the same time, therefore food behaviour is usually the result of many motivations rather than one. Most individuals value health and so it is assumed that they will adopt a lifestyle commensurate with assuring lasting health. Whether they do (or) not, depends upon internal influences such as nutritional knowledge, attitudes, personality traits and anxiety depression and external factors like socio-cultural expectations, food available, cost of food, advertising appeals, food popularity and a desire to keep with the peers. Despite the fact that external factors may determine the immediate behaviour rather than do internal influences, the degree to which knowledge, attitudes and behaviour are related has been the subject of considerable debate (Sreedevi, 1997). Brun (1985) also emphasized the above view points and expressed the same opinion based on his extensive review related to nutrition education.

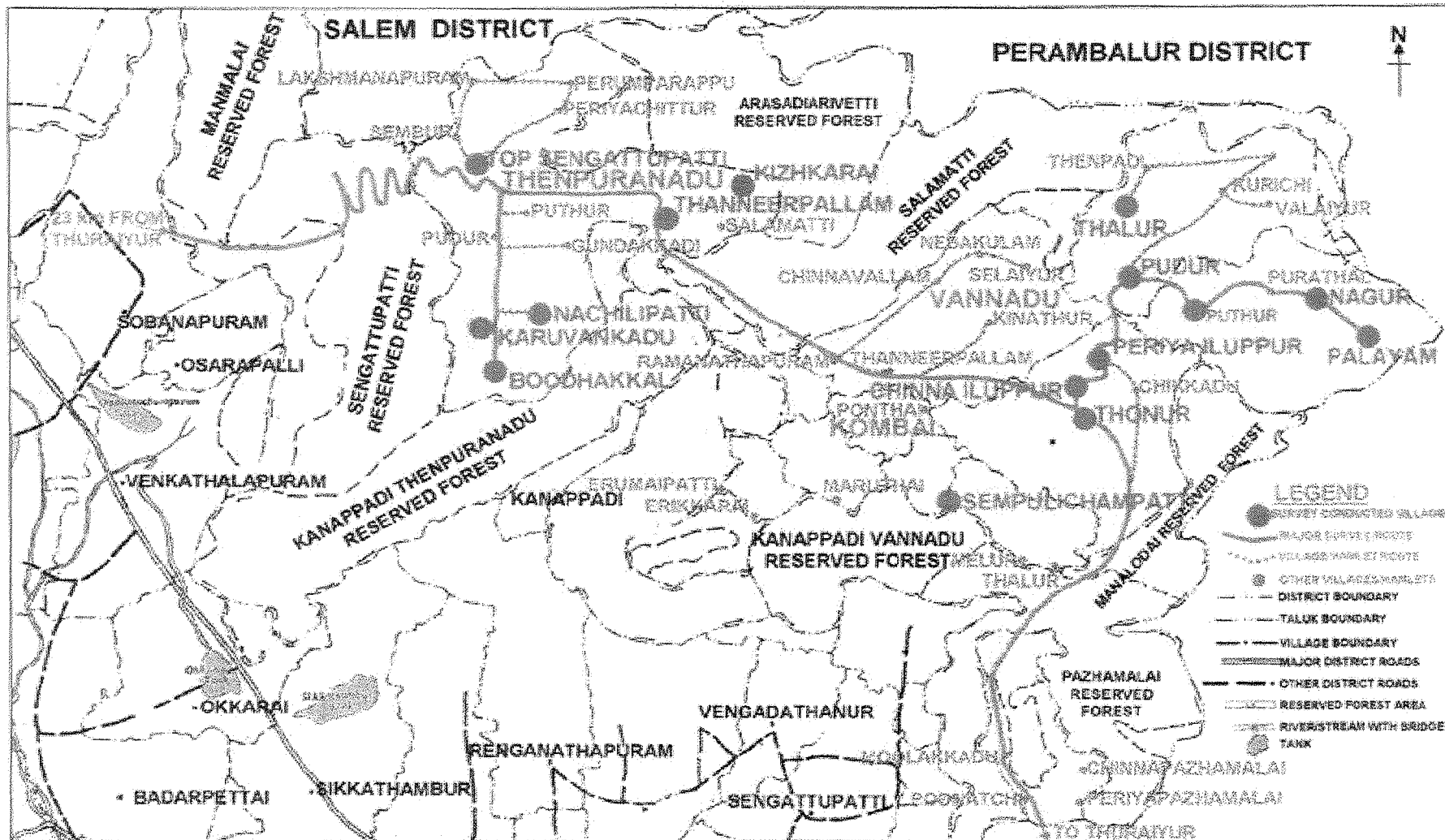
Schwartz (1975) investigated the nature of relationship of nutritional knowledge to attitudes with practices among the subjects. The data revealed that the relationships of knowledge to attitude and attitude

METHODOLOGY



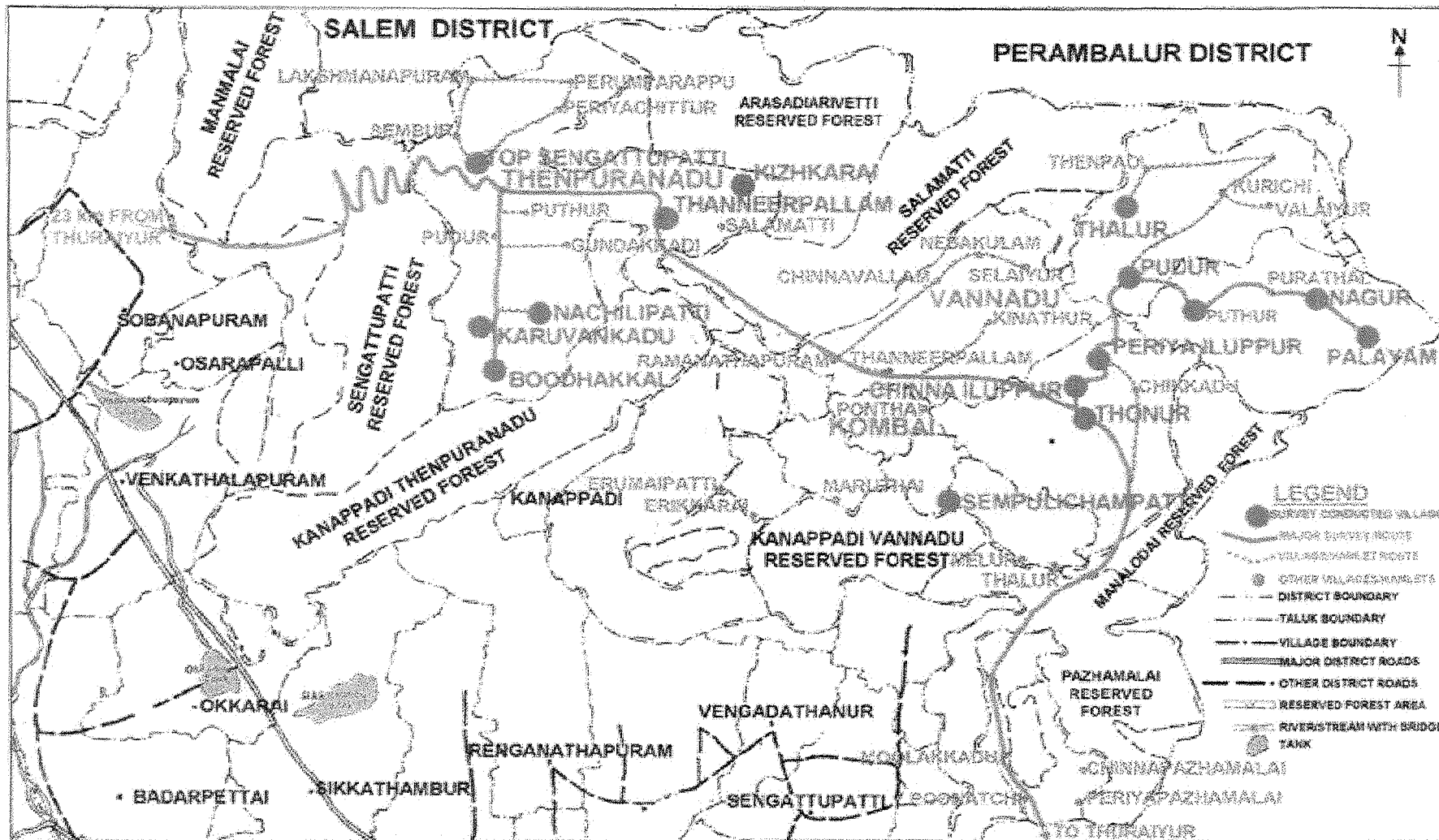
A SURVEY MAP OF PACHAMALLAI

FIGURE 3



MAP SHOWING THE REVENUE VILLAGES / HAMLETS IN THENPURANADU, KOMBAI AND VAN NADU OF PACHAIMALAI IN THURAIYUR TALUK AT THIRUCHIRAPALLI DISTRICT

FIGURE 4



MAP SHOWING THE REVENUE VILLAGES / HAMLETS IN THENPURANADU, KOMBAL AND VAN NADU OF PACHAIMALAI IN THURAIYUR TALUK AT THIRUCHIRAPALLI DISTRICT

FIGURE 4

III. METHODOLOGY

The methodology involved in the conduct of the present study entitled "**Nutritional Status, knowledge, Attitude, Practices and Food Security Profile of Selected Tribal Families of Pachaimalai**" of Trichy district is discussed under the following headings:

- A. Selection of area
- B. Selection of sample
- C. Formulation of the interview schedule and conduct of the study
- D. Assessment of nutritional status of the selected tribal families
- E. Assessment of food security profile of the selected tribal families
- F. Assessment of nutritional knowledge, attitude and practices of tribal women.

A. SELECTION OF AREA

The area selected for the present study was Pachaimalai, which falls in parts of Trichirapalli, Perambalur and Salem districts of Tamilnadu. The total extent of the tribal area is 190sq.km. Tribals are settled in over 70 hamlets, located mostly on the hills. The hilly area consists of three revenue villages, which are called as "nadus". They are as follows:

- i. Kombai nadu
- ii. Van nadu and
- iii. Thenpura nadu.

These tribes are called as "Malayalis". According to 2001 census, the total population of the Pachaimalai is about 12,000 people. The survey map and the map showing the revenue villages is given in Figure 3 and 4.

B. SELECTION OF SAMPLE

A total of 1000 families were distributed in the three nadus mentioned. Among these 1000 families 200 families were selected by random sampling. It was planned in such a way that families from the three nadus were represented in the sample selected. From these 200 families, 20 families (10 per cent of the sample) were further investigated for the assessment of nutritional status and food intake. In the present study the surveyed population did not fall in the HUDCO classification of income. Most of them fall below the poverty line. Their income ranged from Rs.500/- to Rs.2500/- per month. Hence to study the knowledge, attitude and practices related to nutrition, women of these families were categorized into four ranges of income, Rs.500/- to 1000/-, Rs.1001/- to 1500/-, Rs.1501/- to 2000/- and above Rs.2000/-. The details of the sample selected for the study is given in Table I.

TABLE I
DETAILS OF THE SAMPLES OF THE STUDY

Name of the Village	Families Selected for		
	Survey	Assessment of Nutritional Status	Assessment of KAP
Kombai	85	8	85
Van nadu	55	5	55
Thenpura nadu	60	7	60
Total	200	20	200

C. FORMULATION OF THE INTERVIEW SCHEDULE AND CONDUCT OF THE STUDY

A questionnaire cum interview schedule (Appendix I) was used to collect information on the food security profile of the tribes by giving due importance to food production, consumption, expenditure on food, cooking and storage practices followed by the tribes.

Conduct of the Study

The framed schedule was pre-tested among ten families and modifications were made before actual administration of the selected families. The investigator first created rapport with the tribals, with the help of the self-help groups and village administrative officer. Later the interview schedule was administered to the selected families for gathering the required information.

D. ASSESSMENT OF NUTRITIONAL STATUS OF THE SELECTED TRIBAL FAMILIES

Nutritional assessment is the science of determining nutritional status by analyzing an individual medical, dietary and social history; anthropometric data; biochemical data; and drug-nutrient interactions (Krause, 2000). Anthropometry is the single, most universally applicable, inexpensive and non-invasive method available to assess the size, proportions and composition of the human body (WHO Expert Committee, 1995 and Hammond, 1997).

1) Heights and Weights

Body weight and height of children reflect their nutritional and growth status, weights and heights of adults represent the cumulative effect of dietary intake over a long period (Tenth Five Year Plan, 2002-2007)

i) Height

Smita and Underwood (1991) stated that measurement of height is the most sensitive means for evaluating the overall well being of individual. Heights of all subjects were normally taken by using a fibreglass tape. The subjects were made to stand near the wall with heel and head touching the wall. A thin ruler was held on the top of the head, in the centre, crushing the hair at right angle to the scale and the height is recorded in centimeters.

ii) Weight

Body weight is the most widely used and the simplest reproducible anthropometric measure for the evaluation of nutritional status of young children (Rao and Vijayaraghavan, 1996). A weighing scale of platform square type was used for weighing the subjects, as it was portable and convenient to use.

The weighing scale had 0.5kg sensitivity and checked for accuracy and adjusted to zero before weighing. The weight was taken without shoes and heavy clothes. The subjects were asked to stand on the platform of the scale, look straight ahead and the weights were recorded.

In the present study, the selected 20 families comprised of adult males and females, adolescents and school going children. Body heights and weights of all the family members belonging to 20 families were measured using the standard procedures outlined by Jelliffe (1989).

2) Body Mass Index

Quetlet's index, also known as body mass index (BMI) is considered a good index of total body fat in both men and women (Groff and

Gropper, 2000). The BMI is the most widely used anthropometric index for the assessment of the nutritional status in adults as it reflects the effect of both acute and chronic energy deficiency or excess (Tenth Five Year Plan, 2002-2007).

In the present study, the body mass index of all the adults were computed with the heights and weights, and compared with the cut-off values, using the formulae:

$$\text{Body Mass Index} = \text{Weight (kg)} / \text{Height}^2(\text{m})$$

The cut-off levels of Chronic Energy Deficiency (CED) are as follows (Garrow's classification, 1993):

> 18.5	—	Normal
17.0 – 18.5	—	Mild under nutrition or CED grade I
16.0 – 17.0	—	Moderate under nutrition or CED grade II
< 16.0	—	Severe under nutrition or CED grade III

3. Weight for Age

Weight for Age was computed for the school going children as it is found to be a good indicator for the assessment of malnutrition among school going children and the values were compared with the standard given by ICMR (2000).

4. Assessment of Dietary Intake

Diet surveys constitute an essential part of any complete study of nutritional status of individuals or groups, providing essential information on nutrient intake levels, sources of nutrients, food habits and attitudes.

Under conditions where frank signs of malnutrition do not exist, a survey of intake of nutrients may give an indication of the adequacy of the diet for promoting optimal nutrition of individuals or groups (Swaminathan, 1997).

Food consumption is one of the important determinants of nutritional status, hence dietary assessment forms an integral part of nutritional survey (Deshpande, 2001). In the present study a three-day weighing method was employed (Plate 3), food intake was assessed and the nutrient intake was computed and compared with Recommended Dietary Allowances, ICMR (2000) values.

E. ASSESSMENT OF FOOD SECURITY PROFILE OF THE SELECTED TRIBAL FAMILIES

The food security level was assessed for all the 200 hundred families selected for the present study. Scores were given to all the quantitative and qualitative aspects of dietary intake, maximum score allotment of 180, when there is intake from all the five food groups such as cereals and its products, pulses and legumes, milk and meat product, food and vegetables and fats and sugars.

Then the families were categorized as food secure, low food insecure, moderate food insecure and highly food insecure. The classification followed is shown in Table II.

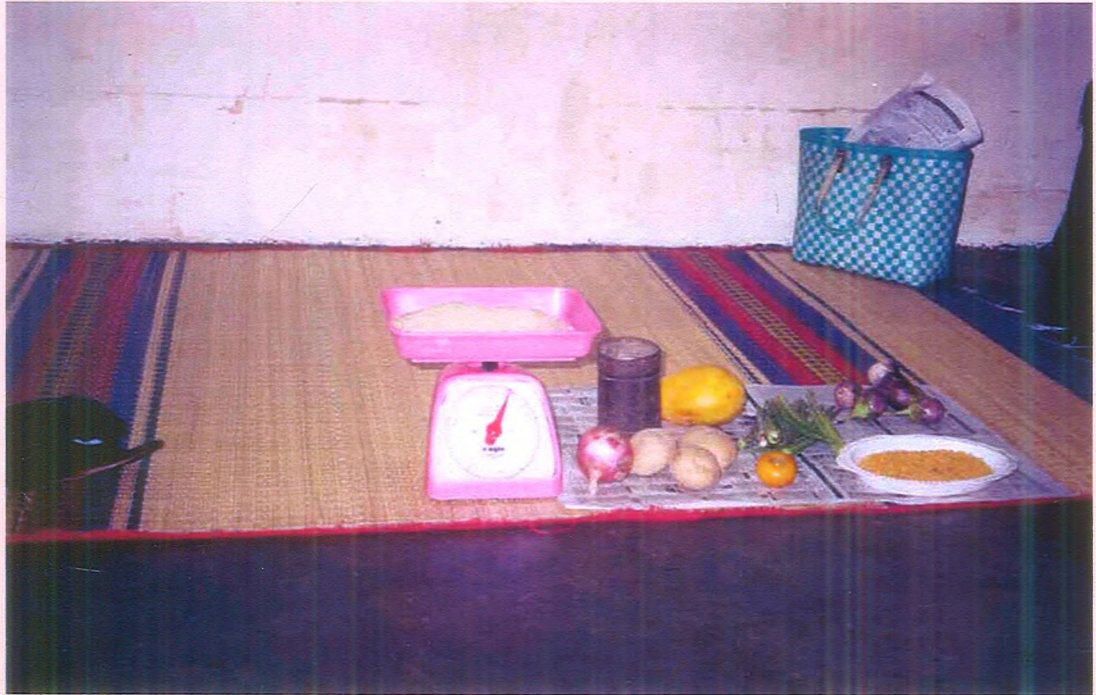


PLATE 3
FOOD WEIGHMENT

TABLE II
CLASSIFICATION OF FOOD SECURITY LEVEL

Scores	Degree of Food security	Description
180	100 per cent food secure	All food groups are sufficient
140 - 180	Low food insecurity	4 Food groups are sufficient
80 - 140	Moderate food security	2 Food groups are sufficient
0 - 80	High Food insecurity	All Food groups are insufficient

* Gogeni, 1996

F. ASSESSMENT OF NUTRITIONAL KNOWLEDGE, ATTITUDE AND PRACTICES OF TRIBAL WOMEN

A detailed questionnaire of 90 questions was formulated (Appendix II) with 30 questions in each aspects related to nutritional knowledge, attitude and dietary practices, and data were collected from the tribal women (Plate 4). Knowledge aspects comprised of questions regarding knowledge of food and nutrients and its functions, attitude questions covered the concepts of importance of nutrition and need for nutrition education and questions related to practices mainly comprised of daily dietary intake, foods included during special conditions, practices followed regarding hygiene and sanitation.

A tentative score was allotted for each question, giving equal weightage. In the case of yes or no questions, the correct alternative was given full scores and the other was given zero. The only exceptions were questions pertaining to practices where a gradation was given with the most desirable practice given full score and least desirable graded zero. These final scores were further analyzed statistically to evaluate the KAP level of all the tribal women of selected families. A glimpse of the selected tribal area is recorded in Compact Disc enclosed in Appendix III.



PLATE 4
INTERVIEW WITH A TRIBAL WOMEN

RESULTS AND DISCUSSION

IV. RESULTS AND DISCUSSION

The results of the study entitled **“Nutritional Status, Knowledge, Attitude, Practices and Food Security Profile of Selected Tribal Families of Pachaimalai”** are discussed under the following headings.

- A. Socio-economic background of the Malayalis
- B. Dietary pattern and food habits of the Malayalis
- C. Food security profile of the Malayalis
- D. Nutritional profile of the Malayalis
- E. Nutritional knowledge, attitude and practices of the women in the selected families.

A. SOCIO-ECONOMIC BACKGROUND OF THE MALAYALIS

The socio-economic development of the tribal areas is of crucial significance on the framework of the Integrated Growth of the Country. Socio-economic and demographic factors play an important role on the pattern of consumption of food and nutrients (Rahaman and Rao, 2001)

Demography may be defined as the empirical, statistical and mathematical study of human population (1969). Three primary focuses of demographic researches may be identified, that is, population, growth of the population, distribution of population in space. The study of a structure and characteristics of population encompasses on the composition of population which embraces basic personal, social and economic characteristics on age, sex, race, nationality, religion, language, marital status, household and family composition, literacy and employment status, occupation and income etc., (Bhende and Kanitkar, 1991).

1. Type of the selected tribal families

Table III denotes the type of the selected families.

TABLE III
TYPE OF THE SELECTED TRIBAL FAMILIES

S.No.	Type of Family	N= 200	Percentage
1.	Nuclear	146	73
2.	Joint	54	27
Total		200	100

Of the 200 families selected, 73 per cent were nuclear families and the remaining 27 per cent were joint families. The predominance of the nuclear families is due to the fact of advanced civilization and scope for better living. In the past, joint family system was very common among them. But later, after the marriage of their children whether male or female, the parents offered them a share in their lands to establish separate households. As emphasized by Sabarwal (1999), with the advent of modern civilization, the joint family system is slowly disintegrating.

2. Size of the selected tribal families

Details regarding the size of the selected families are presented in Table IV.

TABLE IV
SIZE OF THE SELECTED TRIBAL FAMILIES

S.No.	Size of Family*	N= 200	Percentage
1.	1-4	89	44.5
2.	5-8	110	55.0
3.	>9	1	0.5
TOTAL		200	100

* Kumari (2002)

Table IV reveals the size of the selected families; majority of the families (55 per cent) had five to eight members, followed by one to four members (45 per cent). It was noted that only 0.5 per cent of the families had greater than nine members, which is due to the migration of younger generation for job and breakup in joint family. Hussain and Chowdhry (2003) stated that control of family size could be considered as one of the solutions of malnutrition because more number of children could not be brought up with comparatively adequate nutrition in lower economic group.

3. Gender distribution of the selected tribal families

Table V indicates the Gender distribution of the selected families.

TABLE V
GENDER DISTRIBUTION OF THE SELECTED TRIBAL FAMILIES

S.No.	Sex	Number	Percentage
1.	Male	508	54.27
2.	Female	428	45.73
	Total	936	100

Of the 200 families studied, it was found that 54.27 per cent were males and 45.73 per cent were females. The percentage of the males (54.27 per cent) is higher compared to the percentage of females (45.73 per cent). Plate 5 a and b is showing a tribal man and woman.

4. Age wise distribution of the selected tribal families

Table VI shows the age wise distribution of selected families.



PLATE 5a
A TRIBAL MAN



PLATE 5b
A TRIBAL WOMAN

TABLE VI
AGE WISE DISTRIBUTION OF THE SELECTED TRIBAL FAMILIES

Sl.No.	Age	Male		Female		Total	
		No.	%	No.	%	No.	%
1	Infants	7	1.38	5	1.17	12	1.28
2	Pre-School	40	7.87	29	6.78	69	7.37
3	School-going	133	26.18	88	20.56	221	23.61
4	Adolescents	56	11.02	64	14.95	120	12.82
5	Adults	265	52.17	240	56.07	505	53.95
6	Old-age	7	1.38	2	0.47	9	0.96
	TOTAL	508	100	428	100	936	100

Age and sex are the basic characteristics of any population, which affect social, political and economic structure (Bhende and Kanitkar, 1991).

The sex composition of the population in India is found to be favourable to males. Female/male ratio as per 1991 census was 927/1000. As compared to the general population, there appears to be a more even distribution of males and females among the scheduled tribes i.e. 972 in 1991 (Basu, 1990). From the above table it was found that majority of them 53.95 per cent were adults, 23.61 per cent were school-going, 12.82 per cent were adolescents, 7.37 per cent were pre-schoolers, 1.28 per cent were infants and a very few per cent (0.96) were old aged persons.

5. Educational status of the selected tribal families

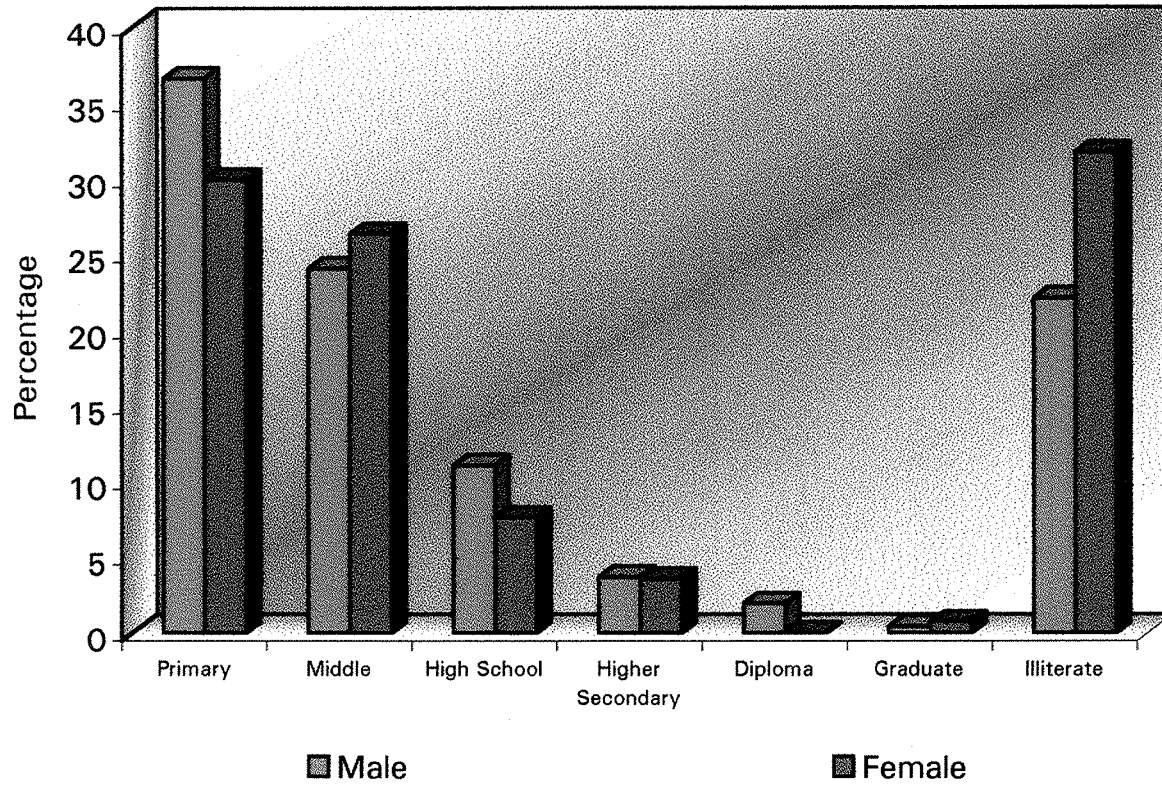
Table VII and Figure 5 reveals the educational status of the selected families.

TABLE VII
EDUCATIONAL STATUS OF THE SELECTED TRIBAL FAMILIES

Sl.No.	Educational Level	Male		Female		Total	
		No.	%	No.	%	No.	%
1	Primary	169	36.66	118	29.95	287	33.57
2	Middle	111	24.08	104	26.39	250	25.15
3	High School	51	11.06	30	7.61	81	9.47
4	Higher Secondary	70	3.69	14	3.55	31	3.63
5	Diploma	9	1.95	—	—	9	1.05
6	Graduate	2	0.43	3	0.76	5	0.58
7	Illiterate	102	22.13	125	31.73	227	26.55
	TOTAL	461	100	394	100	855	100

Education is a catalytic agent for human resource development at every stage. Though education is probably the most effective instrument for ensuring equality of opportunity the tribal people are lagging far behind their more fortunate fellow countrymen due to lack of education. Literacy among the tribals was found to be very low i.e. 25.9 per cent and especially so among the tribal females (14.5 per cent) (NSSO, 1991).

Of the families investigated, it was found that the literacy rate among the tribals in comparison to the total population is high. It was found that 33.57 per cent of the respondents acquired primary level of education and 26.55 per cent were illiterate, of which majority of them were females.



EDUCATIONAL STATUS OF THE SELECTED TRIBAL FAMILIES
FIGURE 5

25.15 per cent of the respondents were educated upto middle school level. 9.47 per cent of the respondents were educated to high school level and 3.63 per cent of the respondents were educated till higher secondary level. A few of them 1.05 and 0.58 per cent of the respondents were educated upto diploma and graduation level respectively. Among the graduates (0.58%), 0.76 per cent were females. Bharati and Dastidar (1990) say that in case of women, education makes them live safe and improve childbearing practices in the family.

The total picture of spread of education among the tribals is not very encouraging, barring a few Tribes of North Eastern region like the Khasi, Naga, Mizo and the Garo etc. who tremendously benefited from the vast network of missionary institutions (Mohanthy, 2003).

There are residential schools in Pachaimalai hills (Plate - 6). It was found during the study that there were school dropouts and inadequate teaching staff. The tribes send their children for food rather than education.

But on a whole, though the spread of education among the Malayalis, seem to be encouraging, it is a pity that all the educated are not going beyond school education except for a few of them.

Parents replied that literacy level of the children was low because they liked to roam around in the nature i.e. forests and the village, even though parents recognized that education was important for children. The parents expressed the following reasons for the low literacy level of their children:



PLATE 6
RESIDENTIAL SCHOOL OF TRIBES

Permissive attitude of the parents, economic difficulties due to which they engaged their children in agricultural activities, irregularity of teachers at school, long distance to school from hamlet. Children get distracted on their way to school through forest or village, climate (especially rainy reason) and peak agricultural months. Maurya and Jaya (2003) reported the same.

6. Occupation of the selected tribal families

Table VIII indicates the occupation of the selected tribal families.

TABLE VIII
OCCUPATION OF THE SELECTED TRIBAL FAMILIES

Sl.No.	Occupation	Male		Female		Total	
		No.	%	No.	%	No.	%
1	Agriculture	242	88.3	248	96.1	490	92.1
2	Landless	9	3.3	9	3.5	18	3.4
3	Government	3	1.1	—	—	3	0.6
4	Own business	20	7.3	1	0.4	21	3.9
	Total	274	100	258	100	532	100

In rural households, forests are valued for a wide array of non-edible products that form an integral part of the household economy (FAO, 1990d).

Of the total 200 families studied, majority of the respondents 92.1 per cent practice agriculture alone. 3.9 per cent of the Malayalis own business and also practice agriculture. 3.4 per cent of the Malayalis were landless, they work as coolies, work in the lands of the inhabitants. A very few of them 0.6 per cent work as Government employees.

Those who follow agriculture in their own lands grow crops like Tapioca, Paddy, Banana, Mango and other crops like Cashewnut and Jackfruit. The harvested products are used for both household purposes and for marketing in the plains.

Agriculture practices in countries around the world have multiple and enduring impacts on the environment and on bio-diversity conservation. Agriculture is one of the most widely spread productive activities, using nearly 40 per cent of the earth's land surface, providing sustenance for us all and generating direct employment and livelihoods for the vast majority of rural dwellers worldwide (www.panda.org).

7. Income wise distribution of the selected tribal families

The income wise distribution of the selected families taken for survey is given in Table IX

TABLE IX
INCOME WISE DISTRIBUTION OF THE SELECTED TRIBAL FAMILIES

S.No.	Income	N= 200	Percentage
1.	500-1000	51	25.5
2.	1001-1500	81	40.5
3.	1501-2000	42	21
4.	> 2000	26	13
	Total	200	100

The income of the families is the basic factor, which determines the level of expenditure and savings (Maheswari, 2000). Vijayalakshmi (2002) observed that family income is a critical determinant of a household's ability to obtain food and thus poverty is a major threat to household food security.

Income is the true index of the socio-economic status of the population. In the case of tribal families it is very difficult to estimate the total family income per month. However through in depth interviews and informal discussions with the family members, information pertaining to income of the families was gathered and the table represents their income level.

In the tribal population studied, income range of the families varied from Rs. 500/- to above Rs. 2000/- per month. Large number of families (40.5 per cent) was found to have income level between Rs. 1001/- to Rs.1500/- per month. Whereas 25.5 per cent of the families Rs. 500/- to Rs.1000/- as their income. 21 per cent of the families had income between Rs.1501/- to Rs. 2000/- and 13 per cent of them had income level of above Rs.2000/- respectively.

8. Income on land holdings of the selected tribal families

Table X indicates the income on land holdings of the selected families.

TABLE X
INCOME ON LAND HOLDINGS OF THE SELECTED TRIBAL FAMILIES

Land holdings	Range of income (in Rs.)									
	500-1000		1001-1500		1501-2000		> 2000		Total	
	No	%	No	%	No	%	No	%	No	%
Nil	9	17.65	—	—	—	—	—	—	9	4.5
< 1ha	36	70.59	54	66.67	3	7.14	—	—	93	46.5
1-2ha	6	11.76	27	33.33	34	80.95	10	38.46	77	38.5
2-4ha	—	—	—	—	5	11.9	13	50	18	9
> 4ha	—	—	—	—	—	—	3	11.54	3	1.5
TOTAL	51	100	81	100	42	100	26	100	200	100

47 per cent of Indian households earn their livelihood from farming. This translates into 89 million households (www.ibef.org). In India where agriculture is the prime source of livelihood for majority of people living in rural and tribal areas, possession of land or land ownership can be termed to be the access to both income and employment around which socio-economic privileges and deprivations revolved. Though the majority of tribals reside in the countryside and remote areas and derive their livelihood by working on land, they are the most disadvantaged ones in terms of land holdings (Soni, 2003).

It was found that 46.5 per cent of the total population were holding less than one hectare of land among which 36 families belonging to the range of income Rs.500/- to Rs.1000/- as their monthly income, 54 families belonging to Rs.1001/- to Rs.1500/- and 3 families Rs.1501/- to Rs.2000/- as their monthly income.

38.5 per cent of the total population was holding one to two hectares of land among which 6, 27, 34 and 10 families were earning Rs.500 to Rs.1000/-, Rs.1001/- to Rs.1500/-, Rs.1501/- to Rs.2000/- and above Rs.2000/- respectively.

Nine per cent of the total population was holding two to four hectares of land among which 5 and 13 of the family were earning Rs.1500/- to Rs.2000/- and above Rs. 2000/- respectively. 1.5 per cent of them were holding greater than 4 hectares of land of which 3 families earned above Rs.2000/-. 4.5 per cent of the total population were landless, they either worked in the fields of the inhabitants or else work as coolies in welfare schemes implemented by Government for laying roads, clearing the bushes, building check dams etc. for a wage of Rs. 54 per day in the form of 7 kg of rice and Rs.14.45/- in cash.

Land Holdings:

The lands are situated in a medium range of hills. The lands fit for farming are very much undulating and soil texture is much gravelly clay and a little porous. Therefore farmers raise only paddy and cassava-tapioca. There is no assured Government source of water supply for irrigation. The landholders raise paddy for domestic consumption or to a little extent for sale. Normally they go in for getting fresh seeds from Block level outlets. Most of the farmers grow cassava-tapioca (Plate 7) for sale. They find it more attractive for the following reasons:

- ♦ Its crop water requirement is much less
- ♦ Drought resistance
- ♦ Pest tolerant
- ♦ Less labour intensive
- ♦ Productivity per hectare is more
- ♦ Market price is more and profitable.

Beyond these two crops, farmers do not go in for any other major crops. India's population exceeds a billion and there is no option in the future except to produce more crops per unit of land for every drop of water (Swaminathan, 2001)

9. Family Expenditure on various items by the selected tribal families

Table XI indicates the various expenditure of the selected tribal families.



PLATE 7
A TRIBAL MAN WITH TAPIOCA PLANT

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TABLE XI

FAMILY EXPENDITURE ON VARIOUS ITEMS BY THE SELECTED TRIBAL FAMILIES

Land holdings	Range	Range of income (in Rs.)							
		500-1000		1001-1500		1501-2000		> 2000	
		No	%	No	%	No	%	No	%
Medicine	< 200	19	37.25	5	6.17	15	35.71	8	30.77
	201-400	—	—	12	14.81	6	14.29	7	26.92
	> 400	—	—	9	11.11	4	9.52	2	7.69
	NIL	32	62.75	55	67.90	17	40.48	9	34.62
	Total	51	100	81	100	42	100	26	100
Fuel	< 200	51	100	72	88.89	30	71.43	8	30.77
	201-400	—	—	9	11.11	12	28.57	16	61.54
	> 400	—	—	—	—	—	—	2	7.69
	NIL	—	—	—	—	—	—	—	—
	Total	51	100	81	100	42	100	26	100
Transport	< 200	42	82.35	63	77.78	31	73.81	12	46.15
	201-400	5	9.80	12	14.81	11	26.19	14	53.85
	> 400	—	—	—	—	—	—	—	—
	NIL	4	7.84	6	7.41	—	—	—	—
	Total	51	100	81	100	42	100	26	100
Recreation	< 200	4	7.84	74	91.36	36	85.71	10	38.46
	201-400	—	—	7	8.64	6	14.29	12	46.15
	> 400	—	—	—	—	—	—	—	—
	NIL	57	92.16	—	—	—	—	—	15.38
	Total	51	100	81	100	42	100	26	100
Miscellaneous	< 200	51	100	74	91.36	36	85.71	10	38.46
	201-400	—	—	7	8.64	6	14.29	16	61.54
	> 400	—	—	—	—	—	—	—	—
	NIL	—	—	—	—	—	—	—	—
	Total	51	100	81	100	42	100	26	100

It was found during the study that in the Malayalis, 47 respondents spent less than Rs.200/- towards medicine and 113 respondents utilized the primary health centres, sub-centres and they also followed the traditional healers. 25 and 15 of the respondents spent Rs.200/- to Rs.400/- and above Rs.400/- for medical services respectively. Families, whose income range is Rs.1001/- to Rs.2000/- and above, spend on medical services upto Rs.400/- and above.

The respondents replied that the reason for spending such an amount on medical services is due to the inadequate and irregularity of the medical staff and they hope for better medical checkups.

The actual expenditure spent on fuel consumption is less than Rs.200/-. The inhabitants collect fuel wood from their own fields and also inside the forest. Normally the family members go out for fuel wood and twigs collection once in a week. The fuel wood they collect every time weighs approximately 20 kg. Their expression for the quantity they carry is "One Bundle" or "kattu". One person normally carries one bundle. Some times if two or three family members go for collection, each brings a bundle with 20kg of fuel wood. Fuel expenditure includes the amount they spend for kerosene which is used for stoves and to lit lamps. 161 of the respondents spent less than Rs.200/- for fuel. 37 and 2 of the respondents spent Rs.201/- to Rs.400/- and above Rs.400/- for fuel consumption, is due to the reason that they owned vehicles.

148 of the respondents spent less than Rs.200/- for transportation. 42 respondents spent amount ranging between Rs.200/- to Rs.400/- and 10 of the respondents spent nothing for transportation. The tribes spent for transportation mainly for two reasons. One is to sell their produce in the plains and the other to have medical checkups and for their personal needs like buying alcohol and for legal litigations etc.

124 of the respondents spent less than Rs.200/- for recreation. 25 of the respondents spent amount ranging in between Rs.200/- to Rs.400/- and 51 of the respondents spent nothing on recreation. Nearly three-fourths of the respondents spent amount less than Rs.200/- on miscellaneous aspects.

B. DIETARY PATTERN AND FOOD HABITS OF THE MALAYALIS

1. Food habits of the selected tribal families

Food habits of the selected tribal families were given in the Table XII.

TABLE XII

FOOD HABITS OF THE SELECTED TRIBAL FAMILIES

S.No.	Food Habits	N= 200	Percentage
1.	Vegetarian	5	2.5
2.	Non. Vegetarian	195	97.5
	Total	200	100

Food habits are among the oldest and most entrenched aspects of many cultures. They exert deep influence on the behaviour of the people. Religious aspects of culture also control food rejection and use. By and large, food habits are based on food availability, economics or symbolism (Bhatia, 1999).

Majority of the families 97.5 per cent were non-vegetarians and vegetarians constituted 2.5 percent. Non-vegetarians consumed pork rather than meat or chicken. None of them consumed beef.

2. Frequency of Food Consumption by the selected tribal families

Table XIII indicates the Frequency of Food Consumption by the selected tribal families.

TABLE XIII

FREQUENCY OF FOOD CONSUMPTION BY THE SELECTED TRIBAL FAMILIES

Food Item	Frequency of Consumption	Range of income (in Rs.)							
		500-1000		1001-1500		1501-2000		> 2000	
		No	%	No	%	No	%	No	%
Cereals	Daily	51	100	81	100	42	100	26	100
	Weekly	—	—	—	—	—	—	—	—
	Monthly	—	—	—	—	—	—	—	—
	Occasionally	—	—	—	—	—	—	—	—
	Total	51	100	81	100	42	100	26	100
Pulses	Daily	94	17.65	12	14.81	13	30.95	11	42.31
	Weekly	2	82.35	69	85.19	29	69.05	15	57.69
	Monthly	—	—	—	—	—	—	—	—
	Occasionally	—	—	—	—	—	—	—	—
	Total	51	100	81	100	42	100	26	100
Other vegetables	Daily	19	37.25	14	17.28	5	11.90	7	26.92
	Weekly	32	62.75	67	82.72	37	88.09	19	73.08
	Monthly	—	—	—	—	—	—	—	—
	Occasionally	—	—	—	—	—	—	—	—
	Total	51	100	81	100	42	100	26	100
Roots and Tubers	Daily	9	17.65	13	16.05	—	—	4	15.38
	Weekly	18	35.29	16	19.75	15	35.71	11	42.31
	Monthly	10	19.61	19	23.46	15	35.71	9	34.62
	Occasionally	14	27.45	33	40.74	12	28.57	2	7.69
	Total	51	100	81	100	42	100	26	100
Milk	Daily	—	—	—	—	2	4.76	2	7.69
	Weekly	3	5.88	3	3.70	5	11.90	7	26.92
	Monthly	—	—	—	—	5	11.90	6	23.08
	Occasionally	48	94.12	78	96.29	30	71.43	11	42.31
	Total	51	100	81	100	42	100	26	100
Oil and Fat	Daily	5	9.80	38	46.91	19	45.24	18	9.23
	Weekly	37	72.55	43	53.09	23	54.76	8	30.77
	Monthly	9	17.65	—	—	—	—	—	—
	Occasionally	—	—	—	1	—	—	—	—
	Total	51	100	81	100	42	100	26	100
Sugar and Jaggery	Daily	5	9.8	6	7.41	14	33.33	16	61.54
	Weekly	10	19.61	21	25.93	9	21.43	4	15.38
	Monthly	—	—	19	23.46	7	16.67	2	7.69
	Occasionally	36	70.59	35	43.21	12	28.57	4	15.38
	Total	51	100	81	100	42	100	26	100

All the respondents of the selected families consumed cereals daily. Three-fourths of the surveyed population consumed pulses once in a week. None of the respondents consumed leafy vegetables either daily or in alternate days. Most of the respondents consumed it either monthly once or occasionally. These tribal populations consumed other vegetables, which are locally available like brinjal, drumstick, jack tender, raw papaya, mango, plantain flower, pumpkin fruit etc. Almost all of them consumed locally produced tapioca in their diets. None of them consumed milk in their diet except a very few. Almost all the respondents consumed jaggery in their beverages instead of coffee or tea. The families in the range of Rs.500/- to Rs.1500/- followed a daily and weekly consumption pattern of pulses and other vegetables depending on the availability of money. Singh and Agarwal (2001) arrived at a similar conclusion which states that in lower socio-economic group cereals were the main source of energy and with the rise in the income, the share of expensive foods like fruits, meat, milk products and fat in the diet increased.

3. Monthly Food Expenditure Pattern of the Selected Tribal Families

Details regarding the monthly expenditure pattern of the selected tribal families are presented in Table XIV.

TABLE XIV

MONTHLY FOOD EXPENDITURE PATTERN OF THE SELECTED TRIBAL FAMILIES

Food Item	Range of Expenditure (in Rs.)	Range of income (in Rs.)							
		500-1000		1001-1500		1501-2000		> 2000	
		No	%	No	%	No	%	No	%
Cereals	50 - 100	24	47.06	35	43.21	26	61.90	3	11.54
	101 - 150	16	31.37	19	23.46	16	38.09	18	69.23
	151- 200	4	7.84	18	22.22	—	—	—	19.23
	> 200	7	13.73	9	11.11	—	—	—	—
	Total	51	100	81	100	42	100	26	100
Pulses	0 - 20	43	84.31	10	12.35	19	45.24	11	42.31
	21 - 40	8	15.69	57	70.37	19	45.24	8	30.77
	> 40	—	—	14	17.28	4	9.52	7	26.92
	Total	51	100	81	100	42	100	26	100
Roots and Tubers	0	43	84.31	18	22.22	16	38.09	17	65.38
	1 - 20	8	15.69	63	77.78	26	61.9	9	34.62
	Total	51	100	81	100	42	100	26	100
Green Leafy Vegetables	0	51	100	81	100	42	100	26	100
	1 - 20	—	—	—	—	—	—	—	—
	Total	51	100	81	100	42	100	26	100
Other Vegetables	0	24	47.06	31	38.27	16	38.09	9	34.62
	1 - 20	27	52.94	20	24.69	22	52.38	16	61.54
	21 - 40	—	—	30	37.04	4	9.52	1	3.85
	Total	51	100	81	100	42	100	26	100
Fruits	0	34	66.67	63	77.78	23	54.76	18	69.23
	1 - 20	17	33.33	18	22.22	19	45.24	8	30.77
	Total	51	100	81	100	42	100	26	100
Nuts and Oil seeds	0	34	66.67	43	53.09	24	57.14	15	57.69
	1 - 20	17	33.33	38	46.91	18	42.86	11	42.31
	Total	51	100	81	100	42	100	26	100
Fleshy foods	0	34	66.67	68	83.95	34	80.95	19	73.08
	1 - 20	9	17.65	4	4.94	3	7.14	4	15.38
	21 -40	8	15.69	9	11.11	4	9.52	2	7.69
	41 - 60	—	—	—	—	1	2.38	1	3.85
	Total	51	100	81	100	42	100	26	100
Milk	0	46	90.19	78	96.29	36	85.71	24	92.31
	1 - 20	5	9.8	3	3.70	6	14.29	2	7.69
	Total	51	100	81	100	42	100	26	100
Sugar and Jaggery	0	36	70.59	72	88.89	23	54.76	10	38.46
	1 - 20	15	29.41	9	11.11	19	45.24	16	61.54
	Total	51	100	81	100	42	100	26	100

Table XIV reveals that the percentage of food expenditure of cereals for income group ranged from Rs.1501/- to Rs.2000/- lies between 11 to 69 per cent. The Government of Tamilnadu is issuing 30 Kg of rice per month to all the tribals in Pachaimalai hills. Only respondents of income ranged from Rs.1001/- to Rs.2000/- spent above Rs.40/- for pulses.

The expense on roots and tubers was nil for 84.31 per cent of income range Rs.500/- to Rs.1000/-, 22.22 per cent of income range Rs.1001/- to Rs.1500/-, 38.09 per cent of income range Rs.1501/- to Rs.2000/- and 65.38 per cent of income range above Rs.2000/-, because most of the families consume the locally grown tapioca. Likewise the expense on green leafy vegetables was also nil among the surveyed population because of the locally available cost free greens like drumstick leaves, vallarai, mudakkathan and thoothuvalai. 47.06 per cent of the respondents of income range Rs.500/- to Rs.1000/- spent nothing for vegetables. Similarly 38.27 per cent, 38.09 per cent and 34.62 per cent of income range Rs.1001/- to above Rs.2000/- respectively also spent nothing on vegetables. Majority of the respondents spent nothing on fruits and consumed locally available fruits like jack fruits, mango, banana, cashew fruit, guava, etc. 33.33 per cent of the respondents of income range of Rs.500/- to Rs.1000/- spent Re.1/- to Rs.20/- on fruits like orange, sweet lime, sapota, pineapple, etc., when they come down to plains. Likewise 46.91 per cent, 42.86 per cent and 42.31 per cent of income range Rs.1001/- to above Rs.2000/- also spent Re.1/- to Rs.20/- on fruits. 66.67 per cent, 53.09 per cent, 57.14 per cent and 57.69 per cent of income range Rs.500/- to above Rs.2000/- also spent nothing on nuts and oil seeds. Similarly majority of the respondents from the four ranges of income spent nil

amount on fleshy foods. Only a very few of the respondents 2.38 per cent and 3.85 per cent of income range Rs.1501/- to above Rs.2000/- spent upto Rs.60/- on fleshy foods, due to increase in family size. They more often consumed chicken and pork and occasionally goat meat. 9.8 per cent, 3.70 per cent, 14.29 per cent and 7.69 per cent of the respondents of the income range between Rs.500/- to above Rs.2000/- spent upto Rs.20/- for milk respectively. Similarly 29.41 per cent, 11.11 per cent, 45.24 per cent and 61.54 per cent of the respondents of income range Rs.500/- to above Rs.2000/- spent Re.1/- to Rs.20/- on sugar and jaggery.

4. Method of cooking followed by the selected tribal families

Cooking methods followed by the Tribal families is given in Table XV.

TABLE XV

METHOD OF COOKING FOLLOWED BY THE SELECTED TRIBAL FAMILIES

Sl.No.	Food items	Method of cooking	Total No. of Families	Percentage
1	Cereals	Boiling	200	100
2	Pulses	Boiling	200	100
3	Vegetables	Boiling	200	100
4	Meat	Boiling	200	100

From the collected information it was observed that all the families used boiling method for the preparation of cereals, pulses, vegetables and meat. It was also found that a few of the Malayalis ate rats by smoking them. Malayalis did not consume fish, because of the non-availability of it. Cereals, pulses, vegetables and meat were cooked in aluminium or mud vessels with or without oil.

Housing and house hold assets

The houses of the Malayalis were found in colonies (Plate 8a and 8b). By observation it was found out that most of the houses were thatched huts constructed with a mixture of cow-dung and mud with thin long sticks and straws collected from forest.

The livestock are kept in separate settlements called 'kottil' adjacent to their huts. All the houses had a small space for cooking area in the corner of the room. They normally use bricks or mud stoves for cooking. Firewood was used as a fuel for cooking. In all the houses, the tribes smeared the floor with cow-dung mixture. The houses were dark with poor ventilation. Though the tribes were provided with electricity, they used it only for lighting purposes and they did not use it for ventilation or cooking gadgets. The source of drinking water was from over head tanks and wells. The result of water sample analyzed has been found potable and slightly acidic (Appendix IV).

With regard to using latrine, all of the 200 families surveyed used only open fields. The household waste was disposed at the back of their houses. They used mainly mud pots and aluminium vessels for cooking with wooden laddle or aluminium laddle.

C. FOOD SECURITY PROFILE OF THE MALAYALIS

1. Computation of Food security based on socio-economic parameters

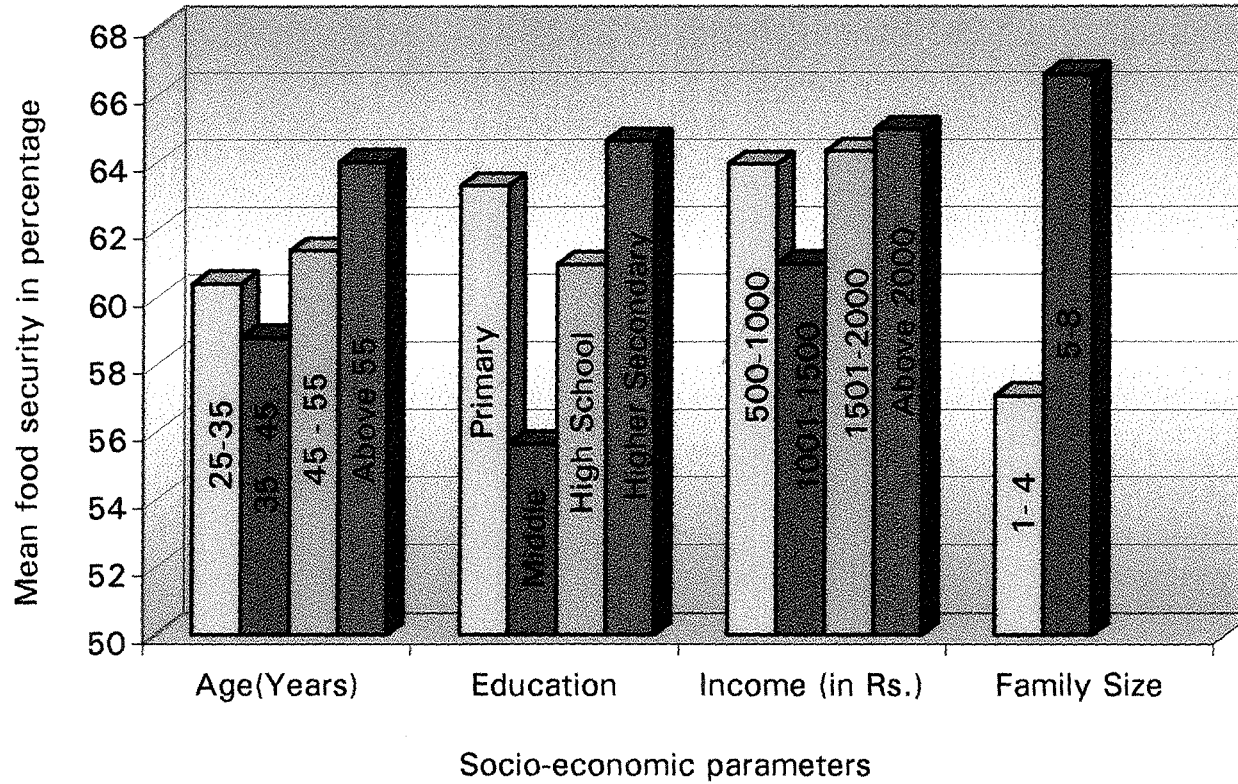
Table XVI and Figure 6 reveals the analysis of variance of food security with the socio-economic parameters such as age, education, income of the family and family size; as these are the contributing factors to family food security. Therefore these factors are studied in the present sample were scored as per the procedure outlined under methodology.



PLATE 8a
HOUSING OF TRIBES



PLATE 8b
HOUSING OF TRIBES



MEAN FOOD SECURITY SCORES BASED ON SOCIO-ECONOMIC PARAMETERS

FIGURE 6

TABLE XVI
MEAN FOOD SECURITY SCORES BASED ON
SOCIO-ECONOMIC PARAMETERS

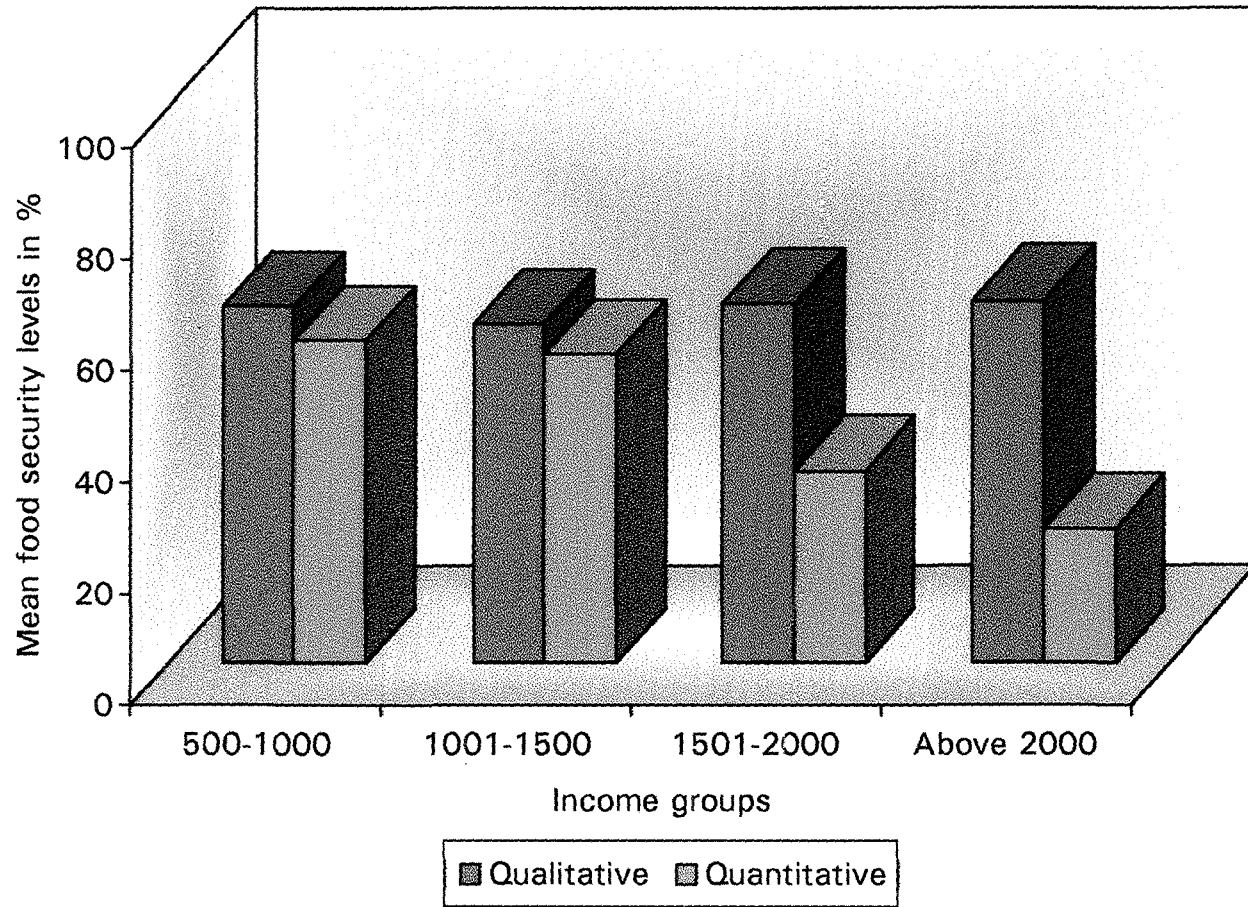
Socio-economic parameters	Food security scores (in mean %)	'F' value (degree of freedom)
Age (years) 25 - 35 35 - 45 45 - 55 Above 55	60.40 ± 8.06 58.81 ± 11.08 61.38 ± 8.15 64.01 ± 4.19	1.04 ^{NS}
Education Primary Middle High school Higher Secondary	63.3 ± 0.1 55.65 ± 13.09 60.96 ± 9.01 64.63 ± 5.65	1.09 ^{NS}
Income (in Rs.) 500 - 1000 1001 - 1500 1501 - 2000 Above 2000	63.94 ± 13.02 60.68 ± 11.68 64.32 ± 4.44 64.98 ± 4.78	1.34 ^{NS}
Family size 1 - 4 5 - 8	57.09 ± 10.47 66.61 ± 5.81	2.02 ^{NS}

NS – Not Significant

The results showed that the percentage of food security level increased with income and family size but was not statistically significant. The difference in scores obtained by the different age groups was also not statistically significant.

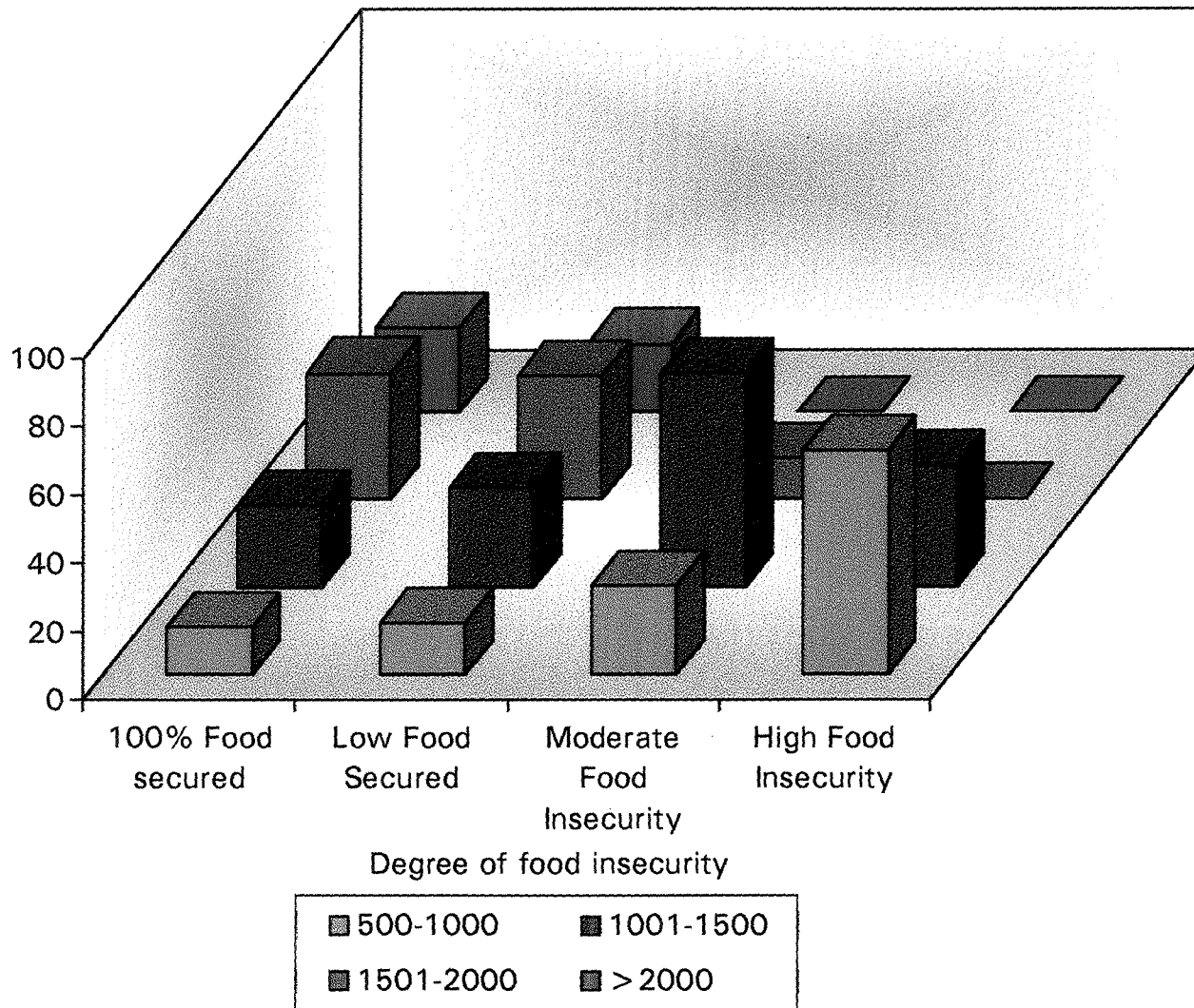
2. Comparison of quantitative and qualitative scores of food security of four ranges of income group

Combining the quantitative and qualitative approaches is a useful strategy for the identification of food insecurity (Chung *et al*, 1997). Table XVII and Figure 7a depicts the food security scores in percentage for both quantitative and qualitative aspects.



COMPARISON OF QUALITATIVE AND QUANTITATIVE SCORES OF FOOD SECURITY OF FOUR RANGES OF INCOME GROUP

FIGURE 7a



CLASSIFICATION OF FAMILIES BASED ON FOOD SECURITY LEVEL

FIGURE 7b

TABLE XVII
COMPARISON OF QUANTITATIVE AND QUALITATIVE SCORES OF FOOD SECURITY OF FOUR RANGES OF INCOME GROUP

Range of income (in Rs.)	Qualitative food security level (mean %)	Quantitative food security level (mean %)	't' value
500 - 1000	63.94 ± 13.02	57.86 ± 17.03	1.04 ^{NS}
1001 - 1500	60.68 ± 11.68	55.36 ± 9.36	1.38 ^{NS}
1501 - 2000	64.32 ± 4.44	34.38 ± 11.89	1.27 ^{NS}
Above 2000	64.98 ± 4.78	23.89 ± 10.87	1.08 ^{NS}

NS – Not significant

The quantitative indicator of household food security measure whether the amount of money spent by a household on food is enough to purchase a nutritionally adequate basic diet (Qualitative indicator). For all the four ranges of income the quantitative food security level did not meet the qualitative level, which was not statistically significant.

3. Classification of families based on food security level

Food security level classification was developed by the investigator on the basis of quantitative and qualitative dietary changes, which has been explained under methodology. This classification provides a measure of extent for sufficiency. The percentage distribution of families according to their food security level classification among the four income groups are given in Table XVIII and Figure 7b.

TABLE XVIII

CLASSIFICATION OF FAMILIES BASED ON FOOD SECURITY LEVEL

Level of Food Security	Degree of insecurity	500 - 1000	1001 - 1500	1501 - 2000	> 200
180	100% Food Secured	7 (14)	12 (15)	11 (26)	17 (65)
140 - 180	Low Food insecurity	12 (24)	24 (29)	26 (62)	9 (35)
80 - 140	Moderate Food Insecurity	19 (37)	29 (36)	5 (12)	—
0 - 80	High Food insecurity	13 (25)	16 (20)	—	—

Figure in parenthesis represents percentage values.

Maximum percentage of the families from the income range of Rs.1501/- to Rs.2000/- was found to be low food insecure. There was merely equal distribution of low food insecured families from income range Rs.500/- to Rs.1500/- respectively. Similar distribution of moderately food insecured families was found in the above-mentioned income groups. High food insecured families belong to the income range of Rs.500/- to Rs.1500/- respectively. Based on the cost of food, it seems that only the income groups ranging between Rs.1501/- to Rs.2000/- households can afford the nutritious food. Houshiar-Rad (2003) reported similar findings.

4. Comparative profile of factors affecting food security in the families studied

Correlation between family size, income from land and expenditure on food were tabulated for four ranges of income and the results were discussed as follows:

- i) Table XIX and Figure 8 represents the factors affecting food security in the Rs.500/- to Rs.1000/- range of income.

TABLE XIX
FACTORS AFFECTING FOOD SECURITY (Rs.500/- to Rs.1000/-)

Factors	Food Security			
	Mean \pm S.D	Regression	Correlation	't' value
Family size	1.68 \pm 0.42	-0.715	-0.032	-0.162 ^{NS}
Income from land	143.31 \pm 264.36	-0.001	-0.030	-0.130 ^{NS}
% expenditure on food	57.86 \pm 17.03	0.023	0.041	0.262 ^{NS}
Constant = 81.53	R - 0.04326		'F' value = 0.043 ^{NS}	

NS – Not Significant

In the case of Rs.500/- to Rs.1000/- range of income families, family size and income from land were negatively and non-significantly correlated to food security. Percentage expenditure on food items was positively a non-significantly correlated to food security level. The multiple correlation (0.04326) of all these factors on food security level of Rs.500/- to Rs.1000/- range of income families was non-significant.

- ii) Table XX and Figure 8 reveals the factors affecting food security for the Rs.1001/- to Rs.1500/- range of income.

TABLE XX
FACTORS AFFECTING FOOD SECURITY (Rs.1001/- to Rs.1500/-)

Factors	Food Security			
	Mean \pm S.D	Regression	Correlation	't' value
Family size	2.03 \pm 0.532	0.937	0.252NS	1.061 ^{NS}
Income from land	401.01 \pm 775.09	-0.001	-0.231NS	-1.031 ^{NS}
% expenditure on food	55.36 \pm 9.36	0.082	0.242NS	1.351 ^{NS}
Constant = 87.63		R = 0.412	'F' value = 0.041 ^{NS}	

NS – Not Significant

Income from land was negatively correlated and was non significant for the families in the income range of Rs.1001/- to Rs.1500/-. Percentage expenditure on food and family size were positively correlated but non significant on food security level. All these factors together were non significant on food security level with a multiple correlation of 0.412.

- iii) Table XXI and Figure 8 reveals the factors affecting food security for the Rs.1501/- to Rs.2000/- range of income.

TABLE XXI
FACTORS AFFECTING FOOD SECURITY (Rs.1501/- to Rs.2000/-)

Factors	Food Security			
	Mean \pm S.D	Regression	Correlation	't' value
Family size	2.01 \pm 0.436	2.631	0.044NS	0.651 ^{NS}
Income from land	291.61 \pm 704.01	-1.613	-0.039NS	-0.619 ^{NS}
% expenditure on food	34.38 \pm 11.89	-0.401	-0.031NS	-0.561 ^{NS}
Constant = 90.16		R = 0.511	'F' value = 0.032 ^{NS}	

NS – Not Significant

Income from land and percentage expenditure on food was negatively correlated and non-significant for the families in the range of Rs.1501/- to Rs.2000/-. Family size was positively correlated but non-significant on food security level.

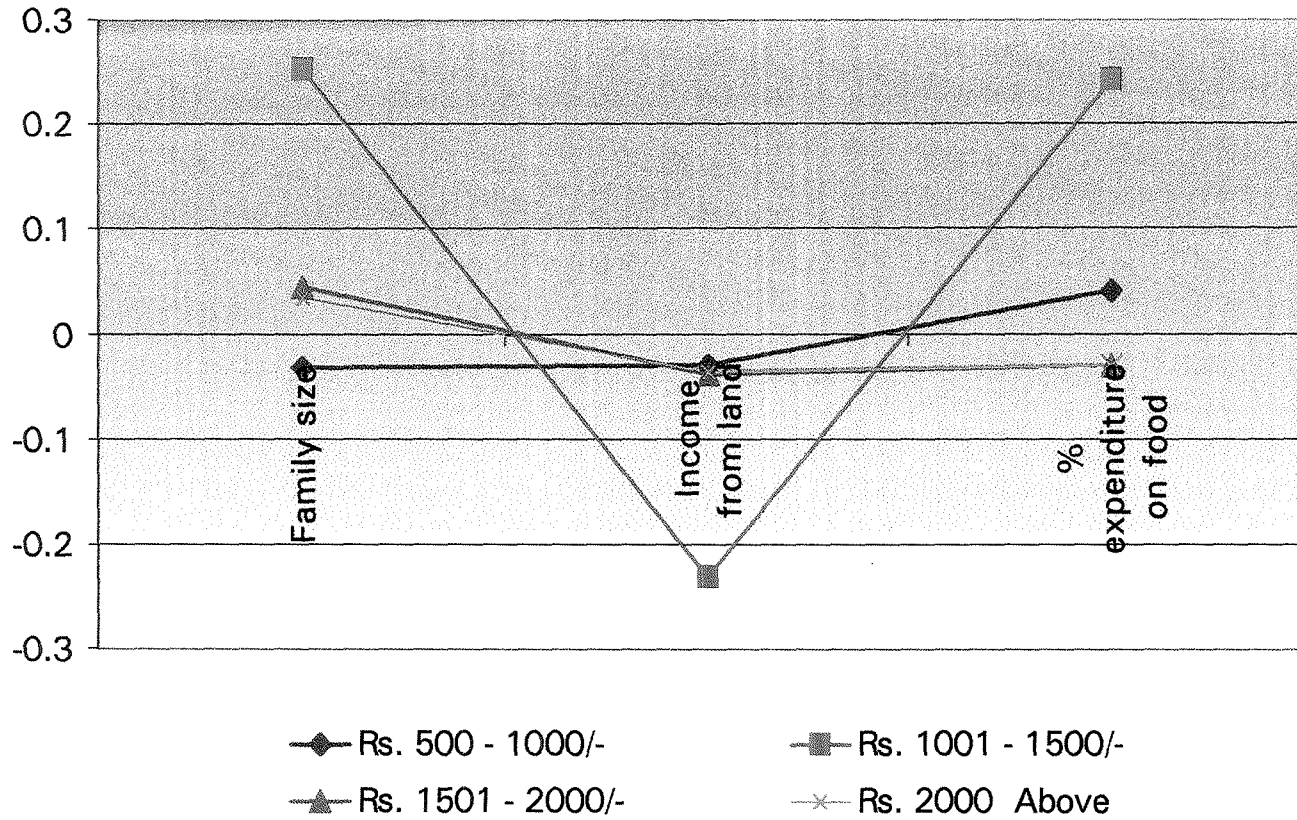
iv) Table XXII and Figure 8 reveals the factors affecting food security for the above Rs.2000/- range of income.

TABLE XXII
FACTORS AFFECTING FOOD SECURITY (Above Rs.2000/-)

Factors	Food Security			
	Mean \pm S.D	Regression	Correlation	't' value
Family size	1.82 \pm 0.45	2.532	0.034NS	0.072 ^{NS}
Income from land	134.08 \pm 2031.61	-2.013	-0.036NS	-0.067 ^{NS}
% expenditure on food	23.89 \pm 10.87	-0.936	-0.031NS	-0.043 ^{NS}
Constant = 92.16		R = 0.501	'F' value = 0.031 ^{NS}	

NS – Not Significant

In the above Rs.2000/- range of income families, percentage expenditure on food and income from land were non-significant and negatively correlated to food security level. On the whole, as the income of the families increases their expenditure on food decreased.



FACTORS AFFECTING FOOD SECURITY

FIGURE 8

5. Details of food purchased from Public Distribution System (PDS)

Table XXIII depicts the foods purchased from PDS.

TABLE XXIII
DETAILS OF FOOD PURCHASED FROM PDS

Foods purchased	Income Range (in Rs.)							
	500/- to 1000/-		1001/- to 1500/-		1501/- to 2000/-		Above 2000/-	
	No	%	No	%	No	%	No	%
Rice	24	47.06	37	45.68	--	--	--	--
Red gram dhal	18	35.29	25	30.86	27	64.28	18	69.23
Sugar	9	17.65	19	23.46	15	35.72	8	30.77
Total	51	100	81	100	42	100	26	100

It was observed from the table that almost all the families surveyed preferred to purchase food items from PDS shops irrespective of range of income. All the families purchased kerosene from PDS for their fuel consumption. The purchase of items such as rice, wheat and sugar varies in different income groups as stated by Vepa *et al* (2001) that all the people may not purchase all the grain requirements from the PDS, but they depend upon the PDS for some items regularly. The PDS in its meaningful form, however, exists only in seven states – Kerala, Andhra Pradesh, Tamilnadu, Jammu and Kashmir, West Bengal, Karnataka and Delhi. In all other states, the coverage is quite low, leakages are high and hence it is hardly an instrument for ensuring access to a minimum food to the poor (Kannan, 2000).

6. Methods of grain storage by the selected tribal families

Table XXIV and Figure 9 denotes the method of grain storage.

TABLE XXIV

METHODS OF GRAIN STORAGE BY THE SELECTED TRIBAL FAMILIES

Land holdings	Gunny Bags		Tins		Kuruthu		Total	
	No	%	No	%	No	%	No	%
< 1 ha	25	86.21	34	87.17	34	25.76	93	46.5
1 - 2 ha	—	—	—	—	77	58.33	77	38.5
2 - 4 ha	—	—	—	—	18	13.64	18	9.0
> 4 ha	—	—	—	—	3	2.27	3	1.50
Landless	4	13.79	5	12.82	—	—	9	4.50
Total	29	100	39	100	132	100	200	100

The need for food security arises primarily due to the fluctuations in food production and non-availability of sufficient food from the domestic sources. Large proportion of the world's under fed population starves not because of the lack of general food shortage, but because of lack of insufficient access to food supplies, or insufficient purchasing power of the consumers (Devadas, 2002). Table XVII reveals that majority of the respondents (132) stored the food grains namely, paddy in "Kuruthu", a storage bin (Figure 9 and Plate 9), which is built a little above the ground level with stone as boulders above which a herb called, "Valaiyeri thalai", "Valaiyeri twigs", and neem leaves, sometimes "Nalluva kuchhi", "Therani" and "sembulichi" leaves are placed. These leaves have the property of preserving the food grains upto ten years without any germs infesting it. Small granite stone jellys are packed above the leaves then it is floored with mixture of mud and cow dung after which it is walled with bamboo sticks and the roof of it is thatched, with a

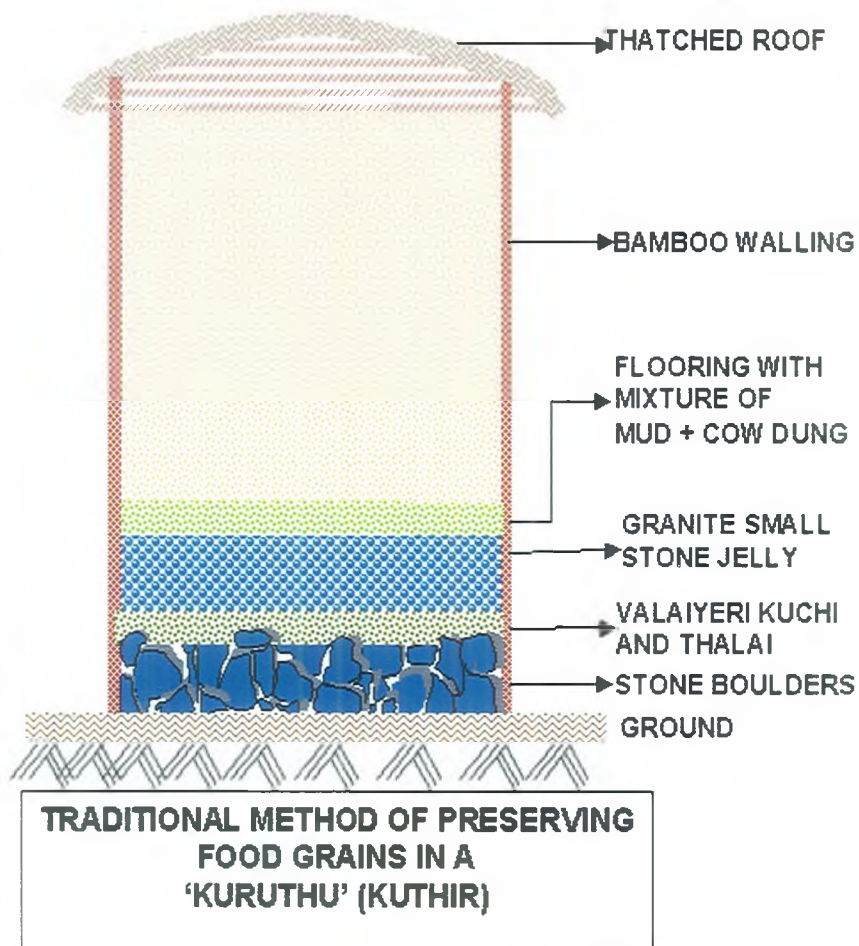


FIGURE 9
TRADITIONAL METHOD OF PRESERVING FOOD GRAINS IN A 'KURUTHU' (KUTHIR)



PLATE 9
KURUTHU

small opening to fill the kuruthu with paddy. 39 of the respondents of the total population survey, stored rice in tins and 29 respondents of the families stored rice in gunny bags or sacks for their use.

While food security of prime concern to prevent social tension, the nutrition security is equally important to bring up a healthy population (Vijayalakshmi, 2002)

Quantity of grain storage

It was observed during the study that the farmers usually grow paddy for domestic consumption and to a little extent to show their social affluent status. They do not grow more paddy because of the following one or more reasons:

- ♦ Water scarcity
- ♦ Climate
- ♦ Soil Properties
- ♦ Market Price
- ♦ Low profit per acre when compared to other crops.

Storages done in gunny bags, tins or pots and in storage bins called "Kuruthu" made up of mud. They store in gunny bags to a maximum of 650kgs, in tins upto 50kgs of rice and in kuruthu upto 2100kgs. The limit for storage is so because for want of space and to avoid more weight loss in prolonged storage.

One tonne of wheat or rice supports the food needs of five individuals in our country. Community Grain Banks each with locally acceptable

staples like ragi, jowar, bajra, and maize could be established, to begin with, in "hunger hot spot" villages (Swaminathan, 2000).

D. NUTRITIONAL PROFILE OF THE MALAYALIS

The nutritional status of community is the sum of nutritional status of the individuals who form that community (Agarwal *et al.*, 2001). The various investigation done for accessing nutritional status of the selected families are discussed below:

1. Anthropometric profile of selected tribal families

a) School going children

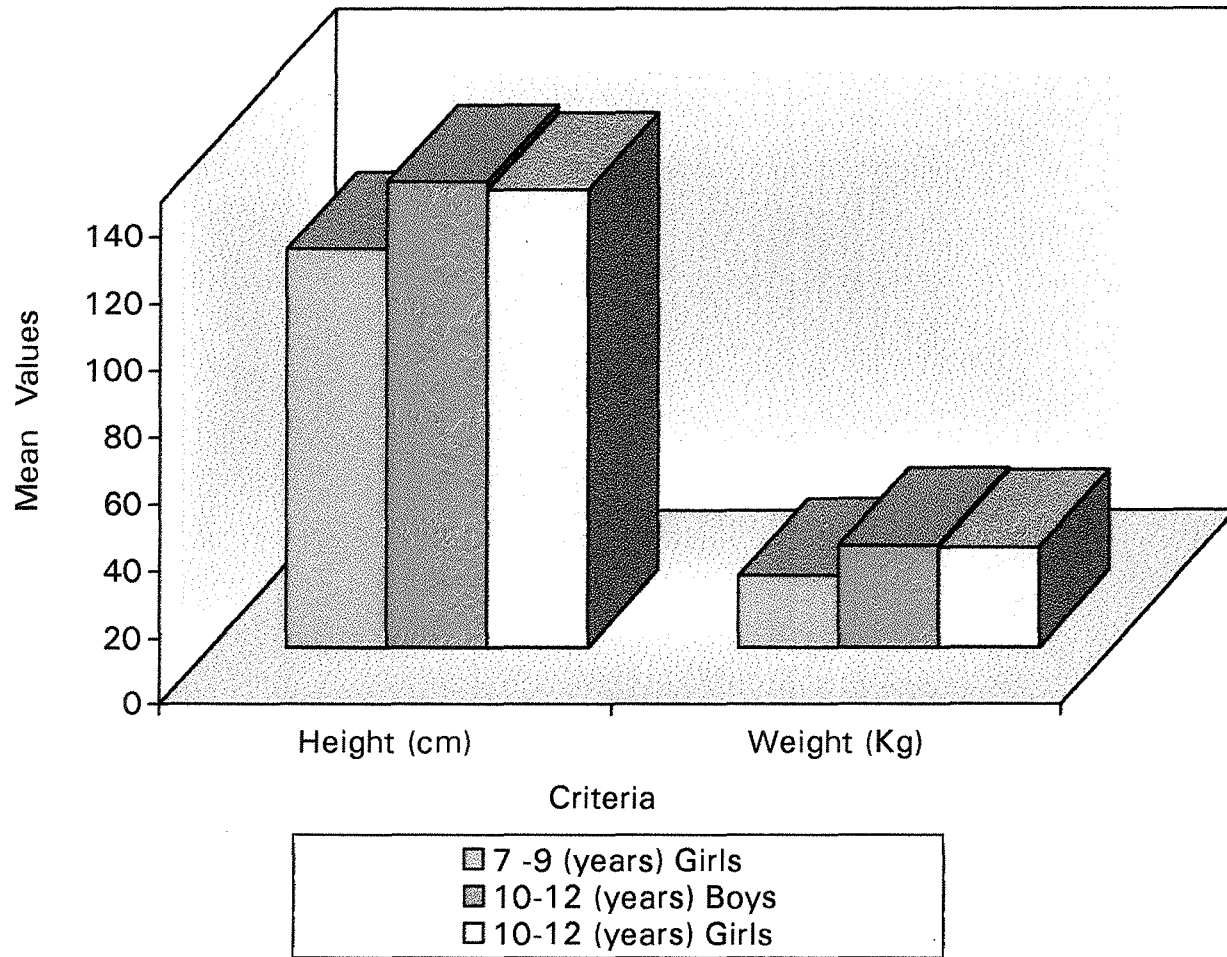
i) Mean Anthropometric measurements of school going children

The Anthropometric measurements and indices of school going children are shown in Table XXV and Figure 10.

TABLE XXV
ANTHROPOMETRIC MEASUREMENTS AND INDICES OF SCHOOL GOING CHILDREN ACCORDING TO AGE AND SEX

Criterion	7 - 9 years (n=7) Girls	10-12 years (n=3) Boys	10-12 years (n=6) Girls
Weight (Kg)	21.07 ± 2.88	30 ± 1.63	29.5 ± 1.71
ICMR	26.8	34.4	37.9
% of deficit	-21.38 ± 2.88	-12.79 ± 1.63	-22.37 ± 1.71
Height (Cm)	118.71 ± 2.66	138.67 ± 1.03	136.33 ± 1.59
ICMR	127.7	143.57	144.96
% of deficit	-7.04 ± 2.66	-3.41 ± 1.03	-5.95 ± 1.59

The height of both girls (7 to 9 years and 10 to 12 years) and of boys (10 to 12 years) was less when compared to the ICMR (2000) standard.



ANTHROPOMETRIC MEASUREMENTS AND INDICES OF SCHOOL GOING CHILDREN

ACCORDING TO AGE AND SEX

FIGURE 10

The deficit of weight was more in girls in both the age groups (7 to 9 years and 10 to 12 years) when compared to 10 to 12 years boys indicating that the prevalence of under nutrition in girls was more than in boys.

ii) Nutritional status of school going children of the selected tribal families

Table XXVI indicates the Nutritional status of school going children based on ICMR classification (1999).

TABLE XXVI
NUTRITIONAL STATUS OF SCHOOL GOING CHILDREN
OF THE SELECTED TRIBAL FAMILIES

ICMR Grade	% of Weight for Expected Age	Boys (in %) (n = 3)	Girls (in %) (n = 13)
Normal	80 and above	66.66	61.54
Grade I	70 - 80	33.33	30.77
Grade II	60 - 70	—	7.69
Grade III	50 - 60	—	—
Grade IV	Below 50	—	—

Majority of the boys (66.66%) and Girls (61.54%) had normal nutritional status. 33.33 per cent boys and 30.77 per cent girls were there in Grade I malnutrition and only 7.69 per cent girls were in Grade II malnutrition.

The higher percentage of boys and girls falling under the normal category may be due to limited number of samples in the selected families.

b. Adolescents

i) Mean Anthropometric measurements of Adolescents

Table XXVII and Figure 11a depicts the anthropometric measurements of adolescents.

**TABLE XXVII
MEAN HEIGHT AND WEIGHT OF ADOLESCENTS OF
SELECTED TRIBAL FAMILIES**

Age group	Weight (Kg)	ICMR Std (Kg)	% of Deficit / Excess	Height (Cm)	ICMR Std (Cm)	% of Deficit / Exces
Adolescent 13 - 15 yrs Boys (7)	29.79±3.26	47.80	-37.68±3.26	141.57±5.47	160.7	11.9±5.47
13 - 15 yrs Girls (3)	32.07±5.28	46.70	-31.33±5.28	142.33±2.62	154.8	8.06±2.62
16 - 18 yrs Girls (2)	36.00±1.00	49.80	-27.71±1.00	150.50±3.50	156.0	3.53±3.50

The mean body weight and height of adolescent boys and girls (Plate 10a and 10b) of the selected families were shorter and less heavier compared to the standard values.

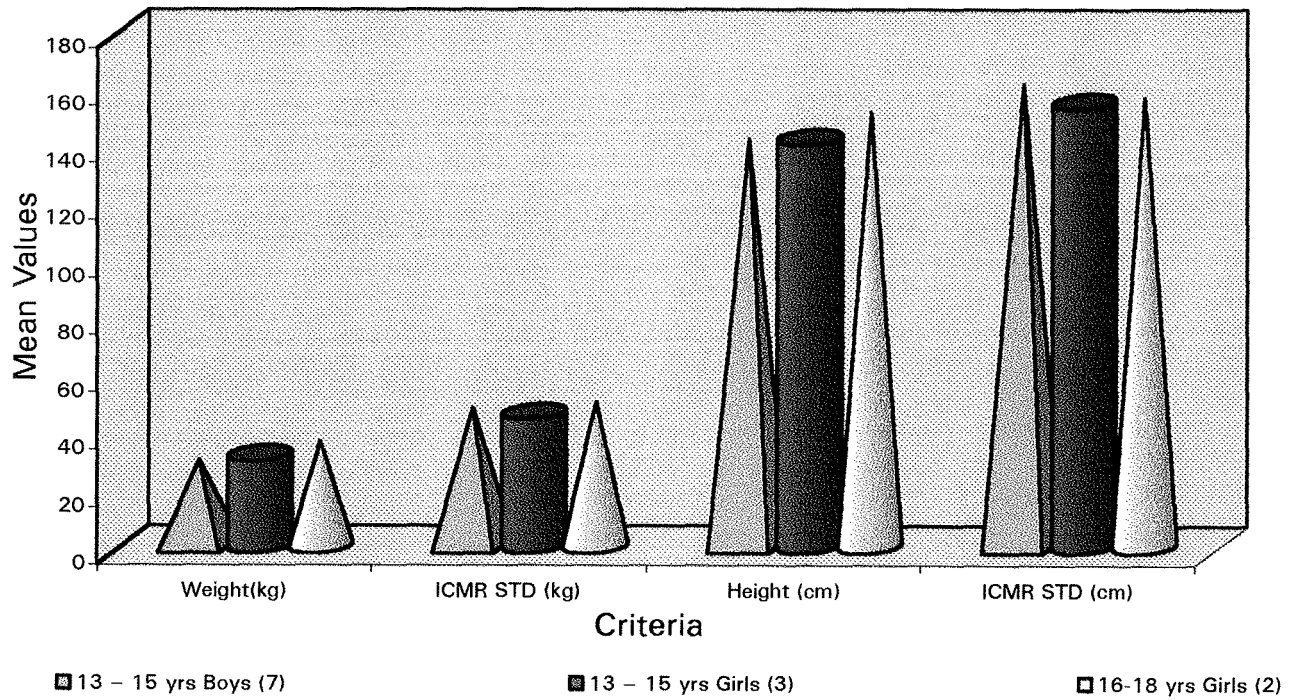
c. Adults

i) Mean anthropometric measurements of adults

The mean height, weight and body mass index of adult males and females of selected tribal families are depicted in Table XXVIII and Figure 11b.

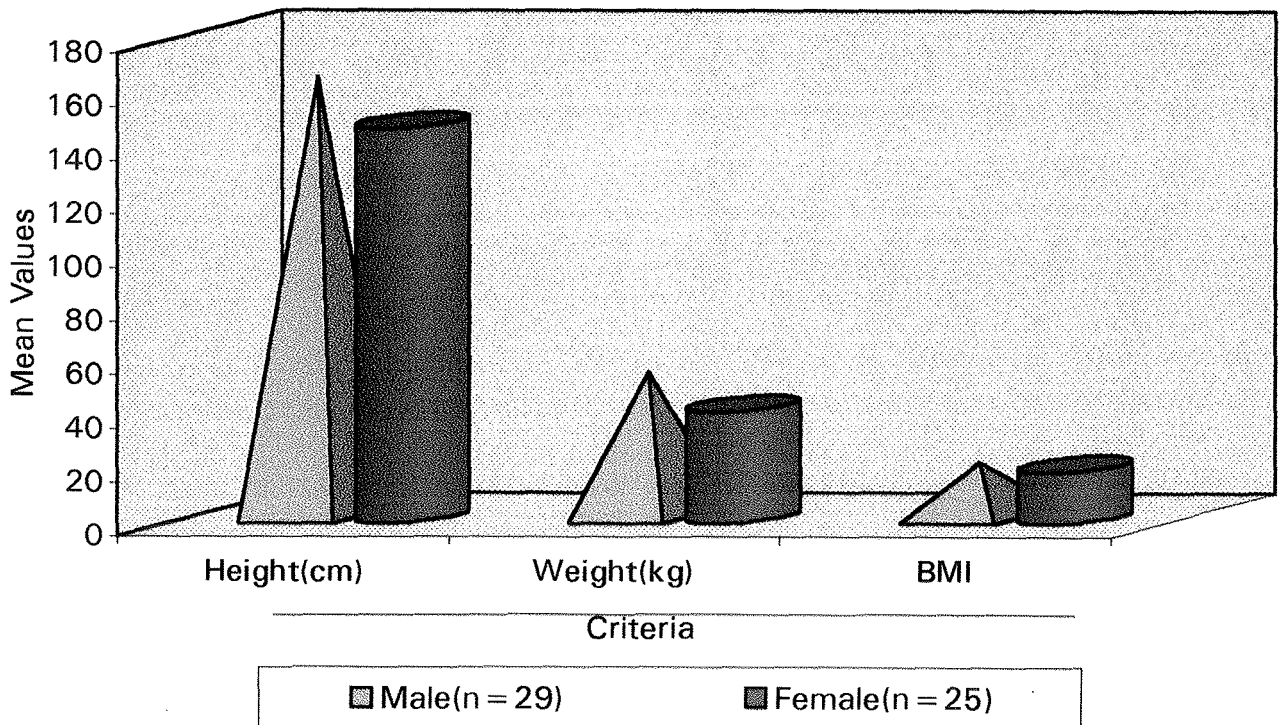
**TABLE XXVIII
MEAN HEIGHT, WEIGHT AND BODY MASS INDEX
OF ADULTS OF SELECTED TRIBAL FAMILIES**

Variable	Male (n = 29)	Female (n=25)
Height (Cm)	163.31±4.43	147.16±3.26
Weight (Kg)	53.14±6.18	41.6±4.69
Body Mass Index (BMI)	19.91±2.07	19.21±2.03



MEAN HEIGHT AND WEIGHT OF ADOLESCENTS OF SELECTED TRIBAL FAMILIES

FIGURE 11a



MEAN HEIGHT, WEIGHT AND BODY MASS INDEX OF ADULTS OF SELECTED TRIBAL FAMILIES

FIGURE 11b



PLATE 10a
RECORDING OF HEIGHT



PLATE 10b
RECORDING OF WEIGHT

The mean weight of both men and women were less than that of Indian reference man (60kg) and reference women (50kg). Of the anthropometric indices, body mass index (BMI) is considered to be more nutritionally than genetically related. Thus, in a country with diverse ethnic groups like India, it is more appropriate to use BMI as an indicator of the nutritional status of adult population (Khongsdier, 2001). In the present study it was found that both, men and women, had an equal range of BMI.

ii) Degree of malnutrition among Adults

Degree of malnutrition among adults based on their BMI is shown in Table XXIX.

TABLE XXIX
BODY MASS INDEX OF ADULTS

BMI Criterion*	Forms Of Malnutrition	Male (n = 29)	Female (n = 25)
16	III grade CED (or) Severe Malnutrition	1 (3.4)	—
16 - 17	II grade CED (or) Moderate Malnutrition	1 (3.4)	4 (16)
17 - 18.5	I grade CED (or) Mild Malnutrition	4 (13.79)	8 (32)
18.5 - 20	Low Weight Normal Condition	14 (48.28)	6 (24)
20 - 25	Normal	8 (27.59)	7 (28)
25 - 30	I grade Obesity	1 (3.4)	—
> 30	II grade or Morbid Obesity	—	—

* Garrow's Classification (1993), (Values in Parenthesis indicate Percentage)

The proportion of low weight condition was 48.28 per cent in males and 24 per cent in females. The proportion of I grade CED was 13.79 per cent among, males and 32 per cent among females. As a marker of nutritional status, low BMI reflects CED (Chronic Energy Deficiency) and acute food shortages (Mohapatra *et al*, 2001). It was observed that 3.4 per cent of the men had I grade obesity. India is presently undergoing the so-called Nutrition Transition, that is, an increasing prevalence of over weight and obesity against a background of under nutrition (Vibha, 2003).

2. Mean Food intake of selected tribal families

Table XXX reveals the mean food intake of the selected tribal families.

TABLE XXX

MEAN FOOD INTAKE OF SELECTED TRIBAL FAMILIES

Age (in years)	Cereals (g)	Pulses (g)	GLV (g)	OV (g)	Roots and Tubers (g)	Oils (g)
7 - 9 Intake RDA**	220 250	3.7 70	31.4 75	12.4 20	38 30	6.6 30
10 - 12 Boys Intake RDA*	405 420	5.05 45	33.5 50	36.3 50	30.8 30	5.9 35
10 - 12 Girls Intake RDA*	365 380	4.98 45	32.5 50	35 50	37.1 30	7 35
13 - 15 Boys Intake RDA**	465 430	7.5 76	52.3 100	40 75	71.8 75	8.5 35
13 - 15 Girls Intake RDA**	415 350	6.5 70	47.5 150	42 75	23.6 75	8.2 35
16 - 18 Girls Intake RDA**	485 350	6.5 70	55.9 150	52 75	63.5 75	9.4 35
Adult Men Intake RDA*	675 490	9.3 45	52.5 40	70 65	50 55	9.5 45
Adult Women Intake RDA*	541 425	5.3 42.5	46 100	55 40	47.5 50	9.0 22.5

* - NIN (1990)

** - Gopalan *et al* (1987)

GLV – Green Leafy Vegetables

OV – Other Vegetables

It was found during the study that as far as cereal consumption is concerned all the age groups had an intake less than the Recommended Dietary Allowances. Among the different age groups, men and women consumed more cereals. Pulse consumption on the other hand was inadequate for all the age groups, the deficit being as high as 98 per cent in the age group of 7 – 9 years. Low intake of pulses has also been reported in the diets of hill Bhuniyas and Lanjia Saoras of Orissa, Gonds and Pradhans of Maharashtra (Gupta, 1982 and Khare, 1988).

Consumption of green leafy vegetables was lower than the recommended intake for all age groups, whereas consumption of other vegetables and roots and tubers was fairly adequate till the age group of 7 – 9 years, for older children and adults, the intake was deficit. Oils and fat consumption was markedly deficit in all age groups. Fruits found place in the diets of tribals in moderate amounts whereas milk and milk products were not consumed during the period of survey. The tribals used jaggery instead of sugar for beverages.

3. Mean Nutrient intake of selected tribal families

Table XXXI and Figure 12 a, b and c reveals the mean nutrient intake of selected tribal families.

23. How frequently you consume alcohol?
- a) Occasional
 - b) Fortnightly
 - c) Weekly
 - d) Daily
24. How often you take bath
- a) Daily
 - b) alternate Days
 - c) Once in 2 days
 - d) Weekly once
25. Do you have practice of proper toilet facilities ?
- a) Yes b) No
26. Do you wash your hands after using toilets?
- a) Yes b) No
27. Do you have the practice of washing your hands before eating
- a) Yes b) No
28. Where do you go to seek medical help during illness?
- a) Primary Health Center
 - b) Home remedies
 - c) Taking to Priests
29. Is Your Child Vaccinated?
- a) Yes b) No
- If yes, list The Vaccine.

Vaccine	Reason

30. Do you attend any Nutrition Program's in your Locality.
- a) Yes b) No
- If Yes, How for you have adopted in your day to day life.

TABLE XXXI

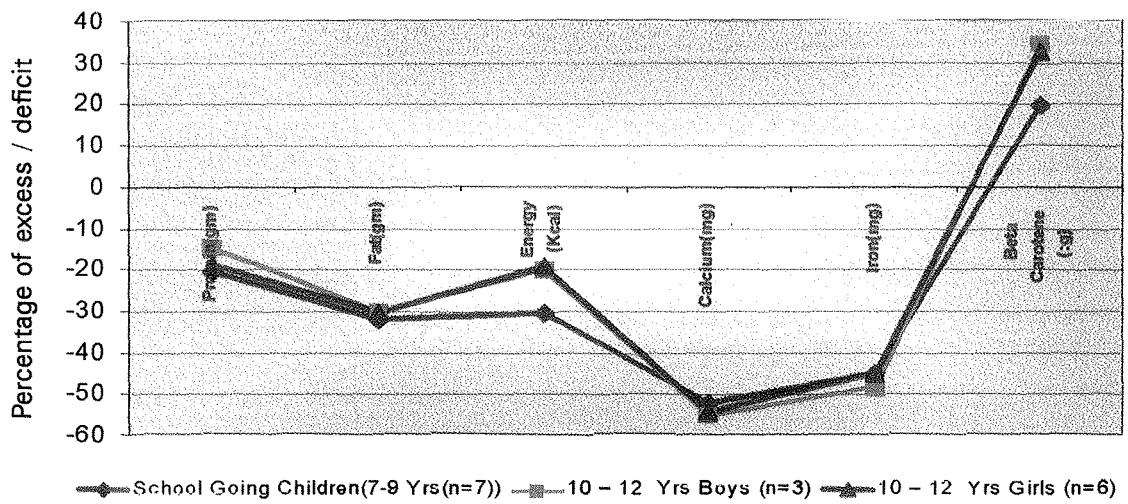
MEAN NUTRIENT INTAKE OF SELECTED TRIBAL FAMILIES

Nutrients	School going children			Adolescents			Adults	
	7 - 9 Yrs Girls (n = 7)	10 - 12 Yrs Boys (n = 3)	10 - 12 Yrs Girls (n = 6)	13 - 15 Yrs Boys (n = 7)	13 - 15 Yrs Girls (n = 3)	16 - 18 Yrs Girls (n = 2)	Male (n = 29)	Female (n = 25)
Protein(gm)								
Actual	32.62±5.06	45.99±6.49	46.24±5.84	60.82±5.14	57.26±0.49	57.05±3.26	49.78±11.03	44.64±2.25
ICMR	41	54	57	70	65	63	60	50
%Excess/deficit	-20.44±5.06	-14.83±6.49	-18.88±5.884	-13.11±5.14	-11.91±0.49	-9.45±3.26	-17.03±11.03	-10.72±2.25
Fat(gm)								
Actual	16.99±4.12	17.47±0.69	15.31±0.64	17.02±3.82	16.52±1.23	18.59±0.36	16.77±2.94	16.09±5.26
ICMR	25	25	22	22	22	22	20	20
%Excess/Deficit	-32.04±4.12	-30.12±0.69	-30.41±0.64	-22.64±3.82	-24.91±1.23	-15.50±0.36	-16.15±2.94	-19.55±5.26
Energy (Kcal)								
Actual	1359.19±96.36	1754.50±7.96	1595.58±41.73	2204.68±103.49	1906.38±224.03	1977.53±8.17	4032.31±470.95	2982.21±621.52
ICMR	1950	2190	1970	2450	2060	2060	3800	2925
%Excess /Deficit	-30.29±96.36	-19.89±7.96	-19.01±41.73	-10.01±103.49	-7.46±224.03	-4±8.17	6.11±470.95	1.95±621.52
Calcium(mg)								
Actual	191.54±10.54	180.12±41.78	273.97±20.66	300.33±26.34	310.23±35.30	291.72±54	342.77±80.07	329.62±57.09
ICMR	400	400	600	600	600	500	400	400
%Excess/Deficit	-52.12±10.54	-54.97±41.78	-54.34±20.66	-49.95±26.34	-48.29±35.30	-41.66±54	-14.34±80.07	-17.59±57.09
Iron(mg)								
Actual	14.32±2.29	13.52±4.58	18.68±1.03	11.76±1.71	25.62±1.58	21.91±0.08	22.54±7.75	22.49±2.56
ICMR	26	26	34	19	41	30	28	30
%Excess/Deficit	-44.92±2.29	-48±4.58	-45.06±1.03	-38.11±1.71	-37.51±1.58	-26.77±0.08	-19.5±7.75	-25.03±2.56
BetaCarotene(µg)								
Actual	2870.94±475.23	3223.86±391.74	3178.11±348.24	3206.99±654.47	2893.41±585.09	3076.53±155.17	2666.69±727.12	2935.63±2076.75
ICMR	2400	2400	2400	2400	2400	2400	2400	2400
%Excess/Deficit	19.62±475.23	34.33±391.74	32.42±348.24	39.58±654.47	34.45±585.09	28.19±155.17	11.11±727.12	22.32±2076.775

The energy intake of all the members from the selected families were lesser than the RDA except adult males and adult females, there was a slight increase in the energy intake. There were substantial differences in the food and nutrient and nutritional status between tribal populations living in different states (NNMB, 2000). The cereal consumption was found to be greater than respective RDA (Chandrasekhar et al, 1997).

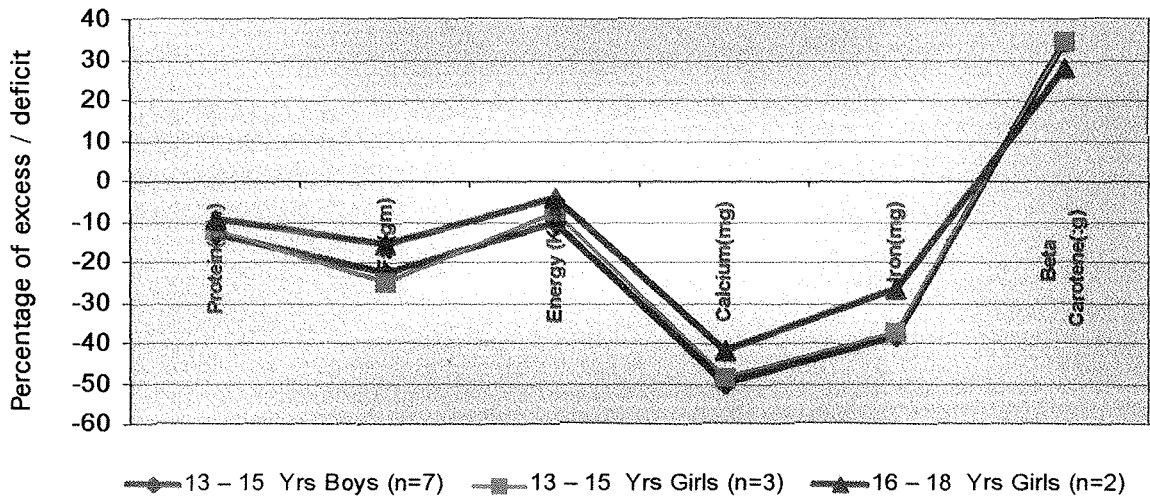
Samai, which was once the staple food of Malayalis, is no more used by them. They transferred their staple food from samai to rice, for easy processing of it and to save time. They started consuming rice. They usually take two or three meals in a day. The intake of other foods such as pulses, green leafy vegetables, oils and fats, fleshy foods, milk and milk products and sugar and jaggery were less by both male and females. Similar findings were reported by Gopalan (1984). All the subjects had deficit in the intake of protein and the contribution of protein was mainly by cereals. They usually take rasam instead of sambar usually red gram dhal.

The intake of iron and calcium were found to be low. Similar findings were reported by Gopaldas (1987). Clinical examinations of the Malayalis showed that anaemia were prevalent among them. Mostly the Malayalis consumed the cereal-based diet and invisible fat contained in grains and vegetables contributed to dietary fat. Lee-kim (2003) stated that fast urbanization and westernization in Asian countries have a significant influence on fat nutrition in Asian population. A high incidence of malnutrition was observed (Ali, 1980, Basu *et al* 1990) also reported the same. An increase intake of beta-carotene was found among the Malayalis, this is due to intake of mango and papaya consumption among these populations. The tribal population is more under nourished than their rural counterparts (Tenth Five Year Plan, 2002 - 2007).



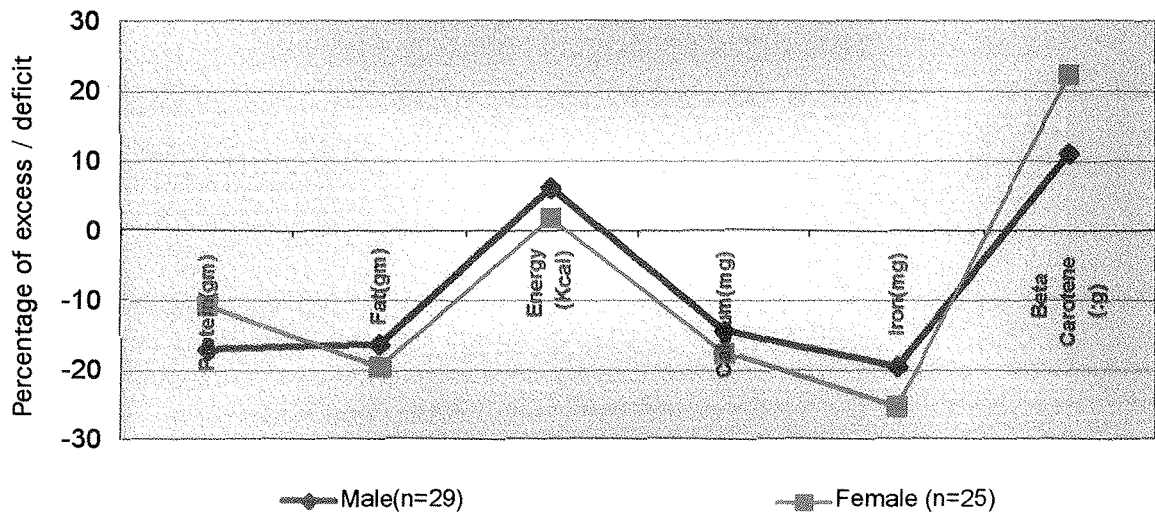
MEAN NUTRIENT INTAKE OF SELECTED TRIBAL FAMILIES – SCHOOL GOING CHILDREN

FIGURE 12 a



MEAN NUTRIENT INTAKE OF SELECTED TRIBAL FAMILIES – ADOLESCENTS

FIGURE 12 b



MEAN NUTRIENT INTAKE OF SELECTED TRIBAL FAMILIES – ADULTS

FIGURE 12 c

4. Prevalence of Clinical signs and symptoms among the members of the selected tribal families

Table XXXII and Plate 11a, 11b, 11c and 11d reveal the clinical signs and symptoms prevalent among the members of the selected tribal families.

TABLE XXXII
PREVALENCE OF CLINICAL SIGNS AND SYMPTOMS AMONG
THE MEMBERS OF THE SELECTED TRIBAL FAMILIES

Diseases in %	School going children	Adolescents	Adult Male	Adult Female
Vitamin A deficiency	—	4.3	1.8	1.9
Diabetes	—	—	1.8	1.9
Angular Stomatitis	7	—	1.8	1.9
Urinary Problem	—	—	8.9	5.7
Tuberculosis	—	—	3.6	—
Bone joint pain	—	—	—	7.7
Skin Diseases	17.5	26.1	21.4	25.0
Scabies	30.0	30.4	16.1	13.5
Dental Caries	35.0	39.1	44.6	42.3

Almost all of them have dental caries, due to improper caring of teeth. 4.3 per cent of the adolescents, 1.8 per cent of the adult males and 1.9 per cent of the adult female have vitamin A deficiency (Plate 11b). Among the adults most of the respondents have the habit of chewing betal leaves. The Malayalis usually use "Unni Sticks" rather than neem sticks to brush their



PLATE 11a
CLINICAL EXAMINATION



PLATE 11b
KERATOMALACIA



PLATE 11c
CLINICAL EXAMINATION SHOWING SCABIES



PLATE 11d
CLINICAL EXAMINATION SHOWING SCABIES

teeth. Next to dental caries, scabies is more prevalent among the tribal population due to unhygienic health habits (Plate 11c and 11d). Skin diseases were also more prevalent among the tribals due to improper hygiene and sanitation. 7.5 per cent of the women population had bone joint pain. A very few per cent of the others are diabetic.

5. Biochemical profile of selected family members

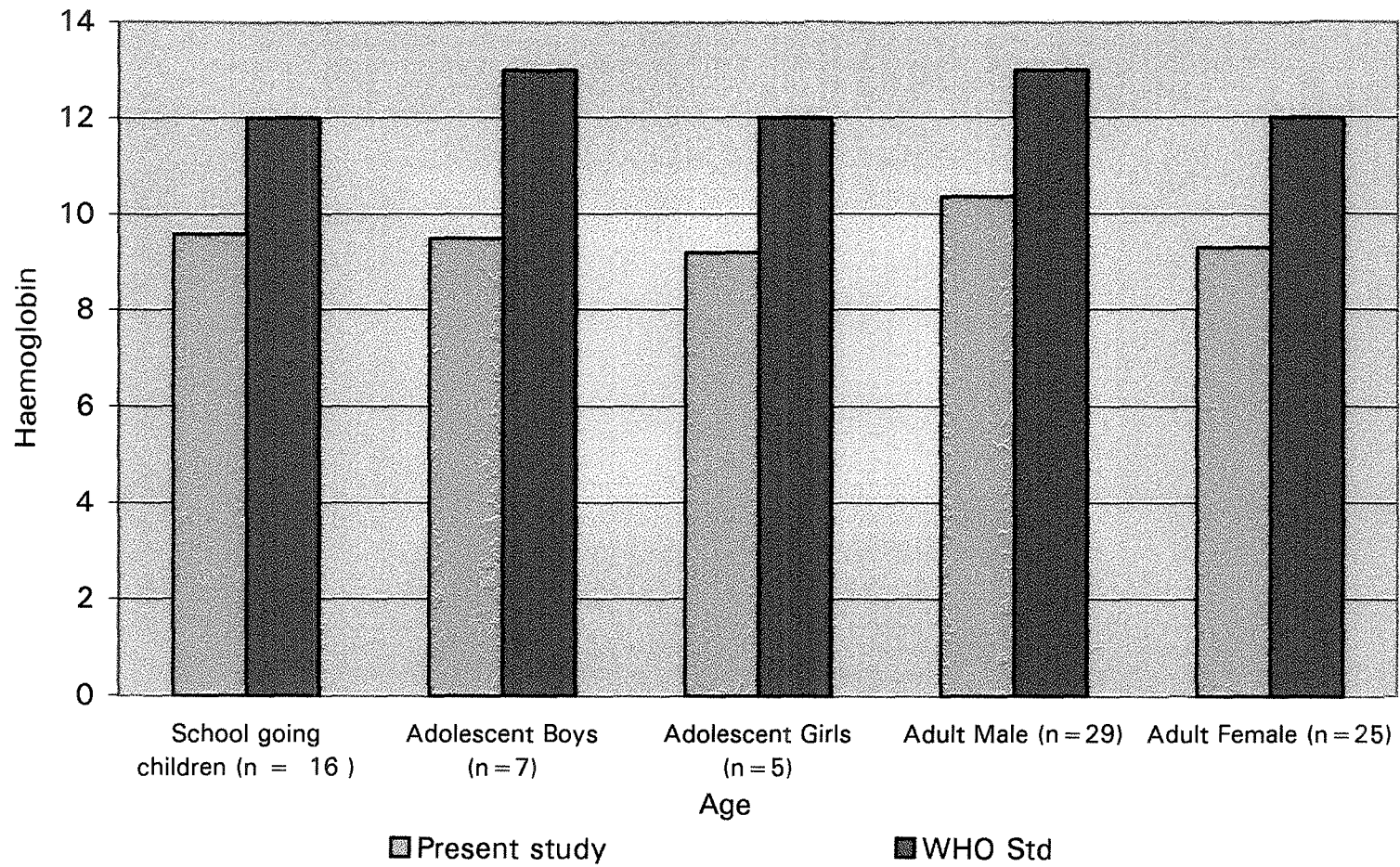
i) Haemoglobin level of selected tribal families

Table XXXIII and Figure 13 shows the mean haemoglobin level of selected tribal families.

TABLE XXXIII
MEAN HAEMOGLOBIN LEVEL OF SELECTED TRIBAL FAMILIES

Age (in years)	Haemoglobin Level (gm/dl)		
	Present study	WHO Standard*	% deficit
School going children (n = 16)	9.59 ± 1.1	12	- 20.08 ± 1.1
Adolescent Boys (n = 7)	9.50 ± 1.0	13	-26.92 ± 1.0
Adolescent Girls (n = 5)	9.2 ± 1.1	12	-23.33 ± 1.1
Adult Male (n = 29)	10.36 ± 1.5	13	-20.31 ± 1.5
Adult Female (n = 25)	9.3 ± 1.1	12	-22.5 ± 1.1

* - WHO standard, 1998



MEAN HAEMOGLOBIN LEVEL OF SELECTED TRIBAL FAMILIES
FIGURE 13

Iron deficiency is the most common nutritional disorder in the world. The numbers are staggering: as many as four to five billion people, 66 to 80 per cent of the world's population, may be iron deficient; two billion people-over 30 per cent of the world's population are anaemic, mainly due to iron-deficiency, and in developing countries, frequently exacerbated by Malaria and worm infections (Sebastian, 2003).

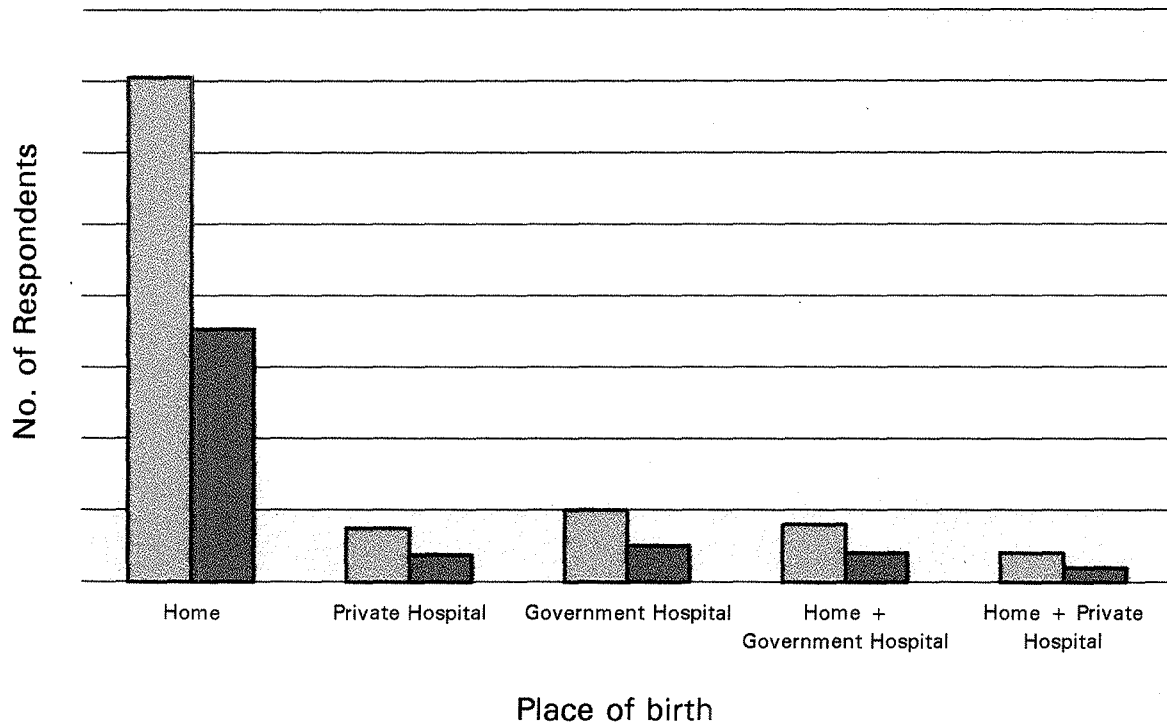
All the age groups had their haemoglobin level lower than the standard. This indicated the increased prevalence of anaemia, due to inadequate intake of iron rich foods. Nutrition anaemia was a major problem for women in India and more so in the rural and tribal belt (U.N., 1984). It is said that in developing countries, majority of women are suffering from malnutrition / nutritional anaemia. This state of affairs provides their body a fertile land for all sorts of diseases (Prema, 1992).

6. Mode of Delivery

Table XXXIV and Figure 14 reveals the mode of delivery of the tribal women.

TABLE XXXIV
MODE OF DELIVERY

Mode of Delivery	No. of respondents	Total
Home	141	70.5
Private Hospital	15	7.5
Government Hospital	20	10.0
Home + Government Hospital	16	8.0
Home + Private Hospital	8	4.0
Total	200	100



MODE OF DELIVERY

FIGURE 14

Normally the tribal women opt for home delivery. Only when complications are suspected they get themselves admitted in private or government hospitals. The elderly women at home help the mothers during delivery time. Mothers delivering do not complain or regret to deliver children at home, as they do not consider childbirth as a medical risk. They even work till the day of delivery in their farms. They feel that it is quite a natural phenomenon for which no medical or technical care is needed.

The majority of the respondents (70.5 %) state that home delivery was very common among them. They also state that whenever they feel that the delivery is difficult they use a sacred stick, which carry inscriptions on it, to make the delivery easy (Plate 12a and 12b). It was also found that through out the Pachaimalai this stick is found only in one village (Nachilipatti). People borrowed it from this village whenever some one had an intensive labour pain. Generally, the delivery takes place in the houses, the patient being attended by women only. Only ten per cent of the respondents said that they were admitted in the government hospitals for the delivery.

Pre-delivery and Post-delivery care

When the respondents were asked about the pre-delivery care 58 per cent expressed that there is no such care taken by or given to the pregnant mothers, while 42 per cent said that they do follow certain practices before delivery. They take nutritious food like green leafy vegetables, meat, egg, and they do not travel much in the hills. In 46 per cent of the respondents families post-delivery care is given to mothers. They consume special kind of dish prepared with more of garlic, pepper, cumin seeds, turmeric, omam in the form of rasam to heal the wound. They eat regularly this along with rice. They consume this dish for at least 15 days to one month after delivery.



PLATE 12a
A SPIRITUAL STICK USED FOR EASY
CONDUCTION OF DELIVERY



PLATE 12b
SPIRITUAL STICK SHOWING INSCRIPTIONS

They believe that it heals the wound quickly and gives strength to their hip and joints. The respondents said that special foods like dry fish, garlic and meat are given to lactating mothers to increase the milk secretion. The rest of them (54%) hardly give any special food.

It was also found that during the study that, the pregnant women after their delivery at home were taken to a place away from their residential area, and were bathed by their relatives.

Personal Habits

When enquired about the personal habits, it was found that majority of the respondents have some undesirable habits. In the study 201 person (61 %) have smoking and drinking habits. Most of the respondents family members (78.59%) have the habit of chewing betal leaves.

Hygiene and Sanitation

Personal hygiene and sanitation are the contributing factors for ones health status. Though the environment seems to be attractive and natural, when personal hygiene is concerned, it was not upto the mark. In most of the places, sewage water is being stagnated in front of the houses (Plate 13).

Majority of the respondents (86.5%) said that they take bath once in two days and only 13.5 per cent take bath regularly. Most of the respondents (45.6%) said that they would wash their clothes daily.

30.2 per cent wash their clothes once in three days and 24.2 per cent reported once in a week due to water scarcity. Majority of



PLATE 13
STAGNATION OF SEWAGE WATER IN FRONT
OF THE HOUSES

the respondents (89 %) use bar soap while 11 per cent of the respondents hardly use any soap for washing. They just rinse their clothes in water.

Almost all the respondents use open fields for toilets and none of them use soaps after using toilets.

7. Herbal Medicines used by Malayalis

Details were collected regarding the herbs they use in the treatment of various diseases. There are some adults in the hills who know about certain medicinal herbs. The traditional healers (Vaithiyar) have a very good knowledge about the herbs and their medicinal value. But they fear to give the names of the herbs for the reason that it may not heal if they deliver or reveal the nature of it. Some of the herbs and its utility value, of which they use at the initial stages of the health problem or occasionally is displayed in Plate 14a, b, c and d showing herbs namely, Mukkonapattai, Avalipattai, Alingipattai and Molavarnapattai used in the treatment of diseases.

TABLE XXXV

HERBS USED FOR TREATMENT OF VARIOUS DISEASES

S.no	Diseases	Name of the plants and mode of consumptio
01.	Stomach Pain	Grind Mukkonapattai and mix it with water and should be consumed in empty stomach.
02.	Stomach pain (Untolerable)	Grind Avalipattai and
03.	Dysentery	Dry powder of Ilaikadukkai with milk.
04.	Continuous stomach pain	Panjai and Nallanai leaves - Grind and consume with milk or water.
05.	Fever for infants upto three months	Sirumavali leaves, yetti seed and kanangi leaves have to be worn as a chain to the infant.
06.	Fever for small children	Grind the barks of Avalitree and drink it with milk or water.
07.	Over bleeding during mensuration	Barks of Nava tree and Aami tree - Grind with water and consume two times a day.
08.	Jaundice	Kizhanaelli and Odavalli leaves - juice and dink.
09.	Snake bit	a. Barks of Alingipattai tree should be ground and given to the patient. b. Barks of Molavarma plant can also given.
10.	Snake bite and stomach pain	Barks of Mukkona tree - Powder and drink with water.
11.	Wounds and cuts	Sithuruvayan thalai - Crush and should be kept at the site of cut.



PLATE 14a
MUKKONAPATTAI



PLATE 14b
AVALIPATTAI



PLATE 14c
ALINGIPATTAI



PLATE 14d
MOLAVARNAPATTAI

E. NUTRITIONAL KNOWLEDGE, ATTITUDE AND PRACTICES (KAP) OF THE WOMEN IN THE SELECTED TRIBAL FAMILIES

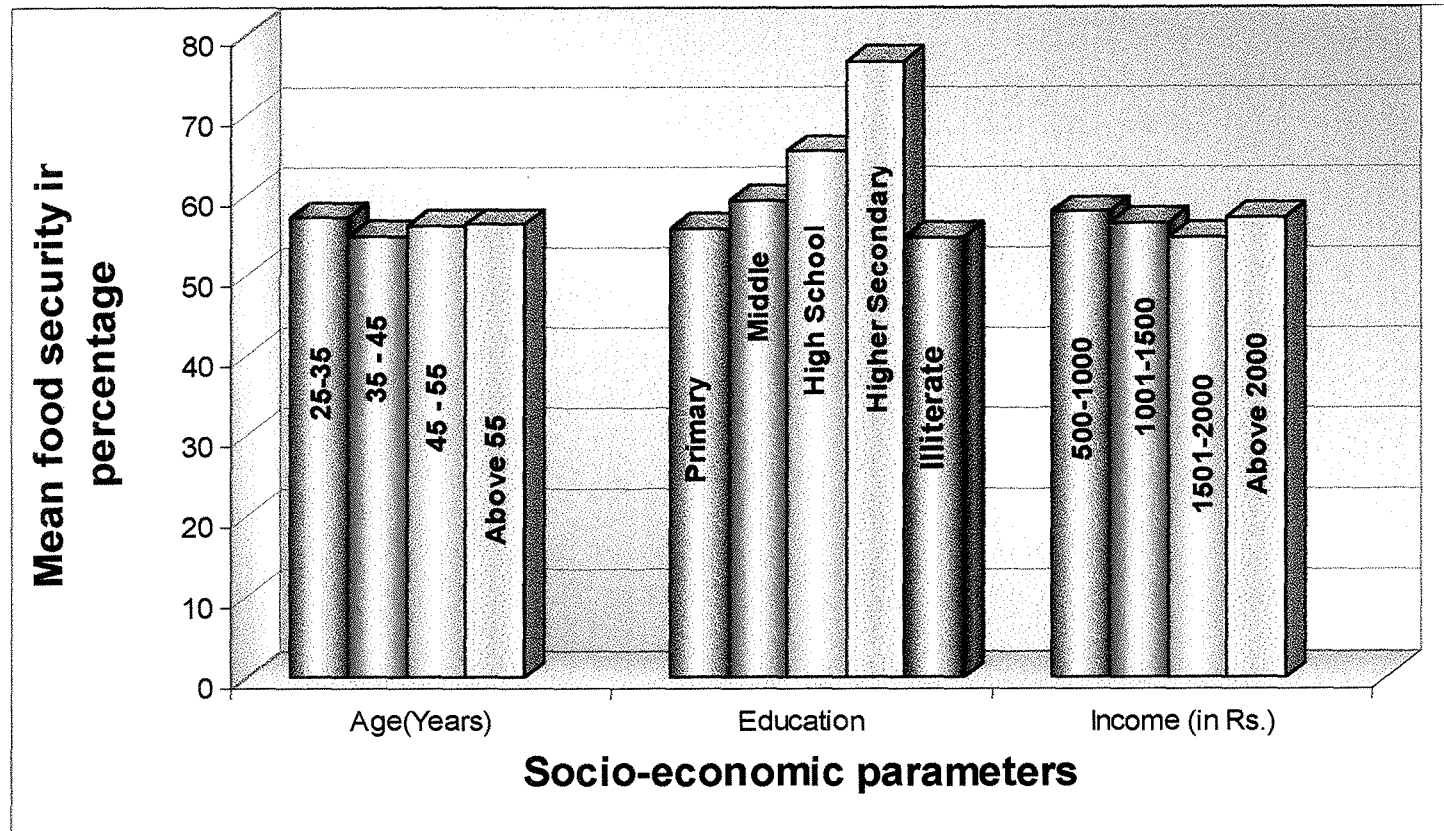
Mean KAP score of the women from the selected families based on the socio-economic parameters such as age, education and income are shown in Table XXXVI and Figure 15.

**TABLE XXXVI
MEAN KAP SCORE OF THE RESPONDENTS**

Socio-economic parameters	KAP Score (mean)	'F' value
Age (years) 25 - 35 (n = 125) 35 - 45(n = 60) 45 - 55 (n = 12) Above 55 (n = 3)	57.23± 4.90 54.93±3.50 56.17±4.60 56.33±4.00	3.529*
Education Primary (n = 71) Middle (n = 28) High school (n = 4) Higher Secondary (n = 5) Illiterate (n = 92)	55.79±1.9 59.21±2.70 65.50±1.00 76.60±2.70 54.69±3.20	99.897**
Income (in Rs.) 500 - 1000 (n = 51) 1001 - 1500 (n = 81) 1501 - 2000 (n = 42) Above 2000 (n = 26)	57.78±3.50 56.38±4.80 54.71±4.10 57.08±6.10	3.659**

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

It was observed that the age of the respondents had an influence on KAP score with maximum score for those aged between 25 – 35 years the result was statistically significant. In a similar manner, women with highest status and those belonging to income group above Rs.2000/- had a statistically



MEAN KAP SCORE OF THE SELECTED TRIBAL WOMEN

FIGURE 15

significant maximum score on KAP. Moreover village health nurses make frequent visits to these tribal areas and educated them on nutrition. Therefore, the socio-economic factors such as age, educational status and income group of women had impact on their Knowledge, Attitude and Practices related to food and nutrition. Devadas (2002) emphasized that all these factors regarding women influence the food and nutrition security of each household.

From the present study, it can be concluded that better economic and educational status with proper amenities assures food and nutritional security.

SUMMARY AND CONCLUSION

V. SUMMARY AND CONCLUSION

A study was conducted on **“Nutritional Status, Knowledge, Attitude, Practices and Food Security Profile of Selected Tribal Families of Pachaimalai”**. Household food security was assessed by eliciting information on Socio-economic background, food consumption pattern and practices of the selected families (200 families – belonging to four ranges of income) using a suitable questionnaire and food security level was calculated by giving scores to the quantitative and qualitative aspects of food security. Ten per cent of these families (20 families) were later assessed for their nutritional status through anthropometric measurements, three-day weightment dietary survey, clinical examinations and biochemical assessment of the family members. The nutritional Knowledge, Attitude and Practices of the women of the 200 selected families were also assessed using a questionnaire. The findings of the study are summarized as follows:

The socio-economic data revealed that majority of the families (73%) were of nuclear families and the remaining (27%) were joint families.

Fifty five per cent of the families had members ranging from five to eight, while 44.5 per cent of the families had one to four members and only 0.5 per cent of the families had nine members, with majority of them (54.27%) being males.

The surveyed population, adult comprised a major portion of these families (53.95%), with only 0.58 per cent of them are graduates.

The major source of income, for the four ranges of income families was from agriculture, with only 0.6 per cent of them being government employees.

Majority of them (40.5%) had income range between Rs.1001/- to Rs.1500/- per month and 13 per cent of them had income ranging above Rs.2000/-.

It was observed that 46.5 per cent of the total population were holding less than one hectare of land and only 1.5 per cent of them possessed more than four hectares of land. Majority of the families (97.5%) from all the four ranges of income were non-vegetarians.

Almost all the respondents consumed cereals (Rice) daily. Only a very few of the respondents from the income range of Rs.1501/- and above Rs.2000/- consumed milk daily.

It was observed that only respondents of income ranged from Rs.1001/- to Rs.2000/- and above spent above Rs.40/- for pulses, due to the increase in family size. Almost all the families used the method of boiling for cooking.

Maximum percentages of the families from the income range of Rs.1501/- to Rs.2000/- were found to be low food insecure. Families belonging to the income range of Rs.500/- to Rs.1500/- were highly food insecure.

Majority of the respondents (132) stored paddy in a storage bin called 'Kuruthu', upto 2100 kilograms.

The mean weight of both, men and women, were less than that of standard values. Both, men and women had an equal range of BMI. The proportion of low weight condition was 48.28 per cent in males and 24 per cent in females.

The intake of energy, protein, fat, calcium, iron of all the members from the selected families were less compared to RDA (ICMR 2000). Intake of beta-carotene was found to be excess in all the age groups compared to RDA (ICMR 2000).

All the age groups had their haemoglobin levels less than the standard, indicating an increased prevalence of anaemia. With regard to clinical examination, almost all of them had dental caries, skin diseases.

It was observed that almost all the families preferred to purchase food from PDS shops.

Irrespective of sex, school children were shorter than the standard values suggested by NCHS.

Among the school going children assessed for their nutritional status, the height of girls (7 – 9 yrs), (10 – 12 yrs) boys and girls, were less when compared to ICMR standard. The deficit for weight was more in girls in both the age groups 7 – 9 years and 10 – 12 years, when compared to their counterparts in opposite sex, indicating that there is prevalence of chronic energy deficit among girls.

The mean height and weight of the adolescent boys and girls of the selected families were shorter and heavier respectively compared to the standard values.

The tribal women mostly opt for home delivery only. Only ten per cent of the respondents said that they were admitted in the government hospitals for the delivery. It was observed that the pregnant women after

their delivery at home were taken to a place away from their residential area and were bathed by their relatives.

With regard to personal habits, 61 per cent of the men had the habit of smoking and drinking. Majority of the respondents (86.5%) take bath once in two days. 45.6 per cent of the respondents washed their clothes daily.

The mean KAP score of the women of the selected families showed that age of the respondents had an influence on KAP score with maximum score for those aged between 25 – 35 years, the result was statistically significant. Similarly, women with the highest educational status (Higher Secondary) and those belonging to income group above Rs.2000/- had a statistically significant maximum score on KAP.

A holistic view of the salient findings indicated that the household food security level of the four ranges of income and the overall nutritional status of selected tribal families were not satisfactory.

The recommendations for future research are that

- ❖ Studies on household food security and nutritional status has to be undertaken on a large number of samples
- ❖ Studies on effect of nutrition education and intervention programmes on nutrition and food security could be carried out
- ❖ Awareness regarding health facilities among the tribes could be created with the help of both, government and voluntary organizations.

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APPENDICES

APPENDIX I

**INTERVIEW SCHEDULE TO ASSESS FOOD SECURITY PROFILE OF THE
SELECTED TRIBAL FAMILIES**

1. SOCIO-ECONOMIC BACKGROUND

- a) Name of the head of the family :
 - b) Door No :
 - c) Address :
 - d) Income of the head of the family :
 - e) Composition of the family :
 - f) Type of the family : Joint Nuclear
 - g) Vegetarian / Non vegetarian :
 - h) Ova-vegetarian :
2. Particulars of the family

S.No	Name of member	Relation to the head of the family	Marital status	Age	Education	Occupation	Income per month

- b) **Other sources of income:** Rs.
- Business earning
 - Receipts from properties
 - Land
 - Building
 - Income from investments
 - Allowances from parents / in laws
 - Other earning _____
 - Total family income _____

3. **Details regarding monthly family expenditure pattern**

a) Expenditure on food production:

Types	Total expenses / year
Fertilizers	
Manures	
Labour	
Technical device	
Insecticides	
Pesticides	
Miscellaneous	

b) Expenditure on other things

Items	Rupees spent / month
Food	
Clothing	
House rent / taxes	
Education	
Medicine	
Fuel	
Recreation	
Transport	
Other	

c) Details regarding debts and savings

Debts

Source of debt	Amount	Purpose	Mode of repayment
Bank loans			
Neighbors			
Friends			
Relatives			
Others			

Mode of savings	Amount	Reasons for saving
Hundi		
Post office		
Bank account Others		

4. What is the basis for meal planning?

Money available

Preferences of family members

Total family requirements

Any other

5. Do you plan the household budget?

Yes No

If yes, is it

Daily Weekly Monthly

a) Details of food expenditure

Foods	Amounts consumed			Expenditure per month
	Daily	Weekly	Monthly	
<u>Cereals</u>				
Rice				
Ragi				
Samai				
Wheat				
<u>Pulses & Legumes</u>				
Bengal gram dhal				
Black gram dhal				
Green gram dhal				
Cow pea				
Red gram dhal				
<u>Leafy vegetables</u>				
Amaranth				
Coriander leaves				
Kuppameni				
Manathakkali leaves				
Modakathan keerai				
<u>Roots and tubers</u>				
Beet root				
Carrot				
Colocasia				

Mango ginger				
Onion				
Radish				
Sweet potato				
Topioca				
Yam				
<u>Other vegetables</u>				
Bottle gourd				
Brinjal				
Broad beans				
Drumstick				
Kovai				
Ladies finger				
Mango, green				
Plantain flower				
Plantain stem				
Pumpkin fruits				
<u>Nuts and oil seeds</u>				
Coconut				
Almond				
Cashewntu				
Gingelly seeds				
Ground nut				
<u>Condiments & Spices</u>				
Chillies green				
Chillies dry				
Cardamom				
Asafoetida				
Fenugreek seeds				
Garlic				
Ginger				
Turmeric				
Pepper				
<u>Fruits</u>				

Amla				
Banana				
Dates (dried)				
Guava				
Korukkapalli				
Lemon				
Sweet lime				
Orange				
Papaya, ripe				
Pine apple				
Pomegranate				
Saptoa				
Jack fruit				
<u>Meat and poultry</u>				
Beef				
Duck				
Egg, (duck)				
Egg, (hen)				
Goat meat				
Pork				
<u>Milk and milk product</u>				
Milk ass's				
Milk buffalo's				
Milk cow's				
Milk goat's				
Curd				
Butter milk				
<u>Fats and edible oils</u>				
Ghee				
Vanaspathi				
Cooking oil				
<u>Sugars</u>				
Honey				
Jaggery (cane)				

b) Consumption of food groups

Food groups	How frequently it is consumed	Is there period of insufficiency of these foods	How long does this period exist
<p><u>Cereals</u></p> <p>Rice</p> <p>Ragi</p> <p>Samai</p> <p>Wheat</p> <p><u>Pulses & Legumes</u></p> <p>Bengal gram dhal</p> <p>Black gram dhal</p> <p>Green gram dhal</p> <p>Cow pea</p> <p>Red gram dhal</p> <p><u>Leafy vegetables</u></p> <p>Amaranth</p> <p>Coriander leaves</p> <p>Kuppameni</p> <p>Manathakkali leaves</p> <p>Modakathan keerai</p> <p>Drumstick leaves</p> <p><u>Roots and tubers</u></p> <p>Beet root</p> <p>Carrot</p> <p>Colocasia</p> <p>Mango ginger</p> <p>Onion</p> <p>Radish</p> <p>Sweet potato</p> <p>Topioca</p> <p>Yam</p> <p><u>Other vegetables</u></p> <p>Bottle gourd</p>			

Brinjal			
Broad beans			
Drumstick			
Kovai			
Ladies finger			
Mango, green			
Plantain flower			
Plantain stem			
Pumpkin fruits			
<u>Nuts and oil seeds</u>			
Coconut			
Almond			
Cashewnut			
Gingelly seeds			
Ground nut			
<u>Condiments & Spices</u>			
Chillies green			
Chillies dry			
Cardamom			
Asafoetida			
Fenugreek seeds			
Garlic			
Ginger			
Turmeric			
Pepper			
<u>Fruits</u>			
Amla			
Banana			
Dates (dried)			
Guava			
Korukkapalli			
Lemon			
Sweet lime			
Orange			

Papaya, ripe Pine apple Pomegranate Sapota Jack fruit <u>Meat and poultry</u> Beef Duck Egg, (duck) Egg, (hen) Goat meat Pork <u>Milk and milk product</u> Milk ass's Milk buffalo's Milk cow's Milk goat's Curd Butter milk <u>Fats and edible oils</u> Ghee Vanaspathi Cooking oil <u>Sugars</u> Honey Jaggery (cane)			
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6. Do you hold land?

Yes

No

If yes,

Irrigated land or non-irrigated land

If irrigated land,

a) Size of the irrigated land (ha)

≤ 2 ha

2.01 to 4 ha

≥ 4.01 ha

b) Cropping and farm production

Crops grown	Area (ha)	Production (q)	Income	Utilization	
				Home (q)	Sale (q)
<u>Cereals</u>					
<u>Pulses & Legumes</u>					
<u>Leafy vegetables</u>					
<u>Roots and tubers</u>					
<u>Other vegetables</u>					
<u>Nuts and oil seeds</u>					

<u>Condiments & Spices</u>					
<u>Fruits</u>					

7. Food produced at home

Types of foods	Amount produced / month	Use of produce		Total income
		By the family	By sale	
<u>Kitchen gardening</u>				
Vegetables				
Fruits				
Others				
<u>Poultry and Dairying</u>				
Milk				
Egg				
Others				
<u>Livestock rearing</u>				
Piggery				
Goat				
Duckery				
Others				

c. Do you use any indigenous practices for grain storage?

Yes No

If yes, mention them and reason why?

Indigenous practices	Reasons

11. Method of cooking

Food items	Boiling	Steaming	Frying		Stewing or roasting	Other
			Shallow fat	Deep fat		
Cereals						
Pulses						
Greens						
Vegetables						
Eggs						
Meat						
Fish						
Others						

12. Foods preserved

Food	Methods of preservation	Period over which preserved	Problems encountered	Preserved food purchased for outside

APPENDIX II

EVALUATION SCHEDULE ON NUTRITIONAL KNOWLEDGE ATTITUDE AND PRACTICES OF SELECTED TRIBAL FAMILIES

Knowledge

1. Important Functions Of Food
 - a. Energy Body Building and Protective
 - b. Energy to Carry out the Work
 - c. Energy to Walk
 - d. Do not Know
2. Energy Providing Foods
 - a. Whole Grain
 - b. Meat
 - c. Milk
 - d. Do Not Know
3. Any Three Sources Of Energy
 - a. Cereals, Fats, Sugar
 - b. Pulses, Milk and Milk Products
 - c. Fruits , Vegetables and Roots and Tubers
 - d. Do not Know
4. Low Intake Of Food Throughout Life
 - a. Impairs Growth and Development
 - b. Improve body Size
 - c. Improve Working Efficiency
 - d. Do Not Know
5. Which among the following builds your body?
 - a. Pulses
 - b. Ghee
 - c. Rice
 - d. Do not know
6. Which among the foods are Protein rich foods?
 - a. Meat, Fish and Egg
 - b. Rice, Ragi and Wheat
 - c. Leafy Vegetables and Fruit
 - d. Do not Know

7. Which type of oil is good for health?
 - a. Gingeley oil
 - b. Coconut Oil
 - c. Castor Oil
 - d. Do not Know
8. Which among the following foods are Protective in nature?
 - a. Fruits and vegetables
 - b. Meat
 - c. Honey
 - d. Do not Know
9. Three foods required for growth
 - a. Pulses, animal foods, Nuts and oil seeds
 - b. Fruits, Cereals, Milk
 - c. Cereals, fats and Vegetables
 - d. Do not Know
10. What does Vegetables Contain ?
 - a. Vitamins and Minerals
 - b. Fat
 - c. Do not Know
11. Green Leafy vegetables are rich sources of
 - a. Minerals, vitamins and fibre
 - b. Carbohydrate
 - c. Protein
 - d. Do not Know
12. Is it essential to consume vegetables daily?
 - a. Yes
 - b. No
13. Which among the following is rich in roots and tubers ?
 - a. Carbohydrates
 - b. Proteins
 - c. Fats
 - d. Do not Know
14. Which among the following foods can prevent bleeding gums ?
 - a. Amla and Guava
 - b. Meat and Fish
 - c. Dry grains
 - d. Do not Know

15. Which food is required for good eye sight ?
- Carrot, Papaya, Greens
 - Rice, Wheat, Ragi
 - Sugar, Nuts and Oilseeds
 - Do not Know
16. Which of the following foods is required for bones ?
- Milk
 - Wheat
 - Vegetables
 - Do not Know
17. Which of the following foods are essential for the formation of blood ?
- Green leafy vegetables
 - Milk
 - Cereals
 - Do not Know
18. Which among the following foods is rich in iron ?
- Rice flakes
 - Coconut
 - Vegetables
 - Do not Know
19. Anaemia is caused due to the deficiency of
- Iron
 - Protein
 - Vitamin A
 - Do not Know
20. Which among the following is a symptom of anaemia?
- Tiredness
 - Bleeding gums
 - Fever
 - Do not Know
21. Which among the following is rich in fibre?
- Whole grain and greens
 - Sugar and Jaggery
 - Sweets and biscuits
 - Do not Know

22. Which of the following will result , if the diet is deficit of fibre ?
- Constipation
 - Diarrhoea
 - Vomiting
 - Do not Know
23. Ragi is rich in
- Calcium and energy
 - Vitamin C
 - Vitamin A
 - Do Not Know
24. Foods for treatment of diarrhoea
- Salt, Sugar Solution
 - Coffee/Tea
 - Ragi ,Kool
 - Soda
25. Nutrient deficiency diseases means
- Condition due to deficiency in nutrients
 - Communicable diseases
 - Allergy
 - Do not Know
26. Balanced diet is needed to
- Maintain health
 - Cure diseases
 - Grow fast
 - Do not Know
27. Reasons for food borne diseases is due to
- Improper processing
 - Keeping foods covered
 - Inhibition of bacterial growth
 - Do not Know
28. The pulses and cereals intake of the expectant woman
- Should be increased
 - Should be decreased
 - Do not Know

29. Usual weight gain during pregnancy is
- 10-12 kg
 - 8-10 kg
 - 6-8 kg
 - Do not Know
30. Frequent alcohol consumption will lead to
- Liver damage
 - Brain damage
 - Fever
 - Do not Know

Attitude

- Which among the following foods are considered as hot foods ?
 - Chicken
 - Curd
 - Fruits
 - Do not Know
- Which of the following foods are considered as cold foods?
 - Milk
 - Mango
 - Chicken
 - Do not Know
- Which among the following foods are gas producer?
 - Pulses
 - Milk
 - Fruits
 - Do not Know
- Do you Consume sprouted pulses?
 - Yes
 - NoIf yes, how do you consume?
 - Raw
 - Boiled
 - Fried
 - Steamed
- Papaya is not consumed during initial stage of pregnancy?
 - It may lead to abortion
 - Foetus grows big in size
 - Causes allergy
 - Do not Know

If yes, which among the following foods do you give

- a. Mashed dhal rice
- b. Mashed greens
- c. Mashed vegetables
- d. All the above

If no, the reason is

- a. It is too early to start
- b. The infant can't digest
- c. It may choke

13. Colostrum is

- a. Rich in Nutrients
- b. Impure
- c. Toxic
- d. Do not Know

14. Immunisation is essential for new borns ,because

- a. To fight against Infection
- b. To grow Fast
- c. Do not Know

15. One of the reasons for maternal deaths is

- a. Severe anaemia
- b. Late marriage and pregnancy
- c. Lack Of Exercise
- d. Do not Know

16. Which type of rice is good for health ?

- a. Raw hand pounded
- b. Parboiled
- c. Raw milled
- d. Do not Know

17. Which of the following foods are low cost nutritious foods?

- a. Greens
- b. Cashewnuts
- c. Wheat
- d. Soyabean

18. Foods having pungent odour
- Cabbage, garlic
 - Rice, beans
 - Milk, butter
 - Do not know
19. Banana helps in
- Relieving Constipation
 - Causing diarrhoea
 - Causing fever
 - Do not Know
20. Which among the following could a diabetic consume?
- Sprouted grams
 - Mango Juice
 - Jack Fruit
 - Do not Know
21. Fried foods should be avoided during
- Jaundice
 - Under Weight
 - Vitamin A Deficiency
 - Do not Know
22. Which among the following foods could be given to a ulcer patient ?
- Milk
 - Coffee/Tea
 - Soda
 - Do Not Know
23. Which among the following foods you think can be given during fever?
- Rice Kanji
 - Ragi Roti
 - Egg
 - Do Not Know
24. Diet deficit of green leafy vegetables and yellow fruits and vegetables leads to
- Night blindness
 - Jaundice
 - Constipation
 - Do not Know

25. Excess Consumption of Sweets will
- Decay the teeth
 - Makes the teeth stronger
 - Provides energy
 - Do not Know
26. Chewing beetle leaves causes
- Mouth Cancer
 - Obesity
 - Lung Disorder
 - Do not Know
27. Which among the following is the property of turmeric ?
- Anti-inflammatory
 - Hemorrhage
 - Toxic
 - Do not Know
28. Use of pressure cooker
- Minimizes loss of nutrients
 - Maximizes loss of nutrients
 - Neither gain nor loss
 - Do not know
29. Who Should Consume nutritious food in the family ?
- Women
 - Men
 - Adolescents
 - Old age
30. Stagnation of water
- Breeds Mosquitoes
 - Acts as a good manure
 - Increases Hygiene
 - Do not Know

Practice

1. When do you want the Vegetables?
- Before cutting
 - After cutting
 - Both
 - Need not Wash at all

2. How many times do you wash rice?
 - a) 1 time
 - b) 2 times
 - c) 3 times
 - d) > 3 times
3. By which method do you cook rice?
 - a) Pressure Cooking
 - b) Boiling
 - c) Both
4. What do you do with the excess of water after cooking?
 - a) Drained off
 - b) Used in the meal preparation
 - c) Used for animal feeds
5. How do you cut the vegetables?
 - a) Small size
 - b) Medium Size
 - c) Large size
6. Do you have a Kitchen garden in your house?
 - a) Yes
 - b) No

If yes, which among the following do you possess in your kitchen?

 - a) greens
 - b) roots and tubers
 - c) Vegetables
 - d) All the above
7. Soaking the cut vegetables in water for long periods
 - a) enhances nutrient loss
 - b) Prevents nutrient loss
 - c) Neither gain nor loss
 - d) Do not Know
8. How do you cook greens?
 - a) Cooking with the lid
 - b) Cooking without lid
 - c) Pressure Cook

9. How do you consume Vegetables?
- a) Raw
 - b) Cooked
 - c) Both
10. Which among the following foods do you give for lactating women to increase milk secretion.
- a) Garlic
 - b) Vegetables
 - c) Sweets
 - d) Castor Oil
11. Which among the following foods do you give during diarrhea?
- a) Dehydration Therapy
 - b) Fluids
 - c) Soda
 - d) Regular Diet
12. Which among the following do you adopt in storing agricultural commodities?
- a) Tin with a tight lid
 - b) Tin with a Loose Lid
 - c) Gunny bags
 - d) Any Other
13. Do you use cooking soda?
- a) Yes
 - b) No
14. Which among the following method do you practice to prevent nutrient loss?
- a) Steaming
 - b) Boiling
 - c) Frying
 - d) Roasting
15. What do you do to determine the quality of egg on purchase?
- a) Floating
 - b) Sinking
 - c) Color Change
 - d) Do not Know
16. To whom do you give more importance in the Family?
- a) Women
 - b) Men
 - c) Children
 - d) Old People

17. Do you give any special foods during Special Conditions?

- a) Yes b) No

If Yes,

Condition	Foods Avoided	Foods Included	Reason
Infancy			
Pre Schools			
Adolescence			
Pregnancy			
Lactation			

18. Do you give any special foods during disease conditions?

- a) Yes b) No

If Yes,

Condition	Foods Avoided	Foods Included	Reason
Fever Diarrhea Jaundice Piles Constipation			

19. Which among the following foods do you preserve at home ?

- a) Mango
b) Lemon
c) Fish
d) Meat

20. Which among the following foods do you consume to relieve cold ?

- a) Pepper
b) Garlic
c) Cummin Seeds
d) Rice Flakes

21. Where do you give birth to your child ?

- a) At Hospital
b) At home
c) Else where

22. By which method do you consume drinking water?

- a) By Boiling
b) Not Boiling