CHAPTER I

A PERSPECTIVE ON THE RESEARCH THEME
CHAPTER I

A PERSPECTIVE ON THE RESEARCH THEME

Introduction

Food and nutrition is the basic need of human existence. At present the most important problems faced by many countries in the world are population explosion, scarcity of resources and poverty imbeddedness. Of all the resources, food resources have the direct relation with the pressure of population. The nature of food resource is the result of the quality and quantity of land, water, soil and climate and which in turn are the basis of agriculture. To feed the growing population nutritionally well, the food production is to be ever increased for which agriculture is to be put on modern and scientific lines and the agricultural land is to be used both intensively and extensively. A true knowledge of current use of agricultural lands, their yield-rates, potential production units and in consequence a true picture of per head per day intake of calories and essential nutrient elements is of paramount importance. There is a need to ascertain the actual nutritional standards of the population and nutritional deficiencies in their ordinary diet, and the consequent diseases among the poverty-ridden rural people. A constant increase of population and low pace of agricultural productivity are responsible for low economic level and poor nutritional standards of the people. Until the food production efficiency of the lands is not raised uniformly through better planning of agricultural land management, the balance between increase in population and the food resources of the country will become more acute every year.

Chronic shortage of food in a large number of developing countries in recent times has focussed the world attention primarily on the urgent need to increase agricultural production in order to provide more food for the third world population as majority of them are the victims of malnutrition. The vast majority of the under-nourished live in Asia. One third of India’s population consumes less than 75 per cent of the calories they need. The average Indian on the other
Food and nutrition is the science of nourishing the body concerning food that is eaten and the way in which the body uses it. The necessary nutrients needed by the body must be present in the food. These nutrients are proteins, fats, minerals such as iron, calcium, phosphorus, iodine and other trace elements and several vitamins such as Vitamin – A, Vitamin – B complex and Vitamin – C. When an individual does not consume the food that supplies sufficient quantities of energy and nutrients, there develops deficiency condition and leads to health hazard.

Statement of the Problem

Ever since the beginning of the Five Year Plans in the country, considerable efforts have been made to improve the pattern of agriculture in general and enhance the food production in particular to meet the needs of the growing population. In this direction "Green Revolution" has brought about a radical change in the increase of agricultural production especially foodgrains. Unfortunately, the fruits of Green Revolution and agricultural modernization have not been shared equally by all regions and all sizes of agricultural land holdings. The high growth in agricultural production has been concentrated in a few pockets while large areas continue to remain in stagnation. In this state of agricultural situation, the small and marginal farmers in the country are found to be the most vulnerable farming community in terms of agricultural development.

In the prevailing agrarian economy, the agricultural backwardness in the rural areas has created many complications. But the serious consequence and concern of agricultural backwardness in relation to ever-increasing population is poor nutritional standards of the people in rural areas. The nutritional standards are associated with the quality and quantity of dietary aspects, hygienic system, physical as well as biological development of human body and the work efficiency nature of an individual.
The increasing pressure of population on land and decreasing man-land ratio as well as precarious nature of agriculture in the rural areas have been accentuating the problems of undernourishment and malnutrition. The undernourishment is a quantitative concern while malnutrition is a qualitative concern and both are mutually inclusive and complimentary to each other. It is not uncommon that the incident of undernourishment and malnutrition is high in low-income groups, people having small and marginal size of land holdings and agricultural labourers in the rural areas.

Today one of the most pressing problems faced by our country is the maintenance of balance between population distribution and nutritional standards. In this critical context, the study of food production, carrying capacity of land and nutritional availability patterns in the rural areas of the country assumes greater significance. It provides a systematic and reliable evaluation of food surplus or food deficit situation at different hierarchical levels i.e., from household to the district/region/state and nation as a whole. Now the magnitude of the nutritional problems still exists and are more specific at micro-level due to the vast differences in the size of land holdings and corresponding gaps in the application of agro-technological inputs and agricultural production.

**Geography and Nutrition**

The study of geographical environment and nutritional standards with reference to agriculture is a new dimension in the field of agro-geographical research. Nutritional standards with reference to cropping pattern and food supply is becoming more important. Nutrition is directly and closely related to the prevailing land use, cropping pattern and production. Physical factors, especially land forms, drainage, climate, hydrology and soil play an indispensable role in shaping the agriculture as well as nutritional standard of a region. Man has always been dependent on a healthy and productive natural environment. There are a number of geographical factors that influence and sometimes even determine the health and reproductive capacity of living beings including man. The natural environment i.e., land, water, air, flora and fauna make certain places more suited for human habitations and healthy living than others.
Food available for human consumption is dependent to a great extent on the physical and economic geographic conditions of a region. Poor food supplies means health affected by malnutrition. To a considerable extent, topography determines the capacity of an area to produce things needed for the survival of living things. Areas having plains formed by rivers are able to produce many crops; the mountainous areas produce less as they do not have extensive plain lands; with good soils if the rains are good, people have more and better food to eat and if they fail drought famine occurs and people suffer from both under-nourishment and malnutrition.

Land Use and Nutrition

Obviously, land is a basic natural resource, and it is also the basis of agriculture. Besides foodgrains and agricultural raw materials, even meat, milk, fish, eggs, etc. are produced directly or indirectly from land. In the final analysis, the capacity of land to feed the ever-increasing population pressure is conditioned by the fact whether it is properly put to use. Hence, nutrition and land used are closely related factors of any region.

The land available for agricultural purposes especially for food production is finite and limited. The ever-increasing pressure of population and decreasing man-land ratio are posing challenging problems to the land use planners and agricultural geographers. Generally, the quantity and quality of caloric output depends mostly upon the land available, optimum utilization of agricultural land resources, type of cropping pattern, the level of crop productivity and the practices of agricultural modernization. There is a premium on the horizontal expansion of arable land. Alternatively, to meet the increasing pressure of population on arable lands and reduce the nutritional deficiency, the only way out is the intensification of agriculture though improvement of land use efficiency.

Conceptual Framework

In the quantitative terms, the nutritional availability is the caloric agricultural output per hectare of agricultural land. It is one of the important measures of farming efficiency in the areas of subsistence agricultural economy.
The quantum of caloric agricultural output per hectare of land depends upon the quality of land, the optimum use of land, the cropping pattern, physico-socio-economic conditions and technological inputs. The question whether it is possible to increase the caloric output per unit of agricultural land with the objective of feeding the increasing population is of paramount importance. Hence, the study of the nutritional availability and standards is necessary to understand the man-land relationship.

The quality of the nutritional availability consisting of different nutrients namely proteins, vitamins, minerals etc., is equally important as like the quantity of nutritional availability (caloric output) in different economic groups of a region. In rural areas, the different items of the diet in a day depends upon the cropping pattern, the mode of cultivation and the size of land holdings.

Earlier the traditional way of farming cereals and millets oriented towards subsistence agriculture. Millet was considered to be the chief content of the diet of the low income groups. In the recent times, due to many reasons most probably may be the awareness of drought and or heavy rainfall, the mixed farming (crop and livestock) assumed greater significance for people having small size of land holdings and low income groups. As usual, the produced animal content is to be taken common place in the dietary aspects of the lower economic strata. It is rather a perplexing and intriguing question to what extent the available animal nutritional production is taking place in the dietary aspects of the producer especially in the case of small and marginal farmers. This aspect of nutritional consumption in the rural poor masses is to be seriously examined.

Another aspect of interesting change in the content of diet of poorer strata is the shift form the inferior foodgrains to superior foodgrains. This shift may be due to many reasons like the introduction of social welfare schemes i.e., subsidized rice scheme by the Government of Andhra Pradesh to the lower economic groups from 1983 onwards. In this context, it is pertinent to state that once the millet dominated cropping pattern of rural areas are now found with a spectacular change. There has been a significant spatial shrinkage in many of the
major millet crops and some of the minor millets are being eliminated from the cropping pattern in the process of crop transformation.

**Food Production and Nutrition**

Meeting the food and nutritional requirements of India's growing population will continue to be a major challenge for the agricultural sector over the coming decades. Foodgrain production was only 82 million tonnes in the year 1960-61, which increased to 172.78 million tonnes in 1989-90 and 192.44 million tonnes in 1997-98. A record production of 202.54 million tonnes of foodgrains in 1998-99 and 209.075 million tonnes of foodgrains in 1999-2000 is hailed as a breakthrough. It is a testimony to the resilience of Indian agriculture. Once our country which could not feed its 450 million inhabitants to a required nutritional level where it now produced enough grain for the caloric coverage of 950 million inhabitants and has recorded a surplus of 33 million tonnes of foodgrain. But it is paradoxical to state that, still according to a recent study by the National Council of Applied Economic Research (NCAER), about 80 per cent of the rural population consume less than the recommended nutritional levels of 2400 calories (The Hindu, Survey of Indian Agriculture, 2000).

**Concepts of Under Nutrition and Malnutrition**

The ill-effects of nutrition are under-nutrition and malnutrition and they will be expressed in terms of quantity and quality respectively. Under-nutrition and malnutrition are not mutually exclusive. People who are under-nourished are likely to be malnourished. Under-nutrition means inadequacy in the quantity of diet, i.e., in caloric intake which, if continued over a longer period, results in either loss of normal body, weight, or reduction in physical activity or both in case of adults, and in case of children it leads to unsatisfactory physical growth and development. The World Health Organization Expert Committee on Medical Assessment of Nutritional Status (1963) has listed the clinical signs where by under-nutrition may be recognized as lethargy, mental and physical starvation, low weight in relation to height of other skeletal indices, diminished skin folds,
exaggerated skeletal prominence, loss of elasticity of skin, etc., (Noor Mohammad, 1981, p. 120).

Malnutrition means bad nutrition that includes both excess and deficiency. Malnutrition reflects the inadequacy in the nutritional quality of the diet. Due to excessive dependence on cereals and starchy foods, and low consumption of animal food, diets of poor nutritional quality are common in most of the developing countries where high percentage of calories are derived from foods rich in carbohydrates. Besides, consumption of protective foods such as fresh green vegetables and fruits is inadequate. These factors along with wrong methods of food preparation, religious taboos, and traditional prejudices are responsible for the deficiency of good quality proteins and of essential minerals and vitamins. Diets of poor nutritional quality and insufficient quantity are largely responsible for illness, general impairment of health, poor physical development and low resistance to infections and diseases. They are directly responsible for widespread occurrence of specific deficiency diseases (Mohammad, 1973). They also contribute to the high mortality among infants and young children and low expectancy of life in developing regions. (F.A.O., 1963).

As a result of under-nutrition and malnutrition, many dietary deficiency diseases have been identified for example, beriberi, cherlisis, pellagra, scruby, goiter and xerosis, which result from single deficiency of Thiamin, riboflavin, niacin, Vitamin − D, Vitamin − C, iodine and Vitamin − A respectively (Hathcock & Josef, 1977). Other diseases may be caused either by a single deficiency or combined deficiencies of specific nutrients. Anemia can result from a deficiency of iron, folic acid, Vitamin − B12, or other nutrients. Rickets is related to deficiencies in calcium, phosphorus and Vitamin − A. Such specific nutrients are needed in small amounts and deficiencies may be the result of improper food storage, processing and lack of variety, or simply inadequate amount of food. In all the regions whether it is a high-level productivity region or a low-level productivity one, there exist disadvantaged groups in the agricultural sector generally known as agricultural labourers and uneconomic land holders. Generally they always suffer from under-nutrition and malnutrition.
Significance of the Study

Cropping systems, Food production and Nutrition development call for greater attention of the scholars of varied allied disciplines. The potential for agricultural development in rural areas is considerable if the available agricultural resources are effectively and scientifically managed with a proper package of technical and credit inputs. The present study will provide an appropriate basis for integrated rural agricultural and nutritional planning and development as the study aims at analyzing the man-land ratio in terms of carrying capacity of agricultural land and the associated nutritional problems from different socio-economic perspectives under the existing nature of agricultural resource utilization for food production. It is directly related to the quantity and quality of foods being consumed, which is largely dependent on the level of agricultural productivity and nature of cropping pattern.

Nutrition is one of the indispensable factors that are closely associated with the physical and mental development of population. Nutritional standards play a vital role in the development of the quality that helps achieving a high level of public health through a balanced and nutrition diet. On the basis of this study, nutritionally balanced / surplus / deficit areas as well as socio-economic groups can be identified and classified. It also examines the disparities in the levels of nutritional standards between the districts, villages and different socio-economic groups. It provides a comprehensive information for planning and development of agriculture – nutrition in the rural areas and weaker socio-economic groups.

Food and Nutrition is but one component of human welfare, enhancement of that should be the prior and major concern of all Government’s efforts for all-round economic development. As such it has a legitimate claim on public resources expenditure and efforts. We also need to consider that malnutrition is an impediment to national growth, because, it reduces work output and life expectancy and it is one of the causes of high infant mortality and it impairs mental development and therefore reduces the effectiveness of investments in education.
Though it is complex and demanding task, the present study hopes to highlight the needs for sustainable agricultural development in the rural areas for providing balanced nutritional standards and adequate economic returns. As long as the poverty ridden rural masses are not assured of standard nutrition in the country, it is very difficult to achieve higher work efficiency, good health and biological system and overall human resource development. An assessment of the disparities in the levels of nutritional standards of the sample villages and sample agricultural holdings at different dimensions provide an in-depth information for making appropriate plans and to take up remedial measures for the most blighted areas as well as the farming communities. Hence, in view of the practical significance of the problem, the present study on “Pattern of Food Production, Carrying Capacity of Land and Nutritional Standards in Rural Andhra Pradesh” is attempted.

Review of Literature

The present theme “Agriculture – Food Nutrition” falls under the purview of interdisciplinary approach consisting of the disciplines like Agricultural Geography, Regional Planning, Food and Nutrition, Public Health, Agricultural Economics, and Home Science, etc. However, from the point of applied study, geographers and economists are very much concerned and interested in finding out the physio-socio-economic problems pertaining to the patterns and prospects of regional agriculture and man-land relationship in terms of food supply and population.

Geographers have recently taken interest in agriculture nutrition subject. Special interest by geographers in our country dates back to last four or five decades and more. Bagli (1942) has suggested measures for increasing the food production in order to meet the growing population of the country. Ghori (1956) has assessed the position of food supply in Greater Mysore. He studied the distribution of crops, agricultural practices and causes of low yield levels and made suggestions for the improvement of agriculture. The major break through and the pioneering work made by Prof. Shafi (1960) who selected twelve villages, typical of different soil areas in Eastern U.P. and on the basis of personal
enquiries into yields, prepared food balance sheets to assess the caloric intake per capita per day. Many other universities in the country have since actively pursued this kind of work. Krishnan has (1960) discussed the problem of self-sufficiency of TamilNadu in foodgrains. Chaturvedi (1962) has evaluated the production of food crops in Andhra Pradesh and made an analysis of production statistics of cereals and pulses in Andhra Pradesh and for the whole of India and made a comparative study of food position of the state in context of shortage in the country as a whole.

Ayyer and Shrivastava (1968) have made an elementary attempt to workout an indirect relationship between land use and nutritional status in the selected villages of Bewas basin. They have pointed out the difficulty in collecting dietary data and have recorded conduct of such surveys on family basis. Amani (1968) analyzed the agricultural land use and crop production in a village in Aligarh district during a period of forty years. Bhattacharya (1968) studied the increase in population and cereal production in West Bengal and concluded that it was possible to eliminate the deficiency in cereals, if a more intensive and coordinated drive was made by the state as well as by the individual farmer. He also suggested a change in the dietary habits of the people. Khan Asjad (1969) has assessed the caloric value of cereal food consumed in twelve selected villages of Rohilkhand region. Khan has (1969) studied the nutritional deficiency diseases and environmental factors in the Central Gangu-Yamuna doab. Akhtar has (1980) conducted field studies on the impact of environment on the level of nutrition in the Kumaon region. Agrawal (1986) has attempted the determinants of malnutrition among children in ten selected villages of Haryana. Tiwari (1989) has also attempted to identify the nutritional problems and made some suggestions for its improvement in Sagar-Damoh plateau.

Sukhatme (1962, 1965, 1967) has suggested the methods of estimating the level of food availability or food consumption in an area and scientifically evaluated the food and nutrition situation as well as prospects of nutritional self-sufficiency for growing millions in India. Shafi (1967, 1969) has used the caloric output to measure the food production efficiency and nutrition for the entire country and further commented that the carrying capacity of land in India was
considerable and the country could feed five times of India's present population, if it could be coaxed well. The concept of carrying capacity of land, i.e., 'the number of people that a unit area of land can feed' has been employed by a number of Indian geographers to analyze the agricultural efficiency. Vijaya Ramsingh, (1964) in his study, has calculated the carrying capacity of land of the Mirzapur and its environs in Uttar Pradesh. Jasbir Singh (1974) has used the carrying capacity of land concept to analyze the regional imbalances in the levels of caloric production in India. Ramanaiah & Reddy (1983) have analyzed the caloric availability and requirement as well as the per capita availability and requirement of agricultural land and the surplus/deficit of agricultural land to support the population of Andhra Pradesh state at a district level.

Ali Mohammad (1978) has made an in-depth analysis on the availability of food and nutrition at different hierarchical levels, namely district, village and household level in Uttar Pradesh. He insisted on the micro-level investigation on the present theme in rural India especially in the backward drought prone areas. Noor Mohammad (1980) considered the nutritional problems in Ghaghra-Rapti doab in Uttar Pradesh in order to identify the nutritional deficiency diseases. Tiwari and Kailash Choubey (1983&1988) have attempted to analyze the calories available from different crops and the problems of nutritional deficiencies in rural areas of Madhya Pradesh. Khan and Sawanth (1988) attempted to analyze the relationship between the availability and requirement of food in Western Maharashtra and also identified the food surplus and deficit areas in a spatial perspective. Mishra and Dube (1984 & 1989) have studied the regional disparities in nutritional availability patterns in Madhya Pradesh.

It is pertinent to state that many of these studies have been carried out at macro-level either at National or State level and concentrated more upon a single orientation i.e., highlighting the nutritional availability and requirement. But none of the above studies had attempted a study on nutritional status of varied socio-economic groups / agricultural holdings / sizes of family of different environmental settings through food consumption surveys and food balance sheets and methods. Hence, a nutritional study at micro-level stating the spatio-
socio-economic relationships is imperative to know the ground realities of under-
nutrition and malnutrition.

Study Area

The study area of the present research work is confined to Andhra
Pradesh state. It is one of the southern states of India and lies between the
latitudes 12° 37' N and 19° 54' N and longitudes 76° 46' E and 84° 46' E.
Geographically it occupies the middle portion of the eastern half of the Indian
peninsula. The state has a total geographical area of 275068 sq.km and a total
population of 7,57,27,541 (2001). The density of population is 275 persons per
sq.km. for the State as a whole. Andhra Pradesh accounts for 8.37 per cent of the
country’s area and 7.37 per cent of the country’s population. The State is divided
into three regions viz., Coastal Andhra, Rayalaseema and Telangana.
Administratively, the State is divided into 23 districts and they are sub-divided
into 1125 mandals and 28,123 villages. Within the State, about 72.92 per cent of
the total population is living in rural areas. The average literacy of the State is
61.11 per cent (2001) and it is lower than the all India average. About 70 per cent
of working force in the State depends upon agriculture for their livelihood. Hence
the economy of Andhra Pradesh is agricultural and the cornerstone of its
economic development lies in the development of agricultural economy.

Andhra Pradesh is endowed with diversified systems of agro-geographical
base with a significant variations in terrain, isohyetal, edaphic and hydrological
conditions. Variations in land use, irrigation, cropping pattern, crop and livestock
production systems divided the farming into different types of agriculture. These
diversified agro-geographical conditions of Andhra Pradesh provide an
appropriate setting for the present study of cropping pattern, food production and
nutritional availability patterns.

Objectives of the Study

The present study is made to bring out systematic account of the complex,
diversified and dynamic nature of agriculture of Andhra Pradesh through the
process of identification, classification, delineation and description of regional
problems on agricultural development and nutritional standards. To provide a comprehensive understanding and to gain insights into the problem as well as planning for the development of agriculture – nutrition of the region, the present study attempts:

(i) to describe the spatial distribution of food crops,
(ii) to examine the growth levels and trends in area, yield, and output of food crops between 1952-55 and 1998-2001,
(iii) to measure the carrying capacity of land and to assess the man-land ratio and nutritional availability at district level,
(iv) to classify the districts into surplus / deficit areas and assess the per capita availability and requirement of arable land,
(v) to assess the nature of food crop production in the form of caloric output of the sample villages and examine the surplus / deficit of the nutritional factors,
(vi) to assess the nutritional intake by different socio-economic groups / size of land holdings at micro level on the basis household sample survey,
(vii) to find out different socio-economic factors contributing for the balance/imbalance in the nutritional standards of the sample agricultural holdings, and
(viii) to provide a clear perspective on the agricultural development – nutritional standards of the rural areas of the study area.

Hypotheses

(i) The environmental conditions decide the cropping pattern of any area and the consumption pattern is found in accordance with the cropping pattern.
(ii) The nutritional standards of the population have a direct relation with the socio-economic standards.
(iii) The incidence of nutritional problems i.e., malnutrition and undernourishment is high among the low-income groups, landholders of small sized lands and socially depressed classes.
(iv) With the improvement in the standard of living, there is a change in the intake of foodstuffs especially from inferior millet grain to superior rice cereal.

**Limitations of the Study**

In the present study, the area under food crops, their yield levels and production patterns are analyzed at district level on the basis of secondary data collected from 1952-53 to 2000-2001. In 1952-53, there were 20 districts in the state, and due to reorganization of the districts, the number of districts are increased to 23. In the process of reorganization, the districts like Srikakulam, Visakhapatnam, Guntur, Nellore, Kurnool and Hyderabad were connected in the formation of three more new districts. The crop data of these districts was not altered in tune with their reorganization and hence, some perplexing and intriguing trends in the crop analysis of these districts are noticed. The negative trends and scanty growth rates in these districts are by and large due to areal shrinkage of the size of the above districts rather than any other expected reasons.

**Data Base**

The present study is based on both primary and secondary data. The secondary data pertaining to various aspects of agriculture are collected for the years 1952-53 to 2000-2001 at district administrative unit level (23 districts) from various offices like the Bureau of Economics and Statistics, Government of Andhra Pradesh, Hyderabad, District Planning Offices, N.I.R.D., Hyderabad etc.

The primary data for sample villages and households are generated through field survey with the help of questionnaire. Two types of questionnaires are prepared for the collection of primary data. One for agro-geographical survey at village level and the second for the nutritional food consumption survey at house-hold level.

The selection of sample villages is on the basis of multi-stage stratified random sampling (district, mandal, village, household) method. The stratification is done on the basis of different criteria namely, spatial location, rainfall,
irrigation, land use and drought conditions etc., and as well as socio-economic parameters. Agro-geographical survey at sample village level has collected the data on population, education, health, rainfall, land use, soil, cropping pattern, yield levels and agricultural development etc., with the help of Assistant Statistical Officer at the M.R.O. Office concerned. Household level is the basic and real operational unit for micro agro-geographic study to find out the true realities about the differences in agricultural development and nutritional intake. The selection samples at household level is made on the basis of systematic random sampling procedure. After carefully identifying and analyzing all agro-geographic, socio-economic and demographic parameters like terrain, rainfall, irrigation land use, cropping pattern, size of land holdings, social status, literacy, size of family, and income of the household, the total information of the sample household is collected from the head of the family. On the basis of 24-hour diet intake history method, nutritional intake information is gathered through personal interview method of field investigation. Normally the dietary standard has a direct relation with economic standards of the population.

There are four major ways of assessing nutritional status (under-nutrition / malnutrition) of the household. They are dietary survey, clinical examination, anthropometric assessment (body measurement), and biochemical tests. The present study is based on dietary survey and deals with the nutrition and nutritional problems at micro level. The actual consumption of various nutritional elements has been compared with their standard requirements and as a result, deficient or surplus nutritional supply is ascertained. In the present investigation, altogether “1012” sample households are chosen from “16” sample villages of the “13” districts in the State. A questionnaire is prepared and filled up through interview method from each respondent in order to acquire first-hand information on important agricultural aspects, type of food intake and the levels of food consumption.

Methodology

The analysis in the present study has been carried out at three levels namely – district, village and household. The spatial distribution of food crops in
terms of area, yield and production for the year 2000-2001 and their growth rates as well as trend levels for the period 1952-53 – 2000-2001 are analyzed at district level and region level for the state of Andhra Pradesh. Carrying capacity of land in terms of population, agricultural efficiency on the basis of caloric output; and availability/requirement of agricultural land per head of population are assessed and analyzed at district level for the period 1951-2001.

In the second stage of analysis, 16 sample villages are selected from 13 districts of the State. The quantitative and qualitative aspects of the nutritional availability and intake factors per head of population of sample villages are computed by using the food balance sheet method. Here, agriculture-nutrition analysis is made for the sample villages in order to find out the gaps between the nutritional availability and requirement.

Keeping in view the importance of the present research theme at micro-level investigation, the third stage of analysis is the study of sample households. Here, the household food consumption survey method is employed to assess the nutritional standards, nutritional factors and deficiencies. For this purpose of analysis, 1012 sample households are chosen from 16 sample villages in 13 districts of the State.

Analytical Framework

In the present study, both cartographic and quantitative techniques are employed for the analysis of both primary and secondary data. Most of the secondary data are represented by thematic mapping methods. Statistical techniques like percentages, averages, standard deviation, co-efficient of variation, co-efficient of correlation, co-efficient determination, test of significance, ‘F’ test, chi-square test, annual linear growth rates, and regression trend analysis are employed to analyze the trends in area, production, yield of available food crops for the State as a whole for the period 1952-53 to 2000-2001. Growth rates are estimated by fitting a linear function of the following form:
Y = abx
Y = Area / Production / Yield of food crops
a = Constant
b = growth
X = period of time

Growth rates are estimated to indicate growth in the area, production and yield of food crops. The present study uses co-efficient of variation for analyzing the instability and stability in area, production and yield of food crops. ‘F’ test is employed to confirm the growth rates and examine the significance of hypotheses. The dependent variable in the study is ‘area, production, and yield’ of food crops, whereas independent variable is ‘year’.

The Plan and Design of the Study

The present study has been carried out with an objective to identify, classify, and describe the spatio-temporal concentration of food crops, production, yield levels and nutritional standards in varied agro-geographical settings and different socio-economic groups of farming community of the rural areas of Andhra Pradesh. To accomplish this objective, the present thesis is planned and designed as given hereunder:

Chapter – I A Perspective on the Research Theme
Chapter – II Geographical Environment of the Study Region
Chapter – III Changing Spatial Concentration of Food Cropping Systems
Chapter – IV Changing Pattern of Yield levels and Production of Food Crops.
Chapter – V Carrying Capacity of Land and Man-Land Ratio.
Chapter – VI Environment, Demographic Structure, Agriculture, Food Situation and Nutritional Availability of Sample Villages.
Chapter – VII Food Consumption and Nutritional Standards of Agricultural Holdings in Sample Villages.
Chapter – VIII Summary and Conclusion