2.1 CONCEPTS AND DEFINITIONS

The concept of food security has been evolved over the last quarter century. Food security concept has been considered at a number of levels: global, regional, national, state, household and individual. While the ultimate concern may be at the household and individual levels it is important to realize that food security at the levels outside the household because it has a strong bearing on the performance at the household level. Initially, food security means arrangements for providing physical supply of a minimum level of food grains at the national level, during all periods including those having harvest failures. It was subsequently recognized that physical availability alone would not ensure economic access to food for all the population, especially the poor and vulnerable sections. Thus it was emphasized that satisfactory production level and stability of supplies should be matched for a reduction in poverty and an increase in the effective demand to ensure economic and physical access for the poor (FAO 1987).

Food and Agricultural Organization (1981) termed the food security as a physical and economic access to food by all people at all times involved in concurrent step of production and consumption. It enlarged its concept of food security by including three components: 1) The ultimate objective to ensure all people at all times to have both economic and physical access to basic food they need; 2) It should have specific aims namely ensuring production of adequate food
supplies and access to available supplies; and 3) Action should be needed on a wide front including all factors that have a bearing on capacity of both countries and people to produce or purchase food. The World Bank (1986) has slightly modified the concept and indicated that food security meant access by all people at all times to enough food for an active, healthy life. Its essential elements were the availability of food and the ability to acquire it.

Three Non-Governmental Organization (NGO) networks handling food aid have enlarged the World Bank definition that availability of food is a necessary, but not sufficient condition for ending hunger. People require assured access to food. The route to that access may consist of income or work opportunities or the ability to acquire food through production, exchange or social entitlement programme.

It also said that food security at the national or regional level does not necessarily indicate food security at the local or personal level. Often there is a great disparity in food security among regions, communities, households and individuals.

A food secure world requires a peaceful and stable environment. Civil and external conflict as well as natural disasters seriously disrupt food production, orderly marketing and stewardship of food reserves.

Food security means that individuals and households have access to sufficient food both in quantity and quality to meet their nutritional and calorie requirements. However food supply is not the only condition for ensuring an active and healthy life, and unless there is access to proper health care, water supply and other basic services, the food will not be efficiently used.

World Food Council (1988) considered food security as a twofold problem, viz. first that food is said to be available, accessible, affordable when and where
needed in sufficient quantity and quality and second that an assurance that this state of affairs could reasonably be expected to continue or in other words that it could be sustained.

International Bank for Agricultural Development (1992) defined the household food security as the stable and sustainable basket of adequate food.

According to Maxwell and Frankenberger (1992) food security had been conceptualized as a secure access at all times to sufficient food and the four basic concepts in definition were 1) sufficiency, 2) temporal consideration, 3) access and 4) security.

Schulthes (1994) opined that food security meant not only assuring availability and access to sufficient quantities of food for all including the poor, but also to expand even further with the population explosion.

Haddad et al. (1994) expressed food security as availability of sufficient food at all times for all people in order to ensure an active and healthy life. Sufficient food referred to both quantity and quality needed for good health.

Food Agricultural Organisation (1996) slightly modified its view on the concept of food security as access by all people to “safe and nutritious food to maintain a healthy and active life”.

Swaminathan (1996) conceptualized the food security in general perspective as livelihood security for the households and all members that ensured both physical and economic access to balanced diet, safe drinking water, environmental sanitation privacy, educational and basic health care.
Rottach and Welt (1996) observed that household food security is not only a matter of access to food but it had to do with the awareness and preference of individuals as well as with the attitude towards food as a special group of society.

According to Costa (1997) the concept of food security essentially meant a state of affairs where all people at all times have access to safe and nutritious food to maintain a healthy and active life.

Government of India (1997) highlighted the importance of food security at different levels. A household food security implied a situation where everyone has access at all times, to the food needed for an active and healthy life. Essential elements of food security are: (a) adequate availability of food, (b) efficient distribution, and (c) the availability of adequate purchasing power in the hands of the people.

In the views of the Haen and Lindland (1997) food security involved three dimensions: (i) food must be available, (ii) the supply should be stable over seasons and years, and (iii) all households should have access to food either through over production or sufficient purchasing power in the hands of the people.

Panth (1997) defined food security as availability of sufficient quantity of food, and sufficient means to purchase it, both at the national as well as at household level.

Shaha (1997) conceived the concept of food security in different angle and defined it as the probability of any agents’ real income exceeding a critical level, whereas the welfare status is measured as the agents’ expected utility of the real income.
Singer (1997) divided food survey concept with macro and micro aspects. The micro aspects related to the way in which household would cope up with food insecurity and the way in which food would be distributed within and between households. Macro aspects related to general economic factors, which may generate poverty and food insecurity.

Bharod and Bhole (1997) when viewed food security for individual recognized that it is not only permanent physical access but also economic access to the food. Further, they opined that mere availability of adequate food may not provide food security to an individual, but it should also indicate the availability of income to purchase the food.

Ngongi (1998) opined that food security would relate about people and not about commodities of supply. It would refer to the access to food and the availability of people to feed their families.

According to World Food Programme (1998) food security would be deemed to exist where all people at all times have the food needed for an active and healthy life. It considered not only food supply issue but also the issue of distribution and access as well as vulnerability to risks that would threaten household food security.

International Food Policy Research Trust (1998) viewed household food security as a concept that would integrate environmental, economic and cultural factors in a manner that would provide a useful tool for predicting directory patterns within the household and it would reflect three different dimensions viz. past food supply, current food stores and future supply of food to meet the needs of all household members adequately.
In the views of Patel and Mishra (1998) food security would mean ensuring all people to have physical and economic access to the basic food they need to work and function normally. Physical access to food can be increased by proper infrastructure, proper marketing and storage facilities. Economic access would imply the ability of nations to generate the foreign exchange and the ability of households to generate income necessary to buy enough food.

Frankenberger and McCaston (1999) defined household food security in terms of livelihood security as adequate and sustainable access to income and resource to meet basic needs which would include adequate access to food, potable water, health facilities, educational opportunities, housing, site for community participation and social integration.

George (1999) while reviewing various concepts about food security finally concluded that physical access must be accompanied by economic access that determines peoples’ ability to acquire food to have food security with the inclusion of quality aspects of the diet as determined by the consumption habits.

Swaminathan (2000) considered biological absorption of food in the body to recognize food security along with availability and access. In his views, availability is a function of production while access is conditioned by purchasing power and biological absorption is determined by the availability of safe drinking water, primary health care and environmental hygiene. Thus according to him non-food factors are as important for food security as food factors.

Gulati’s (2000) view on food security closely resembled the concept of food security given by FAO (1996) and it consisted of five things: (i) Food security is a matter of physical access to food as it is of economic access or entitlement to food;
(ii) food supply is related to all people irrespective of their income level, age, education, gender; (iii) food should be made available to them at all times; (iv) food has to be available in sufficient quantities preferably in time with the consumption preference of the people; and (v) food has to be safe and nutritious so as to lead an active and healthy life.

Gulati (2006) expressed food security at national to household level as it is more a matter of economic access than that of physical availability in developing and developed countries.

According to Serageldin (2001) food security is a multi-dimensional perspective as physical, economic, environmental and social issues. It involved: (i) not just production but also access; (ii) not just output but also process; (iii) not just technology but also policy; (iv) not just global balance, but also natural conditions; (v) not just natural figures but also household realities; (vi) not just rural but also urban consumption; and (vii) not just quantity of food but also quality.

OXFAM (2001) defined food security as all people especially the most vulnerable and least residential have dignified and unthreatening access to the quantity and quality of culturally appropriate food that will fully support the physical, mental, emotional and spiritual health.

Van Cour Food Policy Organization (2001) defined food security as everyone to have access to safe, healthy, locally produced, affordable and environment friendly food.

Stazz (2002) viewed food security as the ability to assure on a long term basis, that the food system provides the total population access to a timely reliable and nutritionally adequate supply of food.
James Roumasset has taken into consideration other aspects of food security: theory, policy and perspectives from Asia and the Pacific Rim. He says food security is commonly regarded as the ability to meet target consumption levels in the face of fluctuating production, prices, and incomes. A fourth risk is often added to this list of problems: namely, the possibility that food supplies will be unavailable at any price.

A draft document of the Sub-committee on Nutrition (United Nations, 1987) defines household food security as follows:

“A household is food secure when it has access to the food needed for a healthy life for all its members (adequate in terms of quality, safety and culturally acceptable) and when it is not at undue risk of losing such access.”

A wider definition of food security incorporates the quality of life indicators. Accordingly, food security implies livelihood security at the level of each household and all members within, and involves ensuring both physical and economic access to balanced diet, safe drinking water, environmental sanitation, primary education and basic health care.

- Food security involves economic growth, especially access to resources;
- Food security touches on education, especially the education of women;
- Food security involves population programme, improved nutrition means, lowered birth rates and increased child survival;
- Food security involves the natural environment; and
- Food security is an issue of democracy.
Chung et al. (1997) have summarized the diverse determinants of food security status in a general conceptual framework as indicated in the following chart. It focuses on the links between resources commanded by the households, levels of farm and non-farm production, household income, household and individual consumption, and individual nutrition.

He described a conceptual framework of food security and generic indicator categories in the following chart.

For the present study, food security is defined as the availability and access to food at all times needed for the households to lead a healthy life.

**Food Grains**

They are defined as cereals and pulses. Cereals consist of paddy, cholam (jowar), cumbu (bajra), maize, ragi, varagu, samai and other cereals, while pulses consist of bengalgram, redgram, greengram, blackgram, horsegram and other pulses.

**Issue Prices**

Government of India fixes Central Issue Prices (CIP) for each commodity, which are valid for a period till they are revised.
Chapter - II

Concepts, Definitions & Review of Literature

**Quantity**

Under the universal Public Distribution System the quantity allotted to the States is much lower than the average requirement of the families.

**Chronic Food Insecurity**

It reflects on the countries with inadequate diet caused by the inability to acquire food. It affects households that persistently lack the ability to either buy food or produce their own.

**Transitory Food Insecurity**

It is defined as a temporary decline in the household’s access to enough food. It results from instability in food prices, food production and household income and in its worst forms, it produces famine.

**Food Availability**

It is the sum of domestic production, imports (both commercial and food aid) and changes in national stock.

**Buffer Stock**

Procurement of wheat and rice and holding of stocks are handled by Food Corporation of India (FCI) under two heads, namely operation stocks and buffer stocks. Buffer stocks are based on the norms fixed by Central Government from time to time.

**Food Access**

It is a measure of people’s entitlement to food, which is the amount they can either produce (net of feed, seed and losses), purchase or otherwise receive (eg. through public distribution system).
Food Utilization

It relates to the capacity of an individual to absorb and utilise the nutrients in the food, and is determined by practices, beliefs, eating habits, hygiene, sanitation and health.

Global Hunger Index (GHI)

It is a tool for regularly tracking the state of global hunger and malnutrition developed by International Food policy Research Institute (IFPRI).

Nutritional Security

It involves physical, economic and social access to balanced diet, clean drinking water, sanitation and primary health care for every child, woman and man. All our citizens should have an opportunity for a healthy and productive life.

Physical Access

Availability of food commodities and the services required to ensure food and nutrition security.

Economic Access

Resources to obtain and command over material and services to ensure food and nutrition security.

Targeting

Identification of target group of food and nutritionally insecure, especially amongst vulnerable sections of society as well as ‘targeting’ resources. Till about 1992, each and every citizen, who had a ration card, had access to supplies under Public Distribution System. Now it is universal in some States like Tamil Nadu and targeted in some other States.
Antyodaya Anna Yojana Scheme (AYY)

The Government of India introduced a new scheme with effect from 25th December 2000. The objective of the scheme is to ensure food security to the poorest of the poor. Under this scheme the beneficiary is given 25 kg food grains per month at the rate of ₹ 3.00 per kg. But in Tamil Nadu AYY beneficiaries are supplied with 35 kg of rice per card per month at the rate of ₹ 1.00 per kg.

Annapoorna Yojana

The aim of the scheme is to provide food security to meet the requirements of those senior citizens who have not been covered under the National Old Age Pension Scheme. Under the scheme, 10 kg of food grains per month are to be provided ‘free of cost’ to the beneficiary.

National Old Age Pension Scheme

The scheme was launched in 1995. It seeks to provide pension at the rate of ₹ 75- per month to destitutes and aged 65 years and above.

National Food Security Mission

Government of India has launched this centrally sponsored scheme, ‘National Food Security Mission’ in August 2007. The major objective of the scheme is to increase production and productivity of wheat, rice and pulses on a sustainable basis so as to ensure food security of the country.

Food Corporation of India

It is an organization established by Government of India and it is responsible for procurement, distribution and storage of food grains.
2.2 REVIEW OF LITERATURE

The nutritive value of the food consumed brought into focus by Vyas (2000)\(^1\) who opined that food supply acquires a meaning when it connotes nutritional security. He stressed that recognizing the roles played by the State, market and civil society and also making them complementary to one another would ensure food-security.

Dilly and Boudreau (2001)\(^2\), in food security contexts, defined vulnerability in relation to an outcome such as hunger or famine. A household security is measured by determining whether or not by fully exercising the means at its disposal, it has access to enough food during all seasons throughout most years. The relationship between these options and different stock factors is what determines a household vulnerability.

In an attempt to measure the food insecurity, Phillips and Taylor (1980)\(^3\) defined that a state of food insecurity exists when members of a household have an inadequate diet for part or all year round or face the possibility of an inadequate diet in the future. The deviation from the current status of food is based on the assessment of food insecurity risks (pre-harvest security, marketing problems and unemployment), food insecurity insurance (land reforms, improved production


technologies, food aid and feeding progm and household type (subsistence or marketable surplus).

Maxwell (1996)\(^4\) developed a methodology for distinguishing and measuring short - term food insecurity at the household level. He developed a technique to measure the coping strategies of the household vulnerability elements like eating foods that are less preferred, limiting the consumption quantity, maternal buffering, skipping meals *etc.*, when such households are faced with insufficient food.

Government of India set up a working group (1985) to evolve many indicators, to identify poor which include: household size, age, structure and sex rate, type of dwelling house and lighting, educational qualifications, number of earning numbers and employment and occupation (principal and secondary) of the household members, monthly household expenditure, possession of assets like land, livestock and durables, drinking water availability and awareness about sanitations.

Apart from the above indicators like value of the assets possessed by the households, imputed cash value of the outputs and income, mortality rates and life expectancy, enrollment of the children in the school and adult literacy in the family, safe drinking water, distance to health centre, schools, roads etc, government expenditure on social sector were used to measure the poverty in rural Ethiopia (Beyan and Joireman, 1997).\(^5\)


Dresrusse (1996)\(^6\) believed that food security could be measured through traditional demand and supply equations. He considered population growth, per capita food consumption and income elasticity in demand equation and on supply side, access to land, yield and marketing cost were specified. With the results he concluded that agricultural research should be given top priority to achieve food security.

Swaminathan (1996)\(^7\) suggested some strategies to achieve food security maintaining the existing growth in agricultural production to ensure sustainable availability of food, sustaining productivity and reserve base over the period but keeping the economic cost at minimum, ensuring adequacy of household income through promotion of mere social security measures and providing entitlement to food to vulnerable groups in the society through productive social security measures.

George (1999)\(^8\) while analysing food security situation in India found that economic access to food could be achieved through a mix of employment and income policies for farm sector. He reiterated that the strategy for reducing poverty and enhanced food security should be based on agricultural development. Based on the consumption pattern, he indicated that about half of the rural consumers and about two third of urban consumers had nutritionally inadequate food consumption


levels. In an effort to narrate status of World Food Economy, Douglas Southgate and Douglas H. Graham (2007) said that the number of people who on an average do not consume enough dietary energy for normal activity and good health has fallen steadily since the late 1960s. The two parts of the globe of greatest concern are South Asia and Sub Saharan Africa. After growing as rapidly as the rest of the population during the 1970s, the food security in India and neighbouring countries has stabilized. However, progress toward food security continues in absolute and relative terms. In contrast, there is little positive news from south of the Sahara, where the number of food insecure people nearly doubled during the last decade of the twentieth century. Consequently, Sub-Saharan Africa will soon have not just the highest incidence of undernourishment, as it has had since the 1970s, but more food-insecure people than any part of the world, including south Asia, as well.

At the all India level, between 1972-73 and 1993-94, according to National Sample Survey Organization (NSSO) data, per capita consumption of cereals declined from 15.3 to 13.4 kg per month during the last two decades. During these two decades ending 1993-94, there occurred a steady decline in the food share from 73 per cent to 55 per cent at the all-India level. This seems to confirm Engel’s law, which says that economic development is accompanied by declining food shares. He feels that a decline in per capita consumption of food per period may, however be attributable to changed inner composition of food. Beunett’s law argues that consumers gradually switch to a more expensive diet, substituting quality for quantity. This is confirmed in the Indian context as revealed by the NSSO data. The

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public distribution system (PDS) as a social safety net can be understood by the fact that aggregate availability of food grains per se is not enough to ensure the ability to acquire food grains. Production does not automatically guarantee consumption. The mere presence of food in the economy, or in the market, does not entitle a person to consume it. Even the ability to buy may not guarantee food security, unless there is an efficient distribution system says Baskar Majumdar (2004).10

Acharya (1983)11 explains food security means not only availability of food for direct consumption but has other implication as well. Availability of food grains will have little relevance if people do not possess purchasing power to buy them for their consumption. This compulsion costs a responsibility on the government to devise ways and means by which, in the first instance, food is available within the country and, in the second, people have the means to buy it. As Indian agriculture depends on the vagaries of monsoon, famines and scarcities have been a feature of our past Indian civilization. But such shortages and scarcities have been managed effectively through a policy mix of ensuring food supply from buffer stocks and through imports.

Swaminathan (2000)12 has equated food security with livelihood security at the levels of each household and all members within and involves ensuring both physical and economic access to balanced diet, safe drinking water, environment

sanitation, primary education and basic health care. To give operational content to such a concept of food security, we should initiate a Hunger Free Area Programme consisting of ensuring sustainable availability of food, sustaining the productivity of the natural resource base, ensuring adequacy of household income through promotional social security, providing entitlement to food through protective social security measures and introduction of a National Food Security Act.

With somewhat satisfactory levels of national food security influenced by the production performance of Indian agriculture during the past decades, attention has been shifted from national food security concerns to individual and household food security while household food security is influenced by both physical access and economic access, food security of individual members of the household is influenced by intra - household allocation of food. Food security of the people will be ensured not only by the increased food production at the national level but also from the increased economic access through increased income levels or from reduced prices. Economic access to food for the poor could be achieved through a mix of employment and income policies for the farm and non-farm sectors and through a minimum safety net (George, 2002).13

The declining per capita demand for food grains in rural and urban India has been elaborately discussed by Hanumantha Rao (2004).14 According to National Sample Survey (NSS) data, that the per capita household demand for food grains has been declining. Since per capita income has been rising, this would have led to

some rise in per capita demand for food grains. The prices of food grains relative to the index of non-food grain prices have declined over a greater part of the last two decades, which would have also resulted in some rise in the demand for food grains. But the actual per capita demand for food grains has been declining. There must be powerful forces operating in our economic system which are dampening the demand for food grains. He cited some factors constraining consumption of food grains among the poor could be the need for increased expenditure on fuel and lights and on miscellaneous goods and services including on conveyance and medical services which have together received a sharp jump for rural population between 1970-71 and 1993-94.

The worst form of deprivation is, according to Debesh Bhowmick (2007)\textsuperscript{15} is hunger. But every person has the fundamental right to live in for satisfying his hunger taking safe and nutritious food. For achieving world food security and abolish hunger, he suggested some immediate steps. They are (a) to supply calorie to those people who are consuming below the specified level of calorie intake, (b) to increase the weight of the children who are underweight and below 5 years, (c) to supply food to disabled hungry people, (d) arrange the essential services, such as medical facility, minimum education, sanitation, safe drinking water free from infections, diseases etc., which are the other causes of hunger irrespective of food deprivation. According to him, the most important causes of food insecurity are mainly low food grain production, weak and insufficient public distribution system,

natural disaster, drought, flood, earth quakes, epidemics, etc., Besides these, insecurity of food and malnutrition were enhanced by the unemployment rate.

While analyzing food security and nutrition: Vision 2020, Radhakrishna and Venkata Reddy (2004)\textsuperscript{16} said that while India achieved success in combating transient food insecurity caused by droughts or floods, it miserably failed to make much dent in chronic food insecurity as reflected in the low energy intake and high incidence of malnutrition. The overall improvement in nutritional status has also been very low. There is a chronic undernourishment in about half of the population, particularly among the vulnerable groups of children, women and elderly from the lower half of the expenditure class. Curiously the proportion of consumption expenditure spent on food is slowly going down even in the households with chronic under-nourishment.

Tarrant (1987)\textsuperscript{17} analyzed the world food crises and informed that one should not forget that the food crises of the 1960s and 1970s were not expression of the real world food problem and therefore their solutions will not be appropriate to it either. These crises were sudden events brought on by combination of circumstances, a combination that, like the crisis itself was short - lived. The real problem that remains is the long term inability of the world to feed its continuously growing population at a price that this population can afford to pay. There is considerable potential to raise food production in the world, but it will be expensive food. Much of the world population is too poor to purchase food at current prices.


The problem is not so much the technical fix of increased food production, although this will get progressively more difficult, but the social and economic development in the third world which will enable the population to purchase food at all. Raised food prices encourage more production, but by doing so place more people in the category of being too poor to afford sufficient food. The world as a whole faces the same dilemma as many developing countries with the potential to increase food production.

According to Chisholm (1984)\textsuperscript{18}, the choice of the target consumption levels is perhaps the most important aspect of a developing country’s food policy, and it can be viewed under two time frames. First, there is the problems of chronic and persistent malnutrition that is caused by the low productive capacity and secular problems of poverty. This constitutes a long term problem that can be overcome only by a steady continuing rise in productive capacity and the real income levels of the poor. The second problem is that of short-term variability of entitlements of consumers to food. Food insecurity in this sense is ultimately a problem that stems from real income fluctuations that affect the ability of people to command adequate food through legal means. The basic causes of real income fluctuations and individuals’ consequent entitlement to food are production and price fluctuations in both the food and non food sectors. For the urban population, fluctuations in staple food prices are usually the major cause of a food security problem. These price fluctuations arise from year to year fluctuations in the domestic or world harvest or

from more irregular natural disasters such as floods, chronic droughts, earth quakes, wars as well as from changes in government food polices.

According to Alberto Valdis (1999)\textsuperscript{19} food security is the ability of food deficit countries, or regions of households within these countries, to meet target consumption levels on a year-to-year basis. Although the most severe impact of short-term food supply instability is felt by the poor, chronic malnutrition, that is caused by persistent poverty constitutes a long-term problem whose dimension and solutions be beyond the question of food security, variability of food supply is caused by the impact of fluctuating weather on the size of harvests. There may be acute shortages of food as a consequence of natural disasters, such as earthquakes and floods, or of political conflicts.

He presents empirical evidence, based on national aggregates, regarding the magnitude of food insecurity in selected countries. It shows that production instability varies considerably among countries and that imports and stocks have generally not been used very effectively to stabilize food consumption. He has explained the food security rules.

The food Security Rule 1: For a particular year \( t \), food security consumption \( (C^1_t) \) is maintained at trend level \( (C^\ast_t) \) when there is a shortage in actual consumption \( (C_t) \), and when food consumption is set equal to other actual consumption. Symbolically,

\[
\text{When } C_t < C^1_t \text{ then } C^1_t = C^\ast_t \quad \text{and} \\
\text{When } C_t > C^\ast_t \text{ then } C^1_t = C_t
\]

Rule II: Food security consumption ($C^{11}_t$) is maintained at trend levels when there is a shortage in actual consumption, but is adjusted downward if actual consumption levels rise above trend levels through planned commercial imports. Symbolically,

When $C_t < C^\wedge_t$, the $C^{11}_t = C_t$;

When $C_t > C^\wedge_t$ and $M_t > C_t - C^\wedge_t$ then $C^{11}_t = C^\wedge_t$; and

When $C_t > C^\wedge_t$ and $M_t < C_t - C^\wedge_t$ then $C^{11}_t = C_t - M_t$.

In some years, countries have imported more than they needed to stabilize consumption, as defined by Rule II. These excess imports are not included in our calculation of import requirements for consumption stabilization. Moreover, even if trend consumption levels are accepted as a true reflection of desired levels, the actual level could be above the trend level because of an unexpected good harvest or food aid obtained under exceptionally favorable conditions.

Radha Sinha (1977)\textsuperscript{20} said that not much has changed fundamentally since the World Food Conference in 1974 in Rome. At the national level several countries have improved their stocks, though in many stocks are still appreciably below the official targets. Many feel that hunger and malnutrition, the extent of which is still a debatable issue, are largely a product of maldistribution of world resources between the rich and the poor countries and between countries and of misdirection of national as well as international priorities. It is therefore widely felt that while the need for ensuring expanded production to feel the growing population, together with a reasonably accelerated pace of population control particularly in areas of

high density cannot be minimized. It is the social reform within the countries and
the restructuring of the world economic system towards a greater degree of
international cooperation and fairness must receive high priority.

Because of the inadequacies of relevant information on production and
consumption of food and its various determinants such as family size, levels and
distribution of income, etc., and their interrelationships as well as methodological
problems of estimating nutritional requirements, the exact magnitude of hunger and
malnutrition is difficult to estimate. Nevertheless, in the absence of detailed
information on food distribution within families, the FAO estimate of 500 million
inadequately fed people has to be treated as a rough approximation.

It is undeniable that, since World War II the problem of hunger and
malnutrition has been aggravated by unprecedented rates of population growth,
resulting from decline in mortality rates in most developing countries. Changes in
fertility have been dramatic is Asia (where the bulk of the World population lives)
and the Pacific, and substantial in Central and South America. There is a growing
awareness that ‘modernization’ of agriculture and the resulting increase in output in
itself will not cure the problems of poverty, inequality of income and malnutrition
unless it goes hand in hand with a radical distribution strategy. Recent experience
with the “Green Revolution’ technology has clearly demonstrated that in spite of its
scale neutrality, it is mainly the richer farmers and well-endowed areas with water
have attained benefits.

Poleman (1977) presents arguments to dispel three myths which have tended
to observe the real issues: (i) the myth of imminent global starvation (ii) the myth
of the so-called ‘Tragedy of the Commons’ (iii) the myth of the food-population
race. He sees the essence of the problem in terms of the income/employment dilemma. Prescribing increased economic participation more and better paying jobs, i.e., development leading to widely shared benefits, he sets out possible guidelines to be followed by agencies concerned with food and agriculture.\(^{21}\)

Taimni (2001)\(^{22}\) says that undernourishment is a condition resulting from inadequate intake of food and/or more essential nutrients resulting in deterioration of physical growth and health. Under nourishment was perceived in the form of protein energy malnutrition (PEM), iron deficiency (nutrition anemia), iodine deficiency disorder (IDD), vitamin A deficiency, prevalence of low birth weight (LBW) in children and at-risk mothers. These were viewed in the context of seasonal variation, natural calamities, market distortion and urbanization.

As a follow up of this policy document, a National Plan of Action on Nutrition (NPAN) was brought out. In the NPAN, the National Nutrition Goals to be reached by the year 2000 are: reduction in moderate and severe malnutrition amongst pre-school going children by half, reduction in chronic under nutrition and stunted growth in children, reduction in incident of low birth weight to less than 10 per cent, elimination of blindness due to vitamin-A deficiency, reduction in iron deficiency, anemia amongst pregnant women to 25 per cent, universal iodisation of salt, reduction of iodine deficiency disorder to 10 per cent, giving due emphasis to paediatric nutrition production of 250 million tons of food grains, improving


household food security through poverty alleviation programme and promotion of appropriate diets and healthy life styles.

He further added that there are two other dimensions to food and nutrition security. Firstly, all the poor are not food and nutritionally insecure (with certain qualification having bearing based on geography, work culture, socio-economic ethos etc.) and secondly, poverty above does not account for this phenomenon. There may be a need for specific nutrition intervention in conjunction with poverty alleviation, health, hygiene and sanitation, and other social sector programmes like literacy, gender issues, class related problems (SC/ST) etc.

Although in recent years we have started to measure through sample surveys on “having two square meals a day”, the measured incidence of hunger in India has declined quite sharply in recent years from 19 per cent of the population in 1987-88 to 6 per cent in 1993-94. This 6 per cent is concentrated in three States - Bihar, Orissa and strangely enough, West Bengal. Anthropometric measures, such as weight at birth and height to weight ratios of children in particular, suggest that under-nutrition is much more pervasive than the “hunger index” indices as noted by Pant (2006).23

He further adds that greater and more balanced availability of food is clearly a sine qua non, but it is by itself not sufficient. Availability of food is not the same as access to food. There must not only be more and better food, every person in the country must have wherewithal to get the nutrition he or she needs and deserves. Calculations indicate that agricultural output will need to grow at about 4.5 per cent

per year on a sustained basis in order to not only absorb the available work force, but also to provide sufficient income to it for meeting its basic needs. The solution appears to lie in the geographical diversification of agricultural growth

Gopalan (1997)\textsuperscript{24} discusses food and nutrition security in a different way. He says while the challenges involved in ensuring food and nutrition security relate to both the production and distribution of food, inequitable distribution rather than inadequate production is the major factor underlying India’s current problem of malnutrition. The inequality cannot be corrected through exercises in tokenism and public programmes but only through creation of assets and support to income generation skills among the poor.

He cautioned that though the situation with respect to food grain production seems satisfactory, we should not be complacent. The five major aspects with respect to food production from the point of national food and nutrition security are: (i) correction of prevailing distortion in the pattern of food production; (ii) laying the groundwork for successful exploitation of the new emerging tools of biotechnology and genetic engineering for optimizing our food production capabilities; and (iii) protection and conservation of our land resources for food production, protection and conservation of our water and marine food resources and improvement in storage, processing and preservation of food and in their quality control.

Optimal nutrition will demand the intake of a wide range of foods, which taken together and in judicious combination (in a well balanced diet) can provide

the essential nutrition that we need. Ensuring good nutrition is not just equivalent to avoidance of hunger. While the later can be achieved through the intake of a single staple cereal, the former will demand besides cereals, an adequate supply of other foods such as pulses, vegetables and fruits and milk. Nutrition security is much more than food security.

Pandey and Sharma (1995)\textsuperscript{25} studied the relationship between crop diversification and food grain self-sufficiency. Comparison of growth ratio between two periods, 1967-81 and 1981-85 showed that there was a marginal increase in the area under food grains during the first period with respect to total cropped area, but this pattern changed during the second period which witnessed a marginal increase in the area under food grains, along with a substantial growth in the area under non food grains. To study the changes in diversification over the twice stipple liner trend equation was estimated. The results indicated that the nature and extent of crop diversification have not witnessed any conflict with self-sufficiency in food grains. The study concluded that increased pace of export led diversification might lead to same trade off other domestic food grains supply.

Meenakshi\textsuperscript{26} (2000) considered the trends in consumption of food and cereals both superior (rice and wheat) and inferior (jowar etc.). She questioned the decline in the share of food in the total expenditure among both the richer and poorer classes which are due to the result of changing pattern of taste preference. She suggested that tastes were changing in favour of expensive food items such as milk

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and meat, consistent with dietary changes associated with the economic growth the world over. The decline in coarse cereal consumption may also be a part of this changing pattern. But the fact that the decreasing production of inferior cereals (in per capita terms) is of same importance in this context. Her analysis of the relationship across regions between production and consumption of cereals shows that the relationship has weakened over time and the changes are not independent of income effects.

Suryanarayana (2000)\(^{27}\) examines the trends on changing food consumption pattern in different classes of people. He notes that despite a modest growth in per capita incomes, cereal consumption per head has declined; and within the cereal group, consumption has gradually shifted in favour of superior cereals. Suryanarayana suggests that this type of changes is dictated more by the availability of different types of grains than by choice. However, he finds that the rising unit cost of cereals does explain the decline in overall cereal consumption in States where coarse cereals are produced and consumed in large measure. This has serious implications for the future because along with decreasing levels of per capita production of inferior cereals, an increasing casualisation of labour and hence an increasing dependence on the market are also observed in these states. Suryanarayana finds that across the States, the level of food grain production is not a significant variable in explaining disparities in rural cereal consumption except in drought years. For him, this indicates that private trade by itself can take care of

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inter-regional flows in normal and good crop years but public intervention would be needed in drought years characterized by general conditions of scarcity.

He briefly considers the suggestion that commodity based targeting can be effective in eliminating errors or omissions and commissions. The idea is simple; if the public distribution system supplies commodities almost exclusively consumed by the poor, the non-poor will not be able to appropriate the grains meant for the poor even if they manage to get ration cards by some means.

Bhakar and Banafar (2006) examined the influence of socio-economic factors on dietary intake pattern as well as nutritional status in order to target the groups for prioritising and focusing efforts for improvement of nutritional status of the rural population. The study was conducted in Dharsiwa block of Raipur district in Chhattisgarh State. The study pertained to the year 2002-2003. The study revealed that the food basket was dominated by cereals with a negligible portion of protein and energy being supplied by food of animal origin. Cereals provided more than 75 per cent of proteins, carbohydrates, calories, phosphorus, thiamine and niacin, though they all were deficient from the recommended dietary allowance. The per capita consumption of fruits in the State was found to be much lower than the all India for both the farm and no-farm households. Diet diversification increased with increase in the farm size, monthly per capita expenditure and literacy level. The policies aimed at improving the nutritional status of rural population include intensifying rural development programmes and promoting agro-based industries to increase the purchasing power of rural population. Development of

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dairy enterprises needs to be given priority for raising the income levels, diversify food basket and raising the nutritional status of the rural population.

Ravi and Ramachandra Reddy (2006)\textsuperscript{29} attempted to understand the socio-economic characteristics and status of poverty and food security among the tribal households with a special reference to Jenukurba tribe to Heggada Devanakot (H. D. Kote) in South India. The study is based on primary data collected from 180 Jenukuruba tribal households, living in and around that protected forests covered by the ‘Rajiv Gandhi National Park’ in Karnataka, South India. The study revealed that these tribals live in abject poverty, virtually devoid of any productive resources and exposure to education. The tribal households, on an average, earned cash income of ₹ 7,873 per annum, which was far below the poverty line. They lived on hand to mouth existence. The average income spent on food by the tribal households was ₹ 3,537 per family per annum. In terms of calorie intake, food consumption, in general, was limited to a meagre 1,072 kcal per capita per day, which was far below the minimum consumption needs. In order to make up the calorie deficit the tribals depend heavily on edible forest products to sustain themselves. The Sen’s index estimated has a value of 0.47, which in other words, reveals the poverty gap implying that income of the tribals should be increased by 47 per cent to entirely alleviate the tribals from poverty line. Thus the government programmes for tribal resettlement should be enhanced taking a cue from their existing deficiencies, for greater success of the programmes.

Pradeep Hadke and Surendra Jichkar (2006)\textsuperscript{30} have defined the concept of food security from various studies and examined the various approaches advocated in improving food security in developing countries. A direct relationship exists between food consumption levels and poverty. Families with the financial resources to escape extreme poverty rarely suffer from chronic hunger; while poor families not only suffer from chronic hunger, but are also the segment of the population most at risk during food shortages and famines. There are many economic approaches advocated to improve food security in developing countries, \textit{viz.}, westernized view (profit maximization), food justice (food for all) and food sovereignty. To sum up food security seems to have improved in India, both at the national and the household levels. India can legitimately take pride in the fact that in spite of a history of famines and 16 to 18 million people being added to its already huge population, it has developed the capacity to ensure that no household is again required to face famines, widespread hunger and starvation. The food, at least of cereals, availability is thus, quite comfortable, even though poor households may have achieved this security at a certain social cost, like many children going to work rather than to schools, A nutritionally balanced diet is still a far cry for millions of poor families, their present income levels are too low to register their demands on the agricultural sector and to induce that sector, which still has tremendous untapped potential. Some policy measures/options are suggested to improve the total food and nutrition security.

Banumathy and Sundaravaradarajan (2006)\textsuperscript{31} studied the consumption pattern of vegetables in rural and urban areas by income groups and to identify the factors influencing the demand for vegetable. The results of the study showed that there were differences in the consumption level of vegetables in the rural and urban areas. The average monthly household expenditure per household indicated that the urban families incurred double the amount of expenditure on vegetables than their rural counterparts. The expenditure elasticity was also higher in urban households for all vegetable. This would denote the difference in the consumption level of vegetables. Vegetable consumption varies across income groups in rural and urban areas. The results indicated that the income elasticity is positive and it is lower than the price elasticity. Therefore, lower prices through enhanced vegetable supplies brought about by the adoption of cost reducing or production enhancing technologies played a stronger role in increasing vegetable consumption than induced consumption via enhanced income. Also vegetable consumption in the study area is far below the recommended level. Efforts to enhance vegetable supplies coupled with the creation of awareness on the role of vegetables in supplying micronutrients that are vital to good health need to be pursued vigorously. More research is needed to develop new varieties that add value for the poor and malnourished population.

Bardhan and Tewari (2006)\textsuperscript{32} studied the broad objective of assessing the trends in food consumption patterns of different food commodities in the world over


the last three decades with special emphasis on identifying the changing importance of specific food commodities as sources of major dietary nutrients and to ascertain status of India vis-à-vis other countries of the world, in the context of nutritional security. The data were taken from FAOSTAT Database (2006). Time series data pertaining to the last three decades, viz., 1970-2003 were used for this analysis. Compound growth rates were estimated using the exponential regression model to examine the changes in consumption pattern of different food commodities. Herfindahl index of diversity was used to test the concentration of food commodities towards specific regions/countries of the world. Convergence in consumption (i.e., tendency of the diets in different countries to become similar over time) was tested by fitting a linear regression model, wherein growth rates in consumption of different commodities in each of twelve regions/countries considered in the study were regressed upon the initial level of consumption at the start of the period of analysis. A statistically significant negative coefficient on the initial consumption would imply existence of convergence of diets across countries. The results revealed noticeable dietary differences between the developed and developing countries. High value livestock food products constituted the major source of nutrients in the developed world accounting for 57 per cent and 26 per cent of total proteins and calories consumed per person in 2003, whereas in the developing countries, low value commodities like cereals contributed most to total nutrients consumed: Cereals accounted for 47 per cents and 52 per cent of proteins and calories consumed per person in 2003. The consumption of most of the food commodities is by and large widely diversified across the world, with the exception of pig meat, vegetable, eggs and rice, the consumption of which is relatively more
concentrated towards a particular region/country, mainly China. However consumption of livestock food products was largely skewed in favour of the developed countries as these countries with a share of 212 per cent of the world’s population accounted for 43 per cent, 33 per cent and 31 per cent of world’s consumption of meat, milk and eggs, respectively, higher than any other food commodities. However, in the last three decades a distinct transformation in consumption patterns has become evident. For meat, milk and eggs, whose initial consumption level in the developed countries in 1970 was high, the existence of consumption convergence was found, because of significantly faster consumption growth rates in the developing countries than in the developed world. Thus, it could be inferred that the relative importance of livestock food products is increasing in the diets of the people across the developing countries. The driving forces behind these changes in dietary preference, such as income and population growth and urbanization are robust and unlikely to subside in the near future. Rapid transformation in food consumption taking place in the developing world including India, with livestock food products becoming increasingly important in the diets of the people, not only are expected to ensure nutritional security, but also provide income growth opportunities for many rural poor.

Navadkar and Yadav (2006)\textsuperscript{33} says that India has definitely made rapid strides in food grain production, which has made the country self-sufficient in food requirement. However, the increasing population and the opening of agriculture to import competition due to WTO regime necessitate new policy initiatives. This is

especially so because the growth rate of agricultural production has decelerated in the 1990s. The paper examines the status of food and nutritional security in India. It is noted that though India has definitely made a lot of progress in agriculture, we cannot possibly say that India has attained food security because there are almost 350 million people who do not fall in the category of being adequately fed or nourished. The net per capita income has been almost stagnant and therefore rural poverty has not been contained. There is a vicious circle of population increase, rural poverty and agriculture unsustainability. The Government can break this vicious circle by formulating and executing appropriate policies thereby increasing food and nutritional security. The future food security programme should have a broad objective of increased agricultural production and enhanced access to food through a participatory approach by the local people.

Pathania and Vashis (2006)\textsuperscript{34} analyzed the availability and requirement of food grains and to suggest ways and means for improving the food security in the State of Himachal Pradesh. The study is based on secondary data collected from the State Government publications and different published sources. The findings of the study have clearly brought out that population in Himachal Pradesh increased by 76 per cent over the years. The reduction in poverty has resulted in spurt in the demand for food grains as well as quality food. The large and medium holdings dwindled while the small and marginal holdings increased over the years resulting in higher human labour pressure on agriculture. This trend calls for not only reduction of the increased population dependent on agriculture to lift it from subsistence level but

also to withdraw population from agriculture by opening up alternative employment opportunities. The education status of both males and females has increased over the period under study. The literacy rate in case of females was noticed to be lesser than that of males. Both birth and death rates have reduced over time in the State. The per capita income at current prices showed an increase from ₹ 816 in 1971-72 to ₹ 22,576 in 2002–2003. There has been a slight change in the area and productivity of food grain crops over the years. For instance, the productivity of maize, wheat and paddy crops has increased while pulses registered a declining trend. The total area under irrigated crops accounted for only 18 per cent. Again, the consumption of fertilizers was very low as compared to the recommended dose. Imbalanced use of three primary nutrients (NPK) not only adversely affects the growth of agricultural production, but also damages the physical and chemical structure of the soil. There exists more than 50 per cent gap between the actual and potential productivity of the crops except maize where it was 28 per cent. Therefore, transfer of technology for improved crop productivity needs to be taken up on a priority basis. The rate of growth of availability for food grains was 74 per cent as against 80 per cent of their requirement during the same period. The study suggests the need to promote women education, equality and empower them through education so that the nutritional level of the family could be increased. It was observed that farmers could produce more food if they were enabled to do so through adoption of appropriate technologies. The State is also faced with the challenge to reduce the poverty and accelerate sustainable development to ensure food security at local, individual and household level. Food security policy must,
therefore, be evolved in totality as a basic element of a social security policy together with nutritional security.

Khatkar and Singh\textsuperscript{35} examined the status of consumption pattern in relation to food security in arid regions of Haryana and Rajasthan. Based on the data collected from a simple of 200 respondents drawn from two selected districts from each state, it was observed that consumption of cereals in both the categories of irrigated and un irrigated farms is less than the recommended level, \textit{viz.}, 520 gm/per capita/day but it is more than the national availability of 428 gm/per capita/day. The actual consumption of cereals in the study area is 430 and 450 gm/per capita/day in irrigated farms of Hanumangarh and Jaisalmer districts respectively, while is 468 gm/per capita/day and 577 gm /per capita/day in unirrigated farms. The consumption of cereals in unirrigated farms is more than the irrigated farms, which is an indicator of prosperity because income and consumption of cereals have negative relationship. In the case of pulses per capita consumption in all the farms \textit{viz.}, irrigated and unirrigated is less than the recommended quantity. The recommended quantity of consumption of pulses is 50 gm/capita/day while in this study it ranged from 12 gm/capita/day in Jaisalmer (Unirrigated) to 0.26 gm in Hanumangarh (Unirrigated). It does not show any relationship with irrigation. The consumption of coarse cereals and pulses was found to be higher on unirrigated farms owing to more production of these commodities on such farms and that of fine cereals, vegetables and fruits were found higher on irrigated farms due to higher income on the latter category of farms. The pulses consumption was lower

than the ICMR recommended level, while the consumption of sugar and gur was found on a higher side. Energy and iron intake was found to be lower in Bhiwani district while the calcium and phosphorus intake was found on a higher side. The protein intake was also found higher in Sirsa district and it was found almost at recommended level in Bhiwani district. Thus, the lower consumption of coarse cereals and pulses also indicates nutritive imbalance in the diet in the study areas as coarse cereals and pulses are growth mainly in the arid regions. Keeping lower productivity of major crops in the study areas, there is a need to improve the productivity through suitable technology development and gearing up the extension activities for meeting the food security. The income level also needs to be improved through providing off-farm employment opportunities to such a large vulnerable section of the population residing in the challenged areas.

Atibudhi (2006)\textsuperscript{36} attempts to seek (i) to examine the changes in dietary pattern and food consumption in rural and urban areas of the state of Orissa and (ii) to compare the Engel’s ratio and monthly per capita expenditure of Orissa with all India level. The study utilises the household level data of National Sample Survey Organisation for the purpose. The analysis indicated that per capita expenditure on non-food items are significantly increasing compared to expenditure on food items in rural and urban areas of the state over the years. The expenditure on non-food items was more than the food items in urban areas and the situation was just the reverse in rural areas. There has been a decline in the percentage expenditure on cereals and rapid increase in the consumption of edible oils, milk, meat, eggs and fish. The

\textsuperscript{36} H. N. Atibudhi, “A Comparative Analysis of Food Consumption at All India Level”, \textit{Indian Journal of Agricultural Economics}, 2006, Vol.61(3).
structural shift in the dietary pattern towards livestock, fisheries etc. is already underway and is likely to intensify further. The structural shift necessitates greater emphasis on diversification towards pulses, oilseeds, milk and vegetables to meet the growing demand for these commodities. The monthly per capita consumer expenditure indicates that there is a wide gap in per capita expenditure of the state between Orissa and all India level, in rural as well as urban areas. The higher Engel’s ratio further confirms the low standard of living of the State in comparison with the national averages in all the regions. This necessitates for special planning with special packages to increase the per capita income. The net state domestic product of the State has to be increased through high dose of investment of farm and non-farm sectors along with the social sectors with increase in employment opportunities in both rural and urban areas of Orissa.

Archana Sinha (2006)\textsuperscript{37} said that with an estimated population of more than 1.2 billion, India is the most populous country in the region of South-East Asia. In the recent past, the country has made considerable progress on social and economic fronts, as indicated by improvements in indicators such as life expectancy, infant mortality rate and maternal mortality rate, under-five mortality and literacy rate. However, improvement in nutritional status of the poorer section of the society has lagged behind. The population of India doubled between 1960 and 1992, but the impressive food grain production nearly kept pace with population growth, and therefore, the per capita availability did not decline. While it is estimated that per capita cereal availability within India is adequate, national level surveys still show

that 40 per cent of the population in India consume less than 80 per cent of the energy required. Low purchasing power, limited access to food, and individual household food insecurity are the major constraints. The development policies of the government have turned the country from a position of net importer of food grains to the state of marginally surplus one. Food security and malnutrition continued to be the main problems among the consumers of low expenditure quartile group more so in the state with backward or slowly growing agriculture, like in Bihar, Orissa, Andhra Pradesh and Tamil Nadu. The task of providing minimum level of nutrition to the people is primarily that of adequate production and access to it, which in turn depends upon an appropriate distribution of incomes and productive resources. The study provides several suggestions to improve the food security situation of the rural poor.

Pandey and Suhag (2006) attempted to examine the spatio-temporal and inter-sectoral changes in food consumption pattern and per capita daily intake of energy and nutrients from different items in Haryana. For this study Haryana state has been divided into north-eastern and south-western regions. The North-eastern region comprised the districts of Ambala, Panchkula, Yamunanagar, Karnal, Panipat, Kaithal, Kurushetra, Sonepat and Rohtak while the south-western region includes Hisar, Fatehabad, Sirsa, Jind, Bhiwani, Mohindergarh, Rewari, Jhajjar, Gurgaon and Faridabad Districts. The study is based on the data collected form 32nd (1977-78) and 55th Rounds (199-2000) of National Sample Survey (NSS) on consumption expenditure, etc., in Haryana. Two-stage stratified random sampling

method was used for selection of the ultimate units of the sample as adopted by the NSSO. The first stage units are the census villages in rural areas and census enumeration blocks in the urban areas. Household forms the second stage unit in both rural and urban sectors. All the districts of Haryana state are stratified as rural and urban populations as per the size of the population. The food consumption pattern of the households has been studied by assessing the items consumed and characteristics of food items dominating the daily diet, reasons for dominance of specific food items, dependence if food diet on plant or animal food and dependence of diet on local production of otherwise. The quantity of food items consumed by the people has been converted into nutrient values by multiplying these quantities consumed by their respective nutritional coefficients. Tabular analysis has been done to derive the inferences. The study clearly reveals that although the per capita consumption of cereals declined spatio-temporal-inter-sectorally in Haryana, yet it is still a major source of calorie intake. Furthermore, the households have also diversified their food consumption pattern thereby implying that the source of calorie intake has changed due to their choice across the stratum of consumer households. Besides, the farmers of Haryana state also supply rice and wheat towards the national food basket and consumer households of the state are by and large economically better-off as compared to other states of the country. However, it cannot be asserted that there are no lapses in the public distribution system of the state. On the whole, a decline in cereal/food consumption and calorie intake need not necessarily mean a decline in the food security.

Saraswat and Pratap Singh (2006) said that food security essentially means that all people at all times have access to safe and nutritious food to maintain a
healthy and active life. This definition implies three dimensions to food security, namely, availability, access and stability at various levels of aggregation, \textit{i.e.}, global, nation, household and individual level. India is today a food self-sufficient country. For the study purpose, Himachal Pradesh is divided into three zones, \textit{i.e.}, low, mid and high. A sample of 60 households was taken, \textit{i.e.}, 20 from each zone. The information about the consumption pattern was collected by cost accounting method for the agricultural year 2004-2005. In this study efforts have been made to work out the calorie intake per person in different age groups on different size of holdings in different zone of Himachal Pradesh. In case of per capita availability of cereals, Himachal Pradesh occupies a better position which is not the case for pulses. In the case of net availability of cereals at farm level maize is surplus at all sizes of farms in all zones, while wheat and rice in most of the cases are in deficit. The study reveals that large farmers had more calorie intake than that of small farmers in all zones. In low hill zone. The calorie intake of male population on small farms is 2346 calories. While in mid hill zone male population of large farms take 2781 calories and the male population of small farms take 2750 calories. Likewise in high hill zone the male population of large farms takes 3408 calories as compared to small farms, \textit{i.e.}, 3220 calories. As far as female population is concerned, the calorie intake by large farms in low hill zone was worked out to be 1996 calories as compared to 1871 calories in small farms. In mid-hill zone female population of large farms take 2429 calories as compared to 2202 calories by small farms. The female population of large farms in high hill zone takes 3112 calories.

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and small farms 2867 calories. It was also observed that cereals are the main ingredients to total energy intake. The proportion of cereals intake decreases as farm size increases and the intake of calories increases as elevation increases. In Himachal Pradesh, the quantity of calorie intake is much closer to the recommended quantity. Thus it can be inferred that the food security scenario is much better in the case of Himachal Pradesh.

Randhawa and Chahal (2006)\(^{40}\) examine the consumption pattern of milk and milk products and to investigate the factors affecting their consumption in rural Punjab. In order to achieve the stipulated objectives a multistage random sampling technique was used. The first stage the number of milch animals per hectare per district was computed and all the districts were categorized into two groups, one above the state average and one below the state average number of milch animals per hectare. Consequently, Amritsar district representing the developed region and Kapurthala district representing the less developed region were selected randomly. Twenty households were selected from each village and thus a total sample size was 240 comprising 120 households form each region. The requisite data was collected through personal interview method. The information on family profile, education, income, pattern of expenditure, factors affecting demand for milk, etc., was collected for the year 2004-2005. Both tabular as well as functional analyses were carried out to analyze the data. The results revealed that the relative share of expenditure in developed region was higher that the total expenditure in less developed region. It was observed that the relative share of expenditure on milk and

milk products to total expenditure was 10.71 per cent of the total expenditure. Also, the relative share of Expenditure on other food items was higher than the expenditure on total milk and milk products. The expenditure elasticity were 0.89 and 0.67 for liquid milk and ‘milk and milk products’ respectively. Per capital total expenditure on milk and milk products had a positive relation with per capita expenditure for all income categories in less developed region. Also, per capita total expenditure elasticity was significant statistically for all the income categories. Per capita total expenditure elastic ties were significant statistically for all the income categories. Per capita total expenditure on milk and milk products had positive and statistically significant relation with per capita expenditure for all income categories in the less developed region. The positive sign of education coefficient indicates that with increase in education level, the per capita total expenditure on milk and milk products increased. The positive sign of food habit coefficient indicates that the vegetarian households consumed more milk and milk products as compared to non-vegetarian households in the less developed region.

Chengappa and Karumbaiah (2006)\(^{41}\) analyzed the economics of different farming systems and its impact on income and nutrition with an emphasis on finding out the gap in nutritional adequacy. For this study, a total of 100 farmers were selected at random from the Bangalore rural district representing eastern dry zone of Karnataka. The results indicated that irrespective of the size of holding, farmers adopted diversified farming systems involving high value commodities, which in turn helped them to realize higher net returns. Access to groundwater

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irrigation and institutional source of credit facilitated the farming system diversified to high value commodities. Food grains constituted nearly 40 per cent of the total expenditure incurred on food which decreased as the farming system diversified to high value commodities. The per capita consumption of milk was much below the recommended level even though milk production was an important component of the diversified farming system. The farmers preferred to sell milk to realize cash income so as to meet their routine expenditure. The farmers following diversified farming systems have shown higher diversity in their consumption pattern and vice versa. The status of nutrient intake assessed through a dietary survey following 7 days recall method indicated that the nutrient deficiency was higher with households following the farming system involving only crops. The adequacy level of nutrient intake increased in the farming systems that were more diversified with high value commodities. Except for calcium, the deficiency for all other nutrients was clearly visible for children, women and men. Highest nutritional deficiency was witnessed among the landless labour households.

Rao and Pant (2006) studied the consumption pattern and expenditure, calorie intake and variation to recommended balanced diet in various income groups in Udaipur city of Rajasthan. Households were divided into three income classes, i.e., lower (monthly income less than ₹ 5000), middle (monthly income ₹ 5000-15000) and higher class (monthly income ₹ 15000 and above). From each income class 15 respondents were randomly selected to make a total of 45 respondents. The data were collected for the year 2004-05. The average monthly income of higher,

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middle and lower income class groups was found to be ₹ 20,740, ₹ 10,600 and ₹ 3,850, respectively. The income used to purchase food was 15.74 per cent by higher income class. 23.73 per cent by middle income and 28.13 per cent by lower income class. The major share of food expenditure of higher and middle income class was on milk while in the lower class it was on cereals. In absolute terms the expenditure on cereals of lower income class was nearly half the expenditure of middle class and one-third of the higher income class. However, lower class compensate the quantity of cereals by purchasing poor quality as well as purchasing wheat and rice at lower price with below poverty line (BPL) card. Meat and eggs were afforded by middle and higher income class only. The consumption of food items was the highest in winter and lowest in summer season. The average per day calorie intake worked out to 2346, 2316 and 1906 calories by an individual of higher, middle and lower income class, respectively. Among the food items the highest calorie intake was found from cereal consumption in all the three income classes. On the whole, in all income groups, the intake of various food items was less than the quantity recommended for balanced diet of 18-20 years age group, except in case of milk where the quantity consumed was more than that recommended.

Thilagavathi and Chandrasekaran (2006) analysed the influence of agriculture in ensuring food security in rural households and to examine the household consumption behaviour and the coping strategies for ensuring better household food security at the micro level in resource degraded areas. Paramakudi and Vilathikulam taluks of Ramanathapuram and Tuticorin districts of Southern Tamil Nadu have been purposively selected for the study and the data were
collected from 160 affected and 80 non-affected sample households from the selected two districts during the year 2003-04. Simultaneous equation model was used to assess the determinants of household income, consumption and activity diversification.43

The results revealed that, the sample farmers allocate, on an average 65 to 70 per cent of their cropped area to cereal and pulse crops from which they get the maximum proportion of intake of calories and protein. As far as income is concerned, 24.60 per cent and 36.82 per cent of the total income was earned through crop production in affected and non-affected households. But in sample farm families, more than 57 per cent of the total family income was generated through non-farm activities.

Non-farm sources provided more employment opportunities to the sample households which are in the affected category whereas in the non sample farms this was only 36.86 per cent while on-farm employment constituted 54.10 per cent in non-affected farm families. Per capita monthly total expenditure on food for the adult units in farm categories revealed that the amount allocation was high in non-affected farm categories compared to the affected farm category but the difference was meagre. Per capita monthly total consumption expenditure for the adult units in farm categories indicated that the amount allocation was higher in affected farm category when compared to non-affected farm category. The significant and relatively larger influence of activity diversification, household income and family consumption units on family consumption expenditure implied that the consumption

expenditure was largely influenced by the magnitude of income and income generating activities rather than the demand side variables such as number of dependents or family consumption units. The number of earners, differences in the wage rate between different activities in trade and service sector, acted as pull factors of the family members to diversify their activities in the sample households.

Krishna Rao and Chowdary\textsuperscript{44} analysed the novel approach evolved and practiced by Deccan Development Society in Andhra Pradesh (DDS) for ensuring food security to the people. This approach has to be people-centered and people designed based on time tested people’s science. The food security is sought to be provided to the local people through improvements in dry land agriculture and putting fallow lands to efficient utilization. Jowar, millets and pulses are part of the new approach. The DDS initiated the alternative public distribution system (PDS) through community grain bank. The basis objective of this jowar-based PDS programme was to ensure local production, local storage and local distribution. This programmes was operationalised for 1600 landless labourers and marginal farmers in 32 villages. Financial assistance was advanced to them to reclaim their 1000 ha fallow lands though timely cultivation, application of farm yard manure and carrying out the other timely cultivation, application of farm yard manure and carrying out the other timely farming practices. The agreement was that the money advanced will be returned in the form of grains which are stored in their own village and sold at a cheap price to the poorest families in the villages. The success of the alternative PDS can be gauged by the fact that it expanded to 100 villages covering

5000 acres of fallows. These lands produced nearly two million kgs of extra food grains in these villages and generated 2,50,000 person-days of employment every season. The millet ration cards covered nearly 8,800 households and fed 50,000 poor households at a very cheap price. The novel approach, when operationalised has provided excellent alternative PDS model for food security. This needs replication to make the people to enjoy not only food security but also food sovereignty.

Selvaraj and Ramasamy (2006) addressed the causes of food insecurity in the rainfed areas using secondary data and farm level data collected from 230 farm households spread over various water limiting rice production environments. Decrease in rice production due to drought was 16.44 lakh tones in Tamil Nadu, while it was 1.61, 2.28 and 0.77 lakh tones, respectively in Ramnad, Thiruvallur and Coimbatore districts. Loss in production due to drought was estimated to the tune of 30 per cent of the state total rice production and in value terms it amount to ₹ 852.11 crores, which accounts for 5.54 per cent of the gross state domestic product. Loss in employment was 17 per cent. To meet the loss in employment ₹ 300 crores is needed as additional investment to generate the employment. The negative correlation between prices and yields reduces crop revenue fluctuations and provides a natural edge to the farmers but such a relationship was not observed in most of the rice production environments. Variability in income in rain fed areas was explained more by variability in yield than the price both during normal and drought periods. The results of recursive model indicated that although rural

poverty is found to be inversely associated with agricultural income per capita of rural population, the strength of the relationship between poverty and agricultural growth are found to have declined in the drought period. Rice is the major source of income accounting for 60 per cent of the total income in these fragile environments even during the drought period and per capita income is lower than the state average (₹ 19,141 at current prices). Per capita consumption of rice/cereals and pulses in these water limiting rice production environments is lower than the state average (Rice: 110, cereals: 130 and Pulses: 12.4 kg per year). These estimates show that the farmers in these fragile areas are prone to various risks and they have to adopt several income and consumption smoothening strategies to overcome the risk of crop failures. Therefore, agriculture still needs to play a key role in supplying adequate food at affordable prices to ensure food security in the rain fed environments. In this context, development and commercialization of drought-tolerant rice varieties and productive investments are some of the key areas that need attention.

Varghese and Azad Mordia (2006)\(^6\) made an attempt to assess the inter-state disparities of indicators directly related to food security in relation to the overall composite indices of rural development in these states. Keeping in view the aspects of physical availability and economic access of food security, those states with relatively higher per capita food grain production, less inter year variability in production, higher growth in food grain production, low growth in population and having lower share of below poverty line (BPL) population could be considered as

less vulnerable to food security. The compound growth rates of food grains during the new economic regime (1991-2004) in different states revealed that the growth rate of food grain production has been higher than population growth in states like Bihar, Haryana, Meghalaya, Nagaland Rajasthan and West Bengal. However, the inter-state variation in per capita food grain production ranging from 0.02 tons in Kerala to 0.98 tons in Punjab reveals the existing regional disparities in the local access to food security. In 18 out of 28 states, the per capita production is less than the national average of 0.20 tones/person in a normal year. While the inter-state variability within a year in the per capita production remained very high during the recent past, the inter-year variability within the states in per capita production has been high for states like Gujarat, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan Sikkim and Tamil Nadu. The high inter-year consistency as evidenced by the low coefficient of variation in per capita production of food grains in states like Assam, Goa, Haryana, Himachal Pradesh, Meghalaya, Punjab, Tripura, Uttar Pradesh and West Bengal revealed that the production of food grains in these states has been growing keeping pace with the population growth. The share of BPL population is more than the national average in states like Arunachal Pradesh, Assam, Bihar, Madhya Pradesh, Meghalaya, Nagaland, Orissa, Sikkim, Tripura, Uttar Pradesh, West Bengal and Manipur. The states such as Punjab, Goa, Tamil Nadu, Andhra Pradesh, Kerala, Karnataka, Maharashtra and Haryana stood as the top eight states in terms of overall development. The states at the bottom of development level included Jharkhand, Bihar, Uttar Pradesh, Rajasthan, Nagaland, Jammu and Kashmir, Meghalaya and Orissa. In terms of food security indices the top states are Punjab, Haryana, West
Bengal, Himachal Pradesh, Andhra Pradesh, Goa, Uttar Pradesh, Tripura and bottom states are Sikkim, Orissa, Maharashtra, Bihar, Jharkhand, Tamil Nadu, Kerala, Madhya Pradesh and Jammu and Kashmir. The rank correlation between overall development indices and food security indices turned out to be non-significant for Indian states.

Parshuram Samal (2006)\textsuperscript{47} analyzed changes in consumption pattern of the consumers of Orissa taking into consideration six quinquennial round data between 1972-73 and 1999-2000. Data were analyzed by rural and urban areas and also by income groups. To investigate into the response of the poor to food price changes, the demand elasticity for various income groups were computed and analyzed. In rural areas, the proportion spent on food decreased from 75 to 66 per cent and in urban area from 65 to 56 per cent during 1972-73 to 1999-2000. The expenditure share on rice was reduced by 16 per cent in rural and 8 per cent in urban areas. The food groups with marginal increase in expenditure share were pulses, milk, vegetables, meat-fish-eggs and “other” food groups in both areas. Rice is the dominant cereal among all the energy producing foods, which accounted for more than 85 and 80 per cent in rural and urban areas respectively. But, the consumption of rice has decreased significantly over the years in the two non-poor groups in rural areas and highest income group in urban areas. However, the very poor group has increased their rice consumption in both rural and urban areas, thus improving their calorie intake. It was observed from the demand elasticity matrix of rice that in most of the cases, the own and cross prices elasticity declined as income increased, which

indicates that low income households were more responsive to food price changes than high income households. The curvature in the slushy substitution elasticity matrix for rice was found to be statistically significant, which implies that poor substitute more flexibly than the rich. Desegregation by commodity and income class is essential because the poor respond very differently to changes in prices of commodities than the rich. The policy implication of this finding is that as rice is the staple food of the poor people in Orissa and number of varieties (coarse, fine and superfine) within the commodity are available, the coarse variety of rice being consumed widely by the poor people and being the cheapest among all the rice varieties, should be subsidized to increase their calorie intake. This will also help in subsidy planning for rice in the state of Orissa.

Shrivastava and Padma Saxena (2006)\(^48\) examined per capita availability of various food crops in India, to examine the consumption pattern in India after Independence, to know the status of food security in India and the causes for low availability of food in our country. The study is based on secondary data. The production of food grain increased over the increase in population increasing the per capita availability of food. The consumption and availability of food increased since Independence. About pulses, a negative trend emerged. The production of pulses decreased by 3.6 per cent and the per capita per day availability of pulses decreased by 36.64 per cent during this period. The production of edible oil increased by 214.3 per cent. Similarly, the per capita per year availability of edible oil and vanaspati increased by 139 per cent and 101.43 per cent respectively. The production and

availability of milk and sugar also increased. Thus the availability and consumption of cereals, edible oils, vanaspati, sugar, milk, tea and coffee increased but in the case of pulses is disappointing because of negative results. The production of food grains needs to be increased and balanced distribution of food products is also needed. There are various measures to improve agricultural productivity upto second green revolution. Rural infrastructure development, job creation and income security are the important tools for combating food insecurity and malnutrition in India.

Waghmare and Tilekar (2006)\(^{49}\) studied the primary data collected from 90 cultivators from the selected centers of the comprehensive scheme spread over three regions in Maharashtra. The data pertained to the agricultural year 2005-06. These data were analysed according to the size groups of farmers and regions. The analysis showed that there was dependence on plant products in diets. The diets in Maharashtra were mainly based on cereals. There were deficiencies in food consumption and nutrient intake when compared with the recommended dietary requirement. It is important to emphasis that although a certain proportion of population was consuming less than the dietary requirements the greatest relative gaps were observed in the case of meat, egg and fish. Similarly, the major nutrition problem was calorie deficiency. Cereals constituted the major source of nutrients. They supplies 70 per cent of the energy, 57 per cent of proteins and 20 per cent of fats. The intake of foodstuffs varied among the size groups of farms and regions. Diet diversification increased with increase in the land holding and income. The

main policy measures for improving the nutritional status of cultivators include improved agricultural technologies and dairy enterprise and plans and programmes for increasing purchasing power of poor farmers. Dairy enterprises should be given more priority in diversifying agriculture and diets, raising both income and nutritional status of the cultivators.

Nasurudeen and Anil Kuruvila (2006)\textsuperscript{50} said that the share of non-cereal items in the monthly per capita expenditure has been consistently increasing in both the rural and urban areas. The fall in percentage share of cereal items in the monthly per capita expenditure was more in rural areas as it declined from 55.70 per cent in 1972-73 to 37.31 per cent in 1999-2000, while in urban areas it declined from 36.12 per cent to 25.7 per cent. The divergence in the percentage share spent on cereals between rural and urban areas narrowed down from 19.58 per cent to 11.61 per cent in the above period. The share of non-food consumption expenditure increased from 27.1 per cent in 1972-73 to 40.6 per cent in 1999-2000 in rural areas while it increased from 35.5 per cent to 51.9 per cent in urban areas. An increase in expenditure share of food items like milk, edible oil, meat, fish, egg, vegetables and fruits and nuts is visible in both rural and urban areas and was discernible in the rural areas.

They said that the per capita consumption of cereals has been declining both in rural and in urban areas. The rural-urban differential in cereal consumption has come down from 3.76 kg in 1972-73 to 2.30 kg in 1999-2000, even though rural per capita consumption was still higher by as much as 22 per cent in 1999-2000. This

\textsuperscript{50} Nasurudeen. P. and Anil Kuruvila, “The Dynamics and inequality of Nutrient Consumption in India”, Indian Journal of Agricultural Economics, Vol.61(3), Sept-2006
difference in consumption could be the result of our food grain production and consumption in rural areas, rural-urban price divergence due to market margin, varied preference due to higher incomes in the urban areas, and variety of foods available in the urban markets. There is a shift in the consumption pattern among different grains both in the rural as well as urban areas.